Final Program
Forty Second Annual Meeting
International Neuropsychological Society

February 12-15, 2014
Seattle, Washington, USA

WEDNESDAY, FEBRUARY 12, 2014

9:00 AM–12:00 PM	**CE Workshop 1: Clinical Trials in Neuropsychological Rehabilitation: Challenges and Solutions** **Presenters: Tessa Hart , John Whyte** **Grand Ballroom A**
1. HART, T	Clinical Trials in Neuropsychological Rehabilitation: Challenges and Solutions
9:00 AM–12:00 PM	**CE Workshop 2: Defining Neuropsychological Deficits Associated with ADHD and Response to Stimulant Medication: A Decade of Progress Based on Studies of Neuroanatomy, Neurochemistry, and Neurodevelopment** **Presenter: James M Swanson** **Grand Ballroom D**
1. SWANSON, J	Defining Neuropsychological Deficits Associated with ADHD and Response to Stimulant Medication: A Decade of Progress Based on Studies of Neuroanatomy, Neurochemistry, and Neurodevelopment
9:00 AM–12:00 PM	**CE Workshop 3: Aging and Everyday Functioning: Measurement, Correlates and Intervention** **Presenters: Maureen Schmitter-Edgecombe, Sarah Tomaszewski Farias** **Willow**
1. SCHMITTER-EDGECOMBE, M	Aging and Everyday Functioning: Measurement, Correlates and Intervention
12:00–3:00 PM	**Student Lecture: Function and Anatomy of the Temporal Lobe Memory System** **Grand Ballroom B&C**
1:00–4:00 PM	**CE Workshop 4: Clinical fMRI: New applications for Neuropsychological Research and Practice** **Presenters: Susan Bookheimer, Agatha Lenartowicz** **Grand Ballroom A**
1. BOOKHEIMER, S	Clinical fMRI: New applications for Neuropsychological Research and Practice
1:00–4:00 PM	**CE Workshop 5: Ethical, Clinical, and Research Considerations for Cultural Neuropsychology** **Presenter: Jennifer Manly** **Willow**
1. MANLY, J	Ethical, Clinical, and Research Considerations for Cultural Neuropsychology

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms.
https://doi.org/10.1017/S1355617714000381

1:00–4:00 PM **CE Workshop 6: Behavioral Interventions to Prevent or Delay Dementia**
Presenters: Glenn Smith, Julie Fields, Melanie Chandler Greenaway, Dona Locke
Grand Ballroom D

1. SMITH, G — Behavioral Interventions to Prevent or Delay Dementia

3:00–4:15 PM **Poster Session 1: Cancer, Medical/Neurological Disorders in Children, TBI in Children, Adult TBI I**
Metropolitan Ballroom

Cancer

1. MOORE, C — Neurobehavioral Impact of Endocrine Therapy Following Chemotherapy for Breast Cancer
2. BERNSTEIN, LJ — Improved Knowledge, Self-Efficacy, and Behavioral Change in Women with Cancer-Related Cognitive Dysfunction Following a Brief Psychoeducational Intervention
3. LO, TT — Comorbidity and Education Influence Recovery of Executive Functioning in Breast Cancer Survivors
4. MENNING, S — Planning and Memory function in breast cancer patients – an fMRI study
5. VON AH, D — Perceived cognitive function in breast cancer survivors: Evaluating relationships with objective cognitive performance and other symptoms using the Functional Assessment of Cancer Therapy Cognitive Scale (FACT-Cog)
6. KIMBERG, C — Psychological Symptom Clusters Identified through a Computerized Diagnostic Interview for Survivors of Childhood Acute Lymphoblastic Leukemia (ALL)
7. KAVANAUGH, B — The Association Between Emotional-Behavioral Functioning and Attention and Executive Functions in CNS-Directed Pediatric Cancer Treatment
8. FONG, MW — Does Depression Play a Role in Cognitive Impairment of Stem Cell Transplant Candidates?
9. WILLARD, VW — Psychological Functioning in Pediatric Patients with Low Grade Gliomas Treated with Conformal Radiation Therapy
10. HOLLAND, A — Predictors of Utilization of School Services by Pediatric Survivors of Medulloblastoma and Pilocytic Astrocytoma
11. ROBINSON, KE — Predictors of Adaptive Functioning and Psychosocial Adjustment in Children with Pediatric Brain Tumor: A Report from the Brain Radiation Investigative Study Consortium
12. GROSCH, MC — Premorbid Functioning in Children Diagnosed with Brain Tumors
13. SMITH, K — Word Reading Skill From Childhood to Adulthood in Pediatric Medulloblastoma: A Case Series
14. NORRIS, T — Pediatric Cancer Case Study of Neurocognitive and Psychosocial Late Effects Following the Implementation of a Cognitive Remediation And Cognitive Skills Training Program
15. BANERJEE, P — Language Performance in Brain Tumor Patients: A Voxel-Based Lesion-Symptom Mapping Study
16. HARDY, KK — Computerized Assessment of Neurocognitive Functioning in Young Survivors of Childhood Cancer: A Pilot Study
17. HARDY, KK — Feasibility of Computerized Cognitive Training with Young Survivors of Childhood Cancer
18. AILION, A — Differential Developmental Trajectories of Reading and Abstract Reasoning Skills in Children with Brain Tumors: Role of Age at Diagnosis and Radiation
19. WALSH, K — Long-Term Neurocognitive Functioning in a Case Series of Medulloblastoma Survivors: The Impact of Cerebellar Mutism Syndrome
20. WALSH, K — Proton versus Photon Radiotherapy in Pediatric Brain Tumor Survivors: A Comparison of Neurocognitive Outcomes
21. LEO, P — Long Term Effects of Whole-brain Radiation Therapy on Cerebral White Matter Injury
22. RAGHUBAR, KP — Attention in Children with Brain Tumors Treated With or Without Radiation Therapy
23. LINDNER, OC — Cognitive impairments due to chemotherapy in young adult cancer survivors
24. EDELMANN, MN — Biomarkers Related to CNS Integrity during Treatment for Acute Lymphoblastic Leukemia
25. MAHONE, M — Age of Treatment Moderates Post-surgery Improvement in Processing Speed in Children with Brain Tumors
26. SCHREIBER, JE — Prospective, longitudinal assessment of attention following risk-adapted treatment for medulloblastoma: importance of multi-modal assessment
27. JAYAKAR, R — Adult Survivors of Pediatric Brain Tumor: Vulnerability of the Left Hippocampus and Verbal Memory Associations to Left versus Right Hippocampal Volumes
28. KRULL, KR — Computerized assessment of simple and complex processing speed in survivors of childhood cancer
29. CAPON, LM — Beyond Coding and Symbol Search: Processing Speed in Survivors of Childhood Cancer

Stroke/Aneurysm

30. HAJEK, C — Cognitive Functioning Following Pediatric Stroke: A Meta-Analysis

Medical/Neurological Disorders/Other (Child)

31. DINCES, SM — Hypothalamic-pituitary-adrenal Axis Function Predicts Child Neuropsychological Functioning at 3 Year Follow-up
32. DRAPEAU, C — Neuropsychological Functioning of Pediatric Patients with a Mitochondrial Disorder

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

33.	GLASIER, PC	A Comparison of Emotional Adjustment and Behavior in Pediatric Patients with Acute Lymphoblastic Leukemia or Multiple Sclerosis
34.	MCCURDY, MD	Social Cognition, Repetitive Behavior, and ADHD Symptoms Among Children with Primary Complex Motor Stereotypies
35.	HUSTON-WARREN, EA	Attentional Networks in Children with Neurofibromatosis Type 1
36.	HEITZER, A	The Relationships Between Temperamental Attributes Assessed at Preschool Age and Perinatal Risk: A Study of Very Preterm-Born Children
37.	PETERS, B	Sex Differences in Language Skills in Very Preterm Born Three-Year Olds
38.	DUVALL, S	Gender Differences in Children Born Low Birth Weight: Examining Early Working Memory and Mastery Motivation
39.	NOMURA, Y	Immediate and long-term infant neurobehavioral consequences of preeclampsia and prenatal depression: A prospective study
40.	MELLOTT, E	Predicting Neurodevelopmental Outcome of Infants with Hypoxic-Ischemic Encephalopathy Treated with Hypothermia: A Pilot Study Highlighting the Role of Protein Biomarkers
41.	BASSO, M	Effect of Executive Function and Family Dynamics upon Treatment Adherence in Children with Type 1 Diabetes Mellitus
42.	BASSO, M	Type 1 Diabetes Mellitus: Parent Affect, Executive Function, & Family Dynamics
43.	LEMONDA, BC	Understanding the Association between Anxiety and Attention Across the Lifespan: Findings from a Heterogeneous Pediatric Population
44.	CASNAR, C	Parent Perspectives on Executive Functioning in Preschoolers with NF1: Comparison to Typically Developing Controls and Teacher Ratings
45.	COOL, DL	Attention and Verbal Memory in Children with Chiari Malformation Type I
46.	RAMOS, V	Neuropsychological Functioning in Albright Hereditary Osteodystrophy: A Case Series
47.	CHRISTOPHER, GB	Neurocognitive Outcomes in Adolescents during Acute Recovery from Anti-NMDA Receptor Encephalitis
48.	YOUNG, C	Sleep and ADHD Symptoms in Children with Cerebral Palsy
49.	IAMPIETRO, M	Memory Functioning in Young Children with Sickle Cell Disease
50.	ONO, KE	Executive Functioning and Social Skills in Youths Diagnosed with Sickle Cell Disease
51.	JONES, KE	Performance-Based Measures vs Caregiver Ratings of Executive Functioning in Pediatric Sickle Cell Disease
52.	WASSERMAN, R	Profiles of Neuropsychological Functioning in Children and Adolescents with Spina Bifida
53.	BURNS, TG	Neurocognitive Outcome of Young Adults with Surgically Corrected Heart Defects
54.	RANE, S	Neuropsychological Functioning in Rapid-onset Obesity with Hypothalamic dysfunction and Autonomic Dysfunction (ROHHAD): A Case Series
55.	RANE, S	Profile Analysis of Behavior Ratings in Survivors of Pediatric Brain Tumors and Children with Attention Deficit/Hyperactivity Disorder

TBI (Child)

56.	RANE, S	Caregiver Reported Symptoms Following Mild to Moderate Traumatic Brain Injury in Preschoolers
57.	HIGHLEY, E	Processing Speed, Visual-Spatial Memory, and Motor Speed Impacted in Individuals With Multiple Mild Traumatic Brain Injuries
58.	FARRER, TJ	Corpus Callosum Pathology and Processing Speed in Pediatric Traumatic Brain Injury
59.	MERKLEY, TL	Developmental Alterations in Cortical Organization, Verbal Learning and Memory Following Moderate to Severe Traumatic Brain Injury (TBI) in Adolescents Injured as Toddlers
60.	NEEDHAM, V	Role of academic intervention in reducing long term academic consequences of concussion
61.	RANSOM, DM	Returning to School Following Concussion: Does an Administrative Policy Addressing Academics Improve Perception of Academic Support?
62.	TERWILLIGER, V	Continued Sport Participation following Adolescent Concussion Lengthens Recovery: The Argument for "When in Doubt, Sit Them Out!"
63.	PRATSON, L	Normative Performance on a Smartphone version of the Standardized Assessment of Concussion (SAC) in a Youth Sample
64.	STUDER, M	Reduced attentional resources influence verbal memory performance in pediatric mild traumatic brain injury
65.	JOHNSON, CP	Investigating the Source of Reading Deficits Following Pediatric Traumatic Brain Injury
66.	IVERSON, GL	Concussion History in High School Athletes with Self-Reported Learning Disabilities
67.	AMAYA-HODGES, M	Impact of Pre-Injury Attention and Learning Problems on Pediatric Post-Concussion Symptom Reports
68.	DAVIS, KC	Time to Follow Commands (TFC) and Duration of Impaired Consciousness Remain the Best Predictors of Long Term Outcome Following Pediatric Traumatic Brain Injury (TBI)
69.	BLAHA, RZ	Adolescents Who Endorse Little to No Memory for Injury Display Increased PTSD Symptomotology After Complicated Mild to Severe TBI
70.	LEVAN, A	WISC-IV and Neuroimaging Predictors of Social Competence in Chronic Pediatric Traumatic Brain Injury
71.	MCMANUS, S	Differences in Initial Symptom Presentation for Female Athletes with Typical and Prolonged Recovery Courses
72.	DORFLINGER, J	Age and Gender Differences in Youth Sports Concussion
73.	MONAHAN, K	Race as a Moderator of Neuropsychological Outcomes Following Pediatric Traumatic Brain Injury

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

74. ROSEMA, S — Young adults' and significant other's perspective of long-term psychosocial outcomes after childhood traumatic brain injury
75. HAASE, E — Relation of Depression, Anxiety and Self-Efficacy on Concussion Recovery in Adolescents
76. REESMAN, J — Symptom Report and Cognitive Exertion in School-Aged Children with Mild Traumatic Brain Injury
77. SADY, M — Correlates and Predictors of Cognitive Exertion Effects in Children and Adolescents with mTBI
78. COLLIER, S — What Does Performance Validity Test Failure Mean for Self-reported Postconcussive Symptoms after Pediatric Mild TBI?
79. PERRINE, K — Exaggeration and Somatization in Pediatric Post-Concussion Syndrome

TBI (Adult)

80. RABINOWITZ, AR — Apolipoprotein E Genotype and Concussion in College Athletes
81. RABINOWITZ, AR — Patients with Sports-Related mTBI Return to Activities More Rapidly than Patients with Motor Vehicle Crash-Related mTBI
82. BOSWORTH, C — Resting State Functional Connectivity and Cognition Changes in Professional Boxers
83. BIRATH, J — Coherence of Semantic Fluency Following Repeated Concussions in Retired Professional Football Players
84. HAMMOND, J — Longitudinal Examination of Attitudes and Behaviors Regarding Helmet Use Among Skiers and Snowboarders: 1999-2012
85. HAMMOND, J — Increasing the Knowledge of Concussion in Adults Overseeing Youth Sports: Baseline Findings
86. HAMMOND, J — Using the Transtheoretical Model of Behavior Change to Increase Bicycle Helmet Use
87. LARSON-DUPUIS, C — Impact of BDNF Val66Met polymorphism on olfactory functions of female concussed athletes
88. MANNINO, C — The Utility of the Neurobehavioral Rating Scale-Revised in Retired Professional Football Players
89. LOPEZ, WD — A Comparison of Methods to Extract Executive Ability from Trails B in Traumatic Brain Injury Survivors
90. LARA-RUIZ, J — Cognitive Function in Retired Professional Football "Speed Players"
91. CORONA, M — Emotional Functioning in Retired National Football League Players With and Without Hormonal Dysfunction
92. WRIGHT, MJ — An Index Incorporating Cognitive Reserve and Concussion History Predicts Long Term Cognitive Outcomes in Retired Professional Football Players
93. BELL, R — Assessing the Validity of the Montreal Cognitive Assessment in Collegiate Athletes
94. YUTSIS, M — Efficacy of donepezil in a newly acquired brain injury in the context of pre-existing vascular dementia
95. MARTIN, R — Sex differences in Edema following Traumatic Brain Injury
96. FEDIO, AA — Personal Creativity and Pro-social Behavior during Recovery from Traumatic Brain Injury
97. AHERN, D — Modified Attention Network Task Performance in Acute Mild Traumatic Brain Injury
98. SOBLE, JR — Is Sleep Apnea a Modifiable Mechanism Underlying Prolonged PTA Duration in Acute TBI Patients?
99. NORMAN, AL — Neurocognitive and Diffusion Tensor Imaging (DTI) correlates of mild traumatic bran injury (mTBI) in the acute care setting
100. MEDAGLIA, JD — The Relationship Between Blobs and Connections in Early Traumatic Brain Injury

4:15–5:15 PM — **Invited Address: Toward the Development of a Rehabilitation Treatment Taxonomy: A Conceptual Framework (CE Session A)**
Presenter: John Whyte
Grand Ballroom B&C

1. WHYTE, J — Toward the Development of a Rehabilitation Treatment Taxonomy: A Conceptual Framework

5:30–6:30 PM — **Awards Ceremony**
Grand Ballroom B&C

6:30–7:30 PM — **Wednesday Evening Welcome Reception**
Grand Ballroom Foyer

THURSDAY, FEBRUARY 13, 2014

7:20–8:50 AM — **CE Workshop 7: Prism Adaptation, Motor Training, and Spatial Neglect**
Presenter: Anna Barrett
Redwood

1. BARRETT, A — Prism Adaptation, Motor Training, and Spatial Neglect

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

7:20–8:50 AM **CE Workshop 8: Cognitive Aging and Dementia: Is White Matter what Matters?**
Presenter: Adam Brickman
Willow

1. BRICKMAN, A — Cognitive Aging and Dementia: Is White Matter what Matters?

9:00–10:00 AM **Invited Address: Mild Cognitive Impairment Comes of Age (CE Session B)**
Presenter: Glenn Smith
Grand Ballroom B&C

1. SMITH, G — Mild Cognitive Impairment Comes of Age

10:00–10:15 AM **Thursday AM Coffee Break**
Ballroom Foyer/Metropolitan Ballroom

10:00–11:30 AM **Symposium 1: The Changing Nature of Executive Control in Preschool: Using Statistical Modeling to Situate Neuroscience in Development**
Chair: Kimberly Espy
Grand Ballroom A

1. ESPY, KA — The Changing Nature of Executive Control in Preschool: Using Statistical Modeling to Situate Neuroscience in Development
2. GARZA, JP — Parsing Executive Control from Foundational Cognitive Abilities in Preschool: Application of the Bifactor Model to Examine Developmental Change
3. CLARK, CA — The Socio-Familial Context in Early Childhood and Mechanisms of Influence on Developing Executive Control in Preschool
4. NELSON, JM — Clarifying Pathways to ADHD Symptom Dimensions in Preschool Using Dualistic Models of Executive Control and Foundational Cognitive Abilities
5. SCHUTTE, AR — A Neural Network Model of Executive Control in Preschoolers

10:00–11:30 AM **Paper Session 1: Language and Aphasia (Progressive and Non-progressive)**
Moderator: Lynn Maher
Grand Ballroom D

1. SZELES, D — Consistency Promotes Fluency
2. ANTONUCCI, SM — How do Persons with Aphasia Use Semantic Feature Information during Lexical Retrieval: Evidence from Verbal-Description and Naming-to-Definition of Living and Nonliving Concepts
3. HENRY, ML — Phonological Processing in Logopenic and Nonfluent Variants of Primary Progressive Aphasia
4. PIGUET, O — Memory and Emotion Processing Performance Differentiates Between Nonfluent Primary Progressive Aphasia Syndromes
5. MILANO, N — Impairment of Propositional and Automatic Speech with Bilateral Mesial Frontal Atrophy: A New Primary Progressive Aphasia Variant?

10:15–11:15 AM **Invited Address: Hemodynamic Factors Underlying the Pathogenesis and Clinical Expression of Alzheimer's Disease**
Grand Ballroom B&C

1. JEFFERSON, AL — Hemodynamic factors underlying the pathogenesis and clinical expression of Alzheimer's disease

10:15–11:30 AM **Poster Session 2 : Adult TBI II, Cognitive Rehabilitation, Cognitive Neuroscience**
Metropolitan Ballroom

TBI (Adult)

1. KEATLEY, E — Neuropsychological Sequelae of TBI among Refugee Survivors of Torture
2. FISCHER, BL — Blast-Related TBI Produces Differential Working Memory Performance and Brain Activation Compared to Civilian TBI
3. ALMENDAREZ, CY — Fluency and Executive Dysfunction Among Service Members with Blast-Related Mild Traumatic Brain Injury
4. TATE, DF — Preliminary Findings of Reduced Fractional Anisotropy in Service Members with Blast-Related Mild Traumatic Brain Injury
5. TWAMLEY, EW — Cognitive Complaints in Veterans with TBI and their Relationship to Objective Measures of Cognition
6. TWAMLEY, EW — Neurocognition and Homelessness among OEF/OIF Veterans with Traumatic Brain Injury

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms.
https://doi.org/10.1017/S1355617714000381

7.	COMBS, HL	Effect of severity of concussion (mTBI) and PTSD on cognitive functioning in veterans with deployment-related mTBI
8.	WEBSTER, J	Prediction of Progress in a Polytrauma Program using a measure of Symptom Validity
9.	STINSON, JM	The Relation of Postconcussive Symptom Report and Cognitive Testing in an mTBI Population: The Effect of Performance Validity Test Results
10.	WOODARD, JL	A Neuropsychological Profile of Blast-Induced Tinnitus
11.	BURNS, KM	Mild TBI and Chronic Pain Associations with Post-Deployment Mental Health Outcomes
12.	BURNS, KM	Military Deployment and the Development of Chronic Pain: Mild Traumatic Brain Injury, Blast, Psychological Trauma, and Combat Associations in the Florida National Guard
13.	PAGULAYAN, K	Prospective Memory in OIF/OEF Veterans with Repeated Blast-Related mTBI
14.	HANSON, KL	Problem Alcohol Use is Associated with Increased Psychiatric Symptomatology and Reduced Processing Speed in Veterans with Mild Traumatic Brain Injury
15.	O'NEIL, ME	Cognitive Impairment in Blast Exposed Veterans with a History of mTBI: A Comparison of Cutoffs for Impaired Scores
16.	TROYANSKAYA, M	Combat Exposure, PTSD Symptoms, and Cognition Following Blast-Related Mild Traumatic Brain Injury in OEF/OIF Service Members and Veterans
17.	KIM, RT	The relationship between coping style, executive function, and mood in veterans with mild to moderate traumatic brain injury
18.	LIPPA, SM	Polymorbidity: Looking Beyond PTSD and TBI in Returning Service Members and Veterans
19.	JURICK, SM	The Factor Structure of the NSI in a Treatment Seeking Cohort of Veterans
20.	JURICK, SM	Post-concussive Symptom Over-reporting in Iraq and Afghanistan Veterans
21.	NORLIEN, J	Concordance of Cognitive Complaints and Cognitive Disorder in Concussed Army Personnel
22.	SORG, S	Cognitive and Psychiatric Dissociations between Fractional Anisotropy and Cortical Thickness in Veterans with Mild TBI
23.	NOVITSKI, J	Relationship between sleep disturbance and cognition in veterans with mild traumatic brain injury and post-traumatic stress disorder
24.	NATION, DA	Correlates of TBI History in Aging Veterans Presenting with Cognitive Difficulties: A Clinical Case Series
25.	BRENNAN, L	Impact of TBI on Clinical and Neuropathological Findings in Alzheimer's Disease: Role of APOE Genotype
26.	HUNT, I	Interhemispheric Transfer Time in Chronic Mild Traumatic Brain Injury
27.	FABER, J	A Longitudinal Investigation of Sleep Quality Following Mild Traumatic Brain Injury: Comparison with Orthopedic and Non-Injured Controls
28.	MACHAMER, J	Post-traumatic Symptoms in Patients with Simple and Complicated Mild TBI
29.	PARKS, AC	Cognitive Load Induced Variability In Behavior And Neurocognition In Young Adults With A History Of Concussion
30.	TOWNS, SJ	Subjective Sleep Quality and Postconcussion Symptoms in Mild TBI
31.	ENSLEY, M	The impact of psychiatric distress on a self-report measure of postconcussion
32.	SWAN, N	Concussion: Relationship of Injury Severity, Cognitive Functioning, and Emotional Factors
33.	JANTZ, T	Cognitive Correlates of Abstract Reasoning in Chronic Mild TBI
34.	MATEVOSYAN, A	Memory Deficits Differ by Working Memory Performance in Mild to Moderate Traumatic Brain Injury
35.	ROBERTSON, K	Automatic and Controlled Processing Abilities Following Traumatic Brain Injury
36.	HILL-JARRETT, TG	Attention Impairment or Generalized Slowing? Cross-Hemispheric Influences of Traumatic Brain Injury on Reaction Time Response
37.	HILL-JARRETT, TG	Traumatic Brain Injury Influences on the Hemispheric Representation of Visuospatial Attention: Findings from the Lateralized Attention Network Test
38.	WONG, CG	Behavioral Inhibition and Activation Systems in Moderate to Severe TBI
39.	GRIECO, J	Comparison of Processing Speed in Individuals with Anoxic, Closed Traumatic, and Combined Anoxic and Closed Traumatic Brain Injuries
40.	MCDERMOTT, HW	Comparing TBI Outcomes in a Public and Private Hospital: The Role of Demographic and Socioeconomic Factors
41.	BILLINGS, N	Coping Style Predicts Objective and Subjective Well-being after Moderate to Severe Traumatic Brain Injury
42.	SUNDERARAMAN, P	Exploring The Relationship Between Money Management and, Mood and Cognition in People with Chronic Traumatic Brain Injury
43.	NOVACK, T	The Effect of Visual Perceptual Training on Screening for Driving Using the Useful Field of View Test Following Moderate to Severe TBI
44.	GOVEROVER, Y	Activity Participation after Traumatic Brain Injury
45.	CHO, Y	Training adults with brain injury how to help-seek when lost: A pilot study
46.	DAHM, J	Comparison Of Long-term Outcomes Following Traumatic Injury: What Is The Unique Experience For Those With Brain Injury?
47.	CHIOU, KS	Self Report of Functioning and Objective Cognitive Performance Following Severe Traumatic Brain Injury
48.	WIEGAND, LA	Rates of Neuropsychological Test Completion, Reasons for Non-Completion and Relationship to TBI Severity

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

49.	FAYTELL, MP	Evidence for the GOAT Score as an Indicator of Patient Readiness to Undergo Neuropsychological Testing Post-Traumatic Brain Injury
50.	ROSSETTI, M	Orbitofrontal White Matter Microstructural Abnormalities in TBI and Executive Dysfunction, a DTI Pilot Study
51.	GILLIS, M	Please Repeat That: Patients With TBI Show Hyperactivation During Early Learning, But A Normal Repetition Suppression Effect
52.	VENKATESAN, UM	Evidence for the Development and Maintenance of Altered Resting-State Functional Connectivity in TBI
53.	ROMAN, CA	Decreased White Matter Integrity Predicts Hyperconnectivity Following Traumatic Brain Injury
54.	ROMAN, CA	The Rich Get Richer: Brain Injury Elicits Hyperconnectivity in Core Subnetworks
55.	MILLER, JB	Consolidated Standards of Reporting Trials in Neuropsychology (CONSORT-NP): Guidelines and Recommendations for Neuropsychological Research

Cognitive Intervention/Rehabilitation

56.	DAVID, D	"Again?" Impact of Repeat Test Administration: Practice, Fatigue, and Examiner Effects
57.	O'NEIL, R	Cognitive Ability Predicts Motor Learning on a Virtual Reality Game in Patients with TBI
58.	JAK, A	Depression Limits Post-Concussive Symptom Improvement in Veterans with a History of TBI
59.	VAS, A	Neurocognitive Outcomes following Reasoning Training in mild TBI
60.	NOVAKOVIC-AGOPIAN, T	Short and Long Term Outcomes of GOALS Executive Function Training in Veterans with Chronic TBI
61.	FAIR, JE	A Controlled Study Comparing Errorless and Errorful Learning in Moderate-to-Severe TBI
62.	COLE, MA	Simultaneous Treatment of Neurocognitive and Psychiatric Symptoms: A Mindfulness-Based Intervention Pilot Study in Comorbid Chronic Mild Traumatic Brain Injury and Posttraumatic Stress Disorder
63.	ROSENBLATT, AS	Training Sustained Attention and Inhibitory Control Improves Attention and Clinical Symptoms in OEF/OIF Veterans
64.	SUMOWSKI, JF	Retrieval practice improves delayed recall after one week in persons with severe traumatic brain injury
65.	MANN, SH	Differential Impact of Education on Recovery from Acquired Brain Injury
66.	ROSS, SL	The Benefits of a Semi-Structured Community-Based Group for Brain Injury Survivors
67.	THOMAS, KR	Age Trajectories of Everyday Cognition in African American and White Older Adults under Prompted and Unprompted Conditions
68.	MECHANIC-HAMILTON, D	The Cognitive Fitness Program: A Comprehensive Intervention to Increase Behaviors Associated With Successful Cognitive Aging
69.	HANCOCK, L	Participant Satisfaction in a Randomized Controlled Trial of Computerized Cognitive Training in MS
70.	HANCOCK, L	Investigating the Effect of Focused Computerized Cognitive Training in Multiple Sclerosis: A Pilot Study
71.	VANNORSDALL, TD	Improving Cognition in Healthy Older Adults with Transcranial Direct Current Stimulation
72.	KINGSLEY, K	Anti-NMDA Receptor encephalitis: cognitive deficits and treatment
73.	CHOI, T	Feasibility and Characteristics of 'Korean Limb and Oral Apraxia Test (KAT)' in Patients with Supratentorial Stroke
74.	MACOUN, SJ	Direct Attention and Executive Function Cognitive Training in Children with Autism Spectrum Disorder
75.	STRANG, J	How to Develop an Effective Intervention through the Participatory Research Process: A Case Example in an Executive Functioning Intervention in High-Functioning Autism Spectrum Disorders
76.	KAEMMERER, T	Impact of Brief Training on Cognition in Chiari I Malformation
77.	MCFARLAND, CP	Visual Imagery Improves Inhibition Among Young Adults
78.	NEUGNOT-CERIOLI, M	Validity and efficiency of cognitive interventions with adolescents presenting intellectual and learning disabilities: Preliminary results
79.	ASHFORD, JM	Predicting Response to Computerized Working Memory Training among Childhood Cancer Survivors
80.	COX, LE	Feasibility and Acceptability of a Remotely-Administered Computerized Intervention to Mitigate Cognitive Late Effects Among Childhood Cancer Survivors
81.	GORLYN, M	Subjective but Not Objective Cognitive Benefit of Bupropion in MDD

Cognitive Neuroscience

82.	ALLEN, N	Improved Social Cognition and Mood Following Participation in a Social Cognition Rehabilitation Group for TBI & Psychological Trauma
83.	ALLEN, N	Exploring the Relationship Between Static and Dynamic Emotion Recognition: A Study Among US Veterans
84.	EICKHOFF, CJ	Effect of Impaired Sleep and Stress on Cognitive Performance in Veterans
85.	WATSON, E	Effects of Emotional Valence on Response Latencies
86.	GRAVANO, J	Neurocognitive and Emotional Correlates of Attentional Networks in Traumatic Brain Injury
87.	GRAVANO, J	Neurocognitive and Emotional Correlates of Attentional Networks in Parkinson's Disease
88.	MATSUI, M	Brain activity in cognitive conflict using face expression stimuli: A study of near-infrared spectroscopy

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

89. NASSEHI, K — A Meta-Analysis: Alcohol Abuse Negatively Affects Social Cognition
90. PETTIT, C — Stress Responsiveness and Performance Monitoring: Potential Sex Differences
91. KNUDSEN, KS — Entertainment, Mind, and the Brain: A Neurocognitive Approach to Creative Achievement
92. SALAZAR, R — Impairments of executive and visuospatial function in motor symptom subtypes of Parkinson's disease
93. SALMINEN, L — Impact of the AGTR1 A116C Polymorphism on Subcortical Hyperintensities and Cognition in Healthy Older Adults
94. ANDERSON, J — Influence of Caffeine on Time Estimation
95. VADNAIS, S — Volumetric Differences in the Inferior Frontal Gyrus Predict Verbal Short-Term Memory Performance
96. ALTMANN, LJ — Semantic Priming of Action Initiation: Does it have therapeutic potential?

Imaging (Functional)

97. MELROSE, RJ — Functional Connectivity of Fronto-Parietal Networks in Mild Cognitive Impairment

11:30 AM–12:30 PM — Invited Address: Update on Acute Effects and Early Recovery after Mild TBI: Lessons from Sports Concussion Research (CE Session C)

Presenter: Michael McCrea
Grand Ballroom B&C

1. MCCREA, M — Update on Acute Effects and Early Recovery after Mild TBI: Lessons from Sports Concussion Research

12:30–1:45 PM — Poster Session 3: Language/Aphasia, Visuospatial/Neglect, Multiple Sclerosis/ALS, Subcortical Dementia/ MCI, Drugs/Neurotoxicology

Metropolitan Ballroom

Language and Speech Functions/Aphasia

1. YOCHIM, B — The Relationship Between Word Finding Difficulty and Frequency of Spoken Word Use
2. KARIDAS, S — Does the Use of Personally Relevant Stimuli in Semantic Complexity Training Facilitate Improved Functional Communication Performance Compared to Non-Personally Relevant Stimulus Items among Adults with Chronic Aphasia?
3. VERCHE, E — Memory problems in children with Specific Language Impairment
4. VERCHE, E — Executive Dysfunction in Specific Language Impairment
5. STEFANATOS, G — An Unusual Case of Aphasia with Coexisting Auditory Processing Disorder
6. ALTMANN, LJ — Differences in Dual Task and Group Effects in Sentence vs. Discourse Production in Parkinson's Disease
7. HUNG, J — An Eyetracking Investigation of Semantic Associations among Actions and Objects
8. MERENS, H — Switching and Clustering in Strategic Letter Word Generation: A Lesion Study
9. HAMBERGER, MJ — Does the Medial Temporal Region Mediate Naming?
10. CAHANA-AMITAY, D — Association of Homocysteine and C-reactive protein with language changes in the aging brain
11. KIM, G — Concordance between in vivo Structural Imaging and Postmortem Histopathology in Primary Progressive Aphasia with Alzheimer Pathology: A Case Report

Visuopatial Functions/Neglect/Agnosia

12. BYARS, JA — Higher Levels of Body Image Concern Are Associated With Allocentric Visuospatial Attention Bias
13. LAFO, JA — Visuoperceptual Task Impairments in Parkinson's Disease: A Pathway-specific Association of Executive Function and Memory?
14. BARRETT, AM — Leftward Where bias and rightward distraction in chronic neglect

Multiple Sclerosis/ALS/Demyelinating Disorders

15. CHENJI, S — Addenbrooke's Cognitive Examination: A possible screening measure for cognitive impairment in ALS patients
16. SUMOWSKI, JF — Paradigm shift in the study of reserve against cognitive impairment in neurologic populations
17. FORTE, M — Caprylic Triglyceride as a Potential Treatment for Cognitive Dysfunction in Multiple Sclerosis: A Case Series
18. FAYAD, A — Self-Report of Attention and Psychological Functioning Among Pediatric Multiple Sclerosis Patients and Sibling Controls
19. BERARD, J — Practice Effects on Measures of Information Processing Speed in Early-Phase Relapsing-Remitting Multiple Sclerosis
20. CANAS, A — Longitudinal Neuropsychological Assessment in Pediatric Multiple Sclerosis: Preliminary Findings
21. SPAT, J — The Effect of Time on Clustering and Switching Performance in Individuals with Multiple Sclerosis and Matched Controls
22. DENNEY, D — Differential Performance on Trail Making Tests A and B In Multiple Sclerosis
23. LOPES COSTA, SM — Effective Connectivity Differences In Processing Speed Deficits in MS

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

24.	MCKEEVER, JD	Prospective Memory in Multiple Sclerosis: Contributions of Encoding and Underlying Neuropsychological Constructs
25.	HADDAD, MM	Changes in Amount of Grey Matter in Adults with Hemiparetic Multiple Sclerosis after Undergoing Constraint-Induced Movement Therapy
26.	TYSON, B	The Relationship of Pain and Complex Attention Performance in Multiple Sclerosis
27.	SMITH, MM	Personality Traits in Individuals with Multiple Sclerosis Vs. Controls and Their Relationship to Cognitive Functioning
28.	WOJTOWICZ, M	Performance variability is associated with white matter integrity in persons with Multiple Sclerosis
29.	LIBON, DJ	Assessing Pre-Frontal Neural Integrity in Multiple Sclerosis with Functional Near-Infrared Spectroscopy (fNIR)
30.	VARGAS, G	Functional Connectivity in the Frontal-subcortical Network as a Vulnerability Factor for Depression in Multiple Sclerosis
31.	GOVEROVER, Y	Activity and participation in MS: The whole is greater than its parts
32.	YAEL, G	'Activity limitation' and 'participation' in multiple sclerosis
33.	GENOVA, HM	Emotional Processing Impairments in Multiple Sclerosis
34.	CHIARAVALLOTI, ND	Cognition in MS
35.	STROBER, L	Understanding the complexities of unemployment in multiple sclerosis (MS): The role of person-specific factors
		Dementia (Subcortical, Specific Disorders, MCI, etc.)
36.	CALVO, D	The Impact of a 6-Month Exercise Program on Serum IGF-1 and Global Cognition in Mild Cognitive Impairment
37.	ENGLAND, HB	RBANS Memory Indices are Related to Medial Temporal Lobe Volumetrics in Mild Cognitive Impairment
38.	MCCONNELL, JM	Mild Neurocognitive Disorder: A Cluster Analysis
39.	GONZALEZ, P	Prioritization of Treatment Outcomes by Caregivers of patients with Mild Cognitive Impairment Introduction
40.	CASTRO, M	Longitudinal Changes in Memory Spanning Mild Cognitive Impairment to Early Alzheimer's Disease
41.	SANDERS, CJ	Examining Impairment in Planning Ability with Mild Cognitive Impairment
42.	FLOWERS, AT	Performance of Participants with Different Subtypes of Mild Cognitive Impairment on an Activity of Daily Living Task
43.	COOLEY, S	Changes In White Matter And Gray Matter Microstructure In Mild Cognitive Impairment: A Diffusion Tensor Imaging Study
44.	TAM, JW	Caregiver Burden among Caregivers of Individuals with Mild Cognitive Impairment (MCI)
45.	SONG, W	Healthy Older and MCI Drivers: Increased Errors When Fatigued and Differences in Cognitive Predictors of Driving Performance
46.	COPELAND, JN	Cortical Thickness and Financial Capacity in Amnestic Mild Cognitive Impairment
47.	EPPIG, J	An Empirically-Driven Approach to Compare Petersen versus Jak/Bondi Criteria in the Diagnosis of Mild Cognitive Impairment
48.	RABIN, L	A Psychometric Approach to the Classification of Subjective Cognitive Decline and Mild Cognitive Impairment
49.	HESSEN, E	Prognosis of amnestic and dysexecutive MCI
50.	NATION, DA	Process-based Verbal Fluency Measures Improve Prediction of MCI Diagnosis
51.	VANDERMORRIS, S	Autobiographical Episodic Memory is Associated with Open-Ended Problem-Solving in Single-Domain Amnestic Mild Cognitive Impairment (aMCI)
52.	CLARK, LR	Faulty Adaptation to Repeated Face-Name Associative Pairs in Mild Cognitive Impairment
53.	SHEPPARD, DP	An Assessment of Instrumental Activities of Daily Living in Huntington's Disease
54.	ROTBLATT, LJ	The Visual Spatial Learning Test: Differential Impairment During the Premanifest and Manifest Stages of Huntington's Disease
55.	HOLDEN, HM	"Forgetting to Remember" in Huntington's Disease: A Comprehensive Study of Laboratory, Semi-Naturalistic, and Self-Perceptions of Prospective Memory
56.	CIMINO, C	Differences Evident at Time of Testing for the Huntington's Disease Gene
57.	GONZÁLEZ, MG	Neuropsychological outcome after unilateral posteroventral pallidotomy in patients with Parkinso Disease
58.	BROWN, DS	Use of the Montreal Cognitive Assessment as a Cognitive Screening Measure in Parkinson Disease
59.	ALBERTY, J	Confrontational naming errors: A comparison between Alzheimer's disease, Parkinson's Disease Dementia, and normal controls
60.	MANGAL, P	Cognitive and Brain Reserve in Parkinson disease: Predictors of Cognitive Changes over Time
61.	PIROGOVSKY, E	Instrumental Activities of Daily Living are Impaired in Parkinson's Disease Patients with Mild Cognitive Impairment
62.	KARANTZOULIS, S	The Cognitive Phenotype of Parkinson's Disease
63.	SPERLING, SA	Predictors of Cognitive Diagnoses in Patients with Parkinson's Disease
64.	JOHNSON, ET	Egocentric Spatial Working Memory Is Impaired In Parkinson's Disease And May Share A Similar Neuropathological Basis With Bradykinesia
65.	LINDBERGH, CA	Delay and Probability Discounting as Candidate Markers for Dementia in Older Adults

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

66. SULLIVAN, C — Regression-based Error Analysis in Behavioral Variant Frontotemporal Dementia (bvFTD)
67. NGUYEN, A — Differentiation of Behavioral Variant Frontotemporal Dementia (bvFTD) from Alzheimer's Disease (AD) Varies by Age of Onset
68. JERARD, T — Altruistic Giving is Compromised in Behavioral Variant Frontotemporal Dementia
69. KIELB, S — Episodic Memory Is A Clinical Indicator of Alzheimer Pathology Versus Frontotemporal Lobar Degeneration In Neuropathologically Characterized Primary Progressive Aphasia
70. NORDLUND, A — Neuropsychological Differences Between Incipient Alzheimer's Disease and Vascular Cognitive Disorder
71. STEED, D — Teasing Apart Concurrent and Predictive Influences on Dementia: Vascular and Neuropsychiatric Symptoms

Drug/Toxin-Related Disorders (Including Alcoholism)

72. KORNBLITH, ES — Association Between Long-term Environmental Mn Exposure and Verbal Fluency in Community-dwelling Adults
73. BOWLER, RM — Cognitive Function Related to Environmental Exposure to Manganese
74. KLINE, JS — Historical lead (Pb) exposure is associated with increased cognitive intra-individual variability
75. BAITZ, HA — Decision Making in Substance Users: Real-World Risk Behaviour and the Expectancy Valence Model
76. BLOMMAERT, K — Respond, Don't React: The Influence of Mindfulness on Risk-Taking Behaviour in Adolescents Diagnosed with Fetal Alcohol Spectrum Disorder
77. WILSON, MJ — Effects of Psychopathy on Reward-Based Decision-Making in Opiate, Stimulant and Polysubstance Users
78. WILSON, MJ — Reward-Based Decision-Making and Pathological Gambling in Different Types of Drug Users
79. MCCREA JONES, LA — Neurocognitive Plateau or Decline in Adolescents with Prenatal Alcohol Exposure:Implications for Assessment and Intervention
80. CATTIE, J — Methamphetamine Dependence is Associated with Deficits in Affective but not Cognitive Theory of Mind
81. SQUEGLIA, LM — Inhibitory Functioning during Early Adolescence Predicts Alcohol and Marijuana Use by Late Adolescence
82. SCHUSTER, RM — Assessment of Working Memory Functioning via Ecological Momentary Assessment in the Context of Simultaneous Cannabis and Tobacco Use

Cognitive Intervention/Rehabilitation

83. SZELES, D — Targeted Intervention Enhances the Relationship Between Left Hemisphere Lesion Size and Right Hemisphere Lateralization of Activity Following Stroke: an fMRI Study

1:15–2:45 PM — Invited Symposium: Ecologically Valid Assessment in Neuropsychology (CE Session D)
Chair: Deirdre Dawson
Discussant: Thomas Marcotte
Grand Ballroom B&C

1. DAWSON, DR — Ecologically Valid Assessment in Neuropsychology
2. SCHMITTER-EDGECOMBE, M — Smart Technologies for Ecological Momentary Assessment and Intervention
3. PARSONS, TD — Virtual Reality Environments for Ecologically Valid Neuropsychological Assessment
4. BROMLEY, E — Video Ethnography: A Veridicality Approach to the Assessment of Everyday Functioning in Schizophrenia

1:15–2:45 PM — Symposium 2: Diffusion Tensor Neuroimaging and Cognitive Development from Birth to Young Adulthood
Chair: J. Michael Williams
Grand Ballroom A

1. WILLIAMS, J — Diffusion Tensor Neuroimaging and Cognitive Development from Birth to Young Adulthood
2. OSIPOWICZ, K — Volumetric MRI and DTI Methods to Examine Cognitive Development
3. PATRICK, KE — Neuroimaging of Language Among Infants and Very Early Children
4. ZAMZOW, J — Neuroimaging of Language and Memory Among Children and Adolescents
5. TART-ZELVIN, A — Neuroimaging of Set Shifting, Working Memory, and Executive Control

1:15–2:45 PM — Paper Session 2: Aging and Dementia
Moderator: Lisa Delano-Wood
Grand Ballroom D

1. GUZMAN, VA — Reconsidering harbingers of Alzheimer's disease: Regional progression of white matter hyperintensities in the community
2. WEISSBERGER, G — Neuropsychological and Neuropathological Profiles of Hispanic Older Adults with Autopsy-Confirmed Alzheimer's Disease

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

3.	SKINNER, JS	Stroke Risk Profile as a Predictor of Cognition in Minority Elders
4.	BETTCHER, BM	Inflammation Deleteriously Relates to Corpus Callosum Integrity as a Function of Age
5.	REED, B	Estimated Reserve Modifies the Effect of Increasing Brain Pathology on Cognitive Decline in Aging

2:00–3:15 PM

Poster Session 4: Attention/ADHD, Learning Disorders, Genetics, HIV/AIDS/Infectious Diseases
Metropolitan Ballroom

Learning Disabilities/Academic Skills

1.	REAMER, M	Relationship of the Student Adaptation to College Questionnaire to the Big Five Factors in Learning Disability Referrals
2.	PARK, SE	Comparing the components of the Five Factor Model with the Personality Assessment Inventory in learning disability referrals
3.	HOLCOMBE, BD	Exploring the Predictive Value of Childhood Obesity on Cognitive and Achievement Test Measures
4.	KUNKES, IB	A Comparison of Cognitive and Academic Functioning in Middle School-Aged Children with Attention-Deficit/Hyperactivity Disorder Versus Co-Occurring Attention-Deficit/Hyperactivity Disorder and Learning Disabilities
5.	HAHN-KETTER, A	Psychiatric Comorbidity in Adults with Learning Disorders and Attention Deficit Hyperactivity Disorder
6.	MCCURDY, MD	Screening for Learning Difficulty: Utility of Teacher Ratings on the Colorado Learning Difficulties Questionnaire
7.	HOLLAND, SC	Neuropsychological Functioning Among Children with Math Disabilities
8.	ELIAS, J	Algebra Refresher Interventions in Adults and Neuropsychological Correlates
9.	CIRINO, PT	Prediction of Algebra with Arithmetic and Neuropsychological Measures
10.	KORIAKIN, T	Severity of Sluggish Cognitive Tempo Predicts Reading Fluency in Children with Slow Processing Speed
11.	MARCHAND, M	Motor and Working Memory Abilities in Children with Learning Disabilities
12.	CASTO, B	Brain Mechanisms Underlying Typical Reading despite Poor Phonological Processing
13.	HICKS, KR	Neuropsychological Functioning Among Children with Reading Decoding and Comprehension Disabilities
14.	LOUGHAN, AR	Early Developmental Delays and Long-Term Outcomes: Emotional and Attention Disorders
15.	ALTMANN, LJ	The Complex Relationship between Word Reading, Nonword Reading, and Spelling
16.	HOADLEY, R	Cognitive and academic intra-individual variability in Attention-Deficit/Hyperactivity Disorder (ADHD) and Learning Disorder (LD)
17.	LI, ST	Contributions of Motor Coordination to Processing Speed and Academic Achievement
18.	JOHNSTON, K	Impact of Phonological Awareness, Executive Function and Vocabulary on Reading and Spelling Accuracy in Adults
19.	FRITZ, C	Predictors of Response to Intervention for Middle School Students with Reading Disabilities
20.	PETERSON, RL	Does Unequal Variance Cause Uneven Gender Ratios in Both High and Low Reading Ability?

ADHD/Attentional Functions

21.	BEEBE, DW	Impact of Sleep Restriction on Critical Skills for Novice Adolescent Drivers
22.	PERSAUD, AD	Addiction Acknowledgment and Attention in Adults with Cognitive Complaints
23.	KINGERY, KM	Reaction Time Variability Correlations Across Five Neuropsychological Tasks
24.	HELD, Z	Assessing Response Time Variability As A Predictor of Cognitive Fatigue
25.	MOYER, KH	Attention and Emotion Regulation in Social Functioning
26.	DELGATY, LE	Effects of Gender and ADHD Subtypes on Neuropsychological Measures of Attention, Executive Functioning and Social Cognition
27.	TAN, A	Sensitivity of Objective Measures of Executive and Social Functioning in Attention Deficit Hyperactivity Disorder
28.	BLACKHURST, Z	Executive Problems in Subclinical ADHD: a Difference in Quantity or Quality?
29.	ULLSPERGER, J	The Role of Executive Function in Predicting Severity and Impairment in Adult Attention Deficit Hyperactivity Disorder: Tasks versus Ratings?
30.	CULOTTA, PHD, V	A Comparison of Cognitive and Academic Functioning in Middle School-Aged Children with ADHD and ADHD with Comorbid Learning Disability: Performance On versus Off Stimulant Medication
31.	WEI, C	Examination of the Role of Negative Expectancies on Task Performance in Adults Concerned about ADHD
32.	ALLART, A	Cognition and Well-Being: The Relationship Between Executive Function and Quality of Life in Adults With Cognitive Complaints
33.	GAVIN, KJ	Perceptual Asymmetries and Lateralization in Adults with Attention Deficit Hyperactivity Disorder
34.	STELMOKAS, J	Evaluation of Meta-Cognitive Group Therapy for Adults with ADHD
35.	SESMA, H	Attention in Adolescents Born Moderately Preterm
36.	AUNE, E	The Validity of Self- versus Informant-reports of ADHD Symptoms in College Students: Cognitive and Academic Achievement Outcomes
37.	IVERSON, GL	Examining Preseason ImPACT® Scores in Adolescent Girls with Attention-Deficit Hyperactivity Disorder

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

38. LOVELL, MR — The use of psychostimulants among adolescent athletes with reported ADHD impacts computerized neurocognitive baseline test performance
39. ARNETT, AB — Joint Developmental Trajectories of Conduct Problems and ADHD Symptoms in Adolescence
40. FERNANDO, H — Learning Characteristics in Children with Attention Deficit/Hyperactivity Disorder, with and without Comorbid Disorders
41. PETRAUSKAS, VM — The Relationship Between Handwriting in Children with ADHD and Symptoms of Hyperactivity and Impulsivity
42. GONZÁLEZ-PÉREZ, P — Executive Functions Affect Reading Comprehension on ADHD Children
43. TALBOT, KS — Event and Time Triggered Remembering: The Impact of ADHD on Prospective Memory Performance in Children
44. BELLOWS, A — Effectiveness of Academic Testing Accommodations for Children with ADHD
45. HINKLE, CD — Comparison of Neuropsychological Profiles of Children with Attention-Deficit/Hyperactivity Disorder (ADHD), Reading Disorder (RD), and Comorbid ADHD and RD
46. DYER, SM — Parent-rated Hyperactivity Predicts Reduced Superior Frontal Cortex Volume in a Mixed Sample of Children
47. ANTONINI, TN — Hot and Cool Executive Functions in Children with ADHD and Comorbid Disruptive Behavior Disorders
48. WEIGARD, A — Lower cognitive processing efficiency and slowed motor preparation do not impair implicit motor sequence learning in ADHD
49. DEWEY, D — White Matter Structural Alterations in Developmental Coordination Disorder and Attention-Deficit/Hyperactivity Disorder
50. DEWEY, D — Comorbidity is Associated with Impaired Neuropsychological Functioning in Children with Developmental Coordination Disorder, Attention-Deficit/Hyperactivity Disorder and Reading Disorder
51. MCLEOD, KR — Functional Connectivity of Neural Motor Networks is Disrupted in Children with Developmental Coordination Disorder and Attention-Deficit/Hyperactivity Disorder
52. BOLINGER, E — Relationship of MMPI-2-RF NUC and COG Scales to Malingering in ADHD
53. BOLINGER, E — Further Validation of the CAARS Infrequency Index in ADHD Evaluation
54. DIAZ-ORUETA, U — AULA Versus d2 Test Of Attention: Convergent Validity and Applicability Of Virtual Reality In The Study Of Reading Disorders. Preliminary Results
55. STEWARD, K — Adolescents with ADHD-PI Show Decreased Self-Awareness of Executive Functioning Deficits

HIV/AIDS/Infectious Disease

56. STEWARD, K — HSV-1 Seropositivity in Middle Age Associated with Lower Global Intelligence
57. JAEHNERT, S — A Longitudinal Study Evaluating Neuropsychological And Neuropsychiatric Functions Across Antiviral Therapy In Individuals With Hepatitis C
58. FAZELI, PL — Shallow Encoding and Forgetting are Associated with Dependence in Instrumental Activities of Daily Living Among Older Adults Living with HIV Infection
59. OBERMEIT, LC — Antiretroviral Non-Adherence is Associated With a Mixed Encoding/Retrieval Profile of Verbal Episodic Memory in Individuals Infected with HIV
60. SILVERBROOK, M — HIV and Aging Effects on Neuropsychological Performance and Rates of HAND in Caucasian MSM on cART with Suppressed Plasma Viral Load, Corrected for Repeated Test Administrations: Prospective Results from the OHTN Cohort Study
61. CLARK, US — The Apolipoprotein E ε4 Allele is Associated with Altered Brain Activation in Individuals with HIV
62. MORGAN, EE — Elevated Dispersion Differentially Predicts HIV-Associated Prospective Memory Deficits Across Age and Task Settings
63. ROONEY, AS — Overconfidence is associated with risky decision making in HIV-infected individuals with bipolar disorder
64. ROSS, JM — Decision-Making, Conduct Disorder Symptoms, and Level of Cannabis Use Interact to Predict Number of Sexual Partners
65. KAMAT, R — Apathy is associated with white matter abnormalities in anterior, medial regions in persons with HIV
66. VAN DYK, K — Processing Speed in HIV is Impacted by Age and Physical Health Status
67. DUFOUR, CA — Physical Exercise and Neurocognition in Hispanic and Non-Hispanic White HIV-infected Adults
68. DOYLE, KL — Real-World Impact of Neurocognitive Deficits in Acute and Early HIV Infection
69. CYSIQUE, LA — Validity, nature and profile of HIV-associated neurocognitive disorder in a high-functioning and optimally treated cohort: relevance to research and clinical practice
70. BLACKSTONE, K — Predictors of Psychotropic Medication Non-adherence Among HIV+ Individuals Living with Bipolar Disorder
71. HEAPS, JM — Relationship Between Risky Decision-Making and Neurocognitive Performance in Older HIV+ and HIV- Adolescents
72. GONGVATANA, A — Chronic Methamphetamine Use and HIV Infection Are Associated with Alterations in Regional Brain Volumes and Cortical Thickness
73. FAMA, R — Anterior Cingulate and Thalamic Volumes are Correlates of Verbal Fluency in HIV Infection, Alcoholism, and their Comorbidity
74. BAKER, L — Impact of HIV serostatus on cognition and risky decision making in adolescents
75. WESTERHAUS, ET — Influence of HIV on Cognitive Function Across the Lifespan

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

76. NAN, K — Profile and Vocational Relevance of Deficits in Prospective Memory Among Chinese Adults Living with HIV Infection
77. DEVLIN, KN — Metabolic Factors Are Associated With Cognitive Decline in HIV-1-Infected Persons
78. MARQUINE, MJ — HIV-infected Hispanics are at Increased Risk for Neurocognitive Impairment
79. WEBER, E — Differential Influence of Time-Based Prospective Memory Across Age and Antiretroviral Pill Burden on Adherence in HIV-Infected Adults
80. IUDICELLO, JE — Elevated levels of vascular endothelial growth factor (VEGF) are associated with neurocognitive impairment in HIV disease and methamphetamine dependence
81. ROURKE, S — Impact of HIV-associated Neurocognitive Disorders on Quality-adjusted Life Years and Medical Costs: Results from The Ontario HIV Treatment Network Cohort Study
82. ROURKE, S — The Veterans Aging Cohort Study Index Predicts Neuropsychological Impairment in HIV/AIDS: Results from The Ontario HIV Treatment Network Cohort Study
83. KARIMIAN, A — Performance-based measures of visuospatial functioning used to screen for HIV-Associated Neurocognitive Disorders (HAND) within the monolingual Spanish-speaking population
84. STEINER, A — Verbal fluency measures used to assess HIV-1-Associated Neurocognitive Disorders (HAND) within the monolingual Spanish-speaking population

Genetics/Genetic Disorders

85. FISHER, EL — Cognitive Development in a Young Child with Mucolipidosis Type IV over Time: A Case Report
86. RAO, R — Neurocognitive Profile of Partial Trisomy 2q: A Case Study
87. BYLSMA, FW — Precocious Onset of Genetically Confirmed Huntington's Disease
88. NEUGNOT-CERIOLI, M — Neuropsychological profiles of individuals with cobalamin C disease
89. FONG, MW — Neuropsychological Profile in Spinocerebellar Ataxia 17 (SCA 17): A Case Report
90. ALMKLOV, E — Structural and Functional MRI in Relation to Glutamate Receptor Gene (GRIN2B) Polymorphisms
91. POPA, AM — The Relationship of Premorbid Intelligence to Educational Achievement in Individuals with Sickle Cell Disease
92. FEE, R — Cognitive Skills of Boys with Becker Muscular Dystrophy Are More Similar to Peers than to Boys with Duchenne Muscular Dystrophy
93. PIERPONT, R — Attention and Executive Functioning in Children with Noonan Syndrome
94. CASNAR, C — Relations of Language Functioning to Attention, Functional Communication, and Social Skills in Young Children with NF1
95. KIEFEL, J — From Preschool to School-Age: Neurocognition and Adapative Functioning of Boys with Dystrophinopathy
96. GOODRICH-HUNSAKER, NJ — Altered fornix and cingulum integrity in children with chromosome 22q11.2 deletion syndrome and relationships with affective and adaptive functioning
97. WALSH, K — Cognitive and Psychological Factors Associated with Social Functioning in Children with NF1: Application of the Socio-Cognitive Integration of Abilities (SOCIAL) Model
98. LEAFFER, EB — Digit Span Performance in Children with Dystrophinopathy: A Verbal Span or Working Memory Contribution?
99. HINTON, VJ — Language Skills in Preschool Boys with Dystrophinopathy
100. GULLER, L — Cognitive Phenotype of PARK2-Associated Early-Onset Parkinson's Disease in Two Siblings

2:45–3:00 PM — **Thursday PM Coffee Break**
Ballroom Foyer/Metropolitan Ballroom

3:00–4:30 PM — **Featured Debate: Best Practices for Enhancing Cognitive Recovery: Restoration, Compensation, and Can we Tell the Difference? (CE Session E)**
Moderator: John Whyte
Grand Ballroom B&C

1. WHYTE, J — Best Practices for Enhancing Cognitive Recovery: Restoration, Compensation, and can we tell the difference?

3:00–4:30 PM — **Paper Session 3: Child and Adult Survivors of Childhood Cancer**
Moderator: Mary Beth Spitznagel
Grand Ballroom A

1. NA, S — Effects of Radiotherapy on an Attention and Working Memory Task in Adult Survivors of Pediatric Brain Tumors
2. MCDONALD, BC — Altered Working Memory-Related Brain Activation after Leukemia Chemotherapy and Relationship to Academic Functioning
3. BRINKMAN, TM — Social Cognitive Deficits In Adult Survivors Of Childhood Brain Tumors
4. JACOLA, LM — Clinical Utility of the DKEFS for Identifying Executive Dysfunction in Childhood Cancer Survivors

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

5.	KRULL, KR	Longitudinal Decline in Verbal Intelligence and Memory Problems Among Adult Survivors of Childhood Acute Lymphoblastic Leukemia
6.	CONKLIN, HM	Change in Brain Activity among Childhood Cancer Survivors Participating in Computerized Working Memory Training

3:00–4:30 PM

Symposium 3: Preclinical Alzheimer's Disease: Biomarkers, Functional Relevance, and Preventative Strategies
Chair: Ozioma Okonkwo
Discussant: Sterling Johnson
Grand Ballroom D

1.	OKONKWO, OC	Preclinical Alzheimer's Disease: Biomarkers, Functional Relevance, and Preventative Strategies
2.	RENTZ, D	Detecting Cognitive and Behavioral Evidence of Preclinical AD
3.	ROE, C	Preclinical AD Biomarkers are Associated with Poorer Driving Performance: Preliminary Results
4.	PETTIGREW, C	Medial Temporal Lobe Atrophy, APOE status, Cognitive Reserve and Risk of Clinical Symptom Onset During Preclinical AD
5.	RODRIGUE, K	Amyloid Deposition in Healthy Aging: Impact of Vascular and Genetic Risk
6.	OKONKWO, OC	Physical Activity Modifies Alzheimer Biomarkers in Preclinical AD: Evidence from the Wisconsin Registry for Alzheimer's Prevention

3:30–4:45 PM

Poster Session 5: Symptom Validity/Effort Testing, Forensics, Assessment/ Psychometrics/Methods in Adults and Children
Metropolitan Ballroom

Malingering/Effort Testing

1.	LOUGHAN, AR	TOMM10e Utility: Assessing Effort in Children
2.	LOUGHAN, AR	TOMM Trial 1 Continues to Prove Validation of Effort in a Pediatric Sample
3.	MONTAGUE, E	Optimizing test performance with feedback about effort for adolescents with mild TBI
4.	SCHNEIDER, H	Utility of the Test of Memory Malingering (TOMM) in Preschool Children with and without ADHD
5.	DEGAIL, NM	ADHD Feigning Questionnaire In College Students
6.	SILVA, LM	Depressive Symptomatology, Abnormal Neuroimaging Findings, and Symptom Validity Performance in Electrical Injury
7.	GRILLS, C	Performance Validity Test And Neuropsychological Assessment Battery Screening Module Performance In An Active Duty Sample with a History of Concussion
8.	PAULSON, D	A Comparison of Two Embedded Effort Indices for the RBANS in a Memory Disorders Clinic
9.	PASTOREK, NJ	Incremental Effect of Declining Performance Validity Test Scores on Several Cognitive Measures in OEF/OIF/OND Veterans with a History of Mild Traumatic Brain Injury
10.	SOFKO, C	A Rarely Missed Items Index for the Repeatable Battery for the Assessment of Neuropsychological Status (RBANS)
11.	WILLIAMSON, KD	Discriminating Between ADHD, ADHD With a Comorbid Psychological Disorder and Malingered ADHD in a College Sample
12.	ROBINSON, J	Serial Position Effects in Effort Test Failures
13.	PROTO, D	The Influence of Successive Numbers of Validity Test Failures on Neuropsychological Testing Performance in Individuals with a History of Mild Traumatic Brain Injury
14.	MCCULLOCH, K	Incremental Classification Accuracy Across the Test of Memory Malingering (TOMM) Trials
15.	MCCULLOCH, K	Evaluation of Symptom Validity with the Neurobehavioral Symptom Inventory
16.	KLAS, P	Validity of the Neuropsychological Symptoms Assessment (NPSA): Preliminary Results
17.	MOHAMMED, S	Effort Exerted in Mandatory vs Voluntary Participation in Undergraduate Experiments
18.	CLARK, AL	Relationships Between Effort, Psychiatric Symptom Reporting, and Structural Brain Changes in OEF/OIF Veterans with History of Mild TBI
19.	SCHEIBEL, RS	Deployment-Related Mild TBI, Effort Testing, and Perceived Limitations in Community Reintegration, Social Participation, and Resiliency Among OEF/OIF Veterans
20.	DUNHAM, KJ	Specificity for Cognitively Impaired Individuals on the RBANS Effort Scale and Effort Index
21.	DUNHAM, KJ	Introduction to a New Profile Analysis on the Medical Symptom Validity Test
22.	ANDRESEN, EN	Relationships Between Personality Assessment Inventory and Victoria Symptom Validity Test Scores Change Across the Lifespan in a Mixed Clinical Sample
23.	SUGARMAN, MA	Embedded Measures of Effort in the Controlled Oral Word Association Test in a Clinical Sample
24.	ESTEVIS, E	The Judgment of Line Orientation Test as an Embedded Measure of Symptom Performance Validity
25.	LAU, L	Detection of Coached Neuropsychological Dysfunction: An Experiment Regarding Mild Closed Head Injury
26.	MILLER, A	A Comparison of the WMS Rarely Missed Index to the WAIS Reliable Digit Span in Depressed Inpatients
27.	BASSO, MR	Symptom Validity and Performance Validity: One or Two Constructs? A Structural Equation Modeling Study
28.	WISDOM, N	PTSD and Cognitive Functioning: Importance of Including Performance Validity Testing

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

Forensic Neuropsychology

29. LANSING, AE — Auditory Processing Deficits Among Incarcerated Youth: Contributors to Performance and Implications for Services
30. LANSING, AE — Non-Verbal Attention Skills Among Incarcerated Adolescents
31. BIDDLE, C — The Effect Of Hand Restraints On Forensic Neuropsychological Evaluations
32. LUU, H — Motor functioning tests as embedded performance validity measure in males
33. WARDIN, L — Digit span total raw score as an embedded performance validity test
34. MITCHELL, EH — The Relationship between Psychological Response Bias, Neurocognitive Symptom Validity, and Estimates of IQ in Criminal Defendants
35. REESE, C — Examining the MMPI-2-RF RBS, HHI-r, and FBS-r Validity Scales in Simulated Head Injury

36. UKUEBERUWA, DM — Simplifying Coping Measurement for the Clinic
37. VARGAS, G — Prevalence, Correlates, and Changes in Elevated Anxiety Levels in Multiple Sclerosis
38. RABINOWITZ, AR — The Effect of Motivation on Cognitive Test-Performance: Integrating Measures of Effort into Baseline Concussion Testing
39. MEYER, J — The Affective Word List: a Measure of Mood and Memory
40. MERRITT, VC — Baseline Predictors of Post-Concussion Symptoms in Collegiate Athletes

Assessment/Psychometrics/Methods (Adult)

41. SCHATZ, P — Improving the Psychometric Interpretation of ImPACT using Base Rate Analyses
42. PIERCY, JC — Exploring Dorsal "Cool" and Ventral "Hot" Executive Functions Using the Emotional Continuous Performance Task (EMO-CPT)
43. PIERCY, JC — Convergent Validity of Clinical and Functional Measures of Memory
44. BUELOW, MT — The Assessment of RIsky Decision Making
45. POSADA, C — Development of the Emotional Verbal Learning Test
46. LOCKWOOD, CA — Facial Affect Recognition in Veterans with PTSD
47. LOCKWOOD, CA — Cognitive Performance in a VA Sample with Chronic Pain
48. MCKENZIE, T — Normative Data for the Original Serial Sevens Test in a Legally Blind Veteran Population
49. LEITNER, D — A Comparison of the Buschke Selective Reminding Test and the California Verbal Learning Test - Second Edition in a Traumatic Brain Injured Population
50. KESSELS, RP — Assessment of Working Memory in Patients with Early Alzheimer's Disease: Comparing Working Memory Tests from the WAIS/WMS-III/IV
51. ABEARE, C — Predicting Estimated IQ with Verbal Fluency Response Characteristics
52. GLASS UMFLEET, L — WAIS-IV GAI, CPI, and FSIQ Discrepancies in Four Clinical Samples
53. GLASS UMFLEET, L — Prorating WAIS-IV Summary Scores for Patients with Relapsing-Remitting Multiple Sclerosis
54. ROSSETTI, M — Novel Upper Extremity Motor Tasks are Reliable and Sensitive to Deficits in Idiopathic Normal Pressure Hydrocephalus
55. BALLDIN, V — Validation of the Brief Cognitive Status Exam (BCSE) in a Mixed Clinical Sample
56. WONG, AL — Evaluating Alternate Versions of the Hopkins Verbal Learning Test and Complex Figures
57. GOLDSWORTHY, R — The Distinctions Between Self-Report and Behavioral Outcomes of Impulsivity Measures
58. PEDERSEN, HA — RBANS Story Recognition: A New Subtest with Promising Clinical Utility
59. WYMAN-CHICK, K — What does Visual Puzzles measure? Factor analysis in a mixed clinical sample
60. KILLGORE, WD — A Psychometric Validation of the Design Organization Test (DOT) in a Healthy Sample
61. XIE, SS — Performance of the Automated Neuropsychological Assessment Metrics (ANAM) in Detecting Cognitive Impairment in Heart Failure Patients
62. O' SHEA, DM — Validating a caregiver-based questionnaire to assess sexual behaviors in patients with brain injury, frontotemporal lobar degeneration and corticobasal syndrome
63. KRISHNAN, K — Change in Montreal Cognitive Assessment Over Time
64. FALKOWSKI, JA — Converting Montreal Cognitive Assessment to Mini-Mental State Examination Scores
65. OJEDA, N — Validation and Normalized data for the M-WCST (NORMACOG Project) in Spanish Population
66. NATELSON LOVE, MC — Alabama Brief Cognitive Screener (ABCs): Design and Initial Clinical Experience
67. FIELDS, KN — A psycholinguistic analysis of the Word Memory Test: Item level characteristics and variability
68. RUSS, K — The reliability of cognitive consistency: Cognitive intra-individual variability across two testing sessions
69. MCCLINTOCK, SM — Psychometric Properties of the NIH Toolbox Cognitive Battery in Patients with Parkinson Disease
70. VELLA, L — Cognitive Impairment Rates in a Sheltered Homeless Population
71. NOULLET, CJ — The Ecological Validity of Measures of Visual Attention in Community-Dwelling Older Adults
72. PULSIPHER, DT — Influence of Sociodemographic Variables on a Performance-Based Measure of Everyday Functioning
73. MARCOTTE, T — EEG-based Workload Estimates During Driving Simulation Predict On-road Performance
74. SCHULTHEIS, MT — Neuropsychology and Functional Activities of Daily Living

75. WHIPPLE, E — Cognition and driving in multiple sclerosis
76. MORSE, C — Multitasking and Vocational Functioning in Multiple Sclerosis: A Performance Based Assessment

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

77. GIOVANNETTI, T — Characterizing Everyday Functioning in Mild Cognitive Impairment with Performance-based Assessment and a Neurocognitive Model
78. BLACKSTONE, K — Metacognition of Everyday Multitasking Among HIV+ Adults
79. SANDERS, C — The map task: An Open-Ended Test of Planning Ability using Ecologically-Valid Stimuli in a Real-World Environment

Assessment/Psychometrics/Methods (Child)

80. POWELL, SK — Analysis of a Novel Model for Neuropsychological Services in a Pediatric Training Hospital: Creation of a Targeted Neuropsychological Assessment Clinic
81. ENNOK, M — Cognitive Processess Assessed by the Contingency Naming Test
82. MCKITTRICK, KJ — An Indepth Investigation of the Beery-Buktenica Developmental Test of Visual-Motor Integration-Sixth Edition: Evidence of a Flynn Effect and Relations with Intelligence
83. LOVELL, M — Normative data for the neuropsychological risk factors reported on the ImPACT neurocognitive test battery
84. IRWIN, J — Comparison of the Reynolds Intellectual Assessment Scales (RIAS) to the Wechsler Intelligence Scale for Children – Fourth Edition in Canadian Children
85. DE JONG, DM — Prenatal Tobacco Exposure and Preschoolers' Observed Externalizing Behavior under Conditions of Frustration
86. WELSH, J — Utility of the ImPACT with Deaf Adolescents
87. PATRICK, K — The Relationship Between Early and Later Language Skills in a Longitudinal Sample of Very Young Children
88. RAIFORD, SE — Validity of New WISC-V Visual Spatial, Fluid Reasoning, Visual Working Memory, Rapid Naming, and Visual-Verbal Associative Memory Subtests
89. HARDY, KK — Promoting Participation in Large, Multi-site Clinical Trials of Neurocognitive Functioning: Use of a Brief, Computerized Neurocognitive Battery for Pediatric Patients with Cancer

4:45–5:45 PM — **Birch Lecture: A Social Neuroscience Perspective on Adolescent Risk-Taking (CE Session F)**
Presenter: Laurence Steinberg
Grand Ballroom B&C

1. STEINBERG, L — A Social Neuroscience Perspective on Adolescent Risk-Taking

FRIDAY, FEBRUARY 14, 2014

7:20–8:50 AM — **Student Panel, Presented by the INS Student Liaison Committee**
Grand Ballroom D

7:20–8:50 AM — **CE Workshop 9: This is Your Brain on Weed: The Neuropsychological Impact of Marijuana and Alcohol Use in Adolescence**
Presenter: Susan Tapert
Redwood

1. TAPERT, S — This is Your Brain on Weed: The Neuropsychological Impact of Marijuana and Alcohol Use in Adolescence

7:20–8:50 AM — **CE Workshop 10: Neuropsychology and Real World Functional Assessment: Success, Barriers and What the Future may Bring**
Presenter: Maria Schultheis
Willow

1. SCHULTHEIS, M — Neuropsychology and Real World Functional Assessment: Success, Barriers and What the Future may Bring

9:00–10:00 AM — **Invited Address: Why is Autism More Common in Males? (CE Session G)**
Presenter: Simon Baron-Cohen
Grand Ballroom B&C

1. BARON-COHEN, S — Why is Autism More Common in Males?

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

10:00–10:15 AM **Friday AM Coffee Break**
Ballroom Foyer/Metropolitan Ballroom

10:00–11:30 AM **Symposium 4: Global Neuropsychology**
Chair: David Schretlen
Grand Ballroom A

1. SCHRETLEN, DJ — Global Neuropsychology
2. HOFER, SM — Integrative Analysis of Longitudinal Studies on Aging (IALSA): Challenges and Requirements for Quantitative Harmonization
3. GROSS, AL — Big Questions in Cognitive Aging: An Integrative Analysis Approach
4. SULLIVAN, C — Cognitive Aging on Four Continents
5. SCHRETLEN, DJ — Cultural Differences in the Effects of Education and Illiteracy on Animal Naming

10:00–11:30 AM **Paper Session 4: Child and Adolescent TBI**
Moderator: Kelly McNally
Grand Ballroom D

1. ARENIVAS, A — Neural activation on a working memory functional MRI task in pediatric sports-related concussion
2. AMAYA-HODGES, M — Retrospective Reports of Pre-Injury Symptoms: Psychometric Properties and Clinical Utility for Pediatric Concussions
3. JIVANI, S — Effects of Injury Severity on White Matter Tract Fractional Anisotropy in Chronic Pediatric Traumatic Brain Injury and the Relationship to Memory
4. HEVERLY-FITT, S — Investigating a Proposed Model of Social Competence in Children with Traumatic Brain Injuries (TBI)
5. HENDRIX, CL — Pragmatic language mediates the relationship between early childhood TBI and adaptive functioning

10:15–11:15 AM **Symposium 5: Item Response Theory and Rasch Analysis in Neuropsychology: Modern Methods for Refining, Calibrating, and Interpreting Measures**
Chair: Callie Tyner
Discussant: Michael Thomas
Grand Ballroom B&C

1. TYNER, CE — Item Response Theory and Rasch Analysis in Neuropsychology: Modern Methods for Refining, Calibrating, and Interpreting Measures
2. MILLIS, SR — Introduction to the Rasch model
3. GIBBONS, LE — Item Response Theory Methods for Calibrating Multiple Tests of the Same Domain
4. TYNER, CE — Pay no attention to that man behind the curtain: Psychometric considerations uncovered by Rasch analysis of a pediatric test of sustained attention
5. THOMAS, ML — A Component Process Analysis of Working Memory Deficits Associated with Head Injury Using Multidimensional Item Response Theory

10:15–11:30 AM **Poster Session 6: Alzheimer's Disease, Medical/Neurological Disorders in Adults, Epilepsy/Seizures**
Metropolitan Ballroom

Dementia (Alzheimers)

1. KERR, DL — Relationships between Brain Atrophy and Financial Capacity in Patients with aMCI and AD
2. EMBREE, L — FDDNP-PET Imaging Identifies Alzheimer's disease-like Binding Patterns in Subjects with Non-Amnestic Mild Cognitive Impairment
3. WIERENGA, CE — Altered Brain Response to Object Naming in Alzheimer's Disease Risk: A Simultaneous BOLD fMRI and Pseudocontinuous Arterial Spin Labeling Study at 3T
4. HARTMAN, ER — Myelin Integrity and Trails B Performance in Normal Elderly, Mild Cognitive Impairment, and Alzheimer's Disease
5. MCDONNELL, Z — Basal Ganglia Hyperintensities in Relation to the Modified Mini-Mental State (3MS) in the Cache County Study on Memory Health and Aging
6. TSUI, YH — Scheltens et al. Ratings For White Matter Hyperintensities in the Cache County Study on Memory Health and Aging
7. COHEN SHERMAN, J — Three-Word Bricolage: A New Task Distinguishes Mild Cognitive Impairment From Healthy Aging
8. TANIGUCHI, A — California Verbal Learning Test (CVLT) Indices of Memory and Pattern Separation Correlate with Hippocampal Volume in Normal Aging, Mild Cognitive Impairment (MCI), and Alzheimer Disease (AD)

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

9.	BONNER-JACKSON, A	Longitudinal Changes in Semantic Memory Activation in Healthy Elders at Genetic Risk for Alzheimer's Disease: Results of a 5 Year fMRI Study
10.	EDMONDS, EC	Susceptibility of the Conventional Criteria for Mild Cognitive Impairment to False Positive Diagnostic Errors: Evidence from the Alzheimer's Disease Neuroimaging Initiative
11.	SHAKED, D	Memory Awareness Influences Modification of Everyday Activities in Cognitively Impaired Elders
12.	COSENTINO, S	Metamemory is Associated with Right Insular Volume in Healthy Aging and Alzheimer's Disease
13.	CINES, S	Disentangling The Link Between Awareness and Depression in Alzheimer's Disease
14.	WARD, A	Olfaction: A key to understanding neural degeneration in Alzheimer's disease?
15.	WEAKLEY, AM	Analysis of Verbal Fluency Ability in Alzheimer's Disease The Role of Clustering, Switching, and Semantic Proximities
16.	EDWARDS, M	Molecular Markers of Neuropsychological Functioning and Alzheimer's Disease
17.	GLENN, M	Temporal Associative Memory Differences in Healthy Older Adults with Pathological or Normal Cerebrospinal Fluid Markers of Alzheimer's Disease
18.	TRAVIS SEIDL, JN	Baseline Neuropsychological Test Performances Differ Between Rapidly and Slowly Progressing Alzheimer's Disease Patients
19.	MCLAUGHLIN, PM	Metacognition in Mild Cognitive Impairment and Alzheimer's disease
20.	MCLAUGHLIN, PM	Variability in Verbal Fluency Performance and Everyday Functioning in Mild Cognitive Impairment and Alzheimer's disease
21.	CARTER, K	The Relationship Between Atherosclerosis Progression and Cognitive Function
22.	PARIKH, M	Predicting the Rate of Decline in Alzheimer Disease: The Role of Neurocognitive Performance Features
23.	ALVERSON, WA	Progression and Stability of Cognitive Asymmetry in a Large Sample of Alzheimer's Disease Patients
24.	KANDAH, C	Longitudinal Performance on the Mini-Mental State Exam (MMSE) and the Mattis Dementia Rating Scale-2 (DRS)
25.	LANE, EM	The Impact of Diabetes Medications on Alzheimer's Disease and Vascular Neuropathology
26.	MULHAUSER, K	Group Differences Between Mild Cognitive Impairment, Vascular Dementia, and Alzheimer's Disease on the Geriatric Depression Scale
27.	JOLLIE, RG	The Relation Between Premorbid Occupation Level and Overall Cognitive Function in Parkinson's Disease
28.	LY, JJ	Deficits in Top-down Processing and Processing Speed in Alzheimer's Disease and Aging, Using the Attentional Blink Paradigm
29.	GIFFORD, K	APOE modifies the relation of cognitive complaints and episodic memory in older adults with mild cognitive impairment
30.	LAU, K	Early functional limitations increase risk of disability and dementia
31.	PARK, LQ	Memory and Executive Functioning Are Important Longitudinal Predictors of IADLs Across the Spectrum of Alzheimer's Disease
32.	FARRELL, M	Subjective word-finding difficulty predicts engagement in social leisure activities in Alzheimer's disease
33.	YOU, SC	Neuropsychiatric Symptoms Predict Functional Status in Alzheimer's Disease
34.	SOLOMON, T	Correlational Analysis of Five Commonly Used Measures of Cognitive Functioning and Mental Status: An Update
35.	DEBROS, GB	The Montreal Cognitive Assessment (MoCA) Is Superior to the Mini-Mental State Examination (MMSE) in Differentiating MCI from Normal Healthy Aging in Patients With Subjective Memory Complaints
36.	GURNANI, A	A Meta-Analysis Examining the Utility of Neuropsychological Tests in Diagnosing Neuropathologically Confirmed Alzheimer's Disease
37.	ENNOK, M	Assessment of Constructional Skills in Patients with Alzheimer's Disease and Parkinson's Disease with Dementia
38.	PENNEY, DL	What The Digital Clock Drawing Test (dCDT) Tells Us About The MoCA Clock Scoring Criteria
39.	PENNEY, DL	Working Harder But Producing Less: The Digital Clock Drawing Test (dCDT) Differentiates Amnestic Mild Cognitive Impairment And Alzheimer's Disease
40.	PENNEY, DL	Rare Errors In The Clock Drawing test: What Missing Hands And Numbers Tell Us
41.	PENNEY, DL	Detecting Mild Cognitive Impairment Using The MoCA Clock Drawing Subtest

Medical/Neurological Disorders/Other (Adult)

42.	SEICHEPINE, DR	Gulf War Illness: Chronicity of Health Symptoms in the Ft. Devens Cohort
43.	WALD, D	A Case Study of an Adult with Fahr's Disease
44.	SHIELDS, M	Physical Activity Level Predicts Reaction Time in Lean, not Obese, Individuals
45.	FEIGON, M	Cognitive Variables Predicting Performance on the Competency Rating Scale in African-Americans with Sickle Cell Disease
46.	MASON, LH	Residual Verbal Fluency Deficits in Anti-NMDA-receptor Encephalitis Status Post-plasmapheresis
47.	SONGY, C	Challenging the Odds: Recovering from West Nile Encephalitis
48.	JONES, J	The Cognition Index of the Parkinson's Disease Questionnaire-39: What does it really measure?
49.	JONES, J	Mood and Amotivation Symptoms in Parkinson patients with and without Mild Cognitive Impairment (MCI): Comparison of 3 MCI classification approaches
50.	LEMONDA, BC	A Data-Driven Approach to the Classification of Neurocognitive Subtypes of Parkinson's Disease: Clinical Correlations and Relationship to MDS Criteria

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

51. LEMONDA, BC — A Case Study of a Patient Following a Diagnosis of Susac's Syndrome: Interindividual Variability
52. HAZAMY, AA — The Effects of a Cycling Dual Task on Cognition in Parkinson's Disease
53. SLONENA, EE — The Role of Levodopa, Pulse Pressure, and Motor Asymmetry in Parkinson's Disease
54. KAUFMAN, DA — Apathy, Novelty Processing, and the P3 Potential in Parkinson's Disease
55. MACE, LC — Associations Between Capacity Judgments and Cognitive Performance on the Montreal Cognitive Assessment in Parkinson's Disease
56. BOGDANOVA, Y — Effects of Parkinson's Disease on Numerical and Spatial Cognition
57. AMIDI, A — A Graph Analytical Approach to Animal Category Fluency in Parkinson Patients and Healthy Controls
58. YEE, MK — Pre-surgical Neuropsychological Tests Predict Post-deep Brain Stimulation Surgery Functional Status in Parkinson's Disease
59. MAHENDRA, N — Effects of Huntington Disease on Cognition and Linguistic Communication
60. MCHUGH-GRANT, S — Biomarkers of Heart Failure and the Identification of Cognitive Impairment
61. GOLDSTEIN, CM — Cognitive Dysfunction is Associated with Increased Physical Limitations But Not Greater Symptom Burden in Heart Failure Patients
62. ALOSCO, M — Reduced Physical Activity Predicts Decreased Cerebral Blood Flow and Cognitive Dysfunction at a One Year Follow Up in Heart Failure
63. ALOSCO, M — Preliminary Observations on MRI Correlates of Driving Independence and Performance in Older Adults with Heart Failure
64. GARCIA, S — The Relationship between Physical Activity and Neuroimaging Indices in Heart Failure
65. FULCHER, KK — Executive Function Predicts Depressive Symptoms in Older Adults with Heart Failure over 12 Months
66. SEIDEL, GA — Heterogeneity of Neuropsychological Profiles in Older Adults with Cardiovascular Disease: A Latent Class Analysis Approach
67. GONZALES, M — Central Adiposity Predicts Diminished BOLD Response in the Frontal Lobes
68. CALVO, D — Is Uncontrolled Eating Related to Poorer Inhibitory Control?
69. SPITZNAGEL, M — Neurocognitive Response to Glycemic Regulation of Common Beverages
70. TOURADJI, P — Associations of TICS with Education, Literacy, and Glycemic Control in a Low-Income African-American Sample with Type 2 Diabetes
71. DE SANCTIS, V — Glutamic Acid Decarboxylase Autoantibody Syndrome Presenting as Depression with Cognitive Deficits: A Case Study
72. YOUNG, JC — Amnesia following thyroid cancer: A case report
73. CONSIDINE, CM — Phonemic, Semantic, and Emotional Word Generation Performance in Treated versus Untreated Obstructive Sleep Apnea Patients
74. DEMIAN, M — Health Literacy, Neurocognitive Ability, and Medication Adherence in Adult Kidney Transplant Recipients
75. HOTH, KF — Daily Activities: The Impact of COPD and Cognition
76. PECK, CP — Further Support for Geschwind's Theory of a Disconnection Syndrome in an Atypical Case of Gerstmann's Syndrome

Epilepsy/Seizures

77. TREBLE-BARNA, A — Brief Behavioral Intervention for Disruptive Behavior in a Child Following Frontal and Temporal Resection for Medically Intractable Epilepsy: A Case Report
78. LOVELL, MR — Adolescent athletes with a history of seizures report a greater number of symptoms at baseline compared to matched controls
79. BAEK, R — Performance validity testing in patients with epilepsy, non-epileptic seizures, and psychiatric disorders
80. STEFANATOS, AK — Executive and Psychosocial Functioning in Children with Intractable Epilepsy Following Surgical Resection
81. BRENNER, L — Word Retrieval Before and After Temporal Lobe Epilepsy Surgery in a Pediatric Sample
82. LONG, E — Psychiatric Comorbidity and Cognitive Flexibility in Pediatric Epilepsy
83. VERCHE, E — Reading problems in children and adolescents with Frontal Lobe Epilepsy
84. BERMUDEZ, CI — Behavioral Changes in Children with Refractory Epilepsy Following Hemispherectomy
85. BOYER, K — Neuropsychological Profiles of Children with Benign Rolandic Epilepsy
86. DORFMAN, A — Cognitive Outcome Following Temporal or Frontal Lobectomy in Children with Pharmacoresistant Epilepsy
87. SEPETA, L — Hippocampal Functioning in Typically Developing Adults
88. MILLER, L — Risk Factors for Cognitive Impairment in Older Adults with Epilepsy
89. HARGRAVE, DD — Predictors of Longitudinal Change in Executive Function in Chronic Temporal Lobe Epilepsy
90. WILLIAMSON, JB — Closure in temporal lobe epilepsy: Laterality and open endings
91. BOTT, NT — Right Hemisphere Functional Connectivity Correlates with Verbal Memory Performance in Left Temporal Lobe Epilepsy
92. GLASS UMFLEET, L — Verbal Memory and Visual Naming Outcome Following Left Anterior Temporal Lobectomy: A Comparison between Electrical Stimulation Mapping Paradigms
93. WINSTANLEY, F — Prediction of Post-Operative Memory Outcome in Temporal Lobectomy Patients Using Resting State Intrinsic Connectivity Distribution
94. BONNER, S — Social Cognition in Post-Surgical Temporal Lobe Epilepsy Patients

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

95. EICHSTAEDT, KE — Predicting Material Specific Memory Deficits Among Patients with Temporal Lobe Epilepsy with Performance Validity Tests and Rey Auditory Verbal Learning Test: Do Green's Word Memory Test Scores Share Variance with RAVLT?
96. COLLINS, R — Perceived Competency and Quality of Life Deficits in Individuals Experiencing Psychogenic Non-epileptic Events
97. BALDASSARRE, M — Neuropsychological profiles associated with epilepsy, non-epileptic seizures and Psychiatric Disorders

Dementia (Subcortical, Specific Disorders, MCI, etc.)

98. WEISSBERGER, G — Elevated Pulse Pressure is Associated with Executive Dysfunction in Hispanic Older Adults

11:30 AM–12:30 PM

Invited Address: Age-related Memory Decline: New Insights from Imaging, Genetics, and Biomarkers (CE Session H)
Presenter: Andrew Saykin
Grand Ballroom B&C

1. SAYKIN, AJ — Age-related Memory Decline: New Insights from Imaging, Genetics, and Biomarkers

12:30–1:45 PM

Poster Session 7: Memory, Functional Imaging, Emotional Processes, Psychopathology/Neuropsychiatry, Autism Spectrum Disorders
Metropolitan Ballroom

Memory Functions

1. OKAHASHI, S — Activation of the Prefrontal Cortex during Free-recall Task using Unrelated/Related Word List: a fNIRS Study
2. BINDER, A — Recognition Memory for Negative Stimuli: Complex Associations with Emotion Regulation
3. KUHN, T — Temporal Lobe Memory Circuits: White Matter Integrity and Memory Performance in Temporal Lobe Epilepsy
4. SOLOMON, T — A Proof of Concept Study for a Randomized Double-Blind, Placebo Controlled, Parallel Group, Efficacy Study of AlphaBrain(TM) Administered Orally
5. MAGNUSON, SA — The Effects of Stroke on Prospective Memory
6. WOODS, SP — Implications of Prospective Memory for Real-World Functioning: A Meta-Analysis
7. RASKIN, S — Using a Measure of Prospective Memory to Predict Onset of Dementia
8. BENEDETTO, A — Prospective Memory and Natural Actions Tasks in Individuals with Traumatic Brain Injury
9. HUA, M — Metacognitive Awareness of the Prospective Memory in Time-based and Event-based tasks
10. PARK, P — Effects of Facial Attractiveness on Memory for Faces in Patients with Parkinson Disease
11. OELKE, L — Source Memory and Generation Effects in Parkinson's Disease
12. MCALISTER, C — Noncontent Memory and Its Relation to Everyday Functioning in Individuals with Mild Cognitive Impairment
13. KIRTON, JW — Cognitive Sequelae of Increased Body Mass Index
14. PAINTER, KN — Obesity Relates to Decreased Verbal Memory in Adolescents
15. BUTTS, AM — Case Study: Intact Procedural Memory with Dense Amnesia in an Adolescent with Bilateral Medial Thalamic and Hippocampal Lesions
16. LOUGHAN, AR — Visual Memory testing in Children with Developmental Disorders: CMS Visual Memory versus the Rey Complex Figure Recall
17. JORDAN, LL — Pediatric Verbal "Memory" Impairments Stem from Encoding Deficits
18. CONSTANCE, JM — An Investigation of Rote and Semantically-Related Verbal Short-term Memory in a Children with RD and/or ADHD

Imaging (Functional)

19. MCINTOSH, E — Investigating the associations between brain activation and depressive symptoms and measures of adiposity during hedonic evaluation of sucrose
20. RAO, JA — Depression and Aging Interact in Producing Aberrant Activation of Frontostriatal Circuits in Major Depressive Disorder
21. RAO, JA — Disruption of Response Inhibition Circuits in Prodromal Huntington Disease
22. MANNING, J — Decreased Functional Connectivity In The Reward System In Social Anxiety Disorder
23. BROWN, GS — Dissociable Neural Networks are Preferentially Engaged During Allocentric and Egocentric Spatial Learning
24. ZLATAR, ZZ — Hippocampal Cerebral Blood Flow and Sedentary Behavior in Older Adults: An Arterial Spin Labeling Study
25. HANTKE, N — Multi-Voxel Pattern Analysis of Famous and Non-Famous Names in Older Adults
26. SUGARMAN, MA — Functional Correlates of Verbal Working Memory in Healthy Aging and Early Alzheimer's Disease
27. LE BERRE, A — Functional Network of Metamemory Performance During an Episodic Feeling-Of-Knowing Judgment
28. LAM, J — A Problem-Solving Task Specialized for Functional Neuroimaging: Validation of the Scarborough Adaptation of the Tower of London (S-TOL) using Near-Infrared Spectroscopy

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

29.	STOUTEN-KEMPERMAN, M	Treatment-dependent cognitive impairment and brain function in breast cancer survivors ≥10 years post-treatment
30.	HILLARY, FG	Hyperconnectivity as a Fundamental Network Response After Neurological Disruption
31.	LEAVITT, VM	The Neural Basis of Cognitive Preservation in Multiple Sclerosis
32.	KILLGORE, WD	Predicting Resilience Against Sleep Loss with Multi-Modal Neuroimaging

Emotional Processes

33.	KILLGORE, WD	The Role of Personality in Sleep Initiation Problems
34.	KILLGORE, WD	The Association Between Sleep, Functional Connectivity, and Emotional Functioning
35.	HASHIMOTO, Y	Sensitivity to the Facial Expression after Traumatic Brain Injury: In the case of Diffuse axonal Injury
36.	HAZAMY, AA	Language Processing in Parkinson's Disease: Effects of Word Valence and Concreteness
37.	DENNY, K	Characterization of depressive symptomatology in ALS and Parkinson's
38.	CREIGHTON, J	Differential Effects of Emotion on Aspects of Reaction Time (Movement and Decision Time) in Mild Parkinson's Disease (PD)
39.	O' SHEA, DM	Examining the Association between Late Life Depressive Symptoms and Cognitive Function in the Context of Cognitive Reserve
40.	LLAMAS, V	Alexithymia and the Role of Attention in Processing Emotion
41.	JENKINS, LM	Hyperactivation and Hyperconnectivity of the Emotional Salience Network are Associated with Intact Facial Emotion Perception in Young Adults with Remitted Major Depressive Disorder
42.	ALLEN, BL	The Relationship Between the Factors of the Beck Anxiety Inventory and Executive Functioning
43.	BRICENO, EM	Unique and divergent neural activation associated with better and poorer emotion perception in healthy adults
44.	HAMILTON, J	Basic Emotion Processing Assessment and its Functional Implications
45.	KESHAVARZIAN, N	An Analysis of Emotional Processing in Natural Sciences Versus Humanities and Social Sciences University Students
46.	JIVANI, S	Differences in Interhemispheric Transfer Time Across the Corpus Callosum Due to Emotional Valence of Stimuli

Psychopathology/Neuropsychiatry (Other)

47.	MCCAULEY, SR	Effects of PTSD, Mild Traumatic Brain Injury, and Alcohol Abuse on Sleep Quality in OEF/OIF Veterans
48.	HIGHSMITH, J	Generalized Clinical and Subclinical Anxiety Effects on Neuropsychological Test Performance
49.	CLAYSON, PE	Cognitive Control Processes in Generalized Anxiety Disorder: Sex Differences in Error-Related Performance Monitoring Indices
50.	CLAYSON, PE	Cognitive Control Processes in Major Depressive Disorder: Sex Differences in Error-Related Performance Monitoring Indices
51.	REINLIEB, M	Cognitive outcomes following methylphenidate augmentation of citalopram in geriatric depression
52.	CARTER, A	Punishment Response Biases in Depression: Implications for Neural Models
53.	ESTEVIS, E	Melancholic vs. Atypical Syndromes of Major Depressive Disorder: A Dissociation of Executive Function Deficits
54.	HARIKUMAR, A	Neuropsychological Correlates of Atypical Depressive Symptoms Among Outpatients
55.	STRINGER, D	Title: Personality As A Clinical Tool For Estimating Cognition Among Individuals With Bipolar Disorder
56.	MARSHALL, DF	Cognitive Functioning in Euthymic Bipolar Disorder and Controls with Cardiovascular Diseases and Risk Factors
57.	BAKER, A	Subjective sleep problems not related to cognitive performance in a large sample of patients with bipolar disorder
58.	PESTER, BD	Clinical and Cognitive Predictors of Work Performance in Bipolar Disorder
59.	MACKALA, S	Cognitive Performance and Quality of Life Early in the Course of Bipolar Disorder
60.	DEV, SI	Increased Cerebral Blood Flow Associated with Better Inhibition in Bipolar Disorder
61.	OJEDA, N	Cognitive Impairment in First-Episode Bipolar I Disorder: The Processing Speed Hypothesis

Psychopathology/Neuropsychiatry (Schizophrenia)

62.	OJEDA, N	Insight Mediates the Relationship of Cognitive Reserve and Functionality in First Episode Psychosis
63.	CARRATHERS, T	Serial Position Effect and Error Types for Sequential Recall Tasks in Schizophrenia
64.	KIM, M	Relationship between IGT and WCST performances in individuals with schizotypal traits
65.	PARK, M	Neuropsychological profiles of patients with schizophrenia and nonclinical individuals with schizotypal traits
66.	PEECHATKA, AL	Dorsal Anterior Cingulate Glutamate Levels as an Indication of Disorder Severity in Chronic Schizophrenia
67.	BODAPATI, AS	Verbal Memory Differentially Predicts State and Trait Anhedonia across Schizophrenia Subtypes
68.	BURTON, CZ	Associations Between Prospective Memory, Level of Disability, and Return to Work in Severe Mental Illness
69.	GILBERT, CD	Incremental Validity of a Performance-based Measure of Formal Thought Disorder in a Sample of Adults with Schizophrenia
70.	MULLANE, AA	Relationship between Cognitive Scores, Psychotic Symptoms, and Effort in Veterans with Serious Mental Illness

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

71. GAVRON, L — Social Functioning and Social Cognition as Related to Coping Strategies in Individuals with Schizophrenia
72. BUCHHOLZ, A — Beyond General Neuropsychological Deficits, Familiality of Working Memory Impairment is Evident in Schizophrenia but Not in Schizoaffective and Psychotic Bipolar Pedigrees

Autism Spectrum Disorders

73. VAN STEENBURGH, JJ — Transcranial Direct Current Stimulation Changes Frontoparietal Control Network Connectivity Associated with Working Memory Performance in High-Functioning Autism
74. KENWORTHY, L — Randomized Controlled Effectiveness Trial of Executive Function Invention for Children on the Autism Spectrum
75. CARSON, AM — Electroencephalogram Coherence in Teens with and without Autism Spectrum Disorders
76. MCLEAN, R — Executive Function Deficits are Associated with Adaptive Function Impairment in Individuals with Autism and Average IQ
77. HAISLEY, LD — Relationship Between Executive Functioning and Restricted and Repetitive Behaviors in 8-10 Year Olds with Autism Spectrum Disorders
78. SONGY, C — Using the Variable of Impulsivity on the Test of Variables of Attention to Improve Medication Management in Children with Asperger's Disorder and Attention-Deficit/Hyperactivity Disorder
79. WODKA, E — Relationship between Attention, Hyperactivity/Impulsivity, and Sensory Behavior in Autism
80. HUNT, I — Cognitive Control and Performance Monitoring in Individuals with Autism Spectrum Disorders: A Meta-Analytic Review
81. CLAWSON, A — Watching Others: Cognitive Control During Observation in Autism
82. WELLER, JA — Do Internalizing Disorders Change Performance on Measures of Cognition and Emotion in Children with Autism Spectrum Disorder (ASD)?
83. PERREAULT, A — Local Information Influences Visual Shape Perception in Autism
84. DUMAS, K — Altered Visually Driven Dampening of Auditory Processing in Children with Autism
85. DUFFIELD, T — Neuropsychological Investigation of Stability of Motor Functioning in Autism Spectrum Disorder (ASD)
86. FUKATSU, R — Motor Functioning in Young Children with Autism
87. TROYB, E — Do Restricted and Repetitive Behaviors During Early Childhood Predict School-Age Outcome Among Children with Autism Spectrum Disorders?
88. DUVALL, S — Examining Gender Differences in Autism Spectrum Disorder
89. NAIR, A — Differential patterns of disrupted functional connectivity between thalamus and prefrontal and temporal cortex in Autism Spectrum Disorders (ASD)
90. LUDWIG, N — Behavioral Validation of a Novel Measure of Social Attribution: The Dynamic Interacting Shape Clips (DISC)
91. GRANADER, Y — Exploring Cogmed in Children with Autism Spectrum Disorders
92. TRONTEL, H — Intellectual Functioning and Differences in Memory Performance in Autism

1:30–3:00 PM — Invited Symposium: Clinical Trials of Behavioral Interventions in Neurologic Patients : Developing Evidence (CE Session J)

Chair: Sureyya Dikmen
Discussants: Charles Bombardier, Nancy Temkin
Grand Ballroom B&C

1. DIKMEN, S — Clinical Trials of Behavioral Interventions in Neurologic patients : Developing Evidence
2. EHDE, DM — Efficacy of Telephone-Delivered Cognitive Behavioral Therapy for Pain in Neurologic Conditions
3. FANN, JR — Telephone and In-Person Cognitive Behavioral Therapy for Major Depression after Traumatic Brain Injury: A Randomized Controlled Trial
4. DIKMEN, SS — The Effect of a Scheduled Telephone Intervention on Outcome After Moderate to Severe Traumatic Brain Injury
5. BELL, K — The Effect of a Scheduled Telephone Intervention on Outcome After Moderate to Severe TBI

1:30–3:00 PM — Symposium 6: Neuropsychology, Technology, and the 21st Century

Chair: Robert Kane
Grand Ballroom A

1. KANE, R — Neuropsychology, Technology, and the 21st Century
2. PARSONS, TD — Virtual Environment-Based Computerized Neuropsychological Assessment Devices
3. BIGLER, ED — 21st Century Integration of Neuroimaging with Neuropsychology
4. CHEN, AJ — From Brains to Games: Technology Contributions to Sharpening Cognitive Functioning after Brain Injury
5. CULLUM, M — Teleneuropsychology: Evidence for Remote Neuropsychological Assessment

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

1:30–3:00 PM

Symposium 7: Early Life Experience and Late Life Cognitive Change
Chair: Bruce Reed
Grand Ballroom D

1.	REED, B	Early Life Experience and Late Life Cognitive Change
2.	MUNGAS, D	Demographic diversity and cognition in late life: Determinants of baseline differences are not mirrored in longitudinal change
3.	MELROSE, RJ	Low Physical Growth and Childhood SES Increase the Rate of Cognitive Decline in Late Life: Findings from the UC Davis Aging Diversity Cohort
4.	BARNES, L	Early-life adversity and late-life cognitive decline among diverse older adults
5.	ZAHODNE, LB	"Good Enough Schooling": Only Early Education Protects against Late-Life Cognitive Decline
6.	BOYLE, P	Potential mechanisms linking childhood circumstances to trajectories of cognitive aging

2:00–3:15 PM

Poster Session 8: Executive Functions/Frontal Lobes, Electrophysiology, Structural Imaging
Metropolitan Ballroom

Executive Functions/Frontal Lobes

1.	SANZ, JH	Executive Function and Quality of Life in School Age Children with Congenital Heart Disease
2.	KRIVITZKY, L	Executive Functioning Profiles in Children with a history of Pediatric Stroke
3.	ARTNAK, M	Executive Functioning and Quality of Life in Pediatric Congenital Adrenal Hyperplasia Patients
4.	MIETCHEN, JJ	Executive Function and Sleep-Related Disordered Breathing among Adolescent Behavioral Weight Loss Program Participants
5.	WOODS, SE	The Mediating Role of Executive Function in the Link Between Parenting and Children's Physical Aggression
6.	HENRIQUEZ, SM	Executive Functioning in Ethnic Minority Youth and Reporter Congruence in Relationship with Objective Measure Performance
7.	GUSTAFSON, EL	A Targeted Executive Functioning Intervention Model for Vulnerable Youth
8.	KASZYNSKI, KL	Executive Functioning, Temperament, and Antisocial Personality Disorder in Homeless Youth
9.	ARES, K	The Relationship between Executive Functioning, Memory, and Risk Taking Behaviors in Homeless Youth
10.	MOLNAR, AE	Unique and Shared Executive Functioning Deficits in Children with ADHD or Dyslexia when Not Controlling for Intellectual Functioning
11.	GERST, EH	Performance and Behavioral Executive Function Measures and Academic Outcomes in Children
12.	LALONDE, G	Links Between Early Childhood Language And The Development Of Executive Functions
13.	MCCUE, KA	Specificity of Deficits in Executive Functioning in Youth with Nonverbal Learning Disability and Attention Deficit Hyperactivity Disorder
14.	DIQUATTRO, ME	Executive Functioning in Children with Autism, Attention-Deficit/Hyperactivity Disorder, and Comorbid Autism and Attention-Deficit/Hyperactivity Disorder
15.	CIRINO, PT	Incorporating Executive Function into Reading Instruction
16.	BERMUDEZ, CI	Transcranial Doppler Velocity Levels in relation to Memory and Executive Functioning in Children with Sickle Cell Disease
17.	MOORE, WR	Fostering an understanding of the bilingual advantage in young adults: Application of a comprehensive model of executive function
18.	DUVALL, S	Multimodal Executive Function Measurement in Preschool Children Born Very Low Birth Weight and Full Term: Relationship Between Performance, Parent Report and Observational Coding
19.	CHIASSON, V	Neuropsychological Outcomes After Early Frontal Lesion : A Case Study
20.	BUELOW, MT	The Influence of an Additional 100 Trials on Iowa Gambling Task Performance
21.	BUELOW, MT	Association Between the Delay Discounting Task and Individual Deck Selections on the Iowa Gambling Task
22.	BUELOW, MT	Social Exclusion Affects Risky Decision Making
23.	BUELOW, MT	Relationships between Personality Characteristics, Mood, and the Columbia Card Task
24.	MAGRYS, S	Alcohol and Acute Stress Interact to Increase Impulsive Responding Among Undergraduates
25.	SUNDERARAMAN, P	The Influence of Cognitive Abilities on Different Aspects of Everyday Decision Making Competency in Young Adults
26.	LANTRIP, C	Relationship between Emotion Regulation Strategies and Executive Functions in Adolescents' Daily Lives
27.	GRAEFE, AC	Decision Making and Executive Functioning Correlates of Risky Driving Behavior in Young Adults
28.	RHODEWALT, L	Executive Problems, Neuroticism, and Affect Suppression: Cognitive and Personality Contributions to Unhealthy Coping
29.	RAAK, J	The Impact of Working Memory and Scenario Intuitiveness on Moral Judgments
30.	FRANCHOW, EI	Abnormally-High Affect Suppression and Longer Motor Planning Time: an Executive Effect
31.	WEISE, RM	The Relationship Between Social Support and Executive Function
32.	HULL, A	Subjective Cognitive Dysfunction: Understanding the Relationship Between Self-report of Cognitive Difficulties, Neurocognitive Performance, Social and Emotional Functioning, and Pain
33.	WIDMANN, G	The Influence of Obsessive Compulsive Symptoms on Executive Functioning

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

34.	RHODES, E	Perseverations and Related Graphomotor Errors Related to Leukoaraiosis Assessed with a Visual Working Memory Test: A Two-Factor Model
35.	TART-ZELVIN, A	Perseverations and Graphomotor Errors Produced on a Visual Serial List Learning Test in Epilepsy
36.	COHEN, J	A Pilot Study of Sex Differences in Graphomotor Planning as a Sign of Differential Executive Impairment in Vascular Aging
37.	WIENER, JR	Motor Perseverations in Frontal Versus Non-frontal Primary Brain Tumors
38.	COHEN, ML	Endogenously and Exogenously Evoked Movement Preparation, Initiation and Reprogramming in Parkinson's Disease
39.	BOTT, NT	Sensitive Measures of Executive Function Deficits in Non-demented Parkinson's Disease
40.	BOTT, NT	Strategy Use on the D-KEFS Design Fluency Test: Relationships with Personality and Creativity
41.	LIM, R	A Quantitative Review of Cognitive Training Effects on the Executive Functions of Older Adults
42.	SUTTON, KA	Physical Exercise Interventions for Executive Functions at Later Age: An Evaluation of Pre-Post Controlled Trials
43.	DIRENFELD, E	Further Examination of a Cross-Cultural Executive Functioning Screener and its Utility in Clinical Populations
44.	BLINKOFF, DC	Examining Convergent Validity of a Novel Set of Executive Function Measures
45.	HUA, M	The Taiwan Odd-Even Number Sequencing Test: An Alternative Measuring Working Memory Function
46.	ELLIOTT, CS	Evaluating Planning Models with Traditional Cognitive Tests and a Performance-based Test of Everyday Action
47.	CRANE, NA	Developing Dimensional, Integrated Constructs of Self-Report and Neuropsychological Data for Inhibitory Control
48.	WITKIN, GA	ASL-Based Clustering on F-A-S Among Deaf College Students
49.	HAYWARD, E	The Effects of Bilingualism on Executive Functioning in a Clinic-Referred Population
50.	KEEN, LD	Influence of Interleukin-6 on Neurocognitive Performance in A Community-Based Sample of African Americans
51.	DULAY, MF	Comparison of Cognitive Profiles After Frontal Versus Cerebellar Stroke
52.	MACKAY-BRANDT, A	Preliminary Lifespan Trajectories of Cognitive, Behavioral, and Neuroimaging Data from the NKI-Rockland Sample Open Access Dataset
53.	MEIER, IB	Lobar Microbleeds Are Associated With Decline In Executive Functioning
54.	DUGGAN, EC	Derivation and Convergent Validity Analysis of a Screener for the Behavioral Assessment of Executive Functions in Young Adults
55.	CREVIER-QUINTIN, E	The Integrative Neuropsychological Theory of Executive-Related Abilities and Component Transactions (INTERACT): Best Predictors of Performance Across the Adult Lifespan
56.	KARR, JE	The Sensitivity of Executive Functions to Multiple Self-Reported Concussions
57.	HILL, K	The Influence of Treadmill Walking on Working Memory and Attention: Paced Auditory Serial Attention Task (PASAT) Performance

Electrophysiology/EEG/ERP

58.	HILL, K	Electrophysiological Indicators of Error Awareness and Performance Monitoring
59.	JANG, K	An Event-related potential study of spatial working memory in nonclinical individuals with ADHD traits
60.	HIGHSMITH, J	Predicting Anterior Cingulate Cortex and Behavioral Responses to Errors: What do Executive Function Measures Tell Us?
61.	ANNETT, RD	Comparison of Mu-Rhythm Suppression in Term and Preterm Infants
62.	DIONNE-DOSTIE, E	The Use of Event-Related Potentials in the Study of the Development of Audiovisual Integration Abilities in Children
63.	PETERS, JB	Neurophysiological Correlates of Task-Switching in Typically Developing Children and Adolescents
64.	LUKIE, CN	Developmental Changes in the Reward Positivity: An Electrophysiological Trajectory of Reward Processing
65.	MOORE, RD	The Influence of Cardiorespiratory Fitness on Strategic, Behavioral, & Neuroelectric Indices of Arithmetic Cognition in Preadolescent Children
66.	PERRY, CE	Anesthesia Exposure, Cognitive Functioning, and Performance Monitoring in Older Adults
67.	PERRY, CE	ApoE Genotype, Performance Monitoring, and Attention in Older Adults
68.	FARRER, TJ	Attention and Dopamine Function in Relation to Performance Monitoring in Community-Dwelling Older Adults: An Event-Related Potential Study
69.	DIETZ RENFROE, J	Electrocortical Correlates of Preparation for Action in Parkinson Disease: Role of Incentive Motivation
70.	BEAULIEU, C	Electrophysiological correlates of implicit motor sequence learning
71.	HENNING, DA	Single Bouts Of Physical Activity Sustain Neural Inhibition
72.	BICKEL, K	Individual Differences in Coping Mechanisms Influence Electrophysiological Responses to Novel Visual Affective Stimuli
73.	LEHOCKEY, KA	Investigating Arousal and Attention Mechanisms of Inhibition

Imaging (Structural)

74.	KILLGORE, WD	Physical Exercise Correlates with Hippocampal Volume in Healthy Adults
75.	KILLGORE, WD	Gray Matter Volume within the Medial Prefrontal Cortex Correlates with Behavioral Risk Taking

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

76. KILLGORE, WD	Sex Differences in Threat Evaluation of Emotionally Neutral Faces
77. MEKOTA, RM	Structural Bain Abnormalities in Combat-Exposed Veterans with Posttraumatic Stress Disorder
78. BUTTS, AM	Cortical Thickness Changes Following Brief Attention Training
79. LANCASTER, MA	Longitudinal White Matter Changes across the Alzheimer's Disease Risk Continuum: A Diffusion Tensor Imaging Study
80. KAY, CD	Motor Timing Intraindividual Variability and Structural Volumes in Healthy Aging and Mild Cognitive Impairment
81. LEE, SE	An Examination of Memory Performance and Anterior and Posterior Hippocampal Volume in Typically Developing Children and Children with ADHD and/or Developmental Dyslexia
82. BREWSTER, R	Double Dissociation Between Integrity of White Matter Tracts, Attention, and Verbal Memory Skills in Adolescents with Congenital Heart Disease
83. MURRAY, A	Cerebral Neonatal Pathology Predicts Adverse Attention and Processing Speed Outcomes in Very Preterm/Very Low Birth Weight Children
84. KRISHNAN, K	Longitudinal Analysis of DTI in a Sample of Professional Boxers
85. WILDE, EA	Serial Diffusion Tensor Imaging in Subacute Uncomplicated Mild Traumatic Brain Injury

3:00–3:15 PM **Friday PM Coffee Break**
Ballroom Foyer/Metropolitan Ballroom

3:15–4:15 PM **Presidential Address: Traumatic Brain Injury - The Challenge to Improve Outcome (CE Session K)**
INS President: Jennie Ponsford
Grand Ballroom B&C

1. PONSFORD, J	Traumatic Brain Injury - The Challenge to Improve Outcome

4:30–5:30 PM **Ceremony to honor INS Executive Secretary Robert Bornstein: Reflections on a Quarter Century**
Grand Ballroom B&C

5:30–6:00 PM **INS Business Meeting**
Grand Ballroom B&C

6:00–7:00 PM **Friday Evening Reception**
Grand Ballroom Foyer

SATURDAY, FEBRUARY 15, 2014

7:20–8:50 AM **CE Workshop 11: Assessment and Enhancement of Decisional Capacity and Informed Consent: Ethical, Methodologic, and Pragmatic Considerations**
Presenter: Barton Palmer
Willow

1. PALMER, BW	Assessment and Enhancement of Decisional Capacity and Informed Consent: Ethical, Methodologic, and Pragmatic Considerations

7:20–8:50 AM **CE Workshop 12: Individual, Social-environmental, and Treatment-related Influences on Long-term Functional Outcomes of Early Childhood TBI: Implications for Intervention**
Presenter: Shari Wade
Redwood

1. WADE, SL	Individual, Social-environmental, and Treatment-related Influences on Long-term Functional Outcomes of Early Childhood TBI: Implications for Intervention

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

9:00–10:30 AM **Invited Symposium: Sifting through the Smoke: Uncovering the Impact of Marijuana Use on Neurocognition (CE Session L)**
Chair: Raul Gonzalez
Discussant: Igor Grant
Grand Ballroom B&C

1. GONZALEZ, R — Sifting through the Smoke: Uncovering the Impact of Marijuana Use on Neurocognition
2. MARCOTTE, TD — Cognitive impact of medicinal cannabis
3. TAPERT, SF — Consequences of Chronic Adolescent Marijuana Use
4. GONZALEZ, R — Decision-Making as a Moderator of Cannabis Use and Consequences from Use
5. LISDAHL, K — Potential Moderators of Marijuana Effects: Age of Onset, Gender, Body Mass, and Genetics

9:00–10:30 AM **Symposium 8: Big-C, little-c: Brain-Behavior Bases of Exceptional and Everyday Creativity**
Chair: Robert Bilder
Grand Ballroom A

1. BILDER, RM — Big-C, little-c: Brain-Behavior Bases of Exceptional and Everyday Creativity
2. KAUFMAN, SB — Opening up Openness to Experience
3. BILDER, RM — The Biology of Creativity: Trans-Species Studies of Creative Cognition
4. VARTANIAN, O — Neuroimaging of Creativity: A Domain Specific Story
5. JUNG, RE — Creative Networks: Implications for Big C and little c

9:00–10:30 AM **Paper Session 5: Adult TBI**
Moderator: Kati Pagulayan
Grand Ballroom D

1. DOUGLAS, J — Evaluating the Efficacy of Communication-specific Coping Intervention for Adults with Traumatic Brain Injury (TBI)
2. CHIOU, KS — Time Matters: Cohort Performance Differences After Moderate to Severe Traumatic Brain Injury
3. MCDONALD, S — Communication disorders after severe traumatic brain injury: the role of Theory of Mind and executive function
4. MEDAGLIA, JD — The Cerebellum Differentially Contributes to Working Memory Function Follow Moderate to Severe Traumatic Brain Injury
5. TWAMLEY, EW — CogSMART Compensatory Cognitive Training for TBI: Effects in a Randomized Controlled Trial

9:30–10:45 AM **Poster Session 9: Aging, Behavioral Neurology, Cerebral Asymmetry/ Callosal Disconnection, Cross-cultural**
Metropolitan Ballroom

Aging

1. ZAIDI, KB — Agreeable Older Adults Can Read You Better: A Pilot Study on Personality and Theory of Mind
2. ROGERS, SA — The Cognitive Benefits for Older Adults to Be Open to New Experience
3. MYHRE, JW — Facebook for Seniors: The Effects of Online Social Networking on Cognitive Function in Healthy Older Adults
4. BALDWIN, AJ — How do Religious Beliefs and Age Influence Social Partner Choice and Memory?
5. MOLDOVAN, CP — Impact of Age, Education, and Spirituality on Cognitive Reserve in Healthy Older Adults
6. OKAHASHI, S — Relationship between the Resultant Acceleration during Written Task, Cognitive Function and Activities of Daily Living in Older Adults
7. SIMON, CM — Instrumental Activities of Daily Living Among Healthy Older Adults: Discrepancies Between Self-Report, Performance-Based, and Direct Observation
8. MEYERS, K — The Unique Contribution of Depressive Symptoms to Activities of Daily Living in Centenarians
9. BURK, M — Impact of Mood on Functional Status in Older Adults
10. PATEL, K — Gender Differences in Neuropsychological Predictors of Driving Hazard Perception
11. SELIGMAN, S — Relations Between Everyday Action Performance and Cognitive Functions in Healthy and Mildly Impaired Older Adults
12. SCHARAGA, EA — Efficient Assessment of Instrumental Activities of Daily Living Predicts Gait and Upper Extremity Functioning in Community-Dwelling Older Adults
13. XU, Y — Depressive Symptoms and Their Effect on Attention Among Healthy Older Adults
14. DALEY, RT — Emotional Perception in Alzheimer's Disease: Contributions to the Caregiving Experience
15. MEISTER, J — The Role of Mindfulness in Awareness of Cognitive Abilities
16. FISCHER, AL — Dissociable Mechanisms for Age Differences in Cognitive and Affective Theory of Mind: A Pilot Study Examining Neurocognitive Performance and Health Status as Modifiers
17. COOLIN, A — Modeling Individual Differences in Cognitive Functions Underlying Hindsight Bias in Older Adults
18. DE FRIAS, C — Health, Emotion Regulation, and Mindfulness Differentially Affect Compensatory Strategy Use

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

19.	LEVY, S	Blood Pressure, Trait Mindfulness, and Cognitive Function in Middle Aged and Older African Americans
20.	WILLIAMSON, JB	The Influence of Emotional Valence on the Chronology of Autobiographical Memory Salience
21.	SMART, CM	Iowa Gambling Task Performance Discriminates Older Adults with Subjective Cognitive Impairment from Healthy Controls
22.	OBERG, LK	Exploring the Relationship between Prospective Memory and Anterior Cingulate Cortex Volume in Older Adults With and Without Subjective Cognitive Impairment
23.	HAN, D	Decision Making and Cognition Discrepancies in Older Adults
24.	JEZNACH, A	Advance Care Plans Among Cognitively Impaired Older Adults: Findings from the Decedent Questionnaire in the Canadian Study of Health and Aging (CSHA)
25.	CANO, H	Correlation between performance in tasks of memory, working activity and years of school in a Mexican sample of elderly health adults
26.	WALTER, J	Middle Aged Adults with MDD Demonstrate More Pronounced Cognitive Deficits than Younger and Older Adults with MDD, Relative to Same-Age Peers
27.	ARJUNAN, A	Physical Activity as a Predictor of Fluid Intelligence in Older Participants
28.	SIEG, E	Vascular Aging: A Focus On The Impact of Cholesterol On Brain Structure And Function
29.	COOK, AH	Maintenance of Cortical Thickness in SuperAgers: A Key to Preserved Cognition in Advanced Age?
30.	GERTSBERG, AG	Magnetic Resonance Imaging Predictors of Processing Speed in the Normal Aging
31.	EWALD, IJ	Reduced Cerebral Blood Flow Predicts Subsequent Cognitive Decline in Older Adults: An Arterial Spin Labeling MRI Study
32.	ZUIDEMA, ET	Learning to Slow Down, Slowing Down to Learn: How Leisure Activities Relate to Neuropsychological Functioning in Older Adults
33.	MATTHEWS, MA	Different Contributions of Family History and Genetic Risk on 5-year Cognitive Changes in Healthy Older Adults
34.	COMBS, HL	Age and IQ Moderate Practice Effects of Verbal Memory Ability in Older Adults
35.	GEFEN, T	Quantitative Examination of Alzheimer Pathology in the Cingulate Cortex of Cognitive SuperAgers
36.	LARSON, MJ	The Influence of Telomere Length on Cognitive Functioning in Healthy Community-Dwelling Older Adults
37.	BARRERA-MARTINEZ, LM	Predictors of Longitudinal Change in White Matter Hyperintensities
38.	WILLIS, SL	Moderating Effects of APOE, Hypertension and Alzheimer Disease on Cognitive Trajectories in Normal Aging
39.	NATION, DA	Pulse Pressure and Cognitive Decline by APOE Genotype: Results from the Framingham Heart Study
40.	BOTT, NT	Young at Processing Speed: Anatomic and Genetic evidence in "Superagers"
41.	SCOTT, SE	Impact of the Serotonin Transporter Polymorphism on Emotion Identification in Healthy Older Adults
42.	ROBINSON, P	On the Relationship Between the Hippocampus and Default Mode Network Connectivity: Age and Gender Effects
43.	SEGERSTROM, SC	Persistent but not Phasic Cortisol Elevations Correlate with Poorer Verbal Memory in Older Adults
44.	KESSELS, RP	Working Memory Binding and Episodic Memory Formation in Aging, MCI and Alzheimer's Dementia
45.	MCGREGOR, KM	Visual Gain Modulation in Older Adults - Effects on Movement Tracking
46.	FRAZIER, DT	Insulin-resistance Is Negatively Associated With Working Memory Performance in Older Normal Adults
47.	SZELES, D	Diminished Vowel Letter Fluency Not Enhanced with Normal Aging
48.	SUNG, J	Deficits of case marker assignment in passive sentences for mild cognitive impairment: Evidence from a Subject-Object-Verb language
49.	SANDERSON-CIMINO, M	Early Detection of Global Cognitive Decline In Older Adults
50.	GERSTENECKER, A	Constructing An Equation To Predict Conversion From Mild Cognitive Impairment To Dementia
51.	BELSER-EHRLICH, J	Validation of the Brief Fatigue Inventory in Community-Dwelling Older Adults
52.	SHUMAN, MJ	Development and Validation of the State Trait Inventory for Cognitive Fatigue (STI-CF)
53.	ENGLAND, S	The Relationship Between Turn Assessment and Visual Perception Abilities in Older Adults
54.	BREWSTER, P	Sensitivity of norm-referenced measures of reaction time variability to cognitive status in older adults: Evidence from the Victorial Longitudinal Study
55.	DUNN, CB	Spatial Learning in Aging: Search Strategies and their Relationship to Performance
56.	GARCIA, NE	Practice Effects and Longitudinal Change in Processing Speed and Executive Functioning Among Older Adults
57.	MULLIGAN, BP	Quantity and Quality of Trial-to-Trial Performance Fluctuation Predicts Self- and Informant-Ratings of Subjective Cognitive Impairment in Older Adults
58.	GICAS, K	Reduced Primacy and Recency Effects in Older Adults with Cognitive Disorders

Behavioral Neurology

59.	GICAS, K	Neurological Validators of Cognitive Profiles in the Marginally Housed
60.	BENSON, LM	Executive Dysfunction and Ataxia Severity in Spinocerebellar Ataxia (SCA)
61.	HUTCHISON, E	Nature and Laterality of Motor Symptoms in Parkinson's Disease and Relationship to Cognitive Profile
62.	HEILMAN, KM	Allocentric Neglect with Posterior Cortical Atrophy
63.	HYMEN, E	Dysfunctional Connectivity of Default and Emotion Networks are Uniquely Related to a History of Depression and Experience of Childhood Trauma

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

64. GERNER, GJ — Associations between Transcranial Doppler Head Ultrasound Resistive Indices in Asphyxiated Neonates Treated with Hypothermia and Early Childhood Neurodevelopmental Outcomes

Hemispheric Asymmetry/Laterality/Callosal Studies

65. VOS, L — Cognitive Inhibition Within And Across Hemispheres: Negative Stroop Priming
66. VOS, L — Lateralized Asymmetry And Sex Differences In Threat Appraisal And Detection
67. ISAAC, B — Negative Priming Stroop Task And Inhibition
68. SARA, NE — The Effects of Right Lateralized Cognitive and Physiological Stress on Right Brain Activation Using a Dual Concurrent Task Paradigm: A Double-Blind Placebo-Controlled Experiment
69. MANGUM, R — Twenty Questions Problem-Solving and Strategy in Individuals with Agenesis of the Corpus Callosum
70. ANDERSON, LB — Problem-Solving in Complete versus Partial Agenesis of the Corpus Callosum: The Iowa Gambling Task
71. REHMEL, JL — Comprehension of Proverbs in Individuals with Agenesis of the Corpus Callosum

Cross Cultural

72. EISMAN, G — The Relationship Between Time Perspective and Neuropsychological Test Performance
73. NAMAZI, S — A Snapshot Of Social Cognition As Measured By Social Skills Among Iranian American Children: The Role Of Parental Acculturation
74. AVILA, J — The Influence of Culture on Performance on Neuropsychological Measures That Require Little Verbal Mediation in English-Speaking and Farsi-Speaking Iranian Individuals
75. CELESTIAL, JE — Design Fluency among Filipinas/os & Filipina/o Americans (FFAs)
76. MARTINEZ, F — The Role of Academic Level and Achievement in Neuropsychological Test Performances of Minorities
77. COLLIER, S — Intellectual Outcome in Monolingual and Bilingual Pediatric Patients with Medulloblastoma
78. SUAREZ, PA — Advantages of bilingualism on test performance persist after accounting for sociodemographic variables among Spanish speakers tested in their native language
79. CHERNER, M — Halstead Category Test Norms for Native Spanish Speakers from the US-Mexico Border Region
80. WILSON, MD — Neurocognitive Impact of Race-Based Stress
81. VERNEY, SP — Cultural Considerations in the Neuropsychological Assessment of American Indian/Alaska Native Adults
82. BENNETT, J — Wechsler Assessment Tools and American Indian Children: A Review & Future Directions
83. SAYEGH, P — The Role of Neuropsychological Language Tests in Clinician-Rated Dementia Severity across Hispanics and Non-Hispanic Whites
84. PETRANOVICH, CK — The relationship of a lab-based measure of social information processing and parent-reported social competence in internationally adopted girls
85. ZAHODNE, LB — Depressive Symptoms Are More Strongly Related to Cognitive Performance among African American Elders
86. MEDINA, LD — Self-Construal as a Predictor of Cognitive Abilities in Healthy Aging

10:30–10:45 AM — Saturday AM Coffee Break
Ballroom Foyer/Metropolitan Ballroom

10:45 AM–12:15 PM — Symposium 9: Vascular mechanisms contributing to the pathogenesis and clinical expression of Alzheimer's disease
Chair: Angela Jefferson
Grand Ballroom B&C

1. JEFFERSON, AL — Vascular mechanisms contributing to the pathogenesis and clinical expression of Alzheimer's disease
2. BONDI, MW — The Need for Better Recognition of Multiple Pathologies in Alzheimer's Disease
3. BRICKMAN, AM — Considering the contribution of white matter hyperintensities to cognitive aging and Alzheimer's disease
4. LIBON, DJ — Defining Alzheimer's/Vascular Spectrum Syndromes: An Error Analysis
5. AU, R — Novel Vascular Brain Injury Score: Framingham Heart Study
6. JEFFERSON, AL — Methodological advances for assessing vascular contributions to Alzheimer's disease

10:45 AM–12:15 PM — Paper Session 6: Psychopathology, Emotion and Motivation
Moderator: Michael Basso
Grand Ballroom A

1. KEILP, JG — Neuropsychological Deficits in Past Suicide Attempters with Varying Levels of Depression Severity
2. SCOTT, J — A Quantitative Meta-analysis of Neurocognitive Functioning in Posttraumatic Stress Disorder (PTSD)
3. CALAMIA, M — Apathy in a Neuropsychological Patient Sample: Factor Structure and Clinical Correlates
4. TERZYAN, S — Anxiety and fear drive specific perceptual level shifts: Global vs. Local Processing
5. NONIYEVA, Y — Dissociable age-related changes in Neuroanatomical Regions for Emotion and Cognition
6. DOBRYAKOVA, E — The Influence of Motivation on Cognitive Fatigue in Individuals with Multiple Sclerosis: a Theoretical Proposal with Functional Neuroimaging Support

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

10:45 AM–12:15 PM

Paper Session 7: Executive Functions
Moderator: Robert Thoma
Grand Ballroom D

1.	FEIGON, M	Cognitive Variables Predicting Activities of Daily Living in African-Americans with Sickle Cell Disease
2.	BOTT, NT	Strategy Use on the D-KEFS Design Fluency Test: Relationships with Cognitive Functioning, Executive Functioning, and Working Memory
3.	WHITESIDE, D	Verbal Fluency: Language or Executive Functioning Measure?
4.	CARBINE, K	The Influence of Treadmill Walking on Response Inhibition and Conflict Interference: Neuropsychological Implications
5.	HOTH, KF	Arterial Stiffening is Associated with Reduced Executive Function and Processing Speed in COPD

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms.
https://doi.org/10.1017/S1355617714000381

Abstracts Presented at the Forty Second Annual Meeting International Neuropsychological Society

February 12-15, 2014
Seattle, Washington, USA

WEDNESDAY MORNING, FEBRUARY 12, 2014

CE Workshop 1: Clinical Trials in Neuropsychological Rehabilitation: Challenges and Solutions

Presenters: Tessa Hart, John Whyte

9:00 a.m.–12:00 p.m.

T. HART & J. WHYTE. Clinical Trials in Neuropsychological Rehabilitation: Challenges and Solutions.
Clinical trials aimed at improving neuropsychological function are increasingly important for developing the evidence base for both pharmacologic and behavioral (experience-based) interventions. In this workshop, we will review and discuss both conceptual and practical issues involved in designing and implementing clinical trials targeting cognitive, psychological and behavioral change. We review basic trial designs and their strengths and weaknesses with respect to internal and external validity; issues involving the selection or design of appropriate control conditions; and special problems such as masking. Issues related to experimental treatment implementation are also discussed, including therapist allocation and training, and assessment of treatment fidelity. While n-of-1 designs will be touched on, most of the workshop content will focus on group studies. Also addressed will be "macro" issues germane to clinical trial design such as consideration of the state of existing knowledge and the challenges of specifying the active ingredients in the complex, learning-based interventions that are widely used in neuropsychological rehabilitation. We will make frequent reference to a developmental framework in which different designs may be appropriate for addressing the distinct goals of different phases of research, from initial proof-of-concept studies to definitive clinical effectiveness trials. At the conclusion of this presentation, attendees will be able to: (1) Describe at least 2 types of control conditions for behavioral clinical trials and the advantages and disadvantages of each; (2) Explain what masking is and list at least methods of achieving optimal masking in a behavioral clinical trial; (3) Describe at least 3 phases of research that may be needed along the trajectory toward clinical effectiveness studies, and the goals of each phase
Correspondence: *Tessa Hart,, PA. E-mail: thart@einstein.edu*

CE Workshop 2: Defining Neuropsychological Deficits Associated with ADHD and Response to Stimulant Medication: A Decade of Progress Based on Studies of Neuroanatomy, Neurochemistry, and Neurodevelopment

Presenter: James M Swanson

9:00 a.m.–12:00 p.m.

J. SWANSON. Defining Neuropsychological Deficits Associated with ADHD and Response to Stimulant Medication: A Decade of Progress Based on Studies of Neuroanatomy, Neurochemistry, and Neurodevelopment.
The core symptom domains of ADHD (inattention, impulsivity, and hyperactivity) suggest specific cognitive deficits and behavioral excesses that define this disorder, and for over 75 years stimulant medication has been a first-line treatment to correct these deficits and excesses. The three goals of this workshop are to provide (1) a brief history of theories of neuropsychological bases for this clinical practice, (2) an update of the hypothesis of etiological subtypes based on possible environmental and genetic causes, and (3) a review of an emerging consensus of dramatic short-term but negligible long-term benefits of stimulant medication.
First, several theories that influence modern concepts of ADHD will be reviewed, including the Sergeant's cognitive energetic theory of information processing, Posner's cognitive anatomical theory of attention, Barkley's response inhibition theory of executive function, Sonuga-Barke's delay aversion theory of choice, Castellano's resting state theory of the brain default mode network, and Volkow's dopamine theory of motivation and salience. Example neuropsychological tasks related to each of these theories will be described and discussed.
Second, recent application of two new approaches relevant to etiology and neuropsychology of ADHD will be described: (1) the developmental origins of health and disease (DOHaD) approach, which is based on the shaping of brain function by events during pregnancy, and (2) the rare variant, common disorder (RVCD) approach, which has been applied to suggest contributions of de novo genomic mutations to complex as well as Mendelian disorders.
Third, new information from longitudinal follow-up studies will be presented about the life course of ADHD, with a focus on (1) the observed patterns of the use of medication from childhood to adulthood and the tradeoffs of costs and benefits of long-term treatment and (2) alternatives and adjuncts to stimulant medication with an emphasis on

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms.
https://doi.org/10.1017/S1355617714000381

recent applications of programs of cognitive training intended to correct underlying neuropsychological deficits associated with ADHD.
Correspondence: *James Swanson,, CA. E-mail: jmswanso@uci.edu*

CE Workshop 3: Aging and Everyday Functioning: Measurement, Correlates and Intervention

Presenters: Maureen Schmitter-Edgecombe, Sarah Tomaszewski Farias

9:00 a.m.–12:00 p.m.

M. SCHMITTER-EDGECOMBE & S. TOMASZEWSKI FARIAS. Aging and Everyday Functioning: Measurement, Correlates and Intervention.
Neuropsychologists are often asked to answer questions about the effects of cognitive deficits on everyday functioning, and this is especially significant when working with an older adult population. This workshop will first review the strengths and limitations of common approaches to measuring everyday function in older adults and discuss challenges for everyday assessment. Second, the continuum of functional impairment form healthy aging through mild cognitive impairment and dementia will be reviewed along with an in-depth discussion of the neurobiological, cognitive, neuropsychiatric, environmental and physical determinants of everyday function. Recent research employing naturalistic direct observation to evaluate errors that occur when completing everyday activities (e.g., omissions, inefficient actions) as will the use of smart environment technology for activity recognition, functional assessment and prompting-based interventions will also be discussed.
At the conclusion of this presentation, attendees will be able to: (1) discuss different clinical and research methods used to measure the functional abilities of older adults; (2) identify cognitive and noncognitive contributors to the functional capacities of older adults and (3) describe the knowledge gaps and recent research that is being conducted to better understand the impact of age and disability on everyday functioning.
Correspondence: *Maureen Schmitter-Edgecombe, Ph.D., Psychology, Washington State University, Department of Psychology, Washington State University, Pullman, WA 99164-4820. E-mail: schmitter-e@wsu.edu*

WEDNESDAY AFTERNOON, FEBRUARY 12, 2014

CE Workshop 4: Clinical fMRI: New applications for Neuropsychological Research and Practice

Presenters: Susan Bookheimer, Agatha Lenartowicz

1:00–4:00 p.m.

S. BOOKHEIMER & A. LENARTOWICZ,. Clinical fMRI: New applications for Neuropsychological Research and Practice.
Functional MRI is increasingly playing a key role in forming our understanding of neuropsychology, from brain development, localization of function, and functional brain networks. FDA approved clinical applications of functional MRI remain limited to pre-surgical planning, typically for motor or language localization. However there are several new approaches in fMRI acquisition, analysis, and acquisition, that are highly relevant to our understanding of brain function and brain disorders, that will ultimately affect neuropsychological practice. This workshop will be divided into three broad sections which will present new conceptual and analysis approaches in functional brain imaging. The first section will discuss major approaches to brain connectivity, specifically functional connectivity and effective connectivity in activation imaging, resting state connectivity, and will go into details of the various approaches to analysis of resting state imaging data. The major resting state networks will be presented and I will discuss various approaches to measuring resting state network function, analyzing resting state data, and how these networks relate to concepts in neuropsychological function. The second section will present graph theoretical approaches to analyzing imaging data, including resting state, activation, as well as structural MRI and DTI. This section will conclude with a brief review of connectivity results in some clinical groups. The final section will focus on the role of the clinical neuropsychologist in conducting and billing for clinical fMRI with an emphasis on more difficult applications, especially memory mapping, within the context of a Bayesian framework in data interpretation, including discussion of reliable analysis strategies, and interpretation within the context of theoretical concepts of memory. II will also discuss how to integrate diffusion tensor imaging into data interpretation, especially tractography for surgical planning.
Correspondence: *Susan Bookheimer,, CA. E-mail: sbook@ucla.edu*

CE Workshop 5: Ethical, Clinical, and Research Considerations for Cultural Neuropsychology

Presenter: Jennifer Manly

1:00–4:00 p.m.

J. MANLY. Ethical, Clinical, and Research Considerations for Cultural Neuropsychology.
Diversity of patients and research participants is increasing, and neuropsychologists must understand the potential influences of culture on cognitive test performance and have access to training and tools for the appropriate assessment of cognition across cultures. This workshop will provide an update on the results of the most innovative models, methodology and analytic approaches to investigation of cognitive test performance among culturally and linguistically diverse people. Key gaps in knowledge have been explored by integrating information about social factors, cardiovascular health, neuroimaging, neuropsychological function, biostatistics, and genetics. For example, recent work has addressed whether childhood and adult social experiences such as perceived discrimination, quality of education, and geographic/neighborhood differences have an effect on brain and cognition, whether cardiovascular disease mediates the relationship between social factors and cognition, and whether bilingualism confers a cognitive advantage or protection against cognitive aging. The workshop will also provide a theoretical framework for resolving controversy over use of ethnicity-specific norms and other ethical considerations for the clinical assessment of ethnic minorities and non-English speakers.
At the conclusion of this presentation, attendees will be able to: (1) describe techniques to assess cultural, linguistic, and educational experience during the neuropsychological testing session and relate these variables to test performance and risk for cognitive impairment; (2) determine when it is appropriate to use neuropsychological test norms for separate ethnic groups; (3) identify neuropsychological tests or test batteries in which modern psychometric techniques were used to develop culturally appropriate cognitive assessment instruments; and (4) assess competency to design, translate, administer, and interpret tests among ethnic minorities and non-English speakers.
Correspondence: *Jennifer Manly,, NY. E-mail: jjm71@columbia.edu*

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms.
https://doi.org/10.1017/S1355617714000381

CE Workshop 6: Behavioral Interventions to Prevent or Delay Dementia

Presenters: Glenn Smith, Julie Fields, Melanie Chandler Greenaway, Dona Locke

1:00–4:00 p.m.

G. SMITH, M. CHANDLER GREENAWAY, D. LOCKE & J. FIELDS. Behavioral Interventions to Prevent or Delay Dementia.
People with Mild Cognitive Impairment (MCI) are at risk to progress to dementia, typically Alzheimer disease. However, research increasingly shows that behavioral intervention can limit functional decline and maintain quality of life, key outcomes of importance to these patients and their families. The session will introduce an intensive state-of-the-art behavioral approach to limiting functional decline in MCI offered Mayo Clinic sites in Minnesota, Florida, and Arizona.. This intervention is 5-component, 50-hour program being provided to nearly 150 patients per year. The 5 components are 1 hour each of: 1) daily physical exercise, 2) computer-based cognitive exercise, 3) patient and family education, 4) separate support groups for MCI patients and their care partners, and 5) a memory support system developed in a prior NIH study. This session will review supporting evidence for each of these separate interventions then present both patient and caregiver outcomes to date for the multicomponent program.
At the conclusion of this presentation, participants will be able to: (1) Discuss the current state of knowledge about the impact of behavioral interventions intended to prevent or delay dementia; (2) Describe a multicomponent intervention program (HABIT) that combines promising behavioral interventions to help maintain function in people with Mild Cognitive Impairment; (3) Explain the effect of behavioral interventions on caregivers of individuals with memory loss
Correspondence: *Glenn Smith,, MN. E-mail: smitg@mayo.edu*

Poster Session 1: Cancer, Medical/Neurological Disorders in Children, TBI in Children, Adult TBI I

3:00–4:15 p.m.

Cancer

C. MOORE, N. FERNANDEZ, A. GHELANI, T.T. LO & S.K. PATEL. Neurobehavioral Impact of Endocrine Therapy Following Chemotherapy for Breast Cancer.
Objective: Neurobehavioral dysfunction among patients with non-CNS tumors has been attributed primarily to the neurotoxic effects of chemotherapy. However, there is now a consensus that other treatment factors, such as adjuvant endocrine therapies, may also contribute. We evaluated the hypothesis that breast cancer patients treated with both chemotherapy and endocrine therapy would have worse neurocognitive and behavioral outcomes than those treated with chemotherapy alone.
Participants and Methods: As part of an ongoing longitudinal study, newly diagnosed post-menopausal breast cancer patients and their age-matched healthy controls were seen for neuropsychological assessment at one year post-treatment. Some patients were put on endocrine therapy (eg. Tamoxifen) soon after chemotherapy to reduce risk of cancer relapse and were on medication at 1 year assessment. ANCOVAs controlling for age, education, and pre-treatment scores were conducted to examine differences in cognitive performance and behavioral functioning in this group (N=39) relative to a group treated with chemotherapy but no endocrine therapy (N=21), and healthy controls (N=60).
Results: Significant differences in self-report of physical health, $F(2,89)=4.96, p=.009$; pain, $F(2,110)=3.24, p=.043$; and somatic symptoms, $F(2,110)=3.60, p=.031$, emerged. The chemo/endocrine group reported the worst functioning, followed by the chemo/no endocrine group. With the exception of performance on tests of fine motor speed, $F(2,99)=3.90, p=.024$, similar effects were not observed on the neurocognitive measures. In addition, there were no differences in self-report of mood.
Conclusions: Endocrine therapy in the year following chemotherapy for breast cancer had adverse effects on behavioral measures of health functioning but not on neurocognitive performance. However, our results are limited by small sample size and it is possible that any small effects on cognitive functioning may become more detectable with larger samples and/or with longer duration on the medications.
Correspondence: *Colleen Moore, City of Hope, 1500 E Duarte Road, Duarte, CA 91010-3000. E-mail: cmoore@coh.org*

L.J. BERNSTEIN, K. MAMEDOVA, P.A. CATTON & J.B. RICH. Improved Knowledge, Self-Efficacy, and Behavioral Change in Women with Cancer-Related Cognitive Dysfunction Following a Brief Psychoeducational Intervention.
Objective: Cancer-related cognitive dysfunction (CRCD) refers to subjective complaints of cognitive problems that persist for a substantial minority of patients even after treatment is discontinued. Preliminary analysis of a one-hour, individual behavioral intervention offered by the Cancer Survivorship Program at Princess Margaret Cancer Centre showed benefits for patients with CRCD, including increased knowledge and self-management skills, and decreased distress associated with CRCD (Bernstein et al., 2012); these improvements were maintained at 6-week follow-up. The current study examined medical history variables to determine who would benefit most from the intervention.
Participants and Methods: 89 female cancer survivors (73 breast; 13 gynecological; 3 head-and-neck; M age=52.4) participated. Likert-scale questionnaires administered immediately before, immediately after, and 6 weeks postintervention evaluated perception of knowledge, distress, self-efficacy, behavior change, and behavioral change effectiveness.
Results: Nearly all patients had completed surgery, chemotherapy, and radiotherapy in this self-referred sample. Thus, intervention effectiveness could not be compared on these major cancer treatment variables. Similarly, given the preponderance of breast cancer patients, we could not analyze the intervention as a function of cancer type. Older adults (> 51 years at diagnosis) reported less overall distress than younger patients, but young and old benefitted equally from the intervention. Finally, intervention effectiveness did not differ for patients with shorter (< 11 months) or longer (> 11 months) time since diagnosis.
Conclusions: A one-hour psychoeducational behavioral intervention for cancer patients suffering from CRCD showed benefits immediately following the intervention and at 6-week follow-up, regardless of age or time since diagnosis. Given the positive findings, we are now expanding this intervention from individual to group sessions and from 1 hour to 5 weekly 2-hour sessions
Correspondence: *Jill Rich, Psychology, York University, 4700 Keele Street, Toronto, ON M3J1P3, Canada. E-mail: jbr@yorku.ca*

T.T. LO, A. WONG, C. MOORE & S.K. PATEL. Comorbidity and Education Influence Recovery of Executive Functioning in Breast Cancer Survivors.
Objective: Some patients may experience persistent neurocognitive late effects following cancer treatment. Characterization of the risk factors is an evolving area of research. In a recently completed study of breast cancer patients, we observed executive dysfunction at one month following cancer treatment. We hypothesized reduced cognitive recovery for patients with a comorbid chronic health condition.
Participants and Methods: One hundred and twenty-one breast cancer patients underwent neuropsychological assessment at two time points: 1-month and 1-year after cancer treatment. An aggregate score of executive functioning measures were calculated by averaging the standard score of D-KEFS Trails 4, Color Word Interference, and Color Word

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

Interference/Switching. The validated Charlson Comorbidity Index was used to assign comorbidity scores based patient's medical records (higher score indicating more comorbid health conditions).
Results: Hierarchical Regression analysis was conducted to evaluate whether comorbidity predicted recovery in executive functioning at one year post cancer treatment. Education was a significant predictor ($p = .005$) accounted for a significant proportion of improved cognitive performance after controlling for age and baseline performance, $F(3,117) = 2.79$, $p = .04$. Our final model revealed that comorbidity was also a significant predictor ($p = .038$) and accounted for an additional 3.5% of the variance even after controlling for effects of education, R Square change $F(1, 113) = 4.41$, $p = .038$; R Square $F(4, 117) = 3.25$, $p = .014$.
Conclusions: Both education and comorbid health condition are significant predictors of improved executive functioning (i.e. recovery) in the year following treatment for breast cancer.
Correspondence: *Tracy T. Lo, Ph.D., City of Hope Medical Center, Pop Sci 107J, 1500 East Duarte Road, Duarte, CA CA 91010-3000. E-mail: tracytylo@gmail.com*

S. MENNING, M.B. DE RUITER, W. BOOGERD, D.J. VELTMAN, L. RENEMAN & S.B. SCHAGEN. Planning and Memory function in breast cancer patients – an fMRI study.
Objective: Cognitive and brain function in breast cancer (BC) patients (pts) may be compromised before the start of adjuvant chemotherapy (CT), as indicated by neuropsychological and several small task-fMRI studies. Here we report neuropsychological and fMRI results in a large sample of BC pts scheduled to receive CT (CT+), BC pts not indicated to undergo CT (CT-) and no cancer controls (NC).
Participants and Methods: 32 CT+ (50.2±9.2 yrs; IQ 100.6±14.1), 33 CT- (52.4±7.3 yrs; IQ 102.8±14.7) and 38 NC (50.1±8.7 yrs; IQ 107.0±11.1) were assessed, in the case of BC pts post-surgery but before adjuvant treatment. The examination consisted of a neuropsychological test battery and self-reported aspects of psychosocial functioning. Cortisol in hair was measured for chronic stress. 3T multimodality MRI was obtained, including an fMRI version of the Tower of London (TOL) assessing planning ability and a visual paired associates task to investigate episodic memory.
Results: Patients and controls did not differ in mean performance on the neuropsychological tests, but a summary measure for overall cognitive performance indicated slightly worse performance in pts compared to controls ($p=0.021$). Lower quality of life and higher perceived stress was reported by pts, in the absence of differences in hair cortisol levels. For the TOL, with increasing task load, CT- patients showed prefrontal hypoactivation compared to the other groups. No other group differences were found for task fMRI.
Conclusions: Our findings suggest that a breast cancer diagnosis is associated with subtle adverse effects on brain function. Follow up measurements will show whether the brain regions with observed baseline differences are most vulnerable to the effects of CT, as well as whether lower neuropsychological performance at baseline predicts cognitive decline post treatment.
Correspondence: *Sanne Menning, Netherlands Cancer Institute, Plesmanlaan 121, Amsterdam 1066CX, Netherlands. E-mail: s.menning@nki.nl*

D. VON AH & E. TALLMAN. Perceived cognitive function in breast cancer survivors: Evaluating relationships with objective cognitive performance and other symptoms using the Functional Assessment of Cancer Therapy Cognitive Scale (FACT-Cog).
Objective: Perceived cognitive impairment has been shown to be one of the most common symptoms following breast cancer treatment. However, subjective measures of cognitive impairment do not always correlate with cognitive performance and are often highly associated with other patient-reported symptoms. Therefore, the purpose of this study was to examine the relationships of scores on the Functional Assessment of Cancer Therapy-Cognitive (FACT-Cog) scale, a self-report questionnaire that measures the dimensions of perceived cognitive impairment (PCI), impact on quality of life, comments from others and perceived cognitive capability (PCA) to objective cognitive performance on neuropsychological tests of memory, speed of processing and executive functioning, as well as to other symptoms (fatigue, depression, anxiety, and sleep disturbance) in breast cancer survivors.
Participants and Methods: 88 breast cancer survivors who were on average 56 years old and 5 years post-treatment completed a one time set of questionnaires and a brief neuropsychological assessment.
Results: 94% of the women reported clinically significant perceived cognitive impairment. The sub-dimension of impairment (PCI) was significantly correlated with some measures of immediate and delayed memory and executive function, whereas perceived capability (PCA) was associated with all measures of immediate and delayed memory and executive function. Neither PCI nor PCA were related to speed of processing. PCI and PCA were both significantly associated with depressive symptoms, fatigue, and anxiety whereas only PCI was related to poor global sleep quality.
Conclusions: The FACT-Cog identified clinically significant perceived cognitive impairment. The dimension of perceived cognitive capability was highly correlated with objective neuropsychological performance and may be clinically useful in identifying problems with memory and executive functioning in breast cancer survivors.
Correspondence: *Diane Von Ah, PhD, Indiana University, 1111 Middle Drive, Indianapolis, IN 46202. E-mail: dvonah@iupui.edu*

C. KIMBERG, J. LUXTON, T.M. BRINKMAN, D. STEWART, C. PUI, M.M. HUDSON & K.R. KRULL. Psychological Symptom Clusters Identified through a Computerized Diagnostic Interview for Survivors of Childhood Acute Lymphoblastic Leukemia (ALL).
Objective: Survivors of childhood ALL are at risk for cognitive and neurobehavioral late effects. Although attention-deficit/hyperactivity disorder is a reported outcome, limited research has explored associated co-morbidities. We aimed to investigate neurobehavioral symptom profiles of ALL survivors.
Participants and Methods: 129 parents of ALL survivors (88.2% mothers) completed modules from the Computerized Diagnostic Interview Schedule for Children-Parent Version. The 20 most frequently endorsed items were selected for dimensional analysis. Categorical Principal Components Analysis was used to identify symptom clusters. Clinically interpretable factors with eigenvalues > 1 were retained. Concurrent validity was assessed through correlations with non-diagnostic parent-report questionnaires and direct- assessment measures.
Results: Survivors were on average 12.2 years of age and 7.1 years from diagnosis. A six-factor solution best represented the data accounting for 61.9% of the variance. Three of the six identified factors included items from multiple diagnostic categories. Factor 1 explained 26% of the variance and consisted of items associated with Internal Arousal, while Factor 2 (Emotional Dysregulation) explained 9.6% of the variance. The remaining factors each accounted for less than 8% of the variance (Social Stress, Anticipatory Fear, Irritability, Specific Worry). Correlations with parent-report questionnaires of child functioning suggested moderate concurrent validity. Factor 1 was related to direct-assessment of attention and processing speed ($r = -0.24$ to -0.30, $p < 0.05$), while Factors 2, 4, 5 were related to performance-based executive function ($r = -0.23$ to -0.27, $p < 0.05$).
Conclusions: Dimensional analysis of diagnostic interview symptoms yielded neurobehavioral clusters not conceptualized under traditional diagnostic categories, but related to cognitive performance. Future research will explore the relation between clusters and functional outcomes.
Correspondence: *Cara Kimberg, St. Jude Children's Research Hospital, 262 Danny Thomas Place, MS 735, Memphis, TN 38105. E-mail: cara.kimberg@stjude.org*

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms.
https://doi.org/10.1017/S1355617714000381

B. KAVANAUGH, J. GREENE WELCH, G. SELKE & C.L. TRASK. The Association Between Emotional-Behavioral Functioning and Attention and Executive Functions in CNS-Directed Pediatric Cancer Treatment.

Objective: Executive functioning is related to both cognitive and emotional regulation and control. Select neurocognitive functions are vulnerable to CNS-directed pediatric cancer treatment, although the associated emotional-behavioral consequences remain unclear. The present study used retrospective chart review to examine the association between attention and executive functions and emotional-behavioral functioning in children and adolescents following CNS-directed pediatric cancer treatment.

Participants and Methods: Records of children treated with intrathecal chemotherapy, including intrathecal methotrexate, for acute lymphoblastic leukemia (ITX Group; n = 10), children treated with cranial radiation due to ALL or brain tumor (in addition to chemotherapy and/or surgical resection; CRT Group; n = 6), and children with diagnosed ADHD as a control group (ADHD Group; n = 9) who underwent neuropsychological assessment were reviewed. Measures including the WISC-IV, D-KEFS, CPT-II, and BASC-2.

Results: Although the three groups were similar in term of age, overall IQ, academic functioning, and other cognitive executive measures, there were differences between the three groups on parent-completed behavior ratings. The ADHD and ITX groups had significantly lower functioning in activities of daily living than children treated with radiation. Moreover, the ADHD group had a higher degree of behavioral symptoms. Correlation analyses ($p < .01$) were conducted between emotional-behavioral and neurocognitive variables in those individuals with a cancer history. Results indicated significant correlations between aspects of attention and internalizing and externalizing symptoms. Time since diagnosis and assessed executive functions were not correlated with parent ratings of emotional or behavioral symptoms.

Conclusions: These findings highlight the relationship between aspects of attention and emotional-behavioral functioning in children and adolescents following CNS-directed pediatric cancer treatment.

Correspondence: *Brian Kavanaugh, M.S., Antioch University New England, 40 Avon St., Keene, NH 03431. E-mail: kavanaugh.brian@gmail.com*

M.W. FONG, A. ARTZ & M. LACY. Does Depression Play a Role in Cognitive Impairment of Stem Cell Transplant Candidates?

Objective: Cognitive deficits have long been documented in oncology patients following hematopoietic stem cell transplantation (HCT). Recent research has established that these deficits are seen prior to HCT process and thus other etiologic factors, such as depression (Schulz-Kindermann, et al., 2007), are being explored in order to minimize this outcome. In our initial study examining cognition in older individuals (>60), we documented notable memory impairment. The aim of the study was to examine the relationship between memory function and depression in older patients prior to HCT.

Participants and Methods: Participants were 30 allogeneic HCT candidates 60 years or older who were consecutively scheduled for routine pre-transplant neuropsychological assessment at a medical center. The mean age was 68.4 (SD=3.4) with 14.1 (SD=3.6) years of education. The Geriatric Depression Scale (GDS); the Hopkins Verbal Learning Test-Revised (HVLT-R) and the Brief Visuospatial Memory Test-Revised (BVMT-R) were used to measure depression, verbal and visual memory function, respectively. Delayed recall scores of the two memory measures were summed to provide an overall memory function index. Pearson correlations were conducted to examine the relationship between depression and overall memory function.

Results: Depression was significantly associated with overall memory function ($r=-.39$, $p<.05$). However, depression was only significantly associated with visual memory ($r=-.48$, $p<.01$), but not verbal memory performance ($r=-.21$, $p=.26$).

Conclusions: These results suggest that depression prior to HCT may partially contribute to noted memory impairment and that visual memory may be more sensitive to the impact of depression in HCT candidates. Visual memory tests have been found to be more sensitive to amygdala volume (Soininen et al, 1994) and amygdala volume has been shown to be related to depression (Andrade et al, 2010). Screening for depression prior to HCT may improve cognitive outcome.

Correspondence: *Mandy W. Fong, Illinois Institute of Technology, 3105 South Dearborn, Chicago, IL 60616. E-mail: wfong1@hawk.iit.edu*

V.W. WILLARD, H.M. CONKLIN, S. WU & T.E. MERCHANT. Psychological Functioning in Pediatric Patients with Low Grade Gliomas Treated with Conformal Radiation Therapy.

Objective: Low-grade glioma (LGG) represents a heterogeneous group of pediatric brain tumors. While many are successfully treated with surgery, those requiring adjuvant therapy are at increased risk for late effects. Conformal radiation therapy (CRT) methods have been used to mitigate these sequelae. Past studies suggest some sparing of cognitive deficits though less is known about the impact on emotional and behavioral functioning. The objective was to determine the trajectory of psychological functioning of pediatric patients with LGG during the first 5 years after photon-based CRT.

Participants and Methods: Pediatric patients with LGG were treated on an institutional Phase II trial (CRT dose: 54 Gy, margin ranged 1.0-0.5cm). Patients completed neurocognitive assessments pre-CRT, 6 months post, and then yearly for 5 years. This study required completion of at least 2 assessments with the Child Behavior Checklist; 80 patients met criteria (45% male, 85% Caucasian). Diagnoses were varied, but the majority were pilocytic astrocytoma (n=51) or optic pathway glioma (n=13). Average age at diagnosis was 6.8 years (±4.3) and 8.9 (±3.4) at CRT.

Results: Before CRT, patients demonstrated lower parent-reported Academic, Social and School Competence, and increased Attention and Social Problems, as compared to normative means (one-sample t-test, $p<.05$). The same trend was apparent at 5 years post-CRT ($p<.0001$) but group performance remained within normal limits. Longitudinal analyses indicated a significant increase in Social Problems over 5 years (intercept=54.2, slope=0.68, $p<.03$). Increases in Social Problems were associated with male gender, Caucasian race, subtotal resection, shunt placement, larger number of surgeries, and younger age at CRT.

Conclusions: Pediatric patients with LGG are at risk for emotional and behavioral problems. These deficits, with the exception of Social Problems, are present before CRT and remain relatively stable 5 years after; suggesting CRT may not exacerbate psychological difficulties in this population.

Correspondence: *Victoria W. Willard, PhD, Psychology, St. Jude Children's Research Hospital, 262 Danny Thomas Place, Mail Stop 740, Memphis, TN 38015. E-mail: victoria.willard@stjude.org*

A. HOLLAND, R. PEREZ & P.L. STAVINOHA. Predictors of Utilization of School Services by Pediatric Survivors of Medulloblastoma and Pilocytic Astrocytoma.

Objective: This study investigated demographic, neuropsychological, and medical risk factors for utilization of special education and Section 504 services among pediatric survivors of medulloblastoma (MB) and cerebellar pilocytic astrocytoma (PA). It was hypothesized that FSIQ, age at surgery, history of hydrocephalus or shunt, and SES would significantly predict utilization of either special education or Section 504 services for both groups.

Participants and Methods: Parents of 36 MB and 20 PA survivors reported history of school services received and SES. MB and PA survivors completed a brief neuropsychological research battery including a brief measure of FSIQ.

Results: Independent samples t-tests revealed that SES did not differ between groups, but MB survivors demonstrated significantly lower FSIQ than PA survivors ($p=.001$). Chi-square analyses indicated significantly more MB survivors utilized special education or 504 services than PA survivors. Regression indicated that FSIQ and SES contributed

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

significantly to prediction of special education utilization for MB but not for PA. For the combined sample, FSIQ and SES contributed significantly to models predicting utilization of either special education or 504 services, with SES contributing most significantly to the model (p=.002, versus p=.035 for FSIQ). Medical variables did not significantly contribute to any models.

Conclusions: FSIQ and SES emerged as significant predictors of school service utilization. This finding was largely attributable to the MB group, as evidenced by individual group analyses. Findings suggest that, in addition to lower FSIQ, higher SES may be associated with increased utilization of school services among pediatric MB survivors. Neither age at surgery nor history of hydrocephalus was associated with school services utilization. Future research should investigate the reasons for lower school resource utilization in low-SES MB or PA survivors and whether lower SES leads to higher risk for poor academic outcomes for these children.

Correspondence: *Alice Ann Holland, PhD, Children's Medical Center Dallas, 6300 Harry Hines Blvd., Suite 900, Dallas, TX 75235. E-mail: Alice.Ann.Holland@childrens.com*

K.E. ROBINSON, K.R. WOLFE, K.O. YEATES, E. MAHONE & M. RIS. Predictors of Adaptive Functioning and Psychosocial Adjustment in Children with Pediatric Brain Tumor: A Report from the Brain Radiation Investigative Study Consortium.

Objective: Children on treatment for pediatric brain tumors are at risk for impairment in adaptive functioning, as well as mood and behavior problems. Although sociodemographic, tumor-related, and treatment-related variables have all been cited as related to outcomes, the relative predictive value of these predictors has not been assessed.

Participants and Methods: We recruited 59 children age 4 to 17 years, an average of 1 month following diagnosis of a pediatric brain tumor. The ABAS-II was used to measure adaptive functioning and the BASC to measure mood and behavior problems. Potential predictors included sociodemographic variables (i.e., SES, family income, parent education), tumor-related variables (i.e., tumor location, size, presenting symptoms), and treatment-related variables (i.e., radiation dose, extent of resection, chemotherapy, time since diagnosis).

Results: Of the 46 parents who completed the ABAS-II, 20.3% reported significant impairment in their children's overall adaptive functioning. Mean adaptive functioning was significantly lower than the normative mean (p<.05). Of the 58 parents who completed the BASC, 6.8% reported significant overall behavioral symptoms. Larger tumor size and less parent education were uniquely predictive of poorer adaptive functioning, whereas supratentorial tumor location and less parent education were uniquely predictive of increased behavioral symptoms.

Conclusions: Deficits in adaptive functioning may be more apparent than behavioral problems during the early course of treatment for pediatric brain tumors. Although parent education predicts both types of outcome, tumor size was uniquely predictive of adaptive functioning, whereas supratentorial tumors contributed uniquely to behavioral and emotional symptoms.

Correspondence: *Kristen E. Robinson, Ph.D., Pediatric Psychology & Neuropsychology, Nationwide Children's Hospital, 700 Children's Drive, Columbus, OH 43205. E-mail: kristen.robinson@nationwidechildrens.org*

M.C. GROSCH, M. RIS, K. YEATES & M. MAHONE. Premorbid Functioning in Children Diagnosed with Brain Tumors.

Objective: Establishment of premorbid function is critical in developmental research on acquired brain injury as it reflects reserve capacities moderating outcome. Research on neurodevelopmental outcome in survivors of pediatric brain tumors is often based on the assumption of normal development up to the onset of overt symptoms, an assumption that requires verification.

Participants and Methods: The Brain Radiation Investigative Study Consortium (BRISC) is a prospective longitudinal multi-site (Cincinnati/Columbus/Baltimore) study of 59 children diagnosed with brain tumors. Premorbid child factors were assessed via retrospective parent rating of psychosocial function (BASC) and questionnaires regarding neonatal/developmental history. Comparisons were made with normative data when available. Also compared were tumors believed to originate early in neurodevelopment (embryonal) and those arising later (non-embryonal).

Results: Mean age at diagnosis was 9.7 years. The overall sample showed no evidence of increased neonatal risk factors or delays in development. Delays in talking were more common in children with embryonal (eg, PNET; 46%) than non-embryonal (eg, astrocytoma; 15%) tumors, but this was not statistically significant (p=.24). Rate of premorbid attention problems on the BASC (14%) was significantly higher than in the normal population. This was moderated by SES, with greater attention problems reported in children from lower income families.

Conclusions: Results indicate largely typical development prior to brain tumor diagnosis, though attention problems may be more common in these children, particularly those of lower SES. Findings highlight the importance of SES in determining premorbid function and subsequently, its implications for interpretation of change over time. Results suggest delays in talking related to embryonal tumors; this requires further study with larger samples. Finally, consistency across these retrospective reporting methods provides support for this approach to establishing premorbid function.

Correspondence: *Maria C. Grosch, Ph.D., Baylor College of Medicine/Texas Children's Hospital, 2825 Bellefontaine St, Apt 321A, Houston, TX 77025. E-mail: maria.grosch@utsouthwestern.edu*

K. SMITH, T. KING, A. AILION, R. MORRIS & N. KRAWIECKI. Word Reading Skill From Childhood to Adulthood in Pediatric Medulloblastoma: A Case Series.

Objective: Diverse cognitive outcomes are associated with medulloblastoma (MB) and its treatments. While research shows a declining trajectory relative to peers in childhood reading, the long-term trajectory as young adults is less clear. Qualitative analysis of longitudinal reading data into adulthood is presented to generate hypotheses.

Participants and Methods: 7 participants with MB treated with radiotherapy (RT) were tested at least 4 yearly intervals during childhood (starting 1-4 years since diagnosis), and again as a young adult (13-20 years since diagnosis). Age at diagnosis was 2-9 years and adults were 18-32 years. Word reading was measured using standard scores from the WRAT-R Reading in childhood, and the WJ-III Letter-Word ID as adults. Demographic and treatment factors were also evaluated.

Results: During childhood, 4 patients showed 24-48 standard score point declines in reading and 3 had a stable trajectory (<5 point decline). The difference from the last childhood to the adult visit for all was minimal (< .5 SD). As adults, the decline group had scores of 54-67 and the stable group, 86-91. Compared to the stable group, the decline group all showed at least 1 SD decrease between 1 to 2 years since diagnosis. In terms of risk factors, it appears the decline group had greater frequency of hydrocephalus, whole brain RT, and chemotherapy. Mean age at diagnosis for the stable group was 6 years and 4.25 years for the decline group. Factors that appeared similar in frequency between the groups included: sex, race, RT dose, hormone deficiency, and SES.

Conclusions: Little change from last childhood point to adult suggests continued impairments relative to peers for the decline group and low average reading for the stable group. Greater cumulative neurological dysfunction may have impacted trajectory of performance in the decline group. The steep decline in reading after the first year may be an indicator of future decline and a marker to healthcare providers to recommend more intense remediation earlier.

Correspondence: *Kristen Smith, M.A., Georgia State University, 140 Decatur St, Atlanta, GA 30303. E-mail: kristensmith27@gmail.com*

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

T. NORRIS, K. SCARDAMALIA, P. PATEL & E. GREENSPAHN. Pediatric Cancer Case Study of Neurocognitive and Psychosocial Late Effects Following the Implementation of a Cognitive Remediation And Cognitive Skills Training Program.

Objective: As more children survive childhood cancers and tumors, greater attention is being focused on treatment effects, most commonly cranial radiation and intrathecal chemotherapy. Both treatments have long-term effects on survivors' neurological, cognitive, and psychological functioning. Survivors are at risk for deficits in attention, memory, and processing speed as well as other disturbances in executive functioning. Emphasis in research is now shifting towards the identification of intervention methods.

Participants and Methods: As part of a larger study investigating the efficacy of a cognitive remediation and cognitive behavioral therapy intervention program for neurocognitive and psychological late effects, pre- and post-intervention data was collected. The current study employs a single-study case design to examine the test data of one participant, an 11-year-old Hispanic male with a history of Acute Lymphoblastic Leukemia (ALL) who received chemotherapy and radiation treatment. Three previous evaluations were also available for review, allowing a longitudinal examination of functioning. This poster compares performance on measures of attention, executive functioning, and memory from the evaluations as well as pre- and post-intervention data.

Results: Results of pre- and post-intervention testing indicated improvement in attention, executive functioning, and memory after participating in the intervention program. Specifically, improvements in accuracy and speed on a counting task requiring cognitive set-switching, divided visual-auditory attention, and delayed verbal memory were demonstrated.

Conclusions: These findings suggest that cognitive remediation and cognitive-behavioral intervention programs have the potential to address weaknesses in attention, executive functioning, and memory among survivors of pediatric cancer. Furthermore, the results highlight the importance of further investigation into the efficacy of these types of programs.

Correspondence: *Thea Norris, UT Austin, 2900 Sunridge Dr., Apt 1004, Austin, TX 78741. E-mail: thea.norris@utexas.edu*

P. BANERJEE, R.J. HARRIS, B.M. ELLINGSON, S. ZARINGHALAM, S.Y. BOOKHEIMER, L.M. LIAU & T.F. CLOUGHESY. Language Performance in Brain Tumor Patients: A Voxel-Based Lesion-Symptom Mapping Study.

Objective: We statistically examined the relationship between lesion presence and language performance on a voxel-by-voxel basis in adult brain tumor patients using innovative voxel-based lesion-symptom mapping (VLSM). VLSM has not previously been used in studies of patients with forebrain tumors.

Participants and Methods: 41 right-handed adults with primary gliomas were administered subtests of the Boston Diagnostic Aphasia Examination: Boston Naming Test (BNT), Complex Ideational Material, Responsive Naming, Repetition of Phrases, and Automatized Sequences. Participants ranged from 27 to 80 years old (M = 46) with 61% males. Tumor location was primarily in the left hemisphere (81%) and mainly in the frontal (42%), temporal (27%), and parietal (22%) lobes. T2-weighted images were registered to a T1-weighted MNI atlas and the tumor region was contoured using a semi-automated thresholding technique. For a voxel, patients were grouped by whether or not tumor was present and a t-test was performed to compare the cognitive scores of these two groups. This analysis was repeated for each voxel for each subtest. Demographics were also considered.

Results: VLSM identified several clusters of voxels with a significant relationship ($p < .05$) between lesion presence and language performance, depicted on high resolution statistical maps (1 mm^3). Neural correlates of the BNT and Responsive Naming included the middle and superior temporal gyri and were more widespread for Responsive Naming. Neural correlates of Complex Ideational Material included regions of the inferior, middle, and superior temporal gyri, caudate, and thalamus; correlates of Repetition of Phrases included the middle temporal gyrus and inferior parietal lobule; and correlates of Automatized Sequences included regions of the thalamus, putamen, superior temporal gyrus, and middle occipital gyrus.

Conclusions: These findings identify some of the key anatomic structures involved in language functioning in brain tumor patients using an innovative lesion analysis technique.

Correspondence: *Pia Banerjee, Ph.D., Neurology, University of California, Los Angeles, 760 Westwood Plaza, #C8-746, Los Angeles, CA 90095. E-mail: pbanerjee@mednet.ucla.edu*

S.A. HOSTETTER, C.H. SEMERJIAN, B.T. HAREL, K.S. WALSH & K.K. HARDY. Computerized Assessment of Neurocognitive Functioning in Young Survivors of Childhood Cancer: A Pilot Study.

Objective: Psychometrically-valid and reliable neurocognitive assessment tools for young children are lacking, particularly for domains affected by central nervous system-impacting cancer and treatment. We examined the utility and construct validity of a brief computerized assessment in a sample of young survivors of acute lymphoblastic leukemia (ALL) or brain tumors (BT).

Participants and Methods: Five computerized tasks using touch-screen technology were developed using the CogState assessment platform specifically for young children. Tasks included measures of processing speed, visual attention, working memory, visual learning, and executive functioning. Survivors aged 4-7 completed these computerized tasks, as well as traditional measures of intellectual, memory, visual-motor, and executive functioning.

Results: To date, 19 survivors (M age = 5.4, 58% male, 84% Caucasian, 74% brain tumor) have completed computerized testing. Mean intellectual functioning and parent-rated working memory and attention were in the average range (FSIQ=104.5, SD=17.96; BRIEF Working Memory T=56.8, SD=11.99; CBCL/BASC Attention T=52.6, SD=6.03). Data supported the convergent validity of many computerized tasks. For example, a computerized one-back working memory task was correlated with FSIQ (r = .48), immediate memory for stories (r = .49,) comprehension of instructions (r = .53), and digit span (r = .36). Additionally, a continuous paired associate visual learning task was highly correlated with a traditional memory for designs task (r = .71).

Conclusions: Computerized cognitive testing has potential advantages over traditional paper-and-pencil measures for survivors at risk for neurocognitive sequelae, including brevity, multiple alternate forms, and reduced motor demands. If reliable and valid, these tasks could serve as rapid, low-cost screening tools that can be administered without an on-site psychologist/neuropsychologist.

Correspondence: *Sarah A. Hostetter, BA, Neurology, Children's National Medical Center, 111 Michigan Ave NW, Washington, DC 20010. E-mail: shostett@childrensnational.org*

S.A. HOSTETTER & K.K. HARDY. Feasibility of Computerized Cognitive Training with Young Survivors of Childhood Cancer.

Objective: Young survivors of CNS-impacting cancer are at risk for neurocognitive sequelae, particularly given their age at diagnosis. In studies to date, computerized working memory (WM) training has been shown to be feasible and preliminary efficacious in childhood cancer survivors aged 8-16, but this approach has not yet been examined in younger survivors. We examined the feasibility and acceptability of a computerized working memory (WM) training program for young survivors of childhood cancer.

Participants and Methods: Cogmed JM, is a home-based, computerized, interactive cognitive training program for children aged 4-7. Training consists of 25, 15-minute sessions over 6-8 weeks. Survivors (> 1 yr from diagnosis) of acute lymphoblastic leukemia or brain tumor (BT) ages 4-7 were randomized to adaptive or non-adaptive treatment arms. Performance-based and parent-reported measures of attention and WM are evaluated pre- and post-intervention.

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

Results: To date, 20 survivors (M age=5.3, 55% female, 80% Caucasian, 55% BT) have been screened for participation, with 16 (80%) meeting eligibility criteria for WM difficulties. Eight children were assigned to the adaptive training condition. Baseline intellectual functioning was average for the group (mean FSIQ = 101.8; SD=15.36), with relative difficulties in processing speed and WM. Eleven of 16 children (69%) completed the intervention, and they appear to take more time to do so than older survivors evaluated previously. Most children were able to use the computer keyboard and mouse either independently (71%), or with parent assistance, to complete the exercises. The majority (77%) of participants' parents reported being "somewhat" or "very" satisfied with the intervention.
Conclusions: Pilot data suggests that families of young cancer survivors are moderately receptive and adherent to home-based computerized WM intervention, which may have the potential to improve WM function in a highly vulnerable group of survivors.
Correspondence: *Sarah A. Hostetter, BA, Neurology, Children's National Medical Center, 111 Michigan Ave NW, Washington, DC 20010. E-mail: shostett@childrensnational.org*

A. AILION, T.Z. KING, H.C. CHRISTOPHER, R. MORRIS & N. KRAWIECKI. Differential Developmental Trajectories of Reading and Abstract Reasoning Skills in Children with Brain Tumors: Role of Age at Diagnosis and Radiation.
Objective: Young age at diagnosis (age) and radiation treatment (RT) of pediatric brain tumors (PBT) are considered risk factors for poor cognitive outcomes. This study investigated reading (WRAT-R) and abstract reasoning skills (SB-4, AR) in children with PBT to examine if RT disrupted skills at different times during development. We hypothesized an interaction between the presence of RT and younger age that would predict that RT earlier in development would result in poorer performance across both outcome measures.
Participants and Methods: Analyses included longitudinal archival data of 134 children with heterogeneous PBT; each child had between 1-9 visits for each measure that began around the time of diagnosis.
Results: We used two 2-level multilevel models. The first model analyzed reading and accounted for risk factors and the second model analyzed the effects of the same risk factors on AR scores. The interaction between RT and time predicted the slope of reading and indicated that, when RT is present, reading scores decreased over time relative to peers whereas AR skills increase was a trend (slope: reading γ=-2.29, p<.00; AR: γ=2.66, p=.08).The interaction between RT and age significantly predicted the intercept of both measures (intercept: reading: γ=2.08, p=.02; AR: γ =1.79, p=.01). Regions of significance testing showed that RT was estimated to affect reading when age was <5 years while RT was estimated to affect AR when age was <8 years.
Conclusions: Age at PBT and RT appeared to impact reading and AR skills differentially over time, likely reflecting children establishing unique skills at different times in development. Children treated with RT had lower reading skills relative to peers over time but the relationship between RT and AR skills over time was less clear. Children with RT at a younger age had poorer reading skills, whereas children with RT at an older age had poorer AR skills. Early intervention for reading and the role of AR skills will be discussed.
Correspondence: *Alyssa Ailion, Georgia State University, 140 Decatur St., 11th Floor Psychology Dept., Atlanta, GA 30303. E-mail: aailion1@student.gsu.edu*

K. WALSH, A. GIOIA & W. ELIZABETH. Long-Term Neurocognitive Functioning in a Case Series of Medulloblastoma Survivors: The Impact of Cerebellar Mutism Syndrome.
Objective: About 25% of pediatric patients with medulloblastoma develop Cerebellar Mutism Syndrome (CMS+) post-resection resection and worse neurocognitive outcomes have been reported but not systematically studied beyond Global IQ. We aim to present a matched case series of children with medulloblastoma with and without CMS on a range of neuropsychological functions. We predict that CMS+ children will perform worse than CMS- children and will have a greater prevalence of clinical impairments.
Participants and Methods: We present 5 matched pairs of medulloblastoma patients off-treatment for at least 1 year; half were CMS+. Participants were matched by diagnosis age, age at assessment, and treatment. All participants underwent a full neuropsychological evaluation. Descriptive data was calculated, and variables were dichotomized for clinical significance at one standard deviation below the mean.
Results: Age range was 9-18 yrs at time of evaluation (M=14.6; SD=2.41), with 50% males. Time off treatment for the CMS+ participants ranged from 1-13 yrs (M=7.0; SD=4.18), and 1-8 yrs (M=4.0; SD=2.34) in the CMS- group. 90% received radiation. CMS+ participants consistently showed scores below CMS- on Performance IQ, particularly Matrix Reasoning. PIQ was impaired in 80% of the CMS+ group and never in the CMS- group. Verbal IQ was impaired in 40% of the CMS+ group, and none of the CMS-. Similar patterns emerged for working memory, flexibility, memory, processing speed, and visual-motor integration.
Conclusions: Based on this matched sample of medulloblastoma survivors, results suggest that CMS is associated with greater impairments across a range of neurocognitive functions (not just language) in the years following treatment. This lends support to the idea that the presence of CMS is an indication of a disruption in cortical pathways associated with higher-order cognitive development and functioning.
Correspondence: *Karin Walsh, Children's National Medical Center, 111 Michigan Avenue NW, Washington, DC 20010. E-mail: kwalsh@childrensnational.org*

G. WOCHOS & K. WALSH. Proton versus Photon Radiotherapy in Pediatric Brain Tumor Survivors: A Comparison of Neurocognitive Outcomes.
Objective: Cranial radiation therapy is an often necessary treatment for many pediatric brain tumor (PBT) patients, and the neurotoxic late effects are well established. Proton radiation therapy (PRT) is an emerging treatment that may offer clinical advantages over conventional photon beam radiation (XRT) by sparing healthy tissue & therefore minimizing neurotoxicity. There are few studies examining neurocognitive outcomes of PRT in PBT survivors. Our aim was to examine the relationship between focal XRT & neurocognitive function in PBT survivors. We hypothesize that PBT survivors treated with PRT will perform better than those with photon XRT.
Participants and Methods: PBT survivors treated with focal PRT (n=14; mean age=12.21; SD=4.44) or focal photon XRT (n=17; mean age= 12.24; SD=3.95) were compared to PBT survivors who received no XRT (n=34; mean age=10.62 years; SD=3.74) on quantitative IQ measures and parent ratings of executive function (EF). ANOVAs were conducted to compare IQ between groups (Wechsler Composite Scores, & Digit Span). Chi squared analyses & odds ratios were calculated to predict the odds of clinical elevations on a parent rating scale of EF (BRIEF).
Results: The PRT group scored significantly higher than the no XRT group on PIQ (p=.033) & FSIQ (p=.012). The PRT group also scored significantly higher than the photon group on VIQ (p=.038), WMI (p=.011), & FSIQ (p=.030). Parent EF ratings revealed a significant relationship between clinically elevated symptoms & group on the Inhibit scale (χ2= 7.03, p =.03, Phi =.33). The photon group was 7 times as likely to be impaired on Inhibit as the PRT group (OR=7.09).
Conclusions: Our results revealed better overall neurocognitive performance in PBT survivors treated with PRT, compared to photon XRT. The photon Parent ratings of EF indicate that photon XRT is more likely to result in clinically significant inhibitory control deficits compared to PRT.
Correspondence: *Karin Walsh, Children's National Medical Center, 111 Michigan Avenue NW, Washington, DC 20010. E-mail: kwalsh@childrensnational.org*

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

P. LEO, M. FRANCZAK, J. BOVI & D. SABSEVITZ. Long Term Effects of Whole-brain Radiation Therapy on Cerebral White Matter Injury.

Objective: Metastatic brain tumors are the most common brain tumors in adults. Whole-brain Radiation Therapy (WBRT) is an effective treatment for managing metastatic disease. White matter (WM) injury is a well-known, but poorly understood complication of WBRT that is thought to underlie the changes in cognition following treatment. Previous work in our lab has shown significant increases in WM injury are first evident approximately 15 weeks post WBRT with continued progression until approximately 52 weeks. Little is known regarding the changes in WM for patients that survive past one year. The current study uses a quantitative volumetric approach to explore WM changes up to 30 months post WBRT.

Participants and Methods: Seventeen patients with unilateral metastatic disease were identified from a larger series of patients. FLAIR MRI scans were obtained pre-treatment and then at 6, 12, 18, 24, and 30 months post-treatment. Using a semi-automated approach, the volume of WM injury contralateral to the diseased hemisphere was measured. This region of interest was selected to more accurately measure WBRT changes without the confounding factors of brain changes secondary to the metastatic disease or edema.

Results: Within-subjects, repeated measure ANOVA with time post treatment as the independent variable and WM change from baseline as the dependent variable showed a significant effect for time. Follow-up analysis revealed that progression in WM change continued to approximately 18 months post-treatment. Post-hoc analysis at 24 and 30 months post treatment were not significant.

Conclusions: These data suggest that WM changes occur until approximately 18 months but then seem to plateau until at least 30 months post-treatment. To our knowledge this is the first study to investigate the long-term consequences of WBRT. Future studies should be aimed at understanding the risk factors associated with WM change as well as how these changes are associated with cognitive functioning.

Correspondence: *Peter Leo, PhD, Medical College of Wisconsin, 9200 W Wisconsin Ave, Department of Neurology - FWC, Milwaukee, WI 53226. E-mail: pleo@mcw.edu*

K.P. RAGHUBAR, K.O. YEATES, E. MAHONE & M. RIS. Attention in Children with Brain Tumors Treated With or Without Radiation Therapy.

Objective: Survivors of pediatric brain tumor treated with radiation therapy have been shown to exhibit deficits in IQ and various cognitive processes in the first year following treatment. The present study investigated cognitive and behavioral attention in children treated with or without radiation therapy following surgical intervention for brain tumor. The relationship between tumor location (supratentorial versus infratentorial) and attentional processes was also examined.

Participants and Methods: The 43 participants in this study of attention came from a sample of 59 participants in a longitudinal, prospective, multisite (Cincinnati, Columbus, Baltimore) study (BRISC: Brain Radiation Investigative Study Consortium). Participants ranged in age from 5 through 16 years diagnosed with a brain tumor who received either radiation therapy (n = 19) or no radiation therapy (n = 24) following surgical intervention. Within this sample, 25 children had supratentorial tumors and 18 children had infratentorial tumors. Participants were evaluated less than one year post-surgery, and they were administered measures of cognitive attention; a parent report measure of behavioral attention was also completed.

Results: Children who received radiation therapy did not significantly differ from those in the no radiation therapy comparison group on measures of cognitive and behavioral attention. Performance did not significantly differ based on tumor location. As a group, children performed within normal limits on measures of cognitive and behavioral attention. Additionally, the measure of behavioral attention was correlated with specific measures of cognitive attention.

Conclusions: Results are discussed with reference to models of attention. Findings are consistent with the notion that neuropsychological late effects of radiation therapy typically do not manifest within the first year after ending treatment. Implications for neuropsychological assessment in pediatric survivors of brain tumor treated with radiation are discussed.

Correspondence: *Kimberly P. Raghubar, Ph.D, Psychology, Texas Children's Hospital, 6701 Fannin Street, Houston, TX 77030. E-mail: kim.raghubar@gmail.com*

O.C. LINDNER, M.G. MCCABE, A. MAYES & D. TALMI. Cognitive impairments due to chemotherapy in young adult cancer survivors.

Objective: Our study aimed to describe chemotherapy-induced cognitive impairments in young adult cancer patients treated for three malignancies. We expected survivors to have memory and attention declines compared to healthy controls, which would not be linked to psycho-social measures.

Participants and Methods: Participants were aged 16 to 50 years old (m=32.1, sd=16.1). Patients (n=60) had been treated for lymphoma (n=30), breast cancer (n=15), or germ cell tumour (n=15). Control participants (n=60) were individually matched to patients on age, gender, and educational level. The neuropsychological tests were administered 6 months to 5 years post-treatment. They evaluated memory, attention, executive functions, and motor skills. The psycho-social measures assessed quality of life, level of distress, fatigue, subjective cognitive complaints, and illness perceptions.

Results: Multivariate analyses revealed that patients suffered declines on verbal immediate, delayed, and recognition memory, executive functions, and made more attention and memory errors. Visual memory and total attention performance were not impaired. Distress and fatigue levels were higher compared to controls. These correlated with a lower self-reported quality of life, with the number of subjective cognitive complaints, and with memory performance. Attention only correlated with memory functioning in the presence of emotional distress. The type and severity of impairments differed based on the type of treatment.

Conclusions: Our results suggest that after chemotherapy young adults suffer memory and executive functions declines which may be linked to both medial temporal lobe and pre-frontal dysfunctions. The type of treatment and level of distress also had a high impact on cognitive functioning. It is yet unclear if the memory problems are hippocampus-dependent, triggered by underlying pre-frontal dysfunction, and/or by underlying emotional distress. We discuss how future research may answer these paramount questions and drive future intervention strategies.

Correspondence: *Oana C. Lindner, BSc, MSc, School of Psychological Sciences, University of Manchester, Brunswick Street, Zochonis building, Manchester M13 9PL, United Kingdom. E-mail: oana.mereuta@postgrad.manchester.ac.uk*

M.N. EDELMANN, C. PUI & K.R. KRULL. Biomarkers Related to CNS Integrity during Treatment for Acute Lymphoblastic Leukemia.

Objective: Survivors of childhood acute lymphoblastic leukemia (ALL) are at risk for chronic health conditions, including altered brain development and function. This study aims to examine changes in biomarkers of central nervous system integrity during chemotherapy for ALL, and to explore associations with future neurocognitive function.

Participants and Methods: Biomarkers were analyzed in the cerebrospinal fluid (CSF) of 235 patients with ALL during pre-treatment, post-induction, and post-consolidation phases of chemotherapy (no patients were treated with cranial radiation). Mean (range) age at diagnosis was 7.2 (1.0-18.9) years, and 49% were female. The following biomarkers were examined: neuron-specific enolase (NSE; concentrated in neuronal soma); total Tau (tTau; indicative of axonal and dendritic health); myelin basic protein (MBP; important for myelin integrity); and glial fibrillary acidic protein (GFAP; concentrated in astrocytes).

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

Survivors went on to complete neurocognitive testing during long-term follow-up.
Results: When compared to pre-treatment spinal taps, NSE and tTau levels increased post-induction ($p<0.001$) and decreased post-consolidation ($p<0.001$). Post-consolidation levels of GFAP were elevated compared to pre-treatment ($p<0.001$) and post-induction ($p<0.001$). Pre-treatment levels of MBP were elevated when compared to post-induction and post-consolidation ($p<0.001$). Neurocognitive testing demonstrated increased rates of impairment in executive functions, including flexibility, fluency and planning and organization. Associations between functional impairment and CSF biomarkers are explored.
Conclusions: Elevated levels of NSE, tTau, and GFAP during treatment for ALL suggests chemotherapy-induced damage to neurons and astrocytes, whereas, elevated pre-treatment levels of MBP suggests altered myelin integrity before treatment onset. Future research is needed to gain more insight into the relation between these biomarkers and future outcomes.
Correspondence: *Michelle N. Edelmann, PhD, St Jude Children's Research Hospital, 262 Danny Thomas Place, Mailstop 735, Memphis, TN 38103. E-mail: michelle.edelmann@stjude.org*

M. MAHONE, L.A. JACOBSON, A. ZABEL, Y.O. KEITH & R. M. DOUGLAS. Age of Treatment Moderates Post-surgery Improvement in Processing Speed in Children with Brain Tumors.
Objective: To investigate change in processing speed in children two years post treatment for brain tumors (BT) with radiation therapy (RT) compared to children with BT treated with surgery only.
Participants and Methods: Participants included 61 children (3-16 years) diagnosed with BT and assessed as part of the Brain Radiation Investigative Study Consortium (BRISC). Neuropsychological assessment emphasizing processing speed was completed at two time points: T1 (3-9 months post-surgery) for 26 children who had received whole brain or targeted RT (RT group) and 35 receiving surgery only (No-RT group), and again two years later (T2) for 39 participants (15 RT, 24 No-RT). Linear mixed effects (LME) regression analyses examined differences in processing speed between groups (RT/No-RT), with moderating variables including sex, age at T1 (age1), SES, tumor location, and time since baseline (time). Main effects and interactions were assessed, and predictor variables removed when not contributing significantly to the model. Processing Speed Index (PSI) from WPPSI-3/WISC-IV was the outcome variable.
Results: There were no significant group differences in age at T1 or T2. LME analyses revealed a significant effect for group ($p=.01$), and significant interactions for group-by-age1 ($p=.006$), group-by-time ($p=.03$), and group-by-age1-by-time ($p=.03$). Examination of the interactions revealed that while both groups' performance improved from T1 to T2, children treated with RT who were older (>10 years) at T1 showed greater improvement over time than children who were younger (<10 years) at time of treatment. Conversely, among the no-RT group, those receiving treatment earlier (<10 years) showed more rapid improvement in PSI than those treated later (>10 years).
Conclusions: Cumulative brain injury earlier in life (tumor, surgery, plus RT) may result in greater cognitive impairment and slower recovery over time. Children with more mature brain development at time of surgery appear to show more rapid recovery of cognitive processing speed.
Correspondence: *Mark Mahone, Ph.D., Neuropsychology, Kennedy Krieger Institute, 1750 East Fairmount Ave., Baltimore, MD 21231. E-mail: mahone@kennedykrieger.org*

J.E. SCHREIBER, S.L. PALMER, L. HUANG, H. ZHANG, M. SWAIN, M.L. CHAPIESKI, D. MABBOTT, M. BONNER, S. KNIGHT, C.L. ARMSTRONG, R. BOYLE & A. GAJJAR. Prospective, longitudinal assessment of attention following risk-adapted treatment for medulloblastoma: importance of multi-modal assessment.
Objective: Research indicates increased attention difficulties following treatment for brain tumors, particularly in younger patients treated with craniospinal irradiation (CSI). This multi-institutional, longitudinal study examined the effects of age at diagnosis and treatment intensity (high versus average risk) on the change in parent ratings and performance-based measures of attention over five years post treatment for pediatric medulloblastoma.
Participants and Methods: Data from at least two assessment time points were available from 175 patients (66 females) treated with risk-adapted CSI and four courses of chemotherapy with stem cell support. Patients were 3 to 21 years at diagnosis (Mean=9.42, SD=4.08). High risk patients (N=40) received CSI to 36 to 39.6 Gy. Average risk patients received a reduced dose of CSI (23.4 Gy). Both groups received a boost treatment of the primary site to 55.8 Gy. All patients underwent serial evaluation of attention via parent ratings (CBCL) and performance-based measures (CPT-II) spanning baseline up to five years following treatment.
Results: Correlations between parent ratings and performance-based measures of attention were low or nonsignificant across time points. Linear mixed-effect modeling revealed statistically significant increases in parent report of attention problems ($p<.01$) and statistically significant increases in attention problems on performance-based measures ($p's \leq .02$). Children younger at diagnosis and/or with high risk status exhibited significantly steeper increases in attention problems on performance-based measures. However, neither age at diagnosis nor risk status had a significant effect on parent report of attention.
Conclusions: Although parent report and performance-based measures both indicated increased attention problems post treatment, performance-based measures were more sensitive to treatment-related factors. Findings highlight the usefulness of including both measurement types in serial assessment following treatment.
Correspondence: *Jane E. Schreiber, PhD, Department of Psychology, St Jude Children's Research Hospital, 262 Danny Thomas Place, Mail Stop 740, Memphis, TN 38105. E-mail: jane.schreiber@stjude.org*

R. JAYAKAR, T.Z. KING, R. MORRIS & C. HENRICH. Adult Survivors of Pediatric Brain Tumor: Vulnerability of the Left Hippocampus and Verbal Memory Associations to Left versus Right Hippocampal Volumes.
Objective: Animal and human studies report asymmetry in left-right hippocampal plasticity and more vulnerability of the left hippocampus to damage. Adult research shows greater left hippocampus involvement in verbal memory (VM). However, findings for hippocampal structure and associated VM are controversial in children with neurological insult. We investigated: (1) hippocampus volume differences between adult survivors of pediatric brain tumor (BT) and neurotypical controls, for the left (LH) and right hippocampus (RH) separately, hypothesizing that LH would be smaller for survivors but RH would not, (2) associations of LH and RH volumes with VM for BT.
Participants and Methods: FMRIB's Integrated Registration and Segmentation tool calculated volumes. The CVLT-II yielded VM scores for List A Trials 1-5 Total, Long Delay Free Recall (LDFR), and Recognition Discriminability (RD). Groups (BT=32, controls=48) did not differ on gender (55% F), ethnicity (54% Caucasian), education (M=13.68), and handedness scores (M=13.13). Survivors were 17.04±1.08 (M±SD) years post-diagnosis and 25±4.52 (M±SD) years old at the time of testing.
Results: One-way ANOVAs showed that LH ($F(1,76)=5.89$, $p=.02$) was significantly smaller for survivors than controls but RH was not. Control structure (putamen) was significantly smaller for survivors on the left and right. Pearson bivariate correlations showed that RH was

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

significantly correlated with LDFR (r=.34, p=.03) but not with Trials 1-5 Total and RD. LH and putamen were not significantly correlated with VM indices.
Conclusions: Survivors have smaller LH than controls, 17 years (mean) after diagnosis, but not smaller RH. This finding is consistent with our prediction and literature on LH vulnerability. Specific RH and VM associations were identified in adulthood after childhood disruption to a developing brain. fMRI studies should explore the potential asymmetry in left and right hippocampal function with regard to VM in BT survivors.
Correspondence: *Reema Jayakar, B.A., Georgia State University, 140 Decatur Street, Atlanta, GA 30303. E-mail: reemajayakar@gmail.com*

J. LUXTON, J. LAI, T. BRINKMAN, F. ZELKO, S. GOLDMAN & K.R. KRULL. Computerized assessment of simple and complex processing speed in survivors of childhood cancer.
Objective: Survivors of childhood cancer are at risk for neurocognitive dysfunction, with impairment often appearing years after treatment completion. Routine cognitive assessment is necessary for early detection of deficits. We examined survivor cognitive function using a brief computerized assessment battery.
Participants and Methods: Two hundred forty-four survivors (160 chemotherapy only; 84 cranial radiation therapy) mean [SD] age=13.6 [3.8] years; time since diagnosis=5.5 [4.6] years completed the Cogstate assessment of cognitive function, including measures of simple and choice reaction time. General linear models were used to examine differences in processing accuracy and speed by cranial radiation exposure (total brain, proton beam, limited field) and chemotherapy only, adjusting for age at assessment, age at diagnosis, and time since diagnosis.
Results: In survivors treated with chemotherapy alone, mental processing speed was significantly slower in females than males (simple: $F(1, 146) = 8.85$, $p<0.001$; choice: $F(1, 150) = 5.22$, $p<0.02$). Female CNS tumor survivors treated with limited field and proton beam radiation also demonstrated significantly slower processing speed (simple: $F(2, 68) = 4.17$, $p<0.02$, choice: $F(2, 74) = 5.11$, $p<0.01$) than males. In contrast, the interaction between gender and total brain radiation suggested no difference in processing speed, though performance for each gender was slower compared to limited field and proton beam CRT groups.
Conclusions: The Cogstate brief computerized assessment detected significant differences in survivor processing speed by gender and treatment exposure. Results provide further support for potential vulnerability of females to processing speed difficulties following cancer treatment in childhood. However, the potentially protective effect of male gender appears to be reduced following exposure to whole brain CRT.
Correspondence: *Kevin R. Krull, Ph.D., Epidemiology & Cancer Control, St. Jude Children's Research Hospital, 262 Danny Thomas Place, MS 735, Memphis, TN 38105-2794. E-mail: kevin.krull@stjude.org*

L.M. CAPON, A.R. GIOIA, C.H. SEMERJIAN, K.S. WALSH & K.K. HARDY. Beyond Coding and Symbol Search: Processing Speed in Survivors of Childhood Cancer.
Objective: Children diagnosed with brain tumors (BT) and acute lymphoblastic leukemia (ALL) are at risk for late-occurring sequelae, including processing speed (PS) deficits. Although PS can encompass both cognitive efficiency and graphomotor speed, it has most commonly been measured using tasks that confound these processes. Our objectives were to clarify the profile of processing speed deficits in a sample of survivors of central-nervous-system impacting cancers, and to identify demographic and medical predictors of impairment in this domain.
Participants and Methods: Data from 159 participants (58.5% male, mean age = 11.6) was abstracted from a larger study examining long-term neurocognitive functioning among survivors of childhood cancer. Participants were diagnosed with ALL (41.5%) and BT (58.5%), and were an average of 61.3 months (SD = 40.85) from diagnosis. Most participants were treated with cranial radiation (53.1%) and/or intrathecal methotrexate (32.7%). Participants completed a full neuropsychological assessment. For the current study, measures evaluating cognitive, motor, and graphomotor processing speed were used (e.g., verbal fluency, pegboard, Wechsler Coding and Symbol Search, Tower of London-DX, Woodcock-Johnson Tests of Achievement Math Fluency, and Test of Everyday Attention for Children).
Results: As a group, participants had average intellectual functioning (FSIQ=95.6, SD=19.04), but weaker fine motor skills (e.g., dominant hand pegboard z-score 5% trimmed mean = -1.16). In contrast, participants performed well on measures of cognitive efficiency without motor demands. Performance on pegboard tasks accounted for a significant portion of the variance in functioning across multiple neurocognitive domains, over and above age at diagnosis, time since diagnosis, and cranial radiation exposure.
Conclusions: Results suggest that fine motor speed impairments may confound interpretation of reported processing speed deficits experienced by this population.
Correspondence: *Lindsey M. Capon, M.A., Neuropsychology, Children's National Medical Center, 111 Michigan Avenue NW, Washington, DC 20310. E-mail: lcapon@cnmc.org*

Stroke/Aneurysm

C. HAJEK, E. KAIZAR, W. LO & K. YEATES. Cognitive Functioning Following Pediatric Stroke: A Meta-Analysis.
Objective: The magnitude of the effect of stroke on cognitive functioning is unknown and results of previous studies vary in part because of methodological limitations. This study evaluates the effects of pediatric stroke on cognitive functioning through the review and meta-analysis of published studies.
Participants and Methods: Nineteen studies were identified through computerized literature searches. We included studies that were specific to pediatric arterial ischemic stroke and hemorrhagic stroke, and used standardized measures of general cognitive ability (FSIQ), as well as verbal (VIQ) and nonverbal (PIQ) intellectual functioning. We ran three separate meta-analyses, with 15 studies chosen for the FSIQ analysis, 14 studies for the VIQ analysis, and 13 studies for the PIQ analysis. We calculated the unstandardized difference between mean cognitive test scores (FSIQ, VIQ, PIQ) and normative data (M=100; SD=50) for each study. To allow for heterogeneity among studies, we fit a random-effects model for each meta-analysis using Review Manager 5 statistical software.
Results: The analysis of FSIQ revealed a difference of 6.18 (95% CI, 4.86 – 7.51), the analysis of VIQ revealed a difference of 5.34 (95% CI, 3.29 – 7.38), and the analysis of PIQ revealed a difference of 8.63 (95% CI, 6.01 – 11.25) between mean cognitive scores of children with stroke and the theoretical mean of the normative population. Overall, results indicate that children with stroke scored significantly lower on measures of FSIQ, VIQ, and PIQ compared to normative populations.
Conclusions: The results of these meta-analyses indicate that children with stroke perform significantly lower than the normative population on measures of general cognitive ability, as well as verbal and nonverbal intellectual functioning.
Correspondence: *Christine Hajek, PhD, Nationwide Children's Hospital, 700 Children's Drive, Columbus, OH 43205. E-mail: christine.hajek2@nationwidechildrens.org*

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

Medical/Neurological Disorders/Other (Child)

S.M. DINCES, L.N. ROWELL, S.N. HILE, M. EMERY THOMPSON, A.C. TANG, S.J. ERICKSON & R.D. ANNETT. Hypothalamic-pituitary-adrenal Axis Function Predicts Child Neuropsychological Functioning at 3 Year Follow-up.

Objective: Hypothalamic-pituitary-adrenal (HPA) function is associated with neuropsychological processes; however few have studied this in children with chronic illness. This study extends findings from Annett et al. (2005) by examining the relationship between cortisol response at study entry and child neuropsychological functioning at 3 year follow-up using data from the Childhood Asthma Management Program (CAMP) clinical trial. The hypothesis tested was that cortisol regulation predicts children's attention and memory at 3 year follow-up.

Participants and Methods: The present study included 62 children (ages 5-13 years) from the CAMP trial and cortisol and neuropsychological functioning were assessed annually (Y0, Y1, Y3). The dependent variables were from the 3-year (Y3) neuropsychological (NP) assessment including measures of attention (GDS) and memory (WRAML). The independent variable was Y0 cortisol assessed via baseline plasma cortisol concentrations (CORTb) and in response to ACTH challenge (CORTa). The cortisol response was normalized by baseline (CORTe=CORTb-CORTa/CORTb).

Results: Relationships between Y0 HPA function and Y3 child neuropsychological function were determined with stepwise regression. CORTb positively predicted Y3 attention, while CORTe negatively predicted Y3 attention (GDS Vigilance; R=.214 p=.054, model F=4.067 p=.049, R=-.366 p=.002, model F=5.643 p=.021, respectively).

Conclusions: Results indicated that both CORTb and CORTe predicted attention 3 years later. Children with higher CORTb and lower CORTe had increased sustained attention. This is surprising as a high CORTe and a low CORTb is typically thought of as an adaptive stress response. Presently it is unclear what may account for this unexpected relationship. This study highlights the importance of conceptual issues surrounding HPA functioning and neuropsychological outcomes. This finding has implications for how early life stress may affect future child attention.

Correspondence: *Sarah M. Dinces, MS, Psychology, University of New Mexico, MSC03 2220 Logan Hall, 1 University of New Mexico, Albuquerque, NM 87131. E-mail: sdinces@unm.edu*

C. DRAPEAU, L. BLACK, B.C. MCDONALD, J.M. KATZENSTEIN & E. BEGYN. Neuropsychological Functioning of Pediatric Patients with a Mitochondrial Disorder.

Objective: Cognitive deficits have been found in the pediatric mitochondrial population, but few studies have explored these deficits. Given the paucity of neuropsychological research in this group, the aim of this study was to gain further information about neuropsychological functioning in a clinical sample of pediatric mitochondrial disorder patients.

Participants and Methods: A retrospective analysis was conducted of 9 pediatric patients diagnosed with a mitochondrial disorder (4 males and 5 females; mean age = 9.68 years, SD = 3.48) who were referred for outpatient neuropsychological evaluation. Given the rare nature of these disorders, our sample was comprised of a heterogeneous mixture of mitochondrial disorders. Cognitive evaluation covered domains of attention, intelligence, memory, language, visuo-motor integration, fine motor skills, academics, behavioral, and adaptive functioning.

Results: Children with mitochondrial disorders scored significantly lower than published norms on measures of overall intelligence ($t(8) = -2.85$, $p = .02$), working memory ($t(8) = -3.48$, $p = .01$), visuo-motor integration ($t(8) = -2.77$, $p = .02$), dominant hand speeded fine motor dexterity ($t(8) = -2.58$, $p = .03$), mathematics ($t(8) = -2.48$, $p = .04$), verbal fluency ($t(6) = -5.60$, $p = .001$), narrative memory ($t(7) = -2.44$, $p = .045$), and adaptive functioning ($t(4) = -3.81$, $p=.02$). Parents did not rate elevated internalizing or externalizing behavioral symptoms compared to the published norms.

Conclusions: Consistent with previous research, children with mitochondrial disorders in the current sample performed significantly lower than published normative data across multiple cognitive domains, including intelligence, narrative memory, visuo-motor integration, math calculation, select areas of executive functioning, fine motor speeded dexterity, and adaptive functioning. Despite the small sample size and variable symptom presentation, results support the importance of thorough neuropsychological evaluation in this group.

Correspondence: *Christopher Drapeau, Educational Psychology, Ball State University, Department of Educational Psychology, Teachers College 518, Ball State University, Muncie, IN 47306. E-mail: cwdrapeau@bsu.edu*

P.C. GLASIER, A. FAYAD, N. WINICK, N. ROLLINS, D. GRAVES, B. GREENBERG & L. HARDER. A Comparison of Emotional Adjustment and Behavior in Pediatric Patients with Acute Lymphoblastic Leukemia or Multiple Sclerosis.

Objective: This study investigated caregiver-rated emotional adjustment and behavior in pediatric patients with acute lymphoblastic leukemia (ALL) treated with chemotherapy without cranial irradiation or multiple sclerosis (MS). These groups were selected for comparison given the theoretical impact to white matter either associated with treatment (i.e., ALL) or pathology (i.e., MS). Based on available research and the chronic nature of MS, it was hypothesized that children with MS would display more symptoms of internalizing disorders but that attention disorder symptoms would not differ significantly between these groups.

Participants and Methods: Participants were 37 individuals with ALL and 27 individuals with MS between 6 and 18 years of age. Caregivers of participants completed the Parent version of the Behavior Assessment System for Children-Second Edition (BASC-2). T scores derived from all BASC-2 clinical scales and composite indexes were compared between the two groups using independent samples t-tests.

Results: Results indicated significantly higher ratings of Somatization for individuals with MS when compared to ALL. Although the groups did not differ significantly in ratings of Depression or Anxiety, the mean T score of the MS group for Depression was closer to the range of clinical significance than the ALL group. Group means did not differ significantly on any other BASC-2 clinical scale or index.

Conclusions: As predicted, aspects of internalizing symptoms were more pronounced in the MS sample than in the ALL sample. Also, the groups did not differ significantly on parental ratings of attention. These findings suggest that pediatric populations with theorized white matter pathologies may differ in emotional outcomes but overlap in attention regulation. Based on these findings, pediatric patients with MS may require regular screening for internalizing disorders, while patients with ALL may show better adjustment.

This project was partially funded by a Children's Oncology Group Chair's Grant.

Correspondence: *Paul C. Glasier, Ph.D., Children's Medical Center, 6300 Harry Hines Blvd, Suite 900, Dallas, TX 75235. E-mail: paul.glasier@childrens.com*

M.D. MCCURDY, A. BELLOWS, J. FERRAND, T. KLINE, C. MORRIS-BERRY, H.S. SINGER & E. MAHONE. Social Cognition, Repetitive Behavior, and ADHD Symptoms Among Children with Primary Complex Motor Stereotypies.

Objective: Complex motor stereotypies (CMS) are patterned, repetitive, rhythmic, involuntary movements that stop with distraction and persist over time. Classification is based on comorbidity with other developmental problems; "primary" (otherwise normal) or "secondary" (associated with autism, intellectual disability, sensory deficits). The present study examined sex differences and the relationships among social cognition, ADHD symptoms, repetitive behaviors and stereotypy severity in children with primary CMS.

Participants and Methods: Participants were recruited through referrals to a hospital-based movement disorders clinic. All stereotyped

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

movements were confirmed by a neurologist (direct observation or video review). Eligible participants reported no significant history of Autism Spectrum Disorder or other neurological disorder. Parents provided ratings of their child's stereotypy severity (Stereotypy Severity Scale), social cognition (Social Responsiveness Scale—SRS), repetitive behaviors (Repetitive Behavior Scale-Revised), and ADHD symptoms (Conners Parent Rating Scale).

Results: A total of 152 participants (91 boys, 61 girls, ages 5-18 years) were included. Between boys and girls, there were no significant differences in age, stereotypy severity, ADHD symptoms, or repetitive behaviors; however, girls with primary CMS had significantly greater social impairments than boys (SRS Total), even after controlling for ADHD symptoms ($p=.01$). In all, stereotypy severity increased significantly with age ($r=.36$, $p<.001$), and was associated with social cognition deficits ($r=-.26$, $p=.008$), inattentive ($r=.38$, $p<.001$), and hyperactive ($r=.20$, $p=.028$) ADHD symptoms.

Conclusions: Children with primary CMS are characterized as having behavioral and social difficulties that may change across development in conjunction with severity of stereotypies. Girls, relative to boys, may demonstrate greater social dysfunction. Further characterization is necessary for identification and intervention to address these comorbid concerns.

Correspondence: *Mark D. McCurdy, B.A., Neuropsychology, Kennedy Krieger Institute, 1750 E. Fairmount Ave., 3rd Floor, Baltimore, MD 21231. E-mail: mccurdy@kennedykrieger.org*

E.A. HUSTON-WARREN, D. KAUFMAN, A.M. VALLORANI, J.C. ISENBERG & D.H. GUTMANN. Attentional Networks in Children with Neurofibromatosis Type 1.

Objective: Neurofibromatosis type 1 (NF1) is a disorder of autosomal inheritance associated with cognitive deficits in specific domains, such as attention. Little is known about the mechanisms underlying attentional deficits in children with NF1. This study examined attentional networks in children with NF1 in order to better characterize their attentional difficulties.

Participants and Methods: Participants consisted of 7 NF1 patients and 11 healthy controls, who completed several clinical measures (WASI-II, JLO, TEA-Ch, CPT), along with the Attention Network Test (ANT). Parents also completed the Conners-3 to provide subjective reports of everyday problems with attention and hyperactivity.

Results: Relative to healthy controls, children with NF1 exhibited deficits on the JLO, TEA-Ch (Score subtest), and Conners-3 rating scales. Across all conditions of the ANT, children with NF1 performed more slowly and less accurately than controls. Reaction time was particularly compromised for NF1 children in the no-cue condition of the ANT, suggesting a disproportionate difficulty for responding to stimuli when they were more difficult to anticipate.

Conclusions: Neuropsychological and ANT behavioral data suggest widespread differences in attentional processing between children with NF1 and healthy controls. Although the attentional deficits associated with NF1 were broad, they specifically highlighted the importance of providing predictive cues in order to maximize performance. Further understanding of these attentional network differences could help to better characterize this patient population and provide valuable clues for interventions.

Correspondence: *Emily A. Huston-Warren, B.A., Psychology, University of Houston, 8383 El Mundo St., Apt. 411, Houston, TX 77054. E-mail: emily.hustonw@gmail.com*

A. HEITZER, B.N. PETERS, J. PIERCY, T. PARTRIDGE, N. OFEN, D. BATTON & S. RAZ. The Relationships Between Temperamental Attributes Assessed at Preschool Age and Perinatal Risk: A Study of Very Preterm-Born Children.

Objective: A vast body of literature supports an association between very preterm birth and performance deficits in multiple neuropsychological domains. However, much less is known about the relationships between perinatal risk factors and temperamental attributes, particularly in cohorts served by the Neonatal Intensive Care Unit in the surfactant era. The objective of the current investigation was to examine risk factors such as gestational age, medical complications or need for respiratory support and their link to temperamental characteristics observed in preschoolers born very preterm.

Participants and Methods: 117 very preterm (≤32 weeks gestation) preschoolers (3-6 years) participated in the study (53 females and 64 males). We excluded children with moderate to severe intracranial hemorrhage and neurological disorders. To assess preschool-age temperament, parents filled out a modified version of the Temperament Assessment Battery for Children (Martin, 1988). Factor scores were calculated based on a five-factor model of temperament (Presley & Martin, 1994). These factors included: Social Inhibition, Negative Emotionality, Adaptability, Activity Level, and Task Persistence.

Results: We used simultaneous linear regression analyses with gestational age, oxygen requirement and number of medical complications as predictors of interest. Socioeconomic status, sex, and age at testing were our "covariates." We found that gestational immaturity was associated with reduced Adaptability ($F[1, 110] = 6.134$, $p = .03$), while greater perinatal medical risk was associated with reduction in Social Inhibition scores ($F[1, 110] = 4.78$, $p = .02$).

Conclusions: Perinatal risk factors, including degree of prematurity and extent of perinatal risk, may influence emotional and behavioral development of very preterm preschoolers. Though activity level is unaffected, increased medical risk seems to be related to reduced inhibitory control. Lower gestational age is linked to increasing difficulty in adjusting to discomfort or change.

Correspondence: *Sarah Raz, Ph.D., Merrill Palmer Institute, Wayne State Univ, Merrill Palmer Institute, 71 E. Ferry St., Detroit, MI 48202. E-mail: sarahraz@wayne.edu*

B. PETERS, A. HEITZER, J. PIERCY, N. OFEN, D. BATTON & S. RAZ. Sex Differences in Language Skills in Very Preterm Born Three-Year Olds.

Objective: Language abilities may be particularly vulnerable to brain changes associated with prematurity, and males are thought to be increasingly susceptible to poor neuropsychological outcome following very preterm-birth. To establish the nature and degree of linguistic disadvantage in preterm-born males, we evaluated sex differences on a wide variety of language tasks in a sample of preschoolers born < 33 gestational weeks.

Participants and Methods: We recruited 18 boys and 29 girls, with an average age of 45.02 ± 3.54 months, adjusted for prematurity. Children with cerebral palsy, severe sensory-perceptual deficits, and moderate/severe intracranial hemorrhage, were excluded. The children were administered the WPPSI–III Block Design and Information subtests, as well as all subtests of the CELF-P2 language test, the NEPSY 2 Affect Recognition, Oromotor Sequences, Speeded Naming, and Word Generation subtests, and the Woodcock Johnson-III Sound Blending subtest.

Results: To analyze outcome data we used simultaneous multiple regression analyses with socioeconomic status, gestational age, intrauterine growth rate, multiple gestation status and the total complications score employed as "covariates". Significant sex differences disclosing female advantage were demonstrated on a language task involving a discernible memory component (CELF-P2 Recalling Sentences in Context, $p < .01$), a task involving pragmatic language/social perceptual skills (NEPSY-2 Affect Recognition, $p < .02$) and a task requiring articulatory motor coordination (NEPSY-2 Oromotor Sequences, $p < .03$).

Conclusions: Despite the advent of surfactant therapy, steroid treatment, and gentler mechanical ventilation methods, gender differences in outcome following very preterm birth have not been eliminated. The findings suggest that females have an advantage in verbal and language development in early preschool age, with males manifesting relative deficits in linguistic abilities that appear to be based on a complex set of neuropsychological functions.

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

Correspondence: *Sarah Raz, Ph.D., Merrill Palmer Institute, Wayne State Univ, Merrill Palmer Institute, 71 E. Ferry St., Detroit, MI 48202. E-mail: sarahraz@wayne.edu*

S. DUVALL, P.M. BLASCO, J. DOLATA, K. ATKINS & S.N. SAXTON. Gender Differences in Children Born Low Birth Weight: Examining Early Working Memory and Mastery Motivation.

Objective: Early working memory and mastery motivation are related to emerging executive function and are predictive of future cognitive and behavioral outcomes. Children born low birth weight (LBW; <2500 grams) are at increased risk for deficits in executive function and poor developmental outcomes. The objective of the current study was to examine the relationships between early working memory, mastery motivation, cognitive function, and gender.

Participants and Methods: Evaluation data were collected for 96 children born LBW (9 to 36 months, mean = 19.98 months) from a Neonatal Intensive Care Unit (NICU). This analysis utilized Cognitive Composite scores from The Bayley Scales of Infant Development III, (BSID-III) and object permanence items were extrapolated from the raw scores to create an object permanence score (Lowe, MacLean, Shaffer, & Watterberg, 2009), which taps early working memory. The Dimensions of Mastery Questionnaire (DMQ) (Morgan, Busch-Rossnagel, Barrett, & Wang, 2009) was completed by caregivers for 64 of these children.

Results: Object permanence was positively correlated with the DMQ Mastery Pleasure scale but was not significantly related to the Cognitive Composite, other DMQ scales, birth weight or gestational age. Through ANOVA, cognitive scores were higher for females. Object permanence scores were also significantly higher for females; this remained after co-varying for Cognitive Composite and age (ANCOVA). When scored on a pass/fail basis, different object permanence passing rates were seen by gender, with significantly more females passing all items (chi square).

Conclusions: Gender differences were found in this sample of children born LBW, with females having stronger early working memory skills which may positively impact their developmental trajectory. Enhanced early working memory was related to increased levels of mastery pleasure, which has been linked with positive parent-child interactive exchanges and may be a target for early intervention for both genders.

Correspondence: *Susanne Duvall, PhD, Psychology, Oregon Health & Science University, Institute on Development & Disability, 707 SW Gaines Street, Portland, OR Oregon. E-mail: duvall@ohsu.edu*

Y. NOMURA, K. DAVEY, J. FINIK, J. SALZBANK, M. DAVEY, N. HYUNH, M. GRABIE & J. LY. Immediate and long-term infant neurobehavioral consequences of preeclampsia and prenatal depression: A prospective study.

Objective: Preeclampsia and depression are prevalent ailments affecting pregnant women and leading causes of infant death. We examined the long-term impact of these conditions on neuro-developmental outcomes of surviving offspring in infancy.

Participants and Methods: Offspring (n=141) of pregnant mothers, receiving prenatal care were followed throughout the perinatal period until 3 months of age. Maternal depression and preeclampsia were ascertained via the Structured Clinical Interview for DSM-IV Axis I Disorders and electronic medical records, respectively. Birth outcomes were assessed shortly after the birth. Mothers also provided a comprehensive report of infant neurobehavioral profiles (with 14 sub-scales) at 3 months.

Results: Multivariable GLM was used to examine the different profiles of infant neurobehavior, while adjusting for inter-correlation and confounders. Maternal problems (obesity, smoking, substance abuse, hypertension, and HPV infection) were all associated with an elevated risk of preeclampsia, which, in turn, was associated with a 5-fold greater risk of infant death; a 3- to 7-fold greater risk of poor birth outcomes, and flatter/negative affect and anxiety sensitivity in the infants. Further, infants born to preeclamptic mothers with depression displayed lower levels of smile/laughter, pleasure seeking, somatosensory function, and approach behavior.

Conclusions: Preeclampsia, a risk for placental insufficient hypoxia, is a major cause of infant mortality. Yet, little is known about negative consequences on neurobehavioral development of surviving infants. Moreover, adverse impacts were amplified by co-occurring depression. Additive risks for infant suboptimal neurobehavioral development by maternal preeclampsia and depression suggests that early detection programs to identify and monitor women with a heightened risk for these conditions could potentially be an effective intervention target for optimal neurobehavioral development in surviving infants.

Correspondence: *Yoko Nomura, PhD, MD, Psychology, Queens College, CUNY, 65-30 Kissena Blvd., Flushing, NY 11367. E-mail: yoko.nomura@yahoo.com*

S.C. HEATON, E. MELLOTT, L. HERNANDEZ, R.L. HAYES, O. GLUSHAKOVA, M.V. DOUGLAS-ESCOBAR & M.D. WEISS. Predicting Neurodevelopmental Outcome of Infants with Hypoxic-Ischemic Encephalopathy Treated with Hypothermia: A Pilot Study Highlighting the Role of Protein Biomarkers.

Objective: Neonates with hypoxic-ischemic encephalopathy (HIE) receive therapeutic hypothermia to optimize developmental outcomes. However, 12% of infants do not respond to hypothermia and there are no methods for early identification of non-responders to guide clinical trials. In other neurological populations, protein biomarkers have proven useful as markers of brain injury, intervention response, and later neurocognitive outcome. We present pilot biomarker and neurodevelopmental outcome data obtained from HIE newborns to demonstrate the potential utility of protein biomarkers in predicting poor neurodevelopmental outcome after therapeutic hypothermia.

Participants and Methods: Blood samples were collected from 10 HIE neonates during the first 4 days following birth (pre- & post-treatment) and biomarker levels of UCH-L1 and GFAP were analyzed. Infants underwent neurodevelopmental testing between 5-10 months of age, and performance on the Bayley Scales of Infant Development (Bayley-3) were used to classify neurodevelopmental outcome (StS<85="poor outcome"). Data was examined for preliminary evidence of a relationship between biomarker concentrations and later neurodevelopmental outcome.

Results: of the neonates (n=5) had poor neurodevelopmental outcome. Higher serum concentrations of UCH-L1 and GFAP were associated with poor neurodevelopmental outcomes in HIE patients treated with hypothermia. The worse outcome was seen in patient 6, who had sustained elevation of UCH-L1 during and after hypothermia.

Conclusions: This preliminary pilot data suggests that protein biomarkers may have predictive power with regard to responsiveness to therapeutic hypothermia and subsequent neurodevelopmental outcome in neonatal HIE. This is the first study of this kind with HIE, and offers an exciting direction for future research aimed at improving neurodevelopmental outcomes in this vulnerable population. Various methodological considerations are discussed in the context of these pilot data.

Correspondence: *Shelley C. Heaton, Ph.D., University of Florida, Box 100165, Gainesville, FL 32610. E-mail: sheaton@phhp.ufl.edu*

M. SIEBENMORGEN, M. BASSO, L. CHALMERS & T. BOURDEAU. Effect of Executive Function and Family Dynamics upon Treatment Adherence in Children with Type 1 Diabetes Mellitus.

Objective: Among children with Type 1 Diabetes Mellitus (T1DM), treatment adherence correlates with depression, anxiety, executive function, and family dynamics. Yet, few studies have simultaneously evaluated their relative impact on treatment adherence. Additionally, the interactive effect of these variables is undefined. Hence, this study.

Participants and Methods: Participants included 80 children with T1DM (43 Females, 35 Males, 2 NA; age M=14.37, SD=2.11; education M=9.03, SD=1.92). Children were administered measures of mood, executive function (EF; Behavior Rating Index of Executive Function),

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

family conflict (FC), and treatment responsibility (TR).The child's HbA1c (durable blood glucose) value was utilized as an objective measure of treatment adherence. The Diabetes Self Management Profiled was administered as a subjective measure of adherence.
Results: Step-wise regression revealed that the most significant predictor of objective adherence was poor EF ($t = 2.30$, $p < 0.05$; semi-partial correlation = 0.25), followed by TR ($t = 2.20$, $p < 0.05$; semi-partial correlation = 0.24). Estimated cross-validation coefficients suggested no significant shrinkage would occur for either of these predictors (0.57, 0.50 respectively). EF was also the only significant predictor of subjective adherence ($t = -2.11$, $p < 0.05$; semi-partial correlation = -0.24, with no significant cross-validation shrinkage (0.62)). Neither the main effect of affect and FC nor the interaction of terms was significant.
Conclusions: The data suggest that poor EF and a lack of family involvement results in poor treatment adherence. Furthermore, the child's daily ability to plan, organize, and problem solve likely affects their perception of adherence. Incorporating helpful strategies for each of these areas within treatment design and implementation may improve the child's perceived ability to maintain behaviors that are beneficial to long-term health. In turn, a better regulated HbA1c may result.
Correspondence: *Marsha Siebenmorgen, MA, University of Tulsa, 800 South Tucker Drive, Tulsa, OK 74104. E-mail: marsha-siebenmorgen@utulsa.edu*

M. SIEBENMORGEN, M. BASSO, L. CHALMERS & T. BOURDEAU. Type 1 Diabetes Mellitus: Parent Affect, Executive Function, & Family Dynamics.
Objective: Adolescents with Type 1 Diabetes Mellitus (T1DM) often find it difficult to adhere to treatment regimens. Contributing factors include child-reported affect, executive function, and family dynamics. Parents typically ensure adherence, but few studies have examined whether similar parental characteristics contribute to adherence.
Participants and Methods: Parents of 80 children with T1DM (66 F, 13 M; age M=42.49, SD=7.09; education M=14.00, SD=2.24 completed measures of mood, executive function (EF; Behavior Rating Index of Executive Function), family conflict (FC), treatment responsibility (TR), and subjective adherence. The child's HbA1c (stable glucose level) represented objective adherence.
Results: Step-wise regression suggested that EF significantly contributed to objective adherence ($t=4.74$, $p<0.01$; part=0.48), as did interactions between negative affect and TR ($t=-2.49$, $p<0.01$; part=-0.24), negative affect and EF ($t=2.10$, $p<0.05$; part=0.20), and anxiety and FC ($t=-2.60$, $p<0.01$; part=-0.24). EF ($t=-3.23$, $p<0.01$; part=-0.35) was the most significant predictor of subjective adherence, followed by the interaction of EF and FC ($t=2.10$, $p<0.05$; part=0.23). For both dependent variables, no significant cross-validation shrinkage was estimated to occur.
Conclusions: Parental EF had the greatest impact on adherence. As such, parental ability to plan, organize, and problem solve should be addressed when treatment regimens are designed and implemented. This is particularly important during adolescence when adherence is notably lowest and the transfer of responsibility to the child is highest. Addressing this area of cognition may improve the perception of affect, family dynamics, and ability to maintain long-term healthy behaviors. In turn, a better regulated HbA1c may result.
Correspondence: *Marsha Siebenmorgen, MA, University of Tulsa, 800 South Tucker Drive, Tulsa, OK 74104. E-mail: marsha-siebenmorgen@utulsa.edu*

B.C. LEMONDA, S. GREIF, E. MELLOTT, T. ZAMOR & S.C. HEATON. Understanding the Association between Anxiety and Attention Across the Lifespan: Findings from a Heterogeneous Pediatric Population.
Objective: High anxiety (HA) individuals demonstrate poorer performance on neurocognitive measures, especially those requiring increased attentional demands. Individuals with HA tend to concurrently engage in both task-relevant and task-irrelevant (i.e., worry) processes. The relationship between attention and anxiety may vary with age, as HA has been associated with poor divided attention in older, but not younger adults (Hogan, 2010). The purpose of the present study was to investigate the association between anxiety and attention in a heterogeneous pediatric population to advance understanding of the relationship between these two variables across the lifespan.
Participants and Methods: The present study utilized data from a larger archival pediatric databank comprised of neurological, developmental, psychiatric, and healthy control groups. Data was extracted on 400 children (ages 6-16; 60% male) who completed the measures used for the current study. Child anxiety was measured using parent ratings on the BASC Anxiety scale. Child attention was measured with 1) parent ratings on the BASC Attention scale, and 2) child performance on the 4 core subtests of the TEA-Ch. Pearson's correlations were conducted to examine the association between parent-reported child anxiety and "attention" (measured used parent-report and child test performance).
Results: Results revealed a significant association between parent-ratings of child anxiety and parent-ratings of child inattention. However, parent-ratings of parent anxiety were not associated with child performance on tests of attention. Post hoc analyses stratified by diagnostic group were conducted.
Conclusions: The adult literature suggests that HA negatively impacts cognitive test performance, particularly on divided attention tasks. However, current study results suggest that this relationship may be more complicated in a mixed pediatric clinical sample. Developmental and methodological issues are discussed.
Correspondence: *Brittany C. LeMonda, Master's, Department of Clinical and Health Psychology, University of Florida, 1225 Center Drive, Gainesville, FL 32611. E-mail: blemonda@phhp.ufl.edu*

C. CASNAR, M. SCHUETT, K. JANKE, S. HUNTER & B. KLEIN-TASMAN. Parent Perspectives on Executive Functioning in Preschoolers with NF1: Comparison to Typically Developing Controls and Teacher Ratings.
Objective: Children with NF1 are at increased risk for attention problems and executive functioning (EF) challenges, but there is little research with young children. In this study, parent report of EF in everyday contexts was examined for preschool-aged children using the Behavior Rating Inventory for Executive Functioning – Preschool Form (Gioia, Espy, Isquith, 2003). Parent report was compared to teacher report, and to rating of typically developing (TD) children.
Participants and Methods: Participants were 68 children ages 3 through 5 (M = 4.52, SD = .88), 26 with NF1 (17 boys) and 37 TD children (15 siblings, 22 community children; 23 boys).
Results: On average ratings of emerging EF were in the normal range. Children with NF1 were rated significantly higher than the normative mean by their parents on Working Memory (WM) and Emergent Metacognition Index (EMI). Teachers rated children with NF1 significantly higher than the normative mean on Planning and Organization (PO), WM, EMI, and General Executive Composite (GEC). There were no significant differences between parent and teacher mean ratings. A significant correlation between parent and teacher ratings of WM was found ($r = 4.79$, $p = .013$), with no other significant correlations between raters. The TD sample did not differ significantly from the normative mean on any scales based on parental report. Based on parental report, the children with NF1 showed significantly more difficulties than the typically developing controls on the WM scale ($t(61) = 2.60$, $p < .05$). Rates of difficulties were similar across the groups for many scales, with the exception of WM (46% NF1, 24% TD), EMI (50% NF1, 22% TD), and GEC (31% NF1, 16% TD). Relations to lab-based measures of EF will also be examined.
Conclusions: Working memory in everyday contexts emerged as a consistent area of difficulty for young children with NF1 based on parent and teacher report and in comparison to typically developing peers, indicating that some emergent EF difficulties can be observed in the preschool years.

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms.
https://doi.org/10.1017/S1355617714000381

Correspondence: *Christy Casnar, M.S., University of Wisconsin - Milwaukee, P.O. Box 413, Garland Hall, Rm 325, Milwaukee, WI 53201. E-mail: clcasnar@uwm.edu*

K. DUNN, D.L. COOL, M.W. FONG, M. LACY & D. FRIM. Attention and Verbal Memory in Children with Chiari Malformation Type I.

Objective: Chiari Malformation Type I (CMI) is defined as tonsillar herniation of 5 mm or more (Kumar et al., 2011) often accompanied by headache and lower body weakness. Kumar and colleagues (2011) found subtle microstructural abnormality in CMI children using DTI, which correlated with cognition. In the current study, we examined the incidence of memory impairment and attentional deficits in a cohort presenting to a neurosurgical clinic.

Participants and Methods: The CMI group was comprised of 30 children over the age of 5 yet below age 19 recruited from a neurosurgery clinic and diagnosed with CMI by a board certified neurosurgeon. Thirty healthy controls (HC) were recruited via advertisements in the hospital. Following consent, parents completed history and behavioral questionnaires. Children were administered a standardized neuropsychological battery, including the California Verbal Learning Test-Children's Version (CVLT-C), Cognitive Assessment System (CAS), Wechsler Abbreviated Scale of Intelligence (WASI), and Wechsler Intelligence Scale for Children (WISC-III) by a trained psychometrician under the supervision of a licensed neuropsychologist.

Results: Children with CMI had a mean age of 11 (SD = 4.16), while the HC group had a mean age of 10 (SD = 2.74). The CMI mean FSIQ was 99.93 (SD = 15.15), while the mean HC FSIQ was 105.23 (SD = 16.53). There were no significant differences between the groups with regard to age (t [58] = -1.14, p= .260), sex (t [58] = -1.03, p = .310), education (t [58] = -1.19, p = .241), handedness (t [58] = -.85, p = .398) or FSIQ (t [57] = 1.28, p = .205). While no significant group differences were noted on the cognitive measures, the CMI group displayed greater variability in performance on the delayed free recall trial [CVLT-C Impairment 30% vs. HC= 10%, p = .05].

Conclusions: The results suggest children with CMI as a group perform within normal limits on standard measures, but they may be at higher risk for memory difficulties.

Correspondence: *Danielle Cool, MA, University of Chicago Medical Center, 675 Lake St., Apt 314, Oak Park, IL 60301. E-mail: dcool@mail.roosevelt.edu*

V. RAMOS, E. MAHONE & E. GERMAIN-LEE. Neuropsychological Functioning in Albright Hereditary Osteodystrophy: A Case Series.

Objective: Albright hereditary osteodystrophy (AHO) is a disorder caused by heterozygous inactivating mutations in the GNAS gene. Patients with GNAS mutations on maternally inherited alleles manifest resistance to multiple Gs protein-coupled hormones, a variant termed pseudohypoparathyroidism type 1a (PHP1a). PHP1a is a rare disorder; therefore research involving specific neuropsychological outcomes is quite limited. The few studies that have been conducted with individuals affected by PHP1a have documented cognitive impairments of varying degrees. Impairments consist of developmental delays, attention deficits, and slowed processing speed, learning difficulties, and reduced overall intellectual capacity. In order to contribute to the existing literature, this case series study examined the neurocognitive effects of PHP1a in a pediatric population

Participants and Methods: We present a series of 6 clinically-referred patients (4 male, 2 female) with PHP1a (ages 4-10 years at time of assessment). Presenting symptoms included concerns with attention and executive functions, memory/learning, information processing speed, and behavioral regulation.

Results: Results revealed variability in overall intellectual functioning across gender. Girls demonstrated lower mean IQ (M=75±19) than boys (M=92±8.64). Sex differences were also noted in overall adaptive functioning with girls demonstrating poorer adaptive skills (M=62±4.9) than males (M=80±22.54), as well as greater behavioral and emotional adjustment problems; i.e., girls demonstrated more symptoms of depression, atypical behaviors, and withdrawal than boys.

Conclusions: These results contribute to the small literature on neurocognitive functioning in patients with PHP1a. The girls in this sample demonstrated greater impairments in cognitive and behavioral functioning, which may be attributable to their older age and greater number of medical conditions not associated with PHP1a.

Correspondence: *Vanessa Ramos, Ph.D., Kennedy Krieger Institute, 1750 E. Fairmount Ave, 3rd floor, Baltimore, MD 21231. E-mail: ramosv@kennedykrieger.org*

G.B. CHRISTOPHER & R.A. HOWARTH. Neurocognitive Outcomes in Adolescents during Acute Recovery from Anti-NMDA Receptor Encephalitis.

Objective: Anti-NMDA receptor encephalitis is a recently characterized auto-immune disorder with a predictable clinical course. Early symptoms typically include headache, fever, and nausea followed by new onset psychiatric symptoms, personality changes, and memory problems. Seizures, altered mental status, movement disorders, and autonomic instability are also common. Neuroimaging findings are often unremarkable. Cognitive changes include deficits in language, attention, and memory, with persistent amnesia often noted during the acute course. Little is known about the cognitive outcomes of this disorder, particularly with a pediatric population following the acute phase of recovery.

Participants and Methods: Participants included three adolescents recently diagnosed and treated for Anti-NMDA receptor encephalitis (male=1). They underwent neuropsychological assessment prior to discharge from intensive rehabilitation therapies. Patients were 17-18 years of age at the time of assessment. Neurocognitive performance was examined through retrospective chart review.

Results: At the time of initial assessment, patients were approximately 4 months out from symptom onset. One patient initially only had brief testing; additional testing was completed one year post-symptom onset. For two patients, mean intellectual functioning was below average (RIAS SS=81). A brief measure of nonverbal intelligence was administered to the third patient (TONI SS=60) revealing notable impairment. Significant deficits were seen in all subjects across cognitive domains (e.g., executive functions, processing speed, fine motor speed). Memory deficits were also seen in two patients, yet not able to be assessed in the third.

Conclusions: Results suggest the presence of ongoing neurocognitive deficits at discharge from intensive rehabilitation, reiterating a slow recovery trajectory. Current findings highlight the need for continued monitoring and high-levels of support for pediatric patients, particularly as they transition back to the school environment.

Correspondence: *Gina B. Christopher, PhD, Abbey Neuropsychology Clinic, 366 S California Ave, Suite 14, Palo Alto, CA 94306. E-mail: gina.christopher@gmail.com*

C. YOUNG, J. KAUFMAN, L. O'BRIEN & S. WARSCHAUSKY. Sleep and ADHD Symptoms in Children with Cerebral Palsy.

Objective: Children with cerebral palsy (CP) display significant sleep disturbance, including symptoms of insomnia and excessive daytime sleepiness, and those sleep symptoms are associated with overall quality of life (Sandella, O'Brien, Shank & Warschausky, 2011). Cerebral palsy entails risk for impairments in attention, executive functions, and ADHD symptoms (Schenker, Coster & Parush, 2005; White & Christ, 2005). In typically developing children, sleep disturbance is associated with ADHD symptoms (Chervin, Dillon, Bassetti et al., 1997); therefore, this study examines the relationship between parent ratings of sleep disorder and ADHD symptoms in children with and without CP.

Participants and Methods: Samples included children with CP (N = 41) and typically developing children (TD) (N = 91), ages 6-12. Measures were the Pediatric Sleep Questionnaire and Conners PRS-3.

Results: Bivariate correlations and multivariate analyses revealed a significant relationship between insomnia ratings and symptoms of inattention (r = .38, p<.05) and hyperactivity/impulsivity (r = .47, p<.01)

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

in children with CP. Excessive daytime sleepiness was also significantly correlated with inattention (r = .31, p<.05) and hyperactivity/impulsivity (r = .30, p = .05) for the CP group. For TD children, sleep disorder symptoms were not associated with ADHD symptoms apparently due to restriction of range in this sample.
Conclusions: Findings highlight the importance of studying causal directions in the associations between sleep disorder and ADHD symptoms as well as treatment response in children with CP.
Correspondence: *Crystal Young, Ph.D., Physical Medicine & Rehabilitation, University of Michigan, 325 E. Eisenhower Pkwy, Suite 300, Ann Arbor, MI 48108. E-mail: crystaly@med.umich.edu*

M. IAMPIETRO, D. OTTEMILLER, R.A. TARAZI & T. GIOVANNETTI. Memory Functioning in Young Children with Sickle Cell Disease.
Objective: Children with Sickle Cell Disease (SCD) demonstrate deficits in cognitive functioning and academic achievement. Memory performance in children with SCD remains largely understudied, despite the hippocampus being a vulnerable target of the complex pathophysiology of the disease. The present study examined memory functioning in children with SCD to better understand specific memory processes and their relation to educational variables.
Participants and Methods: Participant variables and memory data were collected in a prospective study from 21 children with SCD (Age range 5:0-10:11, Mage=7.63, SD=1.60, 38% female). Children had the SCD genotypes HbSS or HbS/β0 thalassaemia, had not suffered a clinical stroke, and were not receiving chronic transfusion therapy.
Results: Verbal working memory performance (Digits Back; M=8.86, SD=2.80) was significantly worse than visual working memory performance (Recognition of Pictures; M=10.76, SD=2.17), t(20) = -2.67, p = .02. No significant within-group differences were found among episodic memory measures, despite considerable heterogeneity of scores within the sample. Better delayed visual recall performance (Memory for Designs; M=10.76, SD=3.40) was significantly associated with receiving intervention before Kindergarten, r(19) = -.45, p = .04 and not receiving special education services in school, r(19) = .46, p = .04.
Conclusions: Visual delayed episodic memory performance has significant relations with educational variables, suggesting that it is both modifiable and important for educational outcomes. The heterogeneity in memory scores in children with SCD without clinical stroke underscores the importance for individualized memory assessment in this population. Verbal working memory training and visual learning strategies should be developed for this population.
Correspondence: *Mary Iampietro, Psychology, Temple University, 1701 N. 13th St., Weiss Hall, Floor 6, Philadelphia, PA 19122. E-mail: mary.iampietro@temple.edu*

K.E. ONO, D.J. BEARDEN, N. LUDWIG, C. BROWN, R. JONES, B. SUN & T. BURNS. Executive Functioning and Social Skills in Youths Diagnosed with Sickle Cell Disease.
Objective: Sickle cell disease (SCD) may cause neurological damage, which is associated with neurocognitive deficits, including decreased general intelligence and executive functioning (EF) deficits. Although neurocognitive deficits in youths with SCD are well established in the scientific literature, less is known about the influence these deficits may have on social, emotional, and behavioral functioning. The aim of the current study was 1) to examine differences on EF tasks between youths with SCD and an age- and gender-matched control group and 2) to examine the relation between EF and adaptive skills in both groups.
Participants and Methods: Participants were 27 youths with SCD and 18 controls between the ages of 9 and 20 years. Parents completed the BASC-2. Youths were administered the WASI, Drexel Tower of London, and DKEFS.
Results: Controlling for IQ, a series of ANCOVAs revealed group differences in DKEFS Color-Word Interference Inhibition and Drexel Rule Violations. As expected, children with SCD exhibited more difficulty inhibiting a proponent response, F (1, 39) = 10.18, p<.01, and remembering/following rules on a goal-directed problem solving task, F (1, 39) = 12.97, p <.01, when compared to the control group. Furthermore, analyses revealed that only the SCD group exhibited significant correlations between parent report of their Adaptive Skill (BASC-2) and their EF (Drexel) performance. Deficits in EF were negatively related to Adaptive Skills, r=-.52, p =.008, indicating that youth with greater EF skills were able to better manage their adaptive functioning, only among SCD children.
Conclusions: In summary, the current study corroborates previous research suggesting the existence of EF deficits in youths with SCD, and supports its detrimental influence on aspects of their social functioning and behavior. Results will be discussed in terms of risk and protective factors promoting socialization among children with SCD and the implications of these findings for social skills intervention and future research.
Correspondence: *Kim E. Ono, M.S., Psychology, University of Miami, 300 S. Biscayne Blvd, #3011, Miami, FL 33131. E-mail: kim.e.ono@gmail.com*

K.E. JONES & R. TARAZI. Performance-Based Measures vs Caregiver Ratings of Executive Functioning in Pediatric Sickle Cell Disease.
Objective: Executive functioning (EF) refers to higher-order processes that regulate cognition and behavior. Standardized tests of EF are frequently used in neuropsychological assessment. Questionnaires assessing "real-world" EF skills have also been developed (e.g., Behavior Rating Inventory of Executive Function [BRIEF]). Previous research suggests weak relationships between the BRIEF and performance-based EF tasks (Toplak et al., 2013). It has been suggested that they measure different underlying EF constructs.
Youngsters with sickle cell disease (SCD) are at increased risk for deficits in attention and EF (Berkelhammer et al., 2007). Because neuropsychological evaluation is not part of routine care in SCD, it is important to evaluate the usefulness of such evaluation in identifying EF deficits in this population.
Participants and Methods: Sample included 21 adolescents with SCD (age 12-18 years; M= 15.24). Participants completed a brief neuropsychological battery: WASI-II; CVLT-C/CVLT-II; D-KEFS Trail Making Test (TM), Color-Word Interference Test (CW); and WISC-IV/WAIS-III Letter-Number Sequencing (LNS). Caregivers completed the BRIEF. Scores were converted to z-scores; a negative score reflected poorer performance. Bivariate correlations were conducted and repeated-measure T-tests analyzed differences between scores on the BRIEF and performance-based measures.
Results: Scores on performance-based tasks were not strongly correlated with caregiver ratings of metacognitive skills (MCI) on the BRIEF (r = .08 to .29, p = n.s.). Although not significant, performance on LNS (M= -1.17), TMT-Switching (M= -1.16), and CW-Inhibition (M= -1.18) was lower than BRIEF MCI scores (M= -0.63) (p= .226, .089, .096, respectively).
Conclusions: Findings of weak relationships between neurocognitive measures and the BRIEF MCI support previous research. Specific to the SCD population, trends in the results suggest neuropsychological tests may be more sensitive to weaknesses in EF than parent report. Further research is indicated.
Correspondence: *Kelly E. Jones, M.S., Department of Psychology, Drexel University, 3141 Chestnut St., Stratton Hall, Rm 119 A, Philadelphia, PA 19104. E-mail: kelly.e.jones29@gmail.com*

R. WASSERMAN & G. HOLMBECK. Profiles of Neuropsychological Functioning in Children and Adolescents with Spina Bifida.
Objective: The current study examined neuropsychological performance among children with spina bifida (SB) to determine if there are distinct subgroups or "profiles" of cognitive functioning.
Participants and Methods: Participants were 96 children with SB myelomeningocele (ages 8-15), who were able to complete a brief research

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

battery. The battery included the following measures: Wechsler Abbreviated Scale of Intelligence (Vocabulary and Matrix Reasoning), Wide Range Achievement Test 3, Cognitive Assessment System (Planned Connections); Delis Kaplan Executive Function System (Verbal Fluency); Test of Everyday Attention for Children (Sky Search, Score, Sky Search Dual Task, and Score Dual Task); Lafayette Grooved Pegboard Test; Diagnostic Analysis of Nonverbal Affect 2 (Faces and Voices); and Comprehensive Assessment of Spoken Language (Inferences and Pragmatic Judgment). Hierarchical and non-hierarchical cluster analyses were used to identify and confirm a cluster solution.
Results: Ward's cluster method indicated a 3-cluster solution best fit the data. The cluster solution was found to be statistically reliable, as it was replicated using another hierarchical method (average-linkage, 82% overlap), and a non-hierarchical method (k-means, 81% overlap). After examining each cluster's mean profile, the following labels were applied to describe distinctive features of each cluster: "Average Cognitive Ability, Impaired Motor" (n=39), "Average Cognitive Ability, Low Average Attention" (n=32), and "Extremely Low to Borderline" (n=25).
Conclusions: Cluster analyses identified 3 distinct cognitive profiles that indicated different patterns of cognitive strengths and weaknesses. Findings from this study highlight the variability in cognitive profiles among children with SB. It is possible SB results in more than one phenotypic neuropsychological profile and may be more accurately described by several likely phenotypes. Clinical implications and future research are discussed.
Correspondence: *Rachel Wasserman, M.A., Loyola University Chicago, 9000 Almeda Road Apt 1201, Houston, TX 77054. E-mail: wassrac@gmail.com*

T.G. BURNS, S. BERRY, R. YOSICK, M. IVANISEVIC, D. DROSSNER, T.Z. KING & W.T. MAHLE. Neurocognitive Outcome of Young Adults with Surgically Corrected Heart Defects.
Objective: Neurodevelopmental outcome of children born with heart defects is an active, growing area of clinical research (e.g., Knowles & Bull, 2012; Gerdes & Flynn, 2010; Spijkerboer et al., 2008). Previous studies have demonstrated these children tend to have deficits in overall IQ, visual-spatial and visual-motor skills, language, and executive functions (Miatton et al., 2006). However, very little research has examined longer-term neurocognitive outcomes, and research that has is limited to childhood and adolescence (i.e., Spijkerboer et al., 2008).
Participants and Methods: The current study aims to examine neurocognitive outcomes of a group of young adults aged 15 to 21 years who were diagnosed with Single Ventricle (SV) or 2 Ventricle (2V) congenital heart disease requiring neonatal open heart surgery. Three comparison groups were analyzed in this study: SV (n=14), 2V (n=12) and healthy controls (n=24). Measures utilized included cognitive, memory, motor, and executive tests. T-tests and ANOVAs were conducted to examine significant differences between groups on dependent variable measures.
Results: Participants in the clinical groups showed lower than average nonverbal reasoning and overall IQ (e.g., WASI-2 scale IQ, $t(48)=2.797$, $p=.009$); attention, information encoding and subsequent recall (e.g., CVLT-II List A Trial 1, $t(48)=5.101$, $p=.000$); fine motor speed and dexterity (e.g., Grooved Pegboard Dominant hand, $t(48)=2.941$, $p=.006$), and executive skills (e.g., DKEFS Stroop Inhibition, $t(48)=2.509$, $p=.016$). When the respective SV and 2V groups were analyzed separately, ANOVAs revealed unique differences between the separate clinical groups and the control group on the dependent measures.
Conclusions: Results indicate that even into young adulthood, children born with the cardiac defects of SV and 2V continue to display IQ, motor, and attention and executive deficits. Clearly, these individuals may require academic and/or occupational supports to compensate for their deficits as they make the transition to adult life.
Correspondence: *Thomas G. Burns, Psy.D., Children's Healthcare of Atlanta, Children's Healthcare of Atlanta, 1001 Johnson Ferry Road, Atlanta, GA 30342. E-mail: thomas.burns@choa.org*

S. RANE, J.L. WELSH & L.A. JACOBSON. Neuropsychological Functioning in Rapid-onset Obesity with Hypothalamic dysfunction and Autonomic Dysfunction (ROHHAD): A Case Series.
Objective: Rapid-onset Obesity with Hypothalamic dysfunction and Autonomic Dysfunction (ROHHAD) is a rare disorder with childhood-onset, often associated with a neural crest tumor. Etiology is likely autoimmune, producing multi-systemic effects; treatment with rituximab (RIT) followed with high-dose cyclophosphamide has been described as successful in one case report. Despite association with behavioral, social, and cognitive difficulties, literature on neuropsychological functioning is lacking. This study examined neurocognitive functioning in two children with ROHHAD.
Participants and Methods: The patients identified with ROHHAD (1 male age 7.0, 1 female age 4.9) were referred at different stages in their treatment. Specifically, one patient was seen for serial assessment: first while undergoing therapy with RIT and again after five cycles of RIT were completed. The second patient was evaluated after completion of both five cycles of RIT combined with immunosuppression and high-dose cyclophosphamide.
Results: In addition to physical symptoms, findings indicate that pre-treatment, patients appear to display marked changes in personality and difficulty with attention regulation, impulse control, and social communication, as well as relative weaknesses in spatial abilities. RIT treatment was associated with a significant but transient improvement on measures of attention, working memory, and impulse control, subjective reports of better social reciprocity, and alleviation of several physical symptoms. Although some change in social functioning appears to persist post high-dose cyclophosphamide therapy, difficulties with executive and adaptive skills remain.
Conclusions: Results provide information regarding neuropsychological functioning in ROHHAD and suggest neuropsychological evaluation is an important aspect of care, given the cognitive and behavioral risks associated with the disorder, and can serve to objectively document treatment response.
Correspondence: *Shruti Rane, Ph.D., Kennedy Krieger Institute/Johns Hopkins University School of Medicine, 777 S. Eden St Apt 1011, Baltimore, MD 21231. E-mail: rane@kennedykrieger.org*

S. RANE, E. PADDEN, T.A. KORIAKIN & L.A. JACOBSON. Profile Analysis of Behavior Ratings in Survivors of Pediatric Brain Tumors and Children with Attention Deficit/Hyperactivity Disorder.
Objective: Neurocognitive late effects (i.e., problems with executive and adaptive skills) have been reported in survivors of pediatric brain tumors. Some have characterized these late effects as similar to symptoms of Attention Deficit/Hyperactivity Disorder (ADHD). The aim was to compare caregiver reports of executive and adaptive functioning in survivors of pediatric brain tumors (BT) to those of clinically-referred children who met criteria for ADHD.
Participants and Methods: Children in the BT group (n=65) ADHD group (n=65), matched on age [BT M=11.1(3.9) ADHD M=10.6(2.7)], gender (BT 57% female; ADHD 54% female), and verbal ability [(BT M=95.2 (16.6); ADHD M=94.3(14)]. The ADHD group consisted of 39 children with ADHD-I (predominantly inattentive) and 26 children with ADHD-H (predominantly hyperactive/impulsive) or ADHD-C (combined). Caregivers completed the Behavior Rating Inventory of Executive Function (BRIEF) and the Behavior Assessment System for Children (BASC-2; adaptive scales reverse coded).
Results: Profile analysis of behavioral ratings indicated significantly different patterns of performance ($p<.001$, partial eta squared =.19). Post-hoc comparisons revealed that the BT group showed significantly less impairment than both the ADHD-I and ADHD-H/ADHD-C groups on the metacognition ($p<.001$) and behavioral regulation ($p<.001$) indices (BRIEF) and on the attention ($p<.001$), hyperactivity ($p<.001$), adaptability ($p<.001$), and activities of daily living ($p<.001$) scales (BASC-2). Similarly, ratings of the social skills and functional communication of children with BT were within normal limits and better than those of children with ADHD-I only.

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

Conclusions: The findings suggest that caregiver reported executive and adaptive difficulties in survivors of pediatric brain tumor do not reach the level of impairment exhibited by a clinically-identified ADHD sample and have important implications with respect to interventions for children with a history of brain tumors.
Correspondence: *Shruti Rane, Ph.D., Kennedy Krieger Institute/Johns Hopkins University School of Medicine, 777 S. Eden St Apt 1011, Baltimore, MD 21231. E-mail: rane@kennedykrieger.org*

TBI (Child)

S. RANE, J. REESMAN, S. SUSKAUER & B. SLOMINE. Caregiver Reported Symptoms Following Mild to Moderate Traumatic Brain Injury in Preschoolers.
Objective: Although there is a high incidence of Traumatic Brain Injury (TBI) in preschoolers, empirical reports of symptoms and injury characteristics in this age group are sparse. The goal of this study is to describe the symptoms and injury characteristics associated with mild to moderate TBI in preschool-aged children who present for a specialty clinic evaluation.
Participants and Methods: Retrospective chart review was conducted for twenty-nine children aged three to five years who sustained mild to moderate TBI and presented to a brain injury clinic within 70 days of injury. Symptoms experienced in association with brain injury were obtained from review of acute care medical records (when available and interview with caregiver at the time of the clinic evaluation. Specifically, parents and children were asked whether the child had or currently experienced common post-concussive symptoms as detailed on the Acute Concussion Evaluation (ACE), and any other new symptoms noted post-injury were also recorded.
Results: Mean age of children was 4.74 years (52% male); evaluation occurred at a mean of 38 days post-injury. Range of days hospitalized was 0 – 7 days (M = 2.38 days). Thirty-eight percent of children had loss of consciousness, and fifty-two percent had intracranial findings on CT. Sixty-five percent of the children experienced symptoms that were not listed on the ACE. Unique symptoms after injury included enuresis, night terrors, changes in appetite, and increased behavioral defiance. The most commonly reported symptoms at the time of the evaluation were irritability (41%), headaches (31%), and increased emotionality (28%).
Conclusions: The findings indicate that the presentation of the milder end of the TBI spectrum in preschoolers includes unique symptoms that may not be typically included on standard symptom assessments. Future directions include the development of additional age-appropriate measures that capture unique symptoms of TBI in preschool-aged children.
Correspondence: *Shruti Rane, Ph.D., Kennedy Krieger Institute/Johns Hopkins University School of Medicine, 777 S. Eden St Apt 1011, Baltimore, MD 21231. E-mail: rane@kennedykrieger.org*

E. HIGHLEY, E. BEGYN & J. KATZENSTEIN. Processing Speed, Visual-Spatial Memory, and Motor Speed Impacted in Individuals With Multiple Mild Traumatic Brain Injuries.
Objective: The proper approach to concussion and mild traumatic brain injury (MTBI) from a neuropsychological perspective is the cause for much debate in current literature. Affected populations are wide reaching, but with proper care and management, the vast majority of MTBI patients fully recover. However, individuals with a history of multiple MTBI are at an increased risk for prolonged recovery. The present study sought to identify longstanding neurocognitive changes in patients with a history of multiple MTBIs.
Participants and Methods: Eight individuals were evaluated, ranging in age from 10.75 to 18.67 years at evaluation (M = 15.21 years, SD = 2.37 years). Number of previous, parent- and self-reported, MTBIs ranged from three to eight (M = 4.0, SD = 2.0), with months since last MTBI ranging from two to eleven (M = 6.0, SD = 3.5). All subjects participated in a standard clinical neuropsychological evaluation; the testing battery was dependent upon presentation and age.
Results: Mean intellectual ability fell generally in the average range on the Weschler scales (M = 92.50, SD = 9.72; $t(7) = 2.18$, $p = 0.07$). Domains that were affected most greatly included Coding of the Wechsler scales (M = 6.50, SD = 2.33; $t(7) = 4.25$, $p = 0.004$), as well as Total Initial Recall of NEPSY-II Memory for Designs (M = 5.50, SD = 3.87; $t(7) = 3.29$, $p = 0.01$), and Delayed Recall (M = 5.25, SD = 2.63; $t(7) = 5.11$, $p = 0.001$). Additionally, Grooved Pegboard scores were slower than expected (raw DH M = 79.50 sec, SD = 12.40, Raw NDH M = 85.50 sec, SD = 10.52).
Conclusions: The neuropsychological domains most greatly affected by a recurrent history of MTBIs were processing speed, motor speed, and visual-spatial abilities. These results have important implications, documenting that select neurocognitive functioning remained mildly affected an average of six months post-MTBI in patients afflicted by recurrent MTBIs. However, additional research with a larger sample size is needed to further explore these findings.
Correspondence: *Eric Highley, Professional Psychological Services, 10293 N. Meridian Street, Suite 375, Indianapolis, IN 46290. E-mail: erichighley@me.com*

T.J. FARRER, P.B. JANTZ, E.D. BIGLER, M. DENNIS, H. TAYLOR, K. RUBIN, K. VANNATTA, C. GERHARDT, T. STANCIN & K.O. YEATES. Corpus Callosum Pathology and Processing Speed in Pediatric Traumatic Brain Injury.
Objective: The corpus callosum (CC) is critical for integrating information across hemispheres and CC integrity may directly influence the speed at which cognitive tasks requiring interhemispheric processing are performed. CC axonal injury is common in TBI but the effects on cognitive processing speed have not been adequately studied in pediatric TBI. This study investigated whether the presence of CC lesions resulted in reduced processing speed in pediatric TBI.
Participants and Methods: From the Social Outcomes of Kids with Brain Injury (SOBIK) project, children ages 8-13 with TBI and visibly evident CC pathology (VECCP; n=13) were compared to children with complicated mild to severe TBI (n=43) and orthopedically injured (OI; n=47) groups. WISC-IV PSI, WASI Vocabulary (V) and Matrix Reasoning (MR) were examined. All underwent MRI and cognitive testing during the chronic phase. Quantitative volumetric CC data were obtained using FreeSurfer. VBR was derived so that PSI correlates of global pathology versus that specific to CC (regional and total volumes) could be examined.
Results: The TBI group with VECCP did not have significantly slower PSI than comparison groups, but did differ on V ($p=.002$) and MR ($p=.006$). Post-hoc comparisons showed significantly lower WASI V score ($p= .022$) in VECCP as compared to OI. Additionally, some regional and total CC volume correlates showed marginally positive relationships with PSI. VBR was significantly larger in the VECCP group than the OI and mTBI groups ($p< .000$), reflecting generalized atrophy in this group, but VBR did not significantly relate to PSI in the VECCP group.
Conclusions: Presence of CC pathology was associated with greater levels of generalized atrophy. Presence of CC pathology may be a marker for more nonspecific injury. Nonetheless, at a group level, the presence of CC damage did not relate systematically to PSI. Results are discussed in terms of the limits of the PSI metric as a measure that taps CC integrity.
Correspondence: *Thomas J. Farrer, M.S., Psychology, Brigham Young University, 1001 Kimball Tower, P.O. Box 25543, Provo, UT 84602-5543. E-mail: thomasfarrer@yahoo.com*

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

T.L. MERKLEY, E.A. WILDE, J.V. HUNTER, L. EWING-COBBS, E.D. BIGLER, M.E. AITKEN, G. HANTEN, S. MULLINS, X. LI, Z.D. CHU, L. NOBLE & H.S. LEVIN. Developmental Alterations in Cortical Organization, Verbal Learning and Memory Following Moderate to Severe Traumatic Brain Injury (TBI) in Adolescents Injured as Toddlers.

Objective: This study investigated how patterns of cortical organization (gyrification) may relate to verbal learning and memory, in order to determine ways in which early TBI may alter typical cognitive and brain development.

Participants and Methods: Participants included 17 adolescents (6F/11M; mean age=13.6+2.4 years) with a history of moderate to severe TBI as young children (age at injury=2-8 years) and 17 uninjured healthy participants (5F/12M; mean age=13.6+2.4) who were demographically similar. High-resolution T1-weighted 3T MRI data were analyzed using the Freesurfer neuroimage analysis suite. The local gyrification index (LGI) was derived as the measure of cortical organization. The California Verbal Learning Test-Children's Version (CVLT-C) was administered to participants.

Results: Total recall on the learning trials of the CVLT-C was reduced in the TBI group ($p<0.05$). Uninjured children showed a greater tendency to favor semantic clustering (Cohen's d=0.43) and the TBI group tended to favor serial clustering (Cohen's d=0.47), although the groups did not differ significantly in use of learning strategies. There were no significant group differences for short and long delayed free recall. The TBI group demonstrated significantly increased LGI (increased cortical folding) in several regions including bilateral dorsolateral frontal, medial frontal, and left parietal areas ($p=0.0001$ after correction for multiple comparisons using a Monte Carlo simulation). CVLT-C total recall was associated with decreased LGI in right frontal regions in the uninjured group alone ($p=0.0001$, corrected), and no significant associations were observed in the TBI group alone.

Conclusions: Increased cortical folding (polymicrogyria) may result as aberrant changes in cortical development following early TBI. The current findings suggest that increased cortical folding in late-developing frontal areas following TBI may relate to verbal learning performance, such that strategic organization and learning of new information is compromised.

Correspondence: *Tricia L. Merkley, TIRR Memorial Hermann, 2455 S. Braeswood Blvd., Houston, TX 77030. E-mail: merkleytl@gmail.com*

V. NEEDHAM, C. VAUGHAN, L. PRATSON & G. GIOIA. Role of academic intervention in reducing long term academic consequences of concussion.

Objective: Immediate academic effects following pediatric concussion are reported, but persisting academic problems have not been studied. Understanding the relation between injury severity, academic intervention and long-term academic outcomes is important for treatment and return to school planning.

Participants and Methods: Archival data was collected from 98 children 5-19 years-old, (58% male) treated in an outpatient concussion clinic (Mean days post-injury=22±13.5), with a follow up assessment 6 months post-injury (± 2 months) following completion of treatment. Clinic data included initial injury characteristics, post-concussion symptom status, and whether schoolwork was reduced following injury. Follow-up survey assessed overall long-term academic functioning.

Results: Reduced or excused schoolwork following concussion was not associated with having had a previous academic support plan (IEP/504) and was not related to loss of consciousness or amnesia. Children receiving these post-concussive supports had a higher number of initial symptoms following injury (M=5.6±3.9) than those not receiving them (M=3.7±3.7). Students receiving post-injury reduced schoolwork were also much more likely to report persisting academic problems following recovery than those who had no schoolwork excused (28.8% vs 5.0%, $p<.01$). Receiving reduced workload mediated the relationship between number of early symptoms and persisting problems such that those who reported a higher number of symptoms and received academic supports were less likely to report continued academic problems ($r = -.319$, $p = .03$) than those who did not have schoolwork excused ($r = -.271$, ns).

Conclusions: The study provides preliminary support for academic interventions post-concussion, such as reducing workload or excusing assignments, as they may help to reduce long-term academic difficulties, particularly in children with a higher symptom burden. Continued study of academic interventions post-concussion is warranted.

Correspondence: *Valerie Needham, M.S., The American School of Professional Psychology, Argosy University, Washington DC, 1550 Wilson Boulevard, Suite #600, Arlington, VA 22209. E-mail: valerie.r.needham@gmail.com*

D.M. RANSOM, L. PRATSON, M. FURDA, S. HANLEY, D. LAMEIRA, G. PICCOLINI, C. VAUGHAN & G. GIOIA. Returning to School Following Concussion: Does an Administrative Policy Addressing Academics Improve Perception of Academic Support?

Objective: Academic support following concussion should reduce student and parent concern and increase confidence in avoiding school problems. We examined parent and student concern following concussion and the amount of confidence they have in the school's academic support system, with or without an academic support policy in place.

Participants and Methods: Participants were students ages 5-18 (n=105) and their parents (days since injury M=22, SD=14.54) evaluated following concussion. Post-injury school problems, symptom ratings, level of concern regarding academic performance, and confidence in the provision of academic supports were obtained from students enrolled in two school districts: Group 1, with an explicit concussion policy to provide academic supports, and Group 2, without an explicit policy.

Results: The level of student and parent concern regarding adverse academic effects was positively associated with school-related post-injury problems, $r(65) = 0.40$, $p \leq .001$, and with total symptoms reported, $r(63) = 0.39$, $p \leq .01$. Higher parent and student confidence in the school's ability to manage the concussion was associated with the fewer number of reported school problems, $r(62) = -0.42$, $p \leq .01$. Paradoxically, Group 1 parents and students endorsed greater concern that symptoms would have an adverse effect on school performance than those in the Group 2, $\chi 2\ (1, 99) = 6.22$, $p < .01$), $\Phi = 0.25$, despite the presence of a support policy. The groups did not differ in their level of confidence in their school systems to provide supports.

Conclusions: This study highlights that school performance concerns relate to more school problems and higher symptoms. Greater academic concern existed in the school system with an explicit support policy (despite similar problems and symptom-levels) which may reflect greater sensitization to the potential effects of the concussion on academic performance. These findings have potential benefit in helping schools and clinicians support students' return to school following concussion.

Correspondence: *Danielle M. Ransom, Psy.D., Division of Neuropsychology, Children's National Medical Center, 1209 McKinley Street, Annapolis, MD MD. E-mail: daniellemransom@gmail.com*

V. TERWILLIGER, L. PRATSON, S. HANLEY, G. GIOIA & C. VAUGHAN. Continued Sport Participation following Adolescent Concussion Lengthens Recovery: The Argument for "When in Doubt, Sit Them Out!"

Objective: The variability in length of recovery (LOR) following sport concussion is poorly understood. It is purported that physical exertion through continued sport participation immediately post-injury and additional blows to the head may result in a lengthened recovery period. We examined the association between LOR and exertion immediately following concussion as well as exposure to additional head force soon after initial injury in adolescent athletes.

Participants and Methods: Adolescents (n=99) ages 13 to 17 (61% male), who sustained a concussion while playing sports (27% soccer, 17% ice hockey, 11 % football, 11% lacrosse), were evaluated through a specialty concussion clinic. Estimated time of continued sport participation following concussion and exposure to additional head force

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

was attained through clinical interview and coded. Symptom status was assessed during initial clinic visit. Length of recovery was determined via retrospective chart review.
Results: Time of continued participation in sports play following a concussion was not found to be associated with LOR (p>.05). Continued participation resulted in an increased risk of an additional blow to the head within sixty minutes (Chi-Square=11.9; p<.001). Sustaining these additional hits to the head post-injury was associated with a longer LOR (mean days to recovery 39.5 vs. 56.7; T=-2.3; p<.03). Sustaining an additional blow to the head also resulted in higher report of symptoms at time of first visit by parents (34.0 vs. 18.5, t=-2.6; p=.01) but not athletes.
Conclusions: Continued sport participation alone did not lead to a prolonged recovery, but did increase the risk of a second blow to the head by a factor of 17. This second blow to the head resulted in a significantly longer recovery time for adolescent athletes. This highlights the critical necessity for early identification and removal of a concussed athlete.
Correspondence: *Lincoln Pratson, Children's National Medical Center, Suite 350, 15245 Shady Grove Rd, Rockville, MD 20850. E-mail: lpratson@cnmc.org*

L. PRATSON, T. ESINHART, A. KHAN, G.A. GIOIA & C. VAUGHAN. Normative Performance on a Smartphone version of the Standardized Assessment of Concussion (SAC) in a Youth Sample.
Objective: Sideline assessments play an integral role in the early identification of concussions. The Standardized Assessment of Concussion (SAC) is a well validated brief paper-based mental status exam, measuring orientation and memory. Its recent incorporation into a smartphone app allows for the measurement of response time, which may increase its sensitivity to concussion effects. This study aimed to examine normative data on accuracy and response time in a youth population.
Participants and Methods: The SAC was administered to 33 uninjured children (ages 10–17, 72% male) by two examiners with the Concussion Assessment & Response (CARE Sport) smartphone app. Orientation, immediate memory, concentration and delayed memory, and a Total Accuracy score were calculated. Response Time was calculated by summing the orientation, immediate memory and delayed memory response times.
Results: Mean exam duration was 4.39 ± 0.74 minutes. Age was not correlated with Total Accuracy or Total Response Time. Means/SDs were calculated for the full sample: Total Accuracy score (27.4 ±1.97 (out of 30 possible)), Total Response Time (35.3 ± 11.52 seconds). Females scored higher than males on Total Accuracy (28.44 ± 1.42 vs. 26.96 ± 2.01, p = 0.05) but not Total Response Time. Total Accuracy and Total Response Time scores were moderately correlated (r=-.53, p= 0.002). Inter-rater reliability, calculated with concurrent scoring of four subjects, indicates identical Total Accuracy scoring and high reliability (Total Response Time ICC = 0.95, Pearson = 0.91).
Conclusions: Preliminary normative values are provided for SAC Accuracy and Response Speed in youth. Age effects were not found with marginal gender differences in accuracy but not response speed. Stability between raters was moderate between Accuracy and Response Time scores, suggesting measurement of unique performance components. Further normative data collection and validation is warranted.
Correspondence: *Lincoln Pratson, Children's National Medical Center, Suite 350, 15245 Shady Grove Rd, Rockville, MD 20850. E-mail: lpratson@cnmc.org*

M. STUDER, B. GOEGGEL SIMONETTI, A. JOERIS, S. BERGER, M. STEINLIN, T. HEINKS & C.M. ROEBERS. Reduced attentional resources influence verbal memory performance in pediatric mild traumatic brain injury.
Objective: Studies have repeatedly shown that mild traumatic brain injuries (mTBI) have subtle effects on children's neurocognitive performance, with complete recovery in most children within the post-acute period. However, there is evidence that some children show elevated post-concussive symptoms (PCS) and report everyday attention and memory problems after the post-acute period. The aim of this study was to determine whether children whose parents observe everyday attention problems do show learning and memory impairments in standardized testing.
Participants and Methods: We prospectively investigated children (age 6-16 years) with mTBI (n=40, mean age at injury: 11.05 years) and mild orthopedic injuries (mOI, n=38, mean age at injury: 10.54 years) 1 and 4 months after the injury. At both timepoints, everyday attention problems were rated from parents with the PCS Inventory Questionnaire and verbal learning and memory performance was tested with the RAVLT.
Results: Our results revealed no group differences in the parents' observation of attention problems or in the verbal learning and memory test performance at both timepoints. However, for both timepoints Pearson correlations indicated significant negative relationships between elevated everyday attention problems and reduced verbal learning and memory performance in mTBI children, but not in mOI children. Furthermore, 4 months after the injury, mTBI children with attention problems did show a significantly worse verbal memory performance compared to the control group with attention problems.
Conclusions: The findings of this study indicate that attention problems in day-to-day life are related to a reduced verbal learning and memory performance in children with mTBI and that the combination of limited everyday attention in combination with an mTBI leads to reduced memory performance. Thus, reduced attention resources influence cognitive functioning in children with mTBI and should be addressed, if necessary, in appropriate interventions to prevent cognitive sequelae.
Correspondence: *Martina Studer, University Children's Hospital Bern, Inselspital, Bern 3010, Switzerland. E-mail: martina.studer@gmail.com*

C.P. JOHNSON & L. EWING-COBBS. Investigating the Source of Reading Deficits Following Pediatric Traumatic Brain Injury.
Objective: Academic deficits in traumatic brain injury (TBI) can be insidious and difficult to predict. Reading deficits in TBI occur in some cases, but not others, and children do not tend to improve with traditional reading interventions. The current study proposes that the underlying source of reading deficits that follows TBI may be separate from the deficits traditionally associated with neurodevelopmental dyslexia and therefore requires a different approach to intervention and explanation.
Participants and Methods: Participants included 90 children with a history of orthopedic injury (n=44) or traumatic brain injury (n=46; 14 complicated mild or moderate and 32 severe). Ages ranged from 6-16 years and did not differ between the three injury groups. Participants were administered the GORT-4, TOWRE Sight Words, WJ-III Letter-Word and Reading Fluency, and CTOPP (Elision and Rapid Letter Naming subtests) 12 months post-injury.
Results: After controlling for age and socioeconomic status, the severe traumatic brain injury group differed from both the orthopedic injury and mild/moderate injury groups on all fluency measures (GORT-4 Fluency, TOWRE Sight Words, and WJ-III Reading Fluency; $p < 0.01$), but not on untimed measures of word reading (WJ-III Letter-Word) or comprehension (GORT-4 Comprehension). Similarly, the severe group differed from the other two groups on automatized naming ($p = 0.001$), but not Elision from the CTOPP. Mediational models for each fluency measure demonstrated that the effect of severe TBI on reading fluency at 12 months post-injury was fully mediated by the effect of severe TBI on rapid letter naming ($p < 0.05$), but not by elision performance.
Conclusions: The current study investigated the underlying pattern of deficits in reading skills following TBI. Conclusions include: 1) Reading deficits in TBI are specific to reading fluency. 2) Deficits are only seen in severe TBI. 3) The effects of TBI on reading fluency are fully mediated through the effect on speed, but not phonological awareness.

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

Correspondence: *Chad P. Johnson, PhD, Pediatrics, University of Texas Health Science Center at Houston, 6655 Travis, 10th Floor, Suite 10.03, Houston, TX 77030. E-mail: Chad.P.Johnson@gmail.com*

G.L. IVERSON, J.E. ATKINS, R. ZAFONTE & P.D. BERKNER. Concussion History in High School Athletes with Self-Reported Learning Disabilities.

Objective: Very little is known about the rate of concussions in adolescents with learning disabilities (LD). It was hypothesized that high school athletes with LDs would report a comparable history of concussion compared to students without LDs.

Participants and Methods: Participants were 6,230 high school student athletes from Maine, USA, between the ages of 14 and 18, who completed a demographics and history questionnaire embedded in the ImPACT® program in 2010.

Results: In the total sample, 20.2% of boys and 13.8% of girls reported one or more past concussions, and 6.9% of boys and 3.9% of girls reported two or more injuries. In the total sample, 3.7% self-reported a diagnosis of LD, representing 4.5% of the boys and 2.6% of the girls. Of those with LDs, 30.1% reported a history of one or more concussions compared to 16.9% of those without LDs [X2 (1, 6,230)=26.73, p<.000001]. Stratified by gender, 32.9% of boys with LDs reported a history of one or more concussions compared to 19.6% of boys without LDs [X2 (1, 3,547)=16.7, p<.00005], and 23.9% of girls with LDs reported a history of one or more concussions compared to 13.5% of girls without LDs [X2 (1, 2,683)=6.32, p<.012]. Of those with LDs, 11.4% reported a history of two or more concussions compared to 5.4% of those without LDs [X2 (1, 6230)=14.75, p<.00013]. Stratified by gender, 12.0% of boys with LDs reported a history of two or more concussions compared to 6.7% of boys without LDs [X2 (1, 3,547)=6.74, p<.009], and 9.9% of girls with LDs reported a history of two or more concussions compared to 3.8% of girls without LDs [X2 (1, 2,683)=6.86, p<.009].

Conclusions: In this large-scale, retrospective survey study, boys and girls with LDs were significantly more likely to report a history of one or more and two or more concussions than those who do not have LDs. Additional research is needed to determine if students with LDs are more susceptible to injury (i.e., have a lower threshold) or have different recovery trajectories.

Correspondence: *Grant L. Iverson, Ph.D., Physical Medicine and Rehabilitation, Harvard Medical School, 79/96 Thirteenth Street, Charlestown Navy Yard, Charlestown, MA 02129. E-mail: giverson@partners.org*

M. AMAYA-HODGES, J. TORRES, E. HOLLISTER, T. LONGO & G. GIOIA. Impact of Pre-Injury Attention and Learning Problems on Pediatric Post-Concussion Symptom Reports.

Objective: The current study examines the impact of pre-morbid Attention-Deficit/Hyperactivity Disorder (ADHD) and Learning Disorder (LD) on pre- and post-injury symptoms in youth who have sustained a concussion.

Participants and Methods: Children (N=494; 63% male; 71% white) first treated within 30 days of injury (M=14.4±7.0) for a diagnosed concussion, as well as their parents, completed the Post-Concussion Symptom Inventory (PCSI) as part of a standard clinical assessment. Reports of current and retrospective pre-injury symptom status were examined for younger (age 8-12, n=138) and older (13-17) age groups, divided into two diagnostic categories: pre-injury diagnosis of ADHD or LD (n = 175) and no pre-morbid diagnosis (Controls).

Results: Parents and adolescents in the ADHD/LD group reported a significantly higher number of pre- and post-injury symptoms than Controls. Though no significant group differences were found on younger children's reports of pre-injury symptoms, those with ADHD/LD noted a greater number of Cognitive symptoms at post-injury. Profile analysis revealed no significant differences between groups in pre- and post-injury symptom patterns. Rate of symptom improvement was measured in a subsample of youth returning for a second visit (n=339). Repeated measures analyses revealed a significant effect of diagnosis, such that parents rated youth with ADHD/LD as having a greater number of symptoms across visits, although this effect was not significant when controlling for pre-injury symptom levels. Across raters, both groups exhibited a significant decrease in symptoms at Visit 2, and there was no difference in rate of improvement between groups.

Conclusions: Following a concussion, a higher number of pre- and post-injury symptoms are reported in children with pre-injury ADHD or LD than those with no significant pre-morbid history. However, the rate of recovery may be similar between groups, suggesting the importance of considering pre-morbid functioning when assessing return to baseline following concussion.

Correspondence: *Meredith Amaya-Hodges, Ph.D., Children's National Medical Center, 15245 Shady Grove Rd., Suite 350, Rockville, MD 20850. E-mail: mamaya@cnmc.org*

K.C. DAVIS, B. SLOMINE & S. SUSKAUER. Time to Follow Commands (TFC) and Duration of Impaired Consciousness Remain the Best Predictors of Long Term Outcome Following Pediatric Traumatic Brain Injury (TBI).

Objective: Predicting long term outcome in children with traumatic brain injury (TBI) continues to be an important challenge within inpatient rehabilitation settings. Duration of impaired consciousness, especially time to follow commands (TFC), has demonstrated particular utility as a predictor of functional outcome. To date, however, few studies have examined the relationship among initial injury severity, duration of impaired consciousness, and later functional outcome in children.

Participants and Methods: In 72 children who received acute inpatient rehabilitation for TBI, we examined correlations between measures of severity/duration of impaired consciousness and functional outcome one-to-two years post injury using the Glasgow Outcome Scale – Extended, Pediatrics Revision (GOS-E Peds). Ratings were completed retrospectively based on documentation from an outpatient visit to a multi-disciplinary rehabilitation clinic. Initial injury severity was measured via the Glasgow Coma Scale (GCS) score; indices of impaired consciousness included TFC, post traumatic amnesia (PTA), and total duration of impaired consciousness (TFC+PTA). Multivariate regression analyses were performed to examine predictors of outcome.

Results: GCS, TFC, PTA, and TFC+PTA were all significant predictors of functional outcome. In multivariate analyses, together these variables accounted for 40 to 43 percent of the variance in GOS-E Peds ratings. TFC and TFC+PTA were the strongest predictors.

Conclusions: Consistent with previous research, results suggest that independently, GCS, TFC, PTA, and TFC+PTA are important predictors of later outcome after TBI, as judged by an outcome measure which is sensitive to the range of outcomes observed after pediatric TBI. While TFC and TFC+PTA are most predictive of outcome, TFC appears to be of particular utility given that it is obtained earlier in recovery than is TFC+PTA.

Correspondence: *Kimberly C. Davis, PhD, Kennedy Krieger Institute/ Johns Hopkins University School of Medicine, 1750 E. Fairmount Ave, Baltimore, MD 21231. E-mail: daviskim@kennedykrieger.org*

R.Z. BLAHA, S.J. TLUSTOS, M.W. KIRKWOOD, H.G. TAYLOR, T. STANCIN, T.M. BROWN & S.L. WADE. Adolescents Who Endorse Little to No Memory for Injury Display Increased PTSD Symptomotology After Complicated Mild to Severe TBI.

Objective: Moderate to severe pediatric traumatic brain injury (TBI) increases the risk for post traumatic stress disorder (PTSD) symptomatology. The role memory for the injury (MOI) plays in the development of such symptomatology is uncertain. Some adult studies suggest impaired MOI might protect an individual from PTSD, as lack of recall might preclude traumatization. Other authors postulate that worse neurologic damage associated with poor MOI might limit the individual's ability to assimilate the trauma, resulting in increased rates of PTSD. We sought

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

to investigate the relationship between PTSD symptomotology and MOI following TBI in adolescence.
Participants and Methods: Participants included 132 adolescents aged 12 through 17 years old (M = 14.54 at time of injury) who had sustained a complicated mild to severe TBI (M GCS=10.06, sd=4.57) within the previous 6 months. Data collection points included baseline and 6 month follow-up. PTSD symptomatology and MOI were assessed using items from the UCLA PTSD Index for DSM IV (Adolescent-Version). Participants were divided into a high MOI group and a low MOI group.
Results: T-tests revealed that adolescents who endorsed little to no memory for the event had higher levels of PTSD symptoms at baseline ($t(125)=2.89$, $p<.01$) and at 6-month follow-up ($t(105)=2.29$, $p<.05$). There was no significant difference in overall PTSD symptoms between baseline and 6 months. PTSD symptoms were not significantly correlated with demographic and injury-related factors, such as gender, age at injury, and GCS score.
Conclusions: The results suggest that a lack of memory for injury following adolescent TBI may increase the risk for the development of PTSD symptomatology. Further investigation is needed to understand the mechanisms for this effect but poor MOI may capture a different aspect of injury severity than more traditional indices such as GCS.
Correspondence: *Robert Z. Blaha, Master of Arts, Rehabilitation, Children's Hospital Colorado, 13123 E. 16th Ave. B285, Aurora, CO 80045. E-mail: robert.blaha@childrenscolorado.org*

A. LEVAN, G. BLACK, B. KIRWAN & S.D. GALE. WISC-IV and Neuroimaging Predictors of Social Competence in Chronic Pediatric Traumatic Brain Injury.
Objective: To determine which measures of processing speed and working memory from the Wechsler Intelligence Scale for Children-Fourth edition (WISC-IV) are the best predictors of social competence outcome in chronic pediatric traumatic brain injury (TBI) and if neuroimaging measures improve predictability.
Participants and Methods: Twenty-three children (15 male; M age=12.8 years, SD=2.3) in the chronic stage following TBI (M years post-injury=3.3, SD=1.6; M GCS=9.1, SD=4.7) were administered the WISC-IV and the Child Behavior Checklist (CBCL). Cortical thickness was measured from high-resolution MRI with FreeSurfer.
Results: Stepwise regression was carried out to predict the Total Competence Index of the CBCL from the measures of working memory (Digit Span, Letter-Number Sequencing) and processing speed (Coding, Symbol Search). The best model included Symbol Search and Letter-Number Sequencing ($p<0.001$). Total frontal lobe volume, right frontal pole cortical thickness, and GCS were entered into a stepwise regression model; right frontal pole cortical thickness was the best predictor of social competence ($p<0.01$). However, right frontal pole cortical thickness did not add significantly to Coding and Symbol Search in predicting social competence.
Conclusions: Parental ratings of Social Competence in children with chronic TBI were best predicted by a combination of a measure of processing speed and working memory. In contrast to what was expected, Symbol Search outperformed Coding. Prior work has suggested the important role of frontal lobe integrity in social outcome after TBI and our data suggest right frontal pole cortical thickness is a viable measure of this relationship; however, while it was predictive on its own, it did not add significantly to the WISC-IV measures in predicting social competence.
Correspondence: *Ashley Levan, M.A., CRC, Clinical Psychology, Brigham Young University, 1423 S. 465 W., Orem, UT 84058. E-mail: Levanaj17@gmail.com*

S. MCMANUS & T.G. BURNS. Differences in Initial Symptom Presentation for Female Athletes with Typical and Prolonged Recovery Courses.
Objective: Individuals who have sustained a concussion experience symptoms that include physical signs, cognitive complaints, emotional changes, and sleep disturbances. Research indicates that acute symptoms typically resolve within 7-10 days following concussion; however, approximately 10-15% of athletes experience persistent symptoms. Researchers have shown that several factors (e.g., loss of consciousness, symptom severity, pre-morbid disorders, concussion history) can complicate the management of and recovery course following concussion. Evidence also suggests that children are slower to recover, and female injuries may take longer to recover. However, it remains unclear as to whether a particular pattern of acute symptomatology is related to increased risk for prolonged recovery or situational factors.
Participants and Methods: This study examined the recovery of post-concussion symptom clusters (physical, cognitive, emotional, sleep) in a group of 450 female athletes (Mage=15.02, SD=1.652). Initial symptom presentation was compared between groups who showed typical or prolonged recovery courses (7, 14, 21, 28, or more days).
Results: There were main effects of Symptom ($F(3,1329)=21.274$, $p<.001$, $\eta p2=.046$) and Group ($F(1,443)=10.327$, $p<.001$, $\eta p2=.104$). A significant Group x Symptom interaction effect ($F(3,1329)=2.655$, $p<.01$, $\eta p2=.29$) was also found; the severity of emotional symptoms ($p<.001$) increased as recovery time increased. Greater discrepancy between cognitive and other symptoms approached significance ($p=.057$). Additional data will be presented on the relative severity ($p<.001$) of specific symptoms (e.g., vestibular symptoms, slowing, irritability).
Conclusions: These results expand previous knowledge about initial symptom presentation in female athletes following concussion. The identification of risk factors for prolonged recovery allows for the early initiation of multi-disciplinary intervention practices, such as cognitive remediation, coping skills training, or graduated exercise programs.
Correspondence: *Susan McManus, PhD, Children's Healthcare of Atlanta, 701 Highland Ave NE, Apt 1301, Atlanta, GA 30312. E-mail: susan.mcmanus@choa.org*

J. DORFLINGER, A. GRETENCORD, A. MION & S. AYLWARD. Age and Gender Differences in Youth Sports Concussion.
Objective: The aim of this study is to examine the post-acute stage of sports-related concussion in male and female children and adolescents.
Participants and Methods: The study is part of an on-going project. At this point, there are approximately 78 children between 10 and 18 years (42 males, 36 females; m=14 years) who were diagnosed with concussion and referred to our postconcussive management clinic in a medical center. Aproximately 50 more patients are expected. A brief concussion-specific neuropsychological evaluation was conducted.
The measures were Auditory Consonant Trigrams (ACT); Conners' Continuous Performance Test, 2nd edition (CPT-II); Immediate Post-Concussion Assessment and Cognitive Testing (ImPACT); Hopkins Verbal Learning Test (HVLT); Woodcock Johnson Tests of Achievement, Third Edition (WCJ-III) math and reading fluency; and parent and self-report of the Behavior Assessment System for Children, 2nd edition (BASC-2) and Behavior Rating Inventory of Executive Functioning (BRIEF).
Results: Preliminary regression equations indicate that females performed significantly worse on the ACT, CPT-II variability, and WCJ-III math fluency. Females self-reported significantly more symptoms on BRIEF scales: emotional control, plan/organize, organization of materials, and task completion, resulting in significantly higher scores for Metacognition and Global Executive Composite. Although there were some significant gender differences on the BASC-II parent and self-report and BRIEF parent report, all scores were average. Age was identified as a moderator for the ImPACT Verbal Memory and Visual Memory. Female performance on Verbal Memory increased with age, while male performance decreased with age on both measures.
Conclusions: Preliminary data with this on-going study indicate that there are differences between girls and boys who sustained a concussion, and the youth's age may be a moderator of some post-concussion cognitive deficits.

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

Correspondence: *Jill Dorflinger, Ph.D., Center for Pediatric Brain, Alexian Brothers Neurosciences Institute, 1555 Barrington Rd, Alexian Brothers Women & Children's Hospital, Hoffman Estates, IL 60169. E-mail: jill.dorflinger@alexian.net*

K. MONAHAN, H. TAYLOR, N. MINICH, S.L. WADE, D. DROTAR, T. STANCIN & K.O. YEATES. Race as a Moderator of Neuropsychological Outcomes Following Pediatric Traumatic Brain Injury.

Objective: This study examined whether race moderates neurobehavioral outcomes over the first 4 years following pediatric TBI.

Participants and Methods: Participants included 73 white and 18 black children with moderate to severe TBI, and 32 white and 23 black children with orthopedic injuries (OI), ages 6-12 years old at the time of injury. Cognitive outcomes included Similarities, Block Design, Object Assembly, Vocabulary, VIQ, PIQ, and FSIQ scores from the WISC-III; Recalling Sentences subtest of the CELF-Revised; Controlled Oral Word Association Test; Developmental Test of Visual-Motor Integration; California Verbal Learning Test; Contingency Naming Test (CNT); Calculation, Writing Samples, Letter Word Identification subtests from the WJ-III. Behavioral measures included the Child Behavior Checklist (CBC) and the Vineland Adaptive Behavior Scale. Assessments occurred shortly after injury, at 6 and 12-month follow-ups, and 4 year follow-up.

Results: General linear mixed models were used to examine child outcomes longitudinally. Group (severe TBI, moderate TBI, and OI) by race (black or white) interactions were examined over time. Most interactions were not significant. Significant interactions were found for CNT scores and CBC total problems and total competence scores over the short term (baseline to 12 months). Follow-up analyses showed that black children with moderate TBI had higher total scores on the CBC (more difficulties) and lower scores on the CNT (poorer performance) relative to black children with severe TBI or OI. Among white children, those with severe TBI had poorer scores than moderate TBI and OI.

Conclusions: Black and white children do not show differential effects on most measures of neurocognitive functioning following moderate to severe TBI, relative to OI controls. However, differences were apparent on a test of executive functions, as well as on parent-reported behavioral/emotional adjustment and competence. The findings may suggest that race can moderate outcomes in pediatric TBI.

Correspondence: *Kerry Monahan, Indiana State University, 692 Gladstone Ave., FL 2, Baltimore, MD 21210. E-mail: kmonahan@sycamores.indstate.edu*

S. ROSEMA, F. MUSCARA, V. ANDERSON, C. GODREY, S. EREN & C. CATROPPA. Young adults' and significant other's perspective of long-term psychosocial outcomes after childhood traumatic brain injury.

Objective: The aim of this study was to investigate the long-term psychosocial outcomes rated by the young adults and their significant other.

Participants and Methods: This prospective longitudinal study recruited from a larger ongoing study started 16 years ago. 33 participants with a CTBI agreed to participate during this follow up. The young adults' and significant ratings on two subscales of the Adaptive Behavior Assessment Scale and the ASEBA Adult Self report and Adult Behavior Checklist were compared using the Intra-class coefficient.

Results: The young adults and significant other seemed to agree on communication skills, alcohol and drug use, however they did not agree on the other subscales of the ASEBA.

Conclusions: The finding that the young adults and significant other do not seem to agree of most of the two VABS and the ASR/ABCL sub scales is worrying as the young adults with problems not noticed by others have the risk of not receiving the appropriate assistance in time.

Correspondence: *Stefanie Rosema, Master in Psycholgy, Murdoch Children's Research Institute, 16 David St, Carlton, VIC 3053, Australia. E-mail: stefanie.rosema@mcri.edu.au*

E. HAASE, L. PRATSON, A. FLETCHER, J. GARCIA, K. HERGENRATHER, G. GIOIA & C. VAUGHAN. Relation of Depression, Anxiety and Self-Efficacy on Concussion Recovery in Adolescents.

Objective: Length of concussion recovery in adolescents varies widely. Depression or anxiety symptoms have been suspected to be factors effecting length of recovery (LOR). A youth's confidence in their own ability to manage their recovery (e.g., self-efficacy) may also relate to LOR, as may parental self-efficacy. This study examines the relation among mood, self-efficacy (parent and adolescent), and LOR from concussion.

Participants and Methods: 33 adolescents (ages 13-18) and a parent were evaluated within 90 days of concussion at an outpatient clinic. LOR ranged from 8 – 146 days, as determined by clinician. Slow recovers (> 30 days) were compared to those with a typical rate of recovery using T-tests examining child ratings of depression and anxiety (pre- and post-injury), and parent and child report of self-efficacy. A modified depression score was created including only emotional-based symptoms (i.e., excluding possible fatigue symptoms of concussion), and depression and anxiety totals were also calculated adjusting for pre-injury level of mood symptoms.

Results: Children with prolonged recovery were no different than those with typical LOR on a child or parent's self-efficacy. Both pre- and post-self-report of depression and anxiety were not related to LOR; however the adjusted post-injury depression score measuring the increase in mood symptoms was significantly higher ($p = .01$) for those with prolonged LOR versus typical. The relation between increased depressive symptoms and LOR remained after excluding fatigue symptoms.

Conclusions: Prolonged recovery from concussion may relate to mood factors, such that increases in depression following concussion may be a more important predictor in outcome than the presence of depression or anxiety alone. Understanding change from pre-injury status is important following concussion, and clinicians should educate parents and provide support for mood.

Correspondence: *Eileen Haase, Ed.M., M.A., Safe Concussion Outcome Recovery and Education Program, The Children's National Medical Center, 111 Michigan Avenue, NW, Washington, DC 20010. E-mail: erh@gwmail.gwu.edu*

J. REESMAN, S. RISEN, S. SUSKAUER & B. SLOMINE. Symptom Report and Cognitive Exertion in School-Aged Children with Mild Traumatic Brain Injury.

Objective: Recommendations for management of pediatric mild traumatic brain injury (mTBI)/concussion include cognitive rest when symptomatic, though the relationship between cognitive exertion and neurocognitive performance has received little attention.

Participants and Methods: Retrospective chart review of 73 children (49 male), aged 9-12 years (mean age = 10.7 years) who presented to a multi-disciplinary concussion clinic 3- 49 days post-injury (mean = 18.9 days, SD = 11.3 days). As part of clinical care, children participated in a brief neuropsychological battery (~40 minutes, including measures of verbal memory, verbal fluency, auditory working memory, processing speed and a timed motor examination) and rated four symptoms (headache, fatigue, difficulty concentrating and irritability) immediately before and after testing. Each symptom was rated on a 0-10 scale where 0 is absence of the symptom and 10 is highest possible severity. Symptoms were considered noteworthy if rated >3. "Clinically meaningful symptom increase" was defined as a 2-point or greater increase on any symptom post-testing.

Results: Sixty-seven percent of children reported noteworthy symptoms pre-testing and 73% post-testing. Thirty percent of children endorsed a clinically meaningful symptom increase. Pre- and post-testing symptom reports were associated with poorer performance on measures of verbal memory (WRAML-2 Verbal Learning) though presence of a clinically meaningful symptom increase was not.

Conclusions: The majority of children reported noteworthy symptoms prior to and after testing, though a minority of the group displayed an increase of symptoms upon exertion. Additionally, pre- and

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

post-symptoms were related to performance on neuropsychological testing while an increase of symptoms upon exertion was not. Absolute symptom report, as opposed to change in symptoms in response to cognitive exertion, may be most useful in making recommendations for the child's learning environment.

Correspondence: *Jennifer Reesman, Ph.D., Kennedy Krieger Institute/ Johns Hopkins University School of Medicine, 1750 E. Fairmount Ave, Baltimore, MD 21231. E-mail: reesman@kennedykrieger.org*

M. SADY, C. MCGILL, C. VAUGHAN, L. PRATSON & G. GIOIA. Correlates and Predictors of Cognitive Exertion Effects in Children and Adolescents with mTBI.

Objective: Cognitive exertional effects (CEE; [increasing symptoms]) occur in response to cognitive activities after mild traumatic brain injury (mTBI). These effects can be quantified using the Exertional Effects Index (EEI). Previously, using standardized regression-based (SRB) change statistics, we established cutoff values on the EEI that differentiate individuals with and without mTBI. This study assesses the relation between exertional SRB change scores and other measures of concussion assessment and investigates potential demographic or injury-related predictors of CEE.

Participants and Methods: Uninjured (n=2007) and mTBI (n=472) participants (5-18y) rated four symptoms (headache, fatigue, concentration problems, irritability) on 0-10 scales before and after cognitive testing, producing the EEI and SRB change scores. We examined the relation between the exertion change scores and cognitive test performance on age-appropriate versions of ImPACT and symptom ratings with the PCSI. Rates of CEE within the mTBI group were examined among demographics (age, gender, previous diagnosis, history of mTBI) and injury characteristics (LOC, amnesia, time since injury, cause of injury).

Results: Correlations of exertional SRB changes scores with ImPACT performance were in the expected direction and slightly stronger in mTBI, but all r's < |.2|. Exertional ratings were mildly correlated with PCSI ratings in older groups of mTBI children (r = .2, .3) but not 5-7 year-olds with mTBI, and correlations were only significant in the younger, uninjured children (5 -12y, $p < .001$, $r < .2$). CEE was more prevalent in females with mTBI (OR = 2.1) and in those with a history of previous mTBI (OR = 1.7). There were no significant differences in CEE rate among the other variables tested.

Conclusions: CEE is quantifiable and largely independent of neurocognitive test performance and symptom ratings, and therefore is a useful additional measure of mTBI status that should be incorporated in mTBI assessment and treatment planning.

Correspondence: *Catherine McGill, Psy.D., Children's National Medical Center, 111 Michigan Ave, NW, Washington, DC 20010. E-mail: catherine.mcgill@hotmail.com*

S. COLLIER, R.L. PETERSON, A.K. CONNERY, D.A. BAKER & M.W. KIRKWOOD. What Does Performance Validity Test Failure Mean for Self-reported Postconcussive Symptoms after Pediatric Mild TBI?

Objective: The majority of youth who sustain mild TBI recover well and relatively quickly. A minority of pediatric patients report persistent postconcussive symptoms, which are known to be driven by both injury- and noninjury-related variables. In adult samples, performance validity test (PVT) failure is one factor that is strongly associated with symptom complaints. In children, no identified studies have examined the relationship between PVT performance and postconcussive symptom report.

Participants and Methods: Participants included 188 children aged 8-17 years old referred to an outpatient concussion program for clinical neuropsychological evaluation following mild TBI. All participants completed an abbreviated neuropsychological battery that included the Medical Symptom Validity Test (MSVT) and a self-report postconcussive symptom scale. The sample was divided into two groups, those who passed the MSVT (n = 167) and those who failed (n = 21). Postconcussive symptom endorsement was then compared between groups.

Results: Significant group differences ($p < .001$) and a large effect size (d = 1.09) were apparent for the total symptom score. Mann-Whitney U tests revealed that the MSVT fail group endorsed significantly higher symptom levels ($p < .05$) for 11 of 14 individual items, with medium to large effect sizes.

Conclusions: PVT failure in pediatric mild TBI samples is likely to be associated with exaggerated or noncredible postconcussive symptom report. These results are consistent with several comparable adult studies and parallel results in children indicating that PVT failure is a robust predictor of ability-based test performance. The findings reinforce the idea that both researchers and clinicians should add objective validity tests to the evaluation of school-aged youth after mild TBI, not only to identify noncredible effort during performance-based tests but to help identify symptom feigning and exaggeration during self-report.

Correspondence: *Shaleise Collier, M.A., Chilcren's Hospital Colorado, 13123 East 16th Avenue, Aurora, CO 80045. E-mail: shaleise.collier@childrenscolorado.org*

A.F. MOLINA, E. GEORGE & K. PERRINE. Exaggeration and Somatization in Pediatric Post-Concussion Syndrome.

Objective: Post-Concussion Syndrome (PCS) is a hot topic in the media and scientific research, and concussion centers for child athletes have been developed in nearly every city in the US. However, the role of psychological factors are virtually never addressed. The current study examines non-physiologic factors in a cohort of adolescents presenting to an academic medical center with PCS.

Participants and Methods: The charts of 22 adolescents who came to a medical center concussion clinic over the past 1.5 years were reviewed. All patients had a detailed concussion history taken. A brief neuropsychological battery was administered. The history and test results were interpreted as being reliable indicators of post-concussion syndrome or reflective of somatization/exaggeration.

Results: Fifty percent of patients exhibited signs of somatization or exaggeration. The average PCS score on the day of the visit for somaticizing patients was 40.3 while the average for non-somaticizing patients was 16.5. Although the self-reported PCS scores were significantly different (Mann-Whitney U = 5.00, p=.013), the average scores for neuropsychological tests (e.g., AVLT, Coding, and Trails B) were not. Notably, the majority of somaticizing patients experienced mild concussions with no loss of consciousness, retrograde amnesia, or post-traumatic amnesia. Factors including social problems such as bullying at school, psychological problems including depression and anxiety, parental pressure, falling into a sick role, and general negative expectations were associated with persisting and exaggerated PCS symptoms that were not physiologic in origin.

Conclusions: Somatization is common among teens assessed for PCS. Caution should be exercised to ensure that obtained results are reliable and valid.

Correspondence: *Kenneth Perrine, Ph.D., Neurological Surgery, Weill-Cornell College of Medicine, 520 E. 70th St., Starr 651, New York, NY 10021. E-mail: krp2003@med.cornell.edu*

TBI (Adult)

A.R. RABINOWITZ, V. MERRITT & P.A. ARNETT. Apolipoprotein E Genotype and Concussion in College Athletes.

Objective: The apolipoprotein E (APOE) gene has been implicated in the development of Alzheimer's Disease (Ferrer et al., 1997) and negative long-term outcomes following traumatic brain injury (Friedman et al., 1999) and concussion (Kutner et al., 2000). Evidence suggests that possession of at least one epsilon-4 (e4) allele, present in approximately 25% of the population, confers risk for cognitive decline. The present study evaluates the role of APOE genotype in risk of concussion in collegiate athletes.

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

Participants and Methods: Fifty-one collegiate athletes participated in the study. Genomic DNA was extracted from cheek swabs. To identify the six APOE genotypes comprising the APOE e2, e3 and e4 alleles, two single nucleotide polymorphisms were assayed using the TaqMan method (Applied Biosystems Inc.). At the time of this writing, genetic data are available for 15 recently concussed athletes.
Results: Genetic data were available for 10 men and 5 women, representing football, rugby, as well as men's and women's soccer, lacrosse, and basketball. Eleven of the participants were Caucasian American, 2 were African American, and 2 were Multi-racial. Among the 15 athletes with recent concussions, 12 possessed at least one e4 allele, and among these, 3 were e4 homozygotes.
Conclusions: Eighty percent of recently concussed college athletes in this small sample possessed at least one e4 allele, as compared with approximately 25% e4 prevalence in the general population (Ferrer et al., 1997). These preliminary findings suggest that APOE e4 may confer risk for concussion in collegiate athletes.
Correspondence: *Amanda R. Rabinowitz, Ph.D., University of Pennsylvania, 2944 Cambridge St., Philadelphia, PA 19130. E-mail: rabinowitz.a@gmail.com*

A.R. RABINOWITZ, X. LI, S.R. MCCAULEY, E.A. WILDE, G.R. HANTEN & H.S. LEVIN. Patients with Sports-Related mTBI Return to Activities More Rapidly than Patients with Motor Vehicle Crash-Related mTBI.
Objective: The literature suggests that sports-related concussions are associated with less disability and more rapid recovery than concussions in non-athletes caused by other mechanisms. However, few studies have directly compared sport and non-sport etiologies of mild traumatic brain injury (mTBI). The aim of this study was to compare participants with sports and motor vehicle crash (MVC) related mTBI with regard to an objective functional outcome—return to work/school.
Participants and Methods: Fifty-one adolescents and young adults aged 12-30 years with either sports or MVC related mTBI were recruited as a consecutive series of admissions to emergency centers and hospital units of three Level-1 trauma centers. Patients were administered a battery of neuropsychological tests at 96 hours, and re-assessed at 1 and 3 months post-injury. Time to return to work or school was also recorded.
Results: Thirty-five patients were injured via MVC, whereas 16 patients sustained injury during participation in sports. Analysis of cognitive test results, controlling for age, revealed that the groups were similar with regard to cognitive functioning and symptom report at 96 hours post injury (all $p>0.05$). Survival analysis revealed that those injured via MVC took 3.2 times longer than those injured in sports-related impacts to return to activity ($\chi2(1) = 5.13$, $p = 0.024$).
Conclusions: These results suggest that patients who sustained their injuries as a result of a MVC experienced greater functional disability, evidenced by longer times to return to work or school, despite a comparable level of impairment demonstrated by cognitive test performance and postconcussion symptoms. The demographic and clinical factors that may contribute to this finding will be discussed.
Correspondence: *Amanda R. Rabinowitz, Ph.D., University of Pennsylvania, 2944 Cambridge St., Philadelphia, PA 19130. E-mail: rabinowitz.a@gmail.com*

C. BOSWORTH, K. KRISHNAN, J. GATSON, S. ASLAN, C. CULLUM, R. DIAZ-ARRASTIA & C. MARQUEZ DE LA PLATA. Resting State Functional Connectivity and Cognition Changes in Professional Boxers.
Objective: Boxers receive numerous concussions and sub-concussive blows throughout their careers, which may have long-term consequences on cognition. Studying concussion-related changes in two prominent neural networks, the default mode network (DMN) and central executive network (CEN), may provide insight into the effects of this type of trauma. We hypothesized that functional connectivity (FC) among nodes of these networks would decline following a concussion, and that the degree of decline would correlate with cognitive outcomes.
Participants and Methods: Ten professional boxers were scanned prior to a fight and 7 days after a boxing-related concussion. Resting state fMRI and DTI were obtained using a 3T Philips MR system. Neuropsychological data was collected using ImPACT on the days of the scans. DMN, CEN, and whole-brain (WB) FC were calculated using a seed-based approach to measure the degree of BOLD synchrony between each network node and the respective seeded regions.
Results: No significant changes in the overall FC of the DMN, CEN, or WB were noted post-concussion, though WB showed a trending decline. Significant declines were noted between the seeded regions and individual nodes of the CEN and DMN on the left side of the brain. At baseline, both verbal memory and cognitive efficiency correlated positively with FC in select nodes within the DMN. Decrease in DMN FC was associated with a slowing of reaction time between baseline and post-concussion. Boxers with more professional experience had greater declines in FC among select nodes of the DMN. Boxers who received more head hits in the fight in which they were concussed had a greater decline in FC between nodes of the CEN.
Conclusions: Mild boxing-related concussions cause decreases in the FC of neural networks, and are associated with declines in neurocognitive ability.
Correspondence: *Christopher Bosworth, Clinical Psychology, University of Texas Southwestern Medical Center Dallas, 5323 Harry Hines Blvd, Dallas, TX 75390. E-mail: christopher.bosworth@utsouthwestern.edu*

J. BIRATH, A. MENDEL, M. CORONA, J. GIBSON, W.D. LOPEZ, E. WOO, D.F. KELLY, C. WANG, R. SWERDLOFF, C.C. KERNAN, R. CANTU, K. GUSKIEWICZ & M.J. WRIGHT. Coherence of Semantic Fluency Following Repeated Concussions in Retired Professional Football Players.
Objective: Athletes with repeated concussions show multiple areas of cognitive decline. Post-traumatic amnesia (PTA) is a salient predictor of outcome following sports concussion. Semantic fluency, which taps the coherence of semantic networks, is a sensitive measure of cognitive decline after traumatic brain injury. Our objective was to measure degradation in semantic coherence by analyzing semantic fluency. We hypothesized that PTA history would predict reduced semantic coherence in retired professional football players.
Participants and Methods: Twenty-seven retired National Football League (NFL) players were administered Animal fluency as part of a larger neuropsychological battery. Participants were divided into speed and non-speed players based on position played. Responses to Animal fluency were analyzed with Latent Semantic Analysis, a computerized statistical tool that measures the semantic relatedness of verbal output.
Results: Spearman's rho was used to determine associations between player variables and semantic coherence. Total number of PTA episodes and PTA severity rating were significantly related to the standard deviation (SD) of semantic coherence in both groups, but more strongly in the speed players group. Linear regression revealed that PTA frequency accounted for 23% of the variance of semantic coherence SD. PTA severity rating did not significantly improve the model's predictive ability. Number of concussions and number of NFL seasons played were not significantly related to semantic coherence.
Conclusions: Frequency of PTA in retired NFL players independently predicted semantic coherence. These results suggest that repeated concussions with PTA degrade semantic networks. Future research should examine more robust linguistic samples to more precisely capture cognitive and linguistic decline related to sports concussion.
Correspondence: *J. Brandon Birath, Ph.D., Psychiatry, Harbor-UCLA Medical Center, 1000 West Carson Street, Box 490, Torrance, CA 90502. E-mail: brandonbirath@gmail.com*

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

J. HAMMOND, T. KIMPTON, B. CLARK, M. REYNOLDS, H. WADSWORTH & S. HALL. Longitudinal Examination of Attitudes and Behaviors Regarding Helmet Use Among Skiers and Snowboarders: 1999-2012.

Objective: This study examined trends in skiers' and snowboarders' attitudes and behaviors regarding ski helmet use over a 13-year period. Given the increasing awareness of sports-related brain injuries, we hypothesized that, over time, respondents would report more positive attitudes and behaviors regarding helmet use.

Participants and Methods: A survey of snowboarders' and skiers' attitudes and behaviors about ski helmets was administered to students. The survey was completed by 106 participants in 1999, 105 participants in 2006, and 127 participants in 2012.

Results: Mean comparisons indicated statistically significant differences in attitudes regarding ski helmet use over time. From 1999 to 2006, there was nearly a 10% increase in the number of participants who rated helmets as necessary for recreational use, with about half of the respondents in 2006 rating helmets as necessary. From 2006 to 2012, there was an additional 33.7% increase in the number of participants who rated helmets as necessary for recreational use, with over 75% of the respondents in 2012 rating them as necessary.

A statistically significant increase in the number of participants who would encourage others to wear a ski helmet was found when scores were compared from 1999 to 2012. Only 7.3% of participants encouraged others to wear a helmet in 1999. In 2012, 96.4% of participants encouraged others to wear a helmet.

In stark contrast to the findings above, only 44% of respondents in 2012 reported actually wearing a ski helmet.

Conclusions: Attitudes and behaviors surrounding ski helmets appear to be changing in a positive direction. There is an increase in the recognition of the importance of wearing helmets and a greater consistency between respondents' attitudes toward helmet use and helmet wearing behavior. However, a striking discrepancy still remains between acknowledging the importance of helmets and the decision to wear one. These findings are valuable in the translation of research into helmet promotion and brain injury prevention efforts.

Correspondence: *Julia Hammond, MA, University of Montana, Department of Psychology Skaggs Building Room 143, Missoula, MT 59812. E-mail: julia.hammond@umontana.edu*

J. HAMMOND, V. MCNEILL, T. MARTIN & S. HALL. Increasing the Knowledge of Concussion in Adults Overseeing Youth Sports: Baseline Findings.

Objective: An estimated 300,000 sports-related concussions are reported annually in the United States. This study assessed the knowledge of adults overseeing youth sports regarding concussions and return-to-play guidelines prior to the existence of legislative guidelines requiring education on this topic. Research has demonstrated that knowledge regarding concussion and return to play decisions improves after implementation of state legislation. These data were collected prior to the first sports season in which such legislation was enacted in the state of Montana and, therefore, represent important baseline data. It was hypothesized that coaches and other adults overseeing youth sports would demonstrate gaps in their knowledge regarding concussion and return to play issues.

Participants and Methods: Adults overseeing youth sports (including coaches, assistant coaches, and athletic directors) were surveyed regarding concussions and return-to-play guidelines.

Results: Only 60.8% of respondents reported that their organization has an individual trained in concussion evaluation and management. Furthermore, 7.6% of respondents indicated that they did not have access, or were unsure of access, to information regarding sports-related brain injury. Almost all respondents (98.3%) acknowledged that a concussion is a brain injury; however, 7.6% were unaware or disagreed that an inability to recall events prior to a blow to the head is consistent with a concussion. In addition, 11.5% of respondents did not acknowledge that mood, personality, or behavior changes are symptoms of a concussion.

Conclusions: A large and troubling gap exists between current sports concussion research and the knowledge of adults involved in overseeing youth sports. These data underscore the need for further improvements in this knowledge base. This research also highlights important baseline data to evaluate legislative efforts to improve the knowledge of individuals involved in youth sports in order to protect young athletes.

Correspondence: *Julia Hammond, MA, University of Montana, Department of Psychology Skaggs Building Room 143, Missoula, MT 59812. E-mail: julia.hammond@umontana.edu*

J. HAMMOND & S. HALL. Using the Transtheoretical Model of Behavior Change to Increase Bicycle Helmet Use.

Objective: This study examined bicycle helmet use behaviors of individuals who ride a bike at least one time per month. Traumatic brain injury (TBI) and mild traumatic brain injury (mTBI) are a serious concern, and helmet use has been shown to mitigate brain injuries at all ages. Prochaska and DiClemente's Transtheoretical Model (TTM) suggests that behavior change occurs in a series of different steps. Within this model, the Preparation stage, which includes individuals who intend to take action within the next month, is the critical stage for the behavior change to occur. Given that research has demonstrated the efficacy of applying the TTM to many health behaviors such as smoking cessation and exercise, it was hypothesized that the TTM would be a valid and useful model to conceptualize bicycle helmet use.

Participants and Methods: A survey of bicycle helmet use behaviors was administered to 557 undergraduate students (378 females and 179 males) ranging in age from 18 to 52 years (M = 21.9 years, SD = 4.9 years).

Results: Of the respondents who ride a bike at least one time per month, 76% do not wear a helmet. Slightly over 10 percent (10.1%) of those who do not currently wear a helmet reported that they intend to in the next 30 days (the Preparation stage). At one-month follow-up, a statistically significant amount of these respondents (34.8%) reported that they wore a helmet within the past 30 days. In other words, a significant number of participants in this stage made a positive health behavior change and wore a helmet.

Conclusions: The TTM of behavior change appears to be a valid and useful model for understanding helmet use behaviors. This research suggests a useful methodology to accurately identify individuals in the critical stage of Preparation, and it is reasonable to assume that interventions designed to target individuals in this stage will result in an increased rate of helmet use behaviors. This research is essential to increase helmet use by improving interventions and promoting brain health.

Correspondence: *Julia Hammond, MA, University of Montana, Department of Psychology Skaggs Building Room 143, Missoula, MT 59812. E-mail: julia.hammond@umontana.edu*

C. LARSON-DUPUIS, E. CHAMARD, J. FRASNELLI, J. POIRIER, H. THEORET, M. LASSONDE, B.A. BACON & L. DE BEAUMONT. Impact of BDNF Val66Met polymorphism on olfactory functions of female concussed athletes.

Objective: This study aims to examine the impact of the BDNF Val-66Met polymorphism (BDNFMet) on plasticity-dependent recovery of olfactory functions following a concussion.

Participants and Methods: Participants were 67 asymptomatic female university athletes who were divided into 4 groups based on their history of concussions and BDNF polymorphism: 1) no concussion and BDNF Val66Val (BDNFVal) (n=17); 2) no concussion and BDNFMet (n=14); 3) concussion(s) and BDNFVal (n=22); and 4) concussion(s) and BDNFMet (n=14). Odor threshold, odor discrimination and odor identification were measured using the Sniffin' Sticks Inventory Test, a standardized psychophysical test.

Results: The study showed that concussed female BDNFVal athletes obtained significantly lower results on the threshold ($F(1, 34) = 4.73$, $p < 0.05$) and the identification tests ($F(1, 34) = 4.96$, $p < 0.05$) compared to BDNFMet athletes. A two-tailed Pearson correlation showed a

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

significant positive association between the time elapsed since the last concussion and odor identification score ($R = 0.458$, $p < 0.05$) in BDNF Val66Val concussed participants.
Conclusions: The present study demonstrates that among asymptomatic female athletes with a history of concussion, carriers of the BDNFVal show significantly reduced olfactory function compared to carriers of the BDNFMet. These results suggest that long-term olfactory function restoration following a concussion is, at least in part, mediated by the BDNF Val66Met polymorphism. Compensatory mechanisms involving cognitive functions might help explain odor identification recovery in BDNF Val66Val participants. This study demonstrates the importance of further examining the impact of genetic factors on the recovery process following a concussion.
Correspondence: *Louis De Beaumont, Ph.D., Montreal Sacred Heart Hospital Research Centre, 5400 Blvd Gouin W, CEAMS, Room 1340, Montreal, QC H4J1C5, Canada. E-mail: louis.debeaumont@uqtr.ca*

C. MANNINO, E. ROMERO, J. GIBSON, F. MARTINEZ, M. CORONA, D. SHERMAN, D.F. KELLY, C. WANG, R. SWERDLOFF, C.C. KERNAN, R. CANTU, K. GUSKIEWICZ & M.J. WRIGHT. The Utility of the Neurobehavioral Rating Scale-Revised in Retired Professional Football Players.

Objective: We sought to determine if the Neurobehavioral Rating Scale -Revised (NRS-R) is useful for retired National Football League (NFL) players with histories of sports related concussions.
Participants and Methods: Forty-eight retired NFL players completed the NRS-R, California Verbal Learning Test-Second Edition, Symbol Digit Modalities Test, tests of verbal fluency (FAS and Animals), and the Hospital Anxiety and Depression Scale (HADS). All tests were administered and scored per standard protocol.
Results: Linear regression demonstrated that the NRS-S executive/cognition factor was not associated with global cognition, although it was associated with attention/concentration, accounting for 8.2% of the variance. The NRS-S mood/affect, positive symptoms, and negative symptoms predicted depressive symptoms on the HADS, accounting for 22% of the variance, although only mood/affect emerged as an independent predictor ($t=3.81$, $p<.001$). NRS-S mood/affect, positive symptoms, and negative symptoms also predicted anxious symptoms on the HADS, accounting for 19% of the variance; mood/affect ($t=3.29$, $p=.002$) and negative symptoms ($t=-2.04$, $p=.047$) emerged as independent predictors.
Conclusions: Retired NFL players often have a history of sports-related concussions that have been associated with cognitive and emotional difficulties. We found that the mood/affect and negative symptoms factors from the NRS-S were predictive of self-reported emotional functioning in retired professional football players. However, the NRS-S executive/cognition factor was not associated with global cognition in our sample. Future work should determine whether the sensitivity of the NRS-S's factors can be improved for populations suffering from sports-concussion.
Correspondence: *Matthew J. Wright, Ph.D., Psychiatry, Harbor-UCLA Medical Center, 1124 W. Carson St., B-4 South, Rm. 111 (Box 490), Torrance, CA 90502. E-mail: mwright@labiomed.org*

W.D. LOPEZ, J. BIRATH, F. MARTINEZ, J. LARA-RUIZ, I. SIKORA, S. AMAYA, D.E. BUDDING, E. WOO, M. SCHMITTER-EDGECOMBE & M.J. WRIGHT. A Comparison of Methods to Extract Executive Ability from Trails B in Traumatic Brain Injury Survivors.

Objective: We examined different methods to quantify executive ability on Trail Making Test, part B (TMT-B) performances in a sample of Traumatic Brain Injury (TBI) participants.
Participants and Methods: Ninety four moderate-to-severe TBI survivors and 98 age and education matched controls participated. Most participants were male and Caucasian. Ninety-one percent of the TBIs were due to acceleration-deceleration events and 58% resulted in closed head injuries. Participants were recruited and tested in Washington. All participants were administered TMT A and B, WAIS-III Letter-Number Sequencing (LNS), verbal fluency (PRW and Animals), the Self-Ordered Pointing Test (SOPT), and the 5-point test (5pt); TBI participants were tested at 6 or 12 months post-injury. The TMT-B score, the difference between TMT-B and TMT-A (TMT-BA), and the difference between TMT-B and a predicted TMT-B score (TMT-BBp) were examined.
Results: The control and TBI groups differed on TMT-B ($t=28.56$, $p<.001$, $d=1.06$), TMT-BA ($t=27.86$, $p<.001$, $d=1.02$), and TMT-BBp ($t=26.28$, $p<.001$, $d=.45$), although TMT-B and TMT-BA provided the most robust effects. TMT-B and TMT-BA correlated with correct/timed performances on the LNS, PRW, Animals, SOPT, and the 5pt; TMT-BBp only correlated with LNS and Animals. The average test correlations of TMT-B ($Mr=.41$) and TMT-BA ($Mr=.36$) were not different ($z=.40$, $p=.68$). Both TMT-B and TMT-BA correlated with process scores from the SOPT and 5pt, while TMT-BA and TMT-BBp also correlated with process scores from the PRW. There were no differences between the average correlations between TMT-B ($Mr=.35$) and TMT-BA ($Mr=.25$) and the process scores ($z=.71$, $p=.48$).
Conclusions: The results suggest that TMT-BA may provide a slight advantage over TMT-B when utilized with TBI samples. Both indices performed similarly in discriminating TBI and control participants and both correlated similarly with omnibus scores on executive tests, but TMT-BA was associated with more process scores than TMT-B.
Correspondence: *Matthew J. Wright, Ph.D., Psychiatry, Harbor-UCLA Medical Center, 1124 W. Carson St., B-4 South, Rm. 111 (Box 490), Torrance, CA 90502. E-mail: mwright@labiomed.org*

J. LARA-RUIZ, J. BIRATH, I. SIKORA, J. GIBSON, F. MARTINEZ, E. WOO, D. ZEHLER, D.F. KELLY, C. WANG, R. SWERDLOFF, C.C. KERNAN, R. CANTU, K. GUSKIEWICZ & M.J. WRIGHT. Cognitive Function in Retired Professional Football "Speed Players".

Objective: The current study was conducted to assess cognitive function in retired football professional players with the greatest risk of head injury (speed players). We predicted that speed players (S) would have lower cognitive function and more concussions during their professional football careers compared to non-speed players (NS).
Participants and Methods: Forty-eight retired National Football League (NFL) players participated in the current study. The S group (n=14) included quarterbacks, running backs, halfbacks, and linebackers; NS (n=34) included participates that occupied other positions. The groups were equivalent in years of age (S=48.54 vs. NS=46.74), years of education (S=16.29 vs. NS=16.39), number of NFL seasons played (S=3.54 vs. NS=3.24), and race (S=57.1% vs. NS=52.6% Caucasian). Performances on measures of speeded attention, Symbol Digit Modalities Test (oral and written), verbal memory, the California Verbal Learning Test-Second Edition, and executive functioning, the verbal fluency (FAS and Animals), were normed and averaged to create domain scores. Neuropsychological tests were administered and scored according to standard protocols.
Results: Group differences in cognition and concussion frequency were evaluated with independent sample t-tests. NS evidenced superior speeded attention and executive function in contrast to S ($t=2.01$, $p<.05$, $d=.56$; $t=2.14$, $p<.05$, $d=.67$, respectively). However, verbal memory and concussion frequency did not differ between the groups ($p>.05$).
Conclusions: Speed players' evidenced poorer attention and executive ability in contrast to non-speed players matched for age, education, race, and number of professional seasons played. However, the groups were similar with regard to verbal memory and concussion frequency. It is possible that a greater number sub-concussive blows account for the cognitive differences between speed and non-speed players, although additional work will be needed to determine this.
Correspondence: *Matthew J. Wright, Ph.D., Psychiatry, Harbor-UCLA Medical Center, 1124 W. Carson St., B-4 South, Rm. 111 (Box 490), Torrance, CA 90502. E-mail: mwright@labiomed.org*

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

M. CORONA, E. ROMERO, W.D. LOPEZ, D. WONG, C. DALY, S. AMAYA, J. BIRATH, E. WOO, D.F. KELLY, C. WANG, R. SWERDLOFF, C. KERNAN, R. CANTU, K. GUSKIEWICZ & M.J. WRIGHT. Emotional Functioning in Retired National Football League Players With and Without Hormonal Dysfunction.

Objective: Retired National Football League (NFL) players with a history of concussions have been found to report more depressive symptoms when compared to their age peers (Didehbani et al., 2012). Also, individuals who suffer a traumatic brain injury often display hormonal dysfunction, including hypopituitarism (Nachtigall, 2005). Hormonal dysfunction has long been associated with symptoms of depression (Sachar, 1976). Thus, the current investigation explored the relationship between hormonal dysfunction and depressive symptoms in a sample of retired NFL players with a reported history of concussions.

Participants and Methods: Thirty-seven retired NFL players with a reported history of concussions. Participants completed lab tests of endocrine function and the Hospital Anxiety and Depression Scale (HADS).

Results: The severity of depressive symptoms for retired football players with hormonal dysfunction (M = 6.00) was significantly higher than for players without hormonal dysfunction (M = 3.95), $F(1, 36) = 3.95$, $p = .05$. In addition, correlations between various hormone values and depressive symptoms differed between groups. While there was a significant positive correlation between depressive symptoms and total thyroxine ($r = .52$, $p = .05$) for retired football players with hormonal dysfunction, significant negative correlations between depressive symptoms and free thyroxine ($r = -.48$, $p = .05$), free testosterone ($r = -.53$, $p = .05$), and total testosterone ($r = -.56$ $p = .01$) were found in retired football players without hormonal dysfunction.

Conclusions: Overall, hormonal dysfunction seems to be related to emotional functioning in retired professional football players. Thus, retired professional football players with hormonal dysfunction should be screened for depression and the need for psychotherapeutic intervention.

Correspondence: *Matthew J. Wright, Ph.D., Psychiatry, Harbor-UCLA Medical Center, 1124 W. Carson St., B-4 South, Rm. 111 (Box 490), Torrance, CA 90502. E-mail: mwright@labiomed.org*

M.J. WRIGHT, E. WOO, J. BIRATH, D. KELLY, C. WANG, R. SWERDLOFF, E. ROMERO, A. MENDEL, J. LARA-RUIZ, C. MANNINO, D. WONG, C. KERNAN, R. CANTU & K. GUSKIEWICZ. An Index Incorporating Cognitive Reserve and Concussion History Predicts Long Term Cognitive Outcomes in Retired Professional Football Players.

Objective: A variety of concussion and personal factors are associated with cognitive recovery in athletes. We evaluated whether an index derived from these factors could be used to predict cognitive outcomes in retired National Football League (NFL) players.

Participants and Methods: Data from 35 retired NFL players were used in the current study. Study exclusions included history of learning disability, significant traumatic brain injury (TBI) outside of football, and complicated TBI during football play. Concussion and game play data were restricted to participants' professional football careers.

Results: On average, participants had been retired from football for 20 years. An index was derived from concussion frequency and severity (post-traumatic amnesia), timeframe of concussive risk (seasons played), as well as cognitive reserve (CR; years of education), and we assessed its predictive power regarding current cognitive ability in retired NFL players. The sample displayed a range of concussions, concussion severities, seasons played, and years of education. Also, many of the participants demonstrated cognitive deficits. The index accounted for 24% of the variance in global cognitive ability in our sample. The individual components of the index (outside of the equation) did not independently predict cognitive outcome.

Conclusions: The current study demonstrated that an index incorporating CR, sports-concussion, and game related data can predict cognitive outcomes in participants who have been retired from professional football for an average of 20 years. Such indices may prove to be useful for clinical decision making and research.

Correspondence: *Matthew J. Wright, Ph.D., Psychiatry, Harbor-UCLA Medical Center, 1124 W. Carson St., B-4 South, Rm. 111 (Box 490), Torrance, CA 90502. E-mail: mwright@labiomed.org*

R. BELL, G. STEWART, L. MYERS, B. ASEMOTA, H. ELGENDY, J. KAPLAN, M. NIEMEYER, R. RANSON & J. JUENGLING. Assessing the Validity of the Montreal Cognitive Assessment in Collegiate Athletes.

Objective: Examine Montreal Cognitive Assessment (MoCA) scores of NCAA Division I athletes to establish normative data, and assess relationships between MoCA scores and demographic and health variables (concussions, mental disorders, learning disabilities).

Participants and Methods: Retrospective study of prospectively acquired data from records of 68 NCAA Division I athletes who underwent a pre-participation evaluation by an interdisciplinary team. Analyses included Fisher's Exact test or exact chi-squared test, t-tests/ANOVA, and Pearson's r or Spearman's rho.

Results: The participants were football athletes (n=48), with nineteen women playing sand volleyball (n=5), track/field (n=5) or volleyball (n=9). Sixty-one subjects were right handed (92.4%) and 6 left handed (9.0%). Participants were Caucasian (n=38), Black (n=25), African (n=3), and Native American (n=1). Using the published cutoff score for cognitive impairment, 53 performed normally and 14 below the cutoff. Impairment and race were significantly related (p=0.01), with 3.5% of whites and 8.5% of nonwhites impaired. Fifty percent who had repeated a grade were impaired, compared to 17% of those who had not ($p = 0.053$). Unimpaired athletes had higher GPAs than impaired athletes ($p = 0.07$). No significant relationships occurred between diagnosed concussion (p=1.0), number of physician diagnosed concussions (p=0.38), or history of mental disorders or learning disabilities (p=0.79) and impairment.

Conclusions: These results indicated that the MoCA may reflect education and culture differences among college athletes. Future research to determine whether specific subtests of the MoCA are influenced by sociodemographic and health variables and whether systematic adjustments to MoCA scores are warranted.

Correspondence: *Roberta Bell, PhD, Tulane Instistue of Sports Medicine, 202 McAllister Extension, New Orleans, LA 70118. E-mail: juengsud@gmail.com*

M. YUTSIS, B. YOCHIM & K. BARRERA. Efficacy of donepezil in a newly acquired brain injury in the context of pre-existing vascular dementia.

Objective: Clinical efficacy of donepezil on cognitive function in people with vascular cognitive impairment and adolescents and younger adults with severe TBI has been demonstrated. However, there is no literature on effectiveness of donepezil following severe traumatic brain injury (TBI) when superimposed onto pre-existing vascular dementia (VaD). We examined the efficacy of donepezil on cognitive recovery following a recent severeTBI in a patient with a pre-existing diagnosis of VaD.

Participants and Methods: In a single subject, multiple baseline design, donepezil (10mg) was administered for 4 weeks to a 47 year-old male, Caucasian, patient with 12 years of education with VaD who had a new severe TBI three months prior. Tests of memory (CVLT-2, BVMT-R), attention (Digit Span), and executive functioning (Trail Making Test B, DKEFS Verbal Fluency) were completed at: 1) baseline (3 months following TBI); 2) 4 weeks after taking donepezil (4 months after TBI); and 3) 4 weeks after discontinuation of donepezil (5 months after TBI)

Results: Using reliable change of index equation (Chelune et a., 1993), significantly improved attention, verbal and visual delayed memory, and lexical fluency were noted (at least 1SD, $p<.05$) between baseline and 4 weeks after taking donepezil, while a significant decline, with scores returning to baseline level, was noted on the same measures after discontinuing donepezil.

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

Conclusions: While practice effects would be expected with repeated neuropsychological assessments together with spontaneous recovery within the first 6-12 months following TBI, our results suggest that donepezil was effective in improving cognitive functioning in a patient with a long-standing diagnosis of vascular dementia irrespective of natural recovery or practice effects, as suggested by declines on the same measures when the medication was discontinued. Larger scale studies with a longer treatment duration would be warranted to establish the efficacy of donepezil in advanced stages of cognitive impairment

Correspondence: *Maya Yutsis, PhD, Polytrauma, VA Palo Alto HCS, 3804 Miranda Ave, Palo Alto, CA 94304. E-mail: maya.yutsis@va.gov*

R. MARTIN, A.Y. STRINGER, A. ODLAND, T.A. NOVACK & L.C. DAVIS. Sex differences in Edema following Traumatic Brain Injury.

Objective: Animal research investigating the effects of progesterone on edema and functional outcomes following an induced experimental injury suggest that pseudo-pregnant females fare better than males. When progesterone is given to males prior to brain injury, edema is reduced. Research with human patients who have suffered a traumatic brain injury (TBI), however, does not consistently support a sex difference in outcome and no studies have specifically examined sex differences in edema.

Participants and Methods: Participants were 1,033 patients (254 non-pregnant females; mean age female=30.1, male=31.4; female/male % injury severity: mild–33.5/36.6, moderate–21.7/20.3, severe–44.9/43.1) identified from the TBI Model Systems of Care National Database, after excluding those who were chemically paralyzed, intubated, or had a confirmed cerebrospinal fluid leak at time of injury. Patients in the menopausal age range were excluded to maximize sex differences. Sex was compared on measures of edema (extent of intracranial compression [EIC], intracranial hypertension, extra-axial collection of fluid [EACF]) controlling for injury severity, age, and blood alcohol level (BAL) at time of injury.

Results: Chi square analyses showed that females had less evidence of edema than males within the moderate range of severity on several measures including EIC ($p=.04$), EACF in right epidural ($p=.02$), and left and right subdural EACF ($p=.02$). Regarding age, the left subdural EACF variable was significantly different within the ages of 20–29 ($p=.03$) and 40–49 ($p=.04$) and the right epidural and subdural EACF was different for ages 15–19 ($p=.04$). For BAL, when there was no alcohol detected or legal levels of alcohol ($< .05$), females showed less evidence of edema.

Conclusions: Females showed less edema than males, providing indirect support that progesterone is neuroprotective following TBI. Progesterone levels in non-pregnant females, however, may be too low for functional outcome differences to emerge.

Correspondence: *Rebecca Martin, Emory University, 922 Rock Springs Ct NE, Atlanta, GA GA. E-mail: rmartin29@gmail.com*

A.A. FEDIO, J. SEXTON, S. GOLDEN, S. EFANOV, K. NIRSCHL, S. CUMMINGS & P. FEDIO. Personal Creativity and Pro-social Behavior during Recovery from Traumatic Brain Injury.

Objective: The present study of individuals recovering from traumatic brain injury (TBI) examined quality of life (QOL) in areas regarding personal growth in relation to their self-concept and motivation for treatment.

Participants and Methods: Fourteen individuals with moderate-severe TBI (8M/6F, mean age: 36; 4 years post injury) rated their physical, cognitive, and emotional status (Neurobehavioral Functioning Inventory [NFI]). They also completed the Quality of Life Inventory, Tennessee Self-Concept Scale (TSCS-2; physical, personal, moral, family, social), and Motivation for Treatment Questionnaire.

Results: Overall QOL was average (T=47), with scale scores ranging from Very Low to High. NFI and TSCS results were also within the average range, with the exception of individuals' perceived value as a family member falling below expectations ($t(13)=-3.67$, $p<.005$). Individuals' QOL in areas of creativity and helping others was associated with a strong social self-concept ($r=.78$-$.87$), along with physical/behavioral self-concept and self-satisfaction ($r=.50$-$.76$). Creativity and learning related to reduced negative emotions ($r=-.53$) and increased self-satisfaction ($r=.62$) across participants. Individuals with fewer somatic complaints were more likely to endorse helping others ($r=-.53$). Individuals' motivation for treatment was predicted by their negative personal self-concept ($r=-.57$) and positive outlook regarding community activities ($r=.52$).

Conclusions: Findings underscore the important interaction of social relationships with variables such as personal creativity and helping others. As personal creativity and pro-social acts are variables that can be more directly addressed clinically, they are potentially valuable areas for interventions that are likely to result in broader gains to include improved quality of social relationships for individuals recovering from TBI.

Correspondence: *Alison A. Fedio, PhD, PsyD, American School of Proessional Psychology, Argosy University, 1550 Wilson Boulevard, Suite 600, Arlington, VA 22209. E-mail: afedio@argosy.edu*

D. AHERN, C. DEL PRINCE, M. WORDEN, J. ROGG, H. SPADER & S. CORREIA. Modified Attention Network Task Performance in Acute Mild Traumatic Brain Injury.

Objective: To determine if a modified Attention Network Task is sensitive to changes in attention and reaction time (RT) following mild traumatic brain injury (mTBI). The overarching goal is to develop a brief, reliable attention measure to guide return-to-activity decisions following mTBI. We previously presented data for healthy controls (HC) and now present preliminary data for acute concussion.

Participants and Methods: The ANT is a well-validated computerized visual flanker test for assessing the altering, orienting, and executive components of attention. Our modified ANT (mANT) pairs the visual stimuli with distracting sounds of varying pitches and waveforms. Participants completed 10 blocks both with and without sound. We previously found significant improvement in RT with a modest improvement in accuracy on sound items compared to no-sound items in HC. We hypothesized these effects would be attenuated or reversed in the acute period following mTBI. We compared mANT performances of 8 undergraduate athlete participants with mTBI within 72 hours of injury to 25 undergraduate HC.

Results: Reaction time improved for both mTBI and HC participants on sound compared to no-sound items (all $p < 0.01$). However, the magnitude of the advantage was significantly smaller for mTBI participants compared to HC on two ANT conditions (i.e., center cue vs. no cue and congruent vs. incongruent flankers, all $p < .05$) with a trend toward significance for incongruent flankers ($p = .059$). Accuracy improved during sound blocks in healthy controls ($p < .05$) but not in mTBI participants ($p = .92$).

Conclusions: These pilot results suggest the presentation of sounds during a flanker task enhances RT and accuracy in healthy participants; however, individuals with acute mTBI show significantly less RT advantage and no benefit to accuracy. The results motivate further research to determine if these effects remain stable in a larger sample, and are encouraging for the use of a brief sustained attention task as a screening tool for mTBI.

Correspondence: *David Ahern, Department of Psychiatry & Human Behavior, Brown University, Box G-BH, Providence, RI 02912. E-mail: davidcahern@gmail.com*

J.R. SOBLE, R. NAKASE-RICHARDSON, D.J. SCHWARTZ, M. MODARRES, M. MCCARTHY, S. BARNETT & R.D. VANDERPLOEG. Is Sleep Apnea a Modifiable Mechanism Underlying Prolonged PTA Duration in Acute TBI Patients?

Objective: Sleep disturbance is common during acute recovery from traumatic brain injury (TBI). Severity of sleep problems is associated

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

with outcomes such as length of posttraumatic amnesia (PTA). Sleep apnea (SA) has significant morbidity including impaired cognition. Thus, the objectives of this study were: (1) document the prevalence of SA among a sample of acute TBI patients and (2) determine the association between SA and PTA duration as an acute outcome measure.
Participants and Methods: Twenty-three consecutive sleep medicine referrals with acute moderate-severe TBI underwent polysomnography as part of their inpatient rehabilitation. Patients' mean age was 33.52 (SD = 12.71) and mean initial Glasgow Coma Scale (GCS) score was 5.27 (SD = 3.03).
Results: Ten participants (43.5%) had SA (SA+), with obstructive SA accounting for 90% of cases. SA+ and SA- groups did not differ in age or time since injury. SA+ patients had a mean PTA duration of 122.80 days (SD = 77.45), whereas SA- patients had a mean PTA duration of 65 days (SD = 59.83). An ANCOVA controlling for initial GCS revealed that this difference in PTA was not significant, $F(1, 21) = 2.86$, $p = .11$, $\eta 2 = .13$, in part due to the small sample size.
Conclusions: This study found a high rate of SA (i.e., 43.5%) among moderate-severe TBI patients undergoing acute neurorehabilitation. SA+ patients had on average 58 more days of PTA compared to SA- patients. Not yet clear is whether more severe TBI results in higher levels of SA, or if SA extends TBI recovery time (i.e., longer PTA duration). Improved access to PSG during rehabilitation can identify disorders that may contribute to TBI cognitive phenomenology.
Correspondence: *Jason R. Soble, Mental Health & Behavioral Sciences, James A. Haley VA Hospital, Dept. of Mental Health/Behavioral Sciences, 13000 Bruce B. Downs Blvd (116-B), Tampa, FL 33612. E-mail: Jason.Soble@va.gov*

A.L. NORMAN, J.L. WOODARD, Z. KOU, A. RAHMAN-FILIPIAK, A. CHAUDHARY, R.D. WELCH, B.J. O'NEIL & S.I. AYAZ. Neurocognitive and Diffusion Tensor Imaging (DTI) correlates of mild traumatic bran injury (mTBI) in the acute care setting.
Objective: Patients with mild traumatic brain injury (mTBI) frequently experience post-concussive symptoms for up to a year following injury despite limited to no macrostructural changes seen on magnetic resonance imaging (MRI) and computed tomography (CT). Advanced MRI techniques, uncommon in an emergency room setting, are increasingly being evaluated as tools to understand the nature and course of post-concussive symptoms. In the current pilot study we evaluated the clinical utility of Diffusion Tensor Imaging (DTI) in predicting future neurocognitive symptoms in an urban acute care setting.
Participants and Methods: Eleven acute mTBI patients were recruited from the emergency department. Each patient underwent MR / DTI within 24 hours post-injury, followed by neuropsychological testing at 1-12 months post-injury. Fractional Anisotropy (FA) was measured using Tract-Based Spatial Statistics (TBSS). Abnormal white matter was individually characterized by patient's total number of voxels with abnormal FA (either increased or decreased) compared to the average FA of a control group.
Results: Abnormal DTI values were uncorrelated with patient age, education, or neuropsychological tests (Hopkins Verbal Learning Test-Revised, Color Trails, Brief Visuospatial Memory Test-Revised, Symbol Digit Modalities; ps >.05). DTI values were correlated with both symptom count ($p=.035$) and symptom severity ($p=.041$) of self-reported neurocognitive post-concussive symptoms. Days since injury was uncorrelated with symptom count or severity ($p>.05$).
Conclusions: Self-reported post-concussive symptoms at 1-12 months post mTBI, and not neuropsychological assessment (e.g., attention, learning and memory), were correlated with total abnormal white matter. Microstructural brain indices assessed in the acute care setting following mTBI may serve as a diagnostic tool for prediction of post-concussion neurocognitive symptoms.
Correspondence: *Andria L. Norman, M.A., Psychology, Wayne State University, 5057 Woodward Ave. 7th Floor, Detroit, MI 48201. E-mail: andria.norman@wayne.edu*

J.D. MEDAGLIA, A. MCALEAVEY, S. ROSTAMI, J. SLOCOMB & F.G. HILLARY. The Relationship Between Blobs and Connections in Early Traumatic Brain Injury.
Objective: Over the past decade, fMRI studies of recovery following traumatic brain injury (TBI) have investigated functional brain activity in individuals in various phases of recovery. Recently, neuroimaging research has shifted to focus on network functional connectivity following injury. However, fundamental questions about the neurodynamics of recovery in early TBI remain. Specifically, we investigated the effects of TBI on fundamental relationships between local and interregional connectivity during early recovery from TBI during working memory (WM).
Participants and Methods: Participants included 16 individuals with moderate to severe TBI 3 months post coma and matched controls. Participants performed a WM task, the n-back, during fMRI scanning. Person-specific regions of interest were defined in the right inferior parietal lobe and prefrontal cortex. Signal change and inter-regional connectivity were calculated for each participant. Two mixed effects models calculated the relationship between prefrontal cortex and parietal lobe signal change and connectivity between the two regions as well as neurodynamic predictions of reaction times.
Results: The right prefrontal cortex (rPFC) percent signal change positively predicted functional connectivity within and between persons in both groups. Local rPFC signal change was positively related to RT in both groups. Right parietal (rPAR) activity was negatively related to RT within subjects in both groups. Critically, the relationship between rPFC signal change and RT was much stronger in early TBI.
Conclusions: The link between local and distant neurodynamic processes remains unaffected even in the very early stages of recovery from TBI. The local activity of rPFC in TBI is a critical regulator of network functioning and performance. As much of neuroimaging has moved to connectivity modeling, local signal change in cognitive control regions is critical to understanding network function, and may be an important prerequisite for network operation in WM following TBI.
Correspondence: *John D. Medaglia, M.S., Psychology, Pennsylvania State University, 347 Moore Building, University Park, State College, PA 16802. E-mail: johnmedaglia@gmail.com*

Invited Address: Toward the Development of a Rehabilitation Treatment Taxonomy: A Conceptual Framework (CE Session A)

Presenter: John Whyte

4:15–5:15 p.m.

J. WHYTE. Toward the Development of a Rehabilitation Treatment Taxonomy: A Conceptual Framework.
Treatments must be clearly defined to be subjected to efficacy research, to allow replication of positive findings, and to facilitate dissemination of proven treatments to clinical practitioners. Yet, outside of pharmacologic treatments, there is no accepted system for defining and classifying treatments. Attempts to define rehabilitation sometimes settle simply for measures of quantity of contact (e.g., hours of "neuropsychological rehabilitation") without regard to the activities conducted during that contact time. Alternatively, treatments may be defined by the goal they are intended to achieve (e.g., "memory remediation treatment") potentially mixing vastly different treatment approaches as long as they hope to achieve a similar outcome. Neither of these approaches serves the above purposes. In this presentation I will discuss the work of a project attempting to develop a rehabilitation treatment classification system that is based on known of hypothesized active ingredients and, thus, aims to ultimately map onto empirical data about efficacy or inefficacy of those ingredients. The presentation will summarize the need for such a system, the many conceptual challenges that arise in attempting to develop an ingredients-based taxonomy, and the current state of

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

attempts to address those challenges. Although the proposed approach aims to provide an organizing framework for rehabilitation treatment definition generally, specific challenges relevant to neuropsychological rehabilitation – where many of the relevant constructs are hypothetical and indirectly measurable – will be emphasized.
At the conclusion of this presentation, attendees will be able to: (1) Describe 2 shortcomings of current approaches to defining rehabilitation treatments; (2) Identify 3 challenges to developing an ingredients-based system of treatment definition; (3) Provide 1 example of a neuropsychologically relevant treatment that falls into each of the major proposed treatment categories.
Correspondence: *John Whyte,, PA. E-mail: jwhyte@einstein.edu*

THURSDAY MORNING, FEBRUARY 13, 2014

CE Workshop 7: Prism Adaptation, Motor Training, and Spatial Neglect

Presenter: Anna Barrett

7:20–8:50 a.m.

A. BARRETT. Prism Adaptation, Motor Training, and Spatial Neglect.
For over 50 years, optical prisms inducing laterally displaced movements have been used to study perceptual-motor learning. In 1990, client exposure to rightward-displacing prisms during inpatient therapy was reported to improve pathological spatial bias causing functional disability (spatial neglect), which predicts longer hospital stay and poor return of independence. Since then, the cognitive neuroscience community generated numerous studies of prism adaptation effects; we and others reported this treatment may selectively train spatial "Aiming" motor-intentional systems (Fortis et al.., 2011). From animal literature to stroke/cognitive neurology, this course is a translational introduction to prism adaptation for spatial neglect: its brain basis, promise, currently-used protocols, and limitations in the clinical setting.
At the conclusion of this presentation, attendees will be able to: (1) list laboratory and clinic methods separating spatial Aiming from the traditionally-defined "Where" visual-perceptual bias in spatial neglect; (2) describe why bottom-up, motor learning approaches might be superior to explicit, verbal strategic training to activate subcortical-cortical spatial Aiming networks; (3) list three knowledge gaps blocking translation of prism adaptation research to standard clinical practice.
Correspondence: *Anna Barrett,, NJ. E-mail: abarrett@kesslerfoundation.org*

CE Workshop 8: Cognitive Aging and Dementia: Is White Matter what Matters?

Presenter: Adam Brickman

7:20–8:50 a.m.

A. BRICKMAN. Cognitive Aging and Dementia: Is White Matter what Matters?
White matter takes up a considerable amount of the brain's real estate but has been relatively under-studied in the neuropsychological literature. Over the past several years, however, there has been an explosion in interest in normal white matter and white matter abnormalities as contributors to cognitive, motoric, and emotional functioning. This interest has been supported by technological innovations in neuroimaging that allow us to visualize, measure, and quantify various aspects of white matter microstructure and macrostructure. By applying modern neuroimaging techniques to aging humans and non-human primates, a consistent story has emerged that indicates that white matter abnormalities and degeneration may be primary sources of age-associated cognitive decline. More recently, white matter abnormalities have been implicated in the pathogenesis and clinical course of Alzheimer's disease, although there is some controversy surrounding this area of research. In the current workshop, we will review neuroimaging approaches to studying white matter, such as diffusion tensor imaging and T2-weighted magnetic resonance imaging, and discuss evidence that implicates white matter changes in cognitive aging and Alzheimer's disease.
At the conclusion of this presentation, attendees will be able to: (1) Become familiar with modern neuroimaging approaches to studying white matter; (2) Learn to evaluate evidence implicating white matter abnormalities in cognitive aging and dementia
Correspondence: *Adam Brickman,, NY. E-mail: amb2139@columbia.edu*

Invited Address: Mild Cognitive Impairment Comes of Age (CE Session B)

Presenter: Glenn Smith

9:00–10:00 a.m.

G. SMITH. Mild Cognitive Impairment Comes of Age.
Recently, the American Psychiatric Association published new criteria for minor neurocognitive disorder and National Institute on Aging-Alzheimer's Association task forces released their proposed new criteria for Mild Cognitive Impairment (MCI) due to Alzheimer's disease. The American Psychological Association's updated its guidelines for the assessment of cognitive aging and dementia specifically references MCI. Early detection of Lewy Body disease, frontotemporal dementia and vacular cognitive impairment is increasingly possible. The concept of MCI has clearly been embraced in research and practice. Nevertheless, discrepancies still exist about the incidence, prevalence, rates of progression, and the utility of diagnosing the MCIs. This talk will discuss actors that contribute to the discrepancies. In addition, the utility of MCI as an opportunity for early intervention will be discussed.
At the conclusion of this presentation, attendees will be able to: (1) Describe the current clinical and research criteria for MCI; (2) Enumerate at least 3 methodological factors that contribute to discrepancies in MCI rates; (3) Discuss intervention opportunities with MCI patients.
Correspondence: *Glenn Smith,, MN. E-mail: smitg@mayo.edu*

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms.
https://doi.org/10.1017/S1355617714000381

Symposium 1: The Changing Nature of Executive Control in Preschool: Using Statistical Modeling to Situate Neuroscience in Development

Chair: Kimberly Espy

10:00–11:30 a.m.

K.A. ESPY, J.P. GARZA, C.A. CLARK, J.M. NELSON & A.R. SCHUTTE. The Changing Nature of Executive Control in Preschool: Using Statistical Modeling to Situate Neuroscience in Development.

Symposium Description: Executive control (EC) development is dynamic in the preschool years, during which dramatic improvement in accuracy on executive tasks occurs from ages 3 to 4, and qualitative changes in the neural network that subserves EC are evident. However, measurement limitations preclude full understanding of the nature and development of EC in young children. A central challenge is the task impurity problem: successful performance on tasks designed to measure EC also requires the use of foundational language, visuospatial, and motor abilities that are also developing and varied across preschool children, making it difficult to know if and to what extent to attribute performance to EC. The overarching goal of this symposium is to demonstrate an innovative application of latent statistical modeling to address this issue. Dr. John Garza describes results of an application of the latent bifactor model to examine the relative contributions of EC and foundational cognitive abilities to performance on an executive task battery at four longitudinal observations spanning the preschool years. Dr. Caron Clark considers whether differences in children's distal and proximal socio-familial risk early in preschool contribute to differences in children's developing EC and foundational cognitive abilities as represented in the bifactor model. Dr. Jennifer Mize Nelson presents findings explicating the relative importance of EC and foundational cognitive abilities, as modeled using the bifactor approach, for dimensions of parent-rated child ADHD symptoms at the cusp of the transition to school. Dr. Anne Schutte presents a dynamic neural field model of EC that captures the interaction between EC and foundational cognitive abilities, and can be used to determine what types of changes may be occurring with development. Dr. Kimberly Andrews Espy concludes the symposium by summarizing and integrating the study findings, and discussing implications for further research and translational application.
Correspondence: *Kimberly A. Espy, Department of Psychology, University of Oregon, 203 Johnson Hall, 1266 University of Oregon, Eugene, OR 97403-1266. E-mail: kaespy@uoregon.edu*

J.P. GARZA, J.M. NELSON, T.D. SHEFFIELD, H. CHOI, C.A. CLARK, S.A. WIEBE & K.A. ESPY. Parsing Executive Control from Foundational Cognitive Abilities in Preschool: Application of the Bifactor Model to Examine Developmental Change.

Objective: Young children's accuracy scores for individual executive tasks confound the contribution of developing executive control (EC) with developing foundational cognitive abilities also required for task performance. We aimed to examine an innovative application of latent bifactor modeling to statistically parse the relative contributions of EC and foundational cognitive abilities to observed performance across an executive battery at each of four preschool age points. We then considered developmental changes in the nature of "top-down" EC, relative to "bottom-up" foundational cognitive abilities.

Participants and Methods: 388 children were enrolled in a cohort-sequential longitudinal study spanning the age points of 3 years, 3 years 9 months, 4 years 6 months, and 5 years 3 months. At each age, children completed a 9-task executive battery, and at the final age, they completed 3 standardized subtests indexing verbal, visuospatial, and motor abilities. Bifactor models at each age specified an EC latent comprised of all executive tasks, and a foundational cognitive abilities (FCA) latent comprised of the executive and foundational tasks, the latter of which was intended to anchor shared variance among the executive tasks associated with foundational abilities.

Results: At ages 3 and 3;9, all executive and foundational tasks had significant positive loadings on the FCA factor, while none of the executive tasks loaded significantly on an EC factor. The factor structure was markedly different at ages 4;6 and 5;3 when the executive tasks had moderate, significant loadings on both the EC and FCA factors.

Conclusions: Children's observed executive task performance in the latter portion of the preschool period appears driven by unique yet dualistic contributions of EC skills and foundational cognitive abilities. This pattern is contrasted with findings at earlier ages suggesting executive task performance is driven entirely by foundational cognitive abilities.
Correspondence: *John P. Garza, University of Nebraska-Lincoln, Developmental Cognitive Neuroscience Laboratory, 501 Building Room 102, Lincoln, NE 68588-0206. E-mail: john.garza@unl.edu*

C.A. CLARK, T.D. SHEFFIELD & K.A. ESPY. The Socio-Familial Context in Early Childhood and Mechanisms of Influence on Developing Executive Control in Preschool.

Objective: Prolonged maturation of the prefrontal cortex that supports executive control (EC) suggests a protracted sensitive period during which EC development may be susceptible to environmental influence. Recent work has linked distal and proximal indicators of socio-familial risk with poorer executive task performance among young children. However, work in this area has not fully considered whether such risk factors uniquely influence EC, the foundational cognitive abilities it regulates, or both. Our aim was to utilize the bifactor model that represents dualistic roles of EC and foundational abilities in executive task performance to tease apart the mechanisms of socio-familial influence.

Participants and Methods: The sample was 388 children stratified by socioeconomic risk. Measures of socio-familial risk, including questionnaires, interviews, and home observations, were collected when families entered the cohort-sequential longitudinal study. Given that unique yet dualistic contributions of EC and foundational cognitive abilities (FCA) to observed executive task performance were evident only at the 4;6 and 5;3 study age points, distal and proximal risk factors were examined in relation to EC-FCA at these later ages.

Results: Higher distal financial stress was associated with poorer FCA but unrelated to EC in both the 4;6 and 5;3 models. Similarly, higher proximal household stress was predictive of poorer FCA but unrelated to EC at both ages. Parent social stress was not associated with FCA or EC in either of the 4;6 and 5;3 models.

Conclusions: When both EC and foundational abilities that drive observed executive task performance are simultaneously modeled in a dualistic fashion, both distal and proximal indicators of socio-familial risk relate to foundational abilities and not EC. Socio-familial risk appears to only indirectly influence the EC process via its direct effects on the developing foundational abilities that are drawn upon and regulated by EC.
Correspondence: *Caron A. Clark, University of Oregon, Lewis Integrative Science Building, 1440 Franklin Blvd., Room 428, Eugene, OR 97403. E-mail: carrie4@uoregon.edu*

J.M. NELSON, T.D. SHEFFIELD & K.A. ESPY. Clarifying Pathways to ADHD Symptom Dimensions in Preschool Using Dualistic Models of Executive Control and Foundational Cognitive Abilities.

Objective: Poorer executive control (EC) is one of the core neuropsychological deficits implicated in the development of Attention-Deficit/Hyperactivity Disorder (ADHD). However, the link between EC and ADHD has less often been examined at preschool age and most often examined with single executive tasks or with respect to single domains of EC in isolation. Previous research has been limited in its accountability of differences in foundational cognitive abilities when using executive tasks to represent EC. We aimed to use the bifactor model incorporating influences of both latent EC and foundational cognitive abilities on executive task performance to clarify pathways to dimensions of ADHD symptoms in preschool.

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms.
https://doi.org/10.1017/S1355617714000381

Participants and Methods: Participants were 388 preschool children enrolled in a cohort-sequential longitudinal study of EC development. Parents provided standardized ratings of children's ADHD symptoms at age 5;3. Symptom ratings were best empirically represented by a bifactor model that included a general ADHD factor and three specific ADHD factors pertaining to inattention, hyperactivity, and impulsivity. Relations of EC and foundational cognitive abilities (FCA) to the latent ADHD factors were considered using the EC-FCA bifactor models at ages 4;6 and 5;3 when the relative influences of EC and FCA were distinguishable.
Results: In both the 4;6 and 5;3 models, poorer EC was uniquely related to higher levels of hyperactivity-specific symptoms, but was unrelated to the general ADHD factor and the specific inattention and impulsivity factors. FCA was only related to general ADHD in the 5;3 model.
Conclusions: Executive control, when statistically parsed from foundational cognitive abilities that confound executive task performance, is uniquely related to hyperactivity symptoms late in the preschool period. Implications for further consideration of the dynamic development of ADHD symptoms in preschool and for translational work will be discussed.
Correspondence: *Jennifer M. Nelson, University of Nebraska-Lincoln, Developmental Cognitive Neuroscience Laboratory, 501 Building Room 102, Lincoln, NE 68588-0206. E-mail: jnelson18@unl.edu*

A.R. SCHUTTE, C.A. CLARK, J.M. NELSON, T.D. SHEFFIELD & K.A. ESPY. A Neural Network Model of Executive Control in Preschoolers.
Objective: Performance on executive control (EC) tasks such as the Shape School task (Espy, 1997) improves over development; however, determining whether improvement is due to changes in EC or to changes in underlying cognitive abilities is an ongoing challenge. The objective of this study was to develop a computational model to capture the interaction between EC and foundational cognitive abilities.
Participants and Methods: We developed a dynamic neural field model of performance in the Shape School task. Dynamic neural fields are a class of neural network models that have been used to capture various areas of cognitive development including working memory development, habituation in infants and language learning (e.g., Samuelson, Schutte, & Horst, 2009; Schöner & Thelen, 2006; Schutte & Spencer, 2009). These models are dynamic systems. Thus, we were able to develop a model that allowed for the integration of foundational cognitive abilities, such as perception, and EC. Schutte, Spencer, and colleagues (e.g., Schutte, Spencer, & Schöner, 2003; Schutte & Spencer, 2009) proposed that changes over development could be captured within these types of networks through strengthening excitatory and inhibitory connections between neurons.
Results: By strengthening the excitatory and inhibitory connections in our model, we were able to fit empirical data from children 3;9, 4;6, and 5;3 years of age. These changes were throughout the model, suggesting that changes in performance over development could depend on changes in both EC and foundational cognitive abilities. The largest change in neural interaction occurred between the 3;9 and the 4;6 year parameter sets with only a slight increase needed to capture data from the 5-year-olds.
Conclusions: Overall changes in excitation and inhibition in the network were able to capture changes over development in the Shape School task.
Correspondence: *Anne R. Schutte, University of Nebraska-Lincoln, 320 Burnett Hall, Lincoln, NE 68588-0308. E-mail: aschutte2@unl.edu*

Paper Session 1: Language and Aphasia (Progressive and Non-progressive)

Moderator: Lynn Maher

10:00–11:30 a.m.

D. SZELES, H. BEHFORUZI, J. STAMPS, J. CHIN, D. NA & K. HEILMAN. Consistency Promotes Fluency.
Objective: When healthy English speakers perform the letter fluency test they produce more words for the letters "F" and "S" than "A". Unlike most consonants that represent only one phoneme, the letter "A" can represent several unique phonemes, and switching amongst them may yield a performance cost. Alternatively, in languages with more consistent orthographies like Korean, each letter represents a unique phoneme. Therefore, the grapheme-phoneme association for the letter "A" in English may be weaker than the grapheme-phoneme associations between each vowel letter and sound in Korean. To compare the phoneme switching, versus grapheme-phoneme strength hypotheses for reduced "A" fluency in English, we compared English and Korean speakers on vowel and consonant letter fluency.
Participants and Methods: Participants were fifteen English speaking and twenty-two Korean speaking healthy adults, equated for age and education. English speakers were assessed with the Controlled Oral Word Association (COWA) test. Korean speakers performed a modified COWA using two Korean consonants and a silent consonant that allowed switching between different vowels, each with unique letter representations. Individual letter totals and overall scores were calculated, along with consonant-vowel ratios comparing relative letter performance.
Results: English and Korean speakers did not differ in the total words produced for each letter (e.g., "F" was not easier than "Giut" in Korean), suggesting comparable letter cue selection. However, English speakers produced significantly fewer words for the vowel relative to two consonants and demonstrated significantly larger consonant-vowel ratios compared to Korean speakers. Conversely, Korean speakers produced comparable output and smaller ratios across all three letter cues.
Conclusions: Results provide support for the postulate that the strength of the grapheme-phoneme association, rather that the number of phonemes available influences verbal fluency.
Correspondence: *Dana Szeles, M.S., University of Florida, 1810 NW 23rd Blvd Unit 226, Gainesville, FL 32605. E-mail: dmszeles@phhp.ufl.edu*

S.M. ANTONUCCI. How do Persons with Aphasia Use Semantic Feature Information during Lexical Retrieval: Evidence from Verbal-Description and Naming-to-Definition of Living and Nonliving Concepts.
Objective: A core prediction of embodied approaches (EA) to semantic organization is that visual-perceptual (V-P) information is more salient to living concepts, whereas function/action (F/A) information is more salient to nonliving concepts. Most evidence comes from controls and neuropsychological populations other than persons with aphasia (PWA), even though many treatments for anomia in PWA are based on semantic feature cueing.
Participants and Methods: 15 persons with chronic, left-hemisphere stroke-aphasia (12 fluent, 3 nonfluent) verbally-described 9 living and 9 nonliving concepts and named 9 living and 9 nonliving concepts from V-P and F/A definitions. Significant RM ANOVAs are reported.
Results: Consistent with EA predictions, PWAs' descriptions of living concepts contained more V-P than F/A information and PWA provided more functional information for nonliving than living concepts. In contrast, accurate nonliving concept descriptions did not contain more F/A than V-P information and there was not more V-P information in living than in nonliving concept descriptions. Also, in contrast to prior work with controls, a large proportion of features in PWAs' descriptions were shared, rather than distinctive. Regarding naming from semantic cues,

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

PWA correctly named-from-definition fewer living than nonliving concepts and were less frequently correct when naming from V-P than F/A definitions, however, there was no domain x feature-type interaction.
Conclusions: Findings support the need for elaboration of EA beyond the core double dissociation. Findings also have implications for semantically-based therapy for anomia in PWA. PWA predominantly produced shared features, less useful in distinguishing among concepts, which may influence PWA's ability to adequately semantically circumlocute to resolve anomic communication breakdown. Semantically-based treatments for anomia may be targeted to increase specificity of circumlocutions. Funded by NIH/NIDCD R03DC010262.
Correspondence: *Sharon M. Antonucci, Ph.D., Communicative Sciences and Disorders, Worcester State University, 486 Chandler Street, Worcester, MA 01602. E-mail: santonucci@worcester.edu*

M.L. HENRY, M. BABIAK, P.M. BEESON, N. BLOCK, B.L. MILLER & M. GORNO-TEMPINI. Phonological Processing in Logopenic and Nonfluent Variants of Primary Progressive Aphasia.
Objective: Classification of primary progressive aphasia (PPA) by variant has become an increasingly important endeavor given the potential for speech-language profile to be an indicator of underlying pathology. Current criteria for diagnosis delineate speech and language features typical of each variant, however, recent reports suggest that the nonfluent and logopenic subtypes may be difficult to differentiate clinically. Phonological deficits have been proposed as a relatively unique feature of the logopenic variant, but performance on phonological processing tasks has not been directly compared across PPA subtypes. We sought to examine phonological processing in logopenic and nonfluent PPA and to determine whether performance on phonological measures may help to distinguish these patient groups.
Participants and Methods: We administered a battery of phonological tasks to 12 individuals with logopenic PPA, 12 with nonfluent PPA, and 15 matched healthy controls. Tasks included phoneme deletion, blending, and substitution measures, as well as reading and spelling of pseudowords.
Results: Logopenic and nonfluent participants were impaired overall relative to healthy controls. Logopenic patients were significantly impaired relative to nonfluent patients on a subset of phonological manipulation tasks, as well as spelling of pseudowords. Logistic regression revealed that the two most discriminating phonological tasks predicted logopenic versus nonfluent group membership with greater than 84 percent accuracy. Importantly, phonological tasks were not used in initial diagnosis by variant. When motor speech and fluency ratings were added to the model, prediction accuracy improved to 95 percent.
Conclusions: Results show that phonological processing is impaired in each of these patient groups, but to a greater degree in individuals with logopenic variant. Further, phonological measures, including sound manipulation and spelling tasks, may improve diagnostic accuracy for differentiation of these two clinical subtypes of PPA.
Correspondence: *Maya L. Henry, Neurology, UC San Francisco, 675 Nelson Rising Lane, San Francisco, CA 94158. E-mail: mayalh@gmail.com*

O. PIGUET, C. HOON, L.D. GLEESON, C. LEYTON & J.R. HODGES. Memory and Emotion Processing Performance Differentiates Between Nonfluent Primary Progressive Aphasia Syndromes.
Objective: Progressive nonfluent aphasia (PNFA) and logopenic progressive aphasia (LPA) are the two nonfluent variants of primary progressive aphasia (PPA). Despite their different neuropathological processes, PNFA and LPA share similar early language deficits, which make them difficult to differentiate. In this study, we compared cognition and emotion processing in PNFA and LPA, in order to identify non-language features that would assist with their differential diagnosis.
Participants and Methods: Thirty-eight patients with a diagnosis of nonfluent PPA (PNFA 20; LPA 18) and 23 age-, and education-matched healthy controls were recruited for this study. All participants underwent a comprehensive assessment of the main cognitive domains and emotion processing, as well as a high-resolution structural brain imaging.
Results: Analyses of variance showed that LPA patients performed worse than controls and PNFA on episodic memory tasks (Rey Figure, Doors) (all p values < .001). In contrast, only the PNFA group was significantly impaired on the Ekman 60 face recognition task for all negative emotions (Anger, Disgust, Fear, Sadness) compared to controls (all p values < .05). The two PPA groups did not differ on other cognitive tasks. Logistic regression indicated that 84% of PPA patients could be correctly classified using Rey Figure recall, composite negative emotion, and visuospatial scores.
Conclusions: PNFA and LPA exhibit a double dissociation on tasks of episodic memory and emotion processing. Given their shared language features at presentation, examining these abilities can help improve diagnostic accuracy of the two nonfluent PPA syndromes. These findings have important clinical implications: Unlike PNFA, LPA is overwhelmingly associated with Alzheimer pathology. LPA patients may therefore potentially benefit from the few therapeutic interventions currently available for Alzheimer's disease.
Correspondence: *Olivier Piguet, PhD, NeuRA, Barker St, Randwick, NSW 2031, Australia. E-mail: o.piguet@neura.edu.au*

N. MILANO & K.M. HEILMAN. Impairment of Propositional and Automatic Speech with Bilateral Mesial Frontal Atrophy: A New Primary Progressive Aphasia Variant?
Objective: Primary progressive aphasia (PPA) is a neurodegenerative condition characterized by progressive language impairment with other cognitive domains relatively spared. The three variants of PPA include the nonfluent/agrammatic, semantic, and logopenic types. Dynamic aphasia, most often caused by a stroke, is a subtype of transcortical motor aphasia. It is characterized by a reduction in spontaneous speech, which is otherwise normal, along with spared comprehension and repetition. We report a patient with a progressive dynamic aphasia in the setting of bilateral mesial frontal atrophy.
Participants and Methods: A 75 year old right handed man with a 2 year history of progressive difficulties with word finding, memory, and apathy was tested for language and memory deficits.
Results: On the Hopkins Verbal Learning Test his delayed recall was impaired but improved with recognition. Naming (Boston Naming Test: 52/60), repetition, comprehension, reading, and writing were all normal. His word generation on the Controlled Oral Word Association Test (total with letters F, A, S: 18) and a category fluency test (animals: 3) was impaired. He had a paucity of spontaneous speech and was unable to recite a story despite prompting. He also had impaired speech fluency with automatic speech, such as when he attempted to recite the Lord's Prayer. When he did speak, he had no evidence of agrammatism or apraxia of speech.
Conclusions: This patient's history and language deficits are consistent with a PPA, but they are in the pattern of a dynamic aphasia as opposed to the known PPA variants. Whereas the signs-symptoms of dynamic aphasia have been previously described, to our knowledge this is the first case associated with predominantly bilateral mesial frontal atrophy that impaired both propositional and automatic speech. Thus, this profile may represent a new variant of PPA.
Correspondence: *Nicholas Milano, MD, Department of Neurology, University of Florida, 1220 SW 11th Ave, Apt D107, Gainesville, FL 32601. E-mail: nicholas.milano@neurology.ufl.edu*

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

Invited Address: Hemodynamic Factors Underlying the Pathogenesis and Clinical Expression of Alzheimer's Disease

10:15–11:15 a.m.

A.L. JEFFERSON. Hemodynamic factors underlying the pathogenesis and clinical expression of Alzheimer's disease.
As the population ages, unhealthy cognitive decline and dementia are increasingly important public health issues. Vascular risk factors, such as hypertension, diabetes mellitus, and atherosclerosis, are associated with abnormal neuroanatomic changes, cognitive impairment, and clinical dementia in older adults. A poorly understood aspect of compromised vascular health and cognitive aging is the association between systemic hemodynamics (cardiac output or the amount of blood exiting the heart to perfuse the system) and brain aging. Clinical and epidemiological data from my laboratory suggests that, independent of shared vascular risk factors, modest reductions in cardiac output are associated with clinically detectable cognitive impairment, reduced gray matter volume, increased white matter hyperintensities, reduced normative cerebral blood flow (CBF) values, and incident dementia. These observations may be due to subclinical systemic blood flow altering CBF homeostasis. Such alterations are especially likely among older adults with age-related compromises in cerebral circulation control mechanisms, placing the brain at greater risk for cerebrovascular injury and Alzheimer's disease (AD) pathogenesis. While vascular pathology and AD pathology may develop independently, compromised cerebrovascular health propagates amyloid deposition, compromised β-amyloid clearance, and faster clinical manifestation and trajectory of AD. Thus, systemic hemodynamics may affect cerebral hemodynamics in older adults with compromised cerebral circulation control mechanisms by not only contributing to cerebrovascular injury but also proliferating the pathogenesis or exacerbation of amyloid deposition and subsequent neuronal injury. This presentation will review evidence to date from my laboratory linking hemodynamics and abnormal brain aging and highlight future strategies to delay abnormal cognitive aging.
Correspondence: *Angela L. Jefferson, PhD, Department of Neurology, Vanderbilt University Medical Center, 2525 West End Avenue, 12th Floor, Suite 1200, Nashville, TN 37203. E-mail: angela.jefferson@Vanderbilt.edu*

Poster Session 2 : Adult TBI II, Cognitive Rehabilitation, Cognitive Neuroscience

10:15–11:30 a.m.

TBI (Adult)

E. KEATLEY, C. SUPELANA, D. SCHEINER, B. WEISS, R. ANNUNZIATO & B. ROSENFELD. Neuropsychological Sequelae of TBI among Refugee Survivors of Torture.
Objective: Cognitive and affective changes are frequently observed following traumatic brain injury (TBI). Refugee survivors of torture are a high-risk group for TBI because of the abuses suffered in their home countries. With one study reporting 69% of refugee survivors incurring a blow to the head in the context of persecution it is essential that the emotional and neuropsychological consequences of these injuries be investigated.
Participants and Methods: Participants consisted of 26 survivors of torture from West and Central Africa with and without a self-reported history of mild or moderate/severe TBI (time since injury > 1 year). Trauma symptomatology was assessed with the Trauma Symptom Inventory-II (TSI-II) and self-report cognitive complaints were assessed with the Cognitive Failures Questionnaire (CFQ). Neuropsychological tests were administered to examine processing speed, executive functioning and verbal/visual memory.
Results: Results showed that survivors with moderate/severe TBI (n=9) had significantly higher overall psychological distress than survivors with mild TBI (n=5) and those without a history of TBI (n=12; $F(2, 21)=6.82$, $p=.005$) including on subscales of depression ($F(2,21)=9.70$, $p=.001$) and posttraumatic stress ($F(2,21)=5.62$, $p=.011$). Survivors with moderate/severe TBI endorsed significantly more cognitive failures on the CFQ than those with no TBI ($t=-2.31$, $p=.032$) however this finding was no longer significant after controlling for trauma symptomatology. Neuropsychological test data (using raw scores) revealed no significant differences between groups.
Conclusions: Refugee survivors of torture represent an underserved and understudied population with a high risk for TBI. Findings suggest that survivors of torture with moderate/severe TBI are at risk for increased psychological distress and report higher rates of cognitive problems. Moderate/severe TBI and associated psychological distress may contribute to self-reported cognitive problems not observed in neuropsychological test results.
Correspondence: *Eva Keatley, BS, Clinical Neuropsychology, University of Windsor, 401 Sunset Ave, Windsor, ON N9B 3P4, Canada. E-mail: keatley@uwindsor.ca*

B.L. FISCHER, M. PARSONS, S. DURGERIAN, C. REECE, L. MOURANY, M. NEWSOME, E. BEALL, K. KOENIG, M. LOWE, G. LOSINSKI, E. WILDE, R. SCHEIBEL, M. LENGEN, G. VOGT, M. TROYANSKAYA, H. LEVIN & S. RAO. Blast-Related TBI Produces Differential Working Memory Performance and Brain Activation Compared to Civilian TBI.
Objective: Blast- induced mild to moderate traumatic brain injury (MTBI) has become the signature injury of military personnel involved in Operations Enduring Freedom and Iraqi Freedom (OEF/OIF). This study used functional MRI (fMRI) during a working memory task to determine if blast-related MTBI results in differential effects on brain function in comparison to civilian MTBI caused primarily by mechanical forces.
Participants and Methods: Four subject groups participated: (1) military TBI (milTBI; n=25; age=29.8 yrs, ed=13.1 yrs) sustained one or more blast induced MTBI between 1 and 6 years prior to enrollment; (2) military controls (milCON; n=25, age=29.9, ed=13.6); (3) civilian TBI (civTBI, n=25, age=27.4, ed=14.3) sustained a non-blast MTBI 1-6 years prior to enrollment; and (4) civilian controls (civCON; n=25, age=27.3, ed=14.2). Subjects completed the Sternberg Working Memory task while undergoing fMRI; 2 [mil, civ] X 2 [tbi, con] ANOVAs were used to evaluate fMRI data and task performance corrected for multiple comparisons.
Results: TBI participants performed less accurately on the Sternberg task than did controls, $p = .023$. At the most difficult task level, milTBI subjects exhibited significantly poorer accuracy than all other groups, $p = .047$. Seven brain regions demonstrated interactions between working memory load and the presence/absence of TBI. Furthermore, two regions in the right caudate nucleus demonstrated a 3 way interaction: the milTBI group displayed no change in activation in response to working memory load, while the three remaining groups exhibited a monotonic activation increase in activation.
Conclusions: MTBI is associated with poorer performance and abnormal brain activation in response to a working memory task. Relative to mechanical head trauma, blast injury demonstrates a unique activation pattern on this task in the right caudate nucleus, suggesting a differential effect of blast-related trauma.
Correspondence: *Barbara L. Fischer, Psy.D., GRECC, Wm. S. Middleton Memorial VA Hospital, 2500 Overlook Terrace, GRECC, Madison, WI 53711. E-mail: barbaralfischer@gmail.com*

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

C.Y. ALMENDAREZ, M. REID, F. LEAL, R. AMADOR, D. COOPER, J. KENNEDY & D. TATE. Fluency and Executive Dysfunction Among Service Members with Blast-Related Mild Traumatic Brain Injury.

Objective: The purpose of this study was to determine the effects of blast-related mild traumatic brain injury (mTBI) on cognitive function, as assessed by a broad battery of neuropsychological tests and symptom measures administered an average of 3 months post injury.

Participants and Methods: Twelve U.S. SM with mTBI acquired through blast injury were compared to 11 active duty formerly deployed demographically matched control SM without TBI. Each participant underwent a neuropsychological examination including measures of attention, executive function, memory, language, fluency, and mood/PTSD assessment. Examination of demographic features revealed no significant differences between the groups for age, education, intelligence, or PTSD/depression symptom reporting.

Results: An independent sample t-test revealed significant reductions in scores for mTBI participants on measures from the Delis Kaplan Executive Function System letter total scaled scores (p=0.016), the DKEFS category total scaled score (p=0.027), the California Verbal Learning Test II (CVLT) List B (p=0.026), the CVLT-II Short Delayed Free Recall (p=0.031), and the Wisconsin Sorting Card Test perseverative errors T scores (p=0.002). No other significant differences were noted.

Conclusions: This study is the first to demonstrate significant differences for measures of fluency, memory, and perseverative errors in a cohort of blast-related mTBI. Unique features of this cohort including time since injury (approximately 3 months) and documented evidence on loss of consciousness (LOC) may influence these findings. However, it is clear that additional studies are required to clarify these findings. Efforts are ongoing to correlate these findings with structural neuroimaging results, including volumetric and DTI changes, in this cohort.

Correspondence: *Cristina Y. Almendarez, MS, Defense and Veterans Brain Injury Center, 3851 Roger Brooke Dr, San Antonio, TX 78234. E-mail: cristina.y.almendarez.ctr@mail.mil*

D.F. TATE, G. YORK, M. REID, D.B. COOPER, J.E. KENNEDY, C. ALMENDAREZ, R. AMADOR, F. LEAL & J. LEWIS. Preliminary Findings of Reduced Fractional Anisotropy in Service Members with Blast-Related Mild Traumatic Brain Injury.

Objective: The purpose of this study was to determine the effects of blast mTBI on diffusion tensor imaging (DTI) and to examine the relationship between DTI changes and cognitive performance in a small well-characterized cohort of blast injured US Service Members (SM).

Participants and Methods: Twelve SMs rendered unconscious (<30 min) by a blast exposure in theatre (mild TBI) were compared to 11 age-matched deployed non-injured SM controls. Each participant underwent MRI examination and a broad battery of neuropsychological testing.

Results: Examination of demographic features revealed no differences between the groups for age, education, intelligence, or reporting of PTSD/depression symptoms. Using tract base spatial statistics (TBSS) analyses, three significant clusters (p<0.05; number of voxels=204, 198, and 25) demonstrated reduced FA for the mTBI group. Clusters were located in the right posterior limb of the internal capsule and the right cerebral peduncles. Post-hoc analysis where each mTBI subject's FA map was compared to the control group separately revealed no significant influence of any one subject. In addition, no significant association between FA and time since injury (p>0.05) or FA and any neuropsychological measures (p>0.05) was noted.

Conclusions: These preliminary findings in a small cohort of blast-injured mTBI SMs demonstrated significantly reduced FA primarily in the right corticospinal tract. This region is known to be susceptible to the injury in TBI where long cursing fiber pathways are exposed to shearing forces and focused blast waves. It is clear that additional analyses are required in larger samples, but the use of advanced MRI methods may be useful in establishing more objective biomarkers of mTBI that could lead to improved diagnosis and prediction of recovery.

Correspondence: *David F. Tate, Ph.D., DVBIC/HJF, SAMMC, San Antonio, TX 78234. E-mail: dftatephd@mac.com*

C.C. HAYS, H.J. ORFF, A.J. JAK & E.W. TWAMLEY. Cognitive Complaints in Veterans with TBI and their Relationship to Objective Measures of Cognition.

Objective: Cognitive impairment is a common chronic complaint of those who have experienced a mild or moderate traumatic brain injury (TBI). In order to provide targeted rehabilitative treatments, it is important to know which cognitive complaints are most common and which are correlated with objective cognitive performance.

Participants and Methods: The neuropsychological reports of 296 OEF/OIF Veterans who had been referred for clinical assessment for possible TBI-related cognitive complaints and had valid neuropsychological testing were reviewed. All patients were administered the Neurobehavioral Symptom Inventory (NSI), a self-report measure of somatic, affective, and cognitive post-concussive symptoms, and a comprehensive neuropsychological battery.

Results: Of the 22 NSI symptoms, seven were endorsed, on average, at "moderate" to "very severe" levels in our sample: poor concentration, forgetfulness, slowed thinking, headaches, sleep problems, anxiety, irritability, and frustration. Examining the objective correlates of subjective cognitive symptoms, we found that forgetfulness was correlated with lower performances in visual memory (Rey-O Delay r=-.23, p=<.001) and verbal memory (CVLT-II Long Delay Free Recall r=-.19, p=.001). Concentration complaints were associated with poorer visual memory performance (Rey-O Delay r=-.13, p=.031). Slowed thinking complaints were not associated with processing speed performance.

Conclusions: Difficulty with concentration, forgetfulness, and slowed thinking were the most-endorsed cognitive complaints in our sample of Veterans with histories of TBI. Those who endorsed more forgetfulness and concentration problems tended to perform worse on memory tasks, suggesting that targeted rehabilitation to improve memory functioning is a reasonable approach. However, the relationships between self-reported cognitive problems and objective cognitive performance were modest, consistent with previous research suggesting that cognitive complaints do not always reflect actual cognitive performance.

Correspondence: *Elizabeth W. Twamley, PhD, Psychiatry, UCSD, 140 Arbor Drive (0851), San Diego, CA 92103. E-mail: etwamley@ucsd.edu*

E.W. TWAMLEY, C.C. HAYS, H.J. ORFF, C.A. DEPP & A.J. JAK. Neurocognition and Homelessness among OEF/OIF Veterans with Traumatic Brain Injury.

Objective: Ending homelessness in Veterans is a national priority. Cognitive impairment may be a risk factor for homelessness, along with psychiatric and substance use disorders. We examined the relationship between neurocognition and homelessness in OEF/OIF Veterans with a history of traumatic brain injury (TBI).

Participants and Methods: We reviewed the medical records and neuropsychological reports of 479 OEF/OIF Veterans referred for neuropsychological assessment for possible TBI-related cognitive complaints, 20 of whom were homeless. Those with invalid test results (3 homeless, 49 not homeless) were removed from the dataset; rates of invalid effort did not differ between the two groups.

Results: Homelessness was not associated with demographic factors (age/gender/race/ ethnicity/education), TBI history (length of loss of consciousness/post-traumatic amnesia), or neuropsychological diagnosis (normal/Cognitive Disorder NOS/other). Despite having nonsignificantly higher premorbid intellectual functioning, homeless Veterans performed worse than non-homeless Veterans on neuropsychological tests of verbal list learning and executive functioning (CVLT-II Trials 1-5, p=.034; D-KEFS Color-Word Inhibition/Switching, p=.023), and, on average, had impaired performance on these tests. Compared with non-homeless Veterans, homeless Veterans were less likely to be working (18% vs. 43%, p=.037), more likely to have a substance use disorder

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

(56% vs. 16%, p<.001), and reported higher levels of post-concussive, depressive, and PTSD symptoms (ps<.01).
Conclusions: Among OEF/OIF Veterans with TBI referred for neuropsychological testing, homelessness appears to be associated with worse performance on measures of learning and executive functioning, more severe post-concussive and psychiatric symptoms, and higher rates of substance abuse and functional disability. Larger prospective samples of homeless veterans are needed to determine the pathways between cognitive impairment, psychiatric symptoms, substance abuse, and functional disability.
Correspondence: *Elizabeth W. Twamley, PhD, Psychiatry, UCSD, 140 Arbor Drive (0851), San Diego, CA 92103. E-mail: etwamley@ucsd.edu*

H.L. COMBS, D. BERRY, T.L. PAPE, J. BABCOCK-PARZIALE, B.M. SMITH, R.E. SCHLEENBAKER & W.M. HIGH, JR.. Effect of severity of concussion (mTBI) and PTSD on cognitive functioning in veterans with deployment-related mTBI.
Objective: Incidence rates of mild traumatic brain injury (mTBI) in veterans of the OEF/OIF conflicts range between 12-16%. Incidence rates for PTSD are similar (13-17%). Many veterans are affected by both mTBI and PTSD. Subjective complaints of difficulty with attention and memory are prevalent among veterans with mTBI and/or PTSD. Distinguishing the effects of mTBI versus PTSD on cognition has been difficult to detangle but may have important implications for both treatment and prognosis. The effect of severity of mTBI has not been studied systematically in relation to PTSD diagnosis in this population. If mTBI is causing an effect on attention, memory, and information processing speed, more severe mTBI resulting in loss of consciousness (LOC) should have a greater effect than less severe mTBI resulting in only alteration of consciousness (AOC) with no LOC.
Participants and Methods: We examined 251 veterans about 3.5 years following mTBI who were screened for poor effort. 53 veterans experienced mTBI as evidence by LOC or AOC, 32 veterans currently met CAPS criteria for PTSD only, 50 had a history of mTBI and met criteria for PTSD, and 116 had no history of mTBI or PTSD. Groups were matched for age, education, and estimated pre-injury IQ. Neuropsychological variables were analyzed utilizing a 3 (LOC, AOC, no mTBI) X 2 (PTSD, no PTSD) ANOVA.
Results: Main effects were observed for mTBI on Visual Scanning ($F(2,245)=6.02$, $p<.01$), Switching ($F(2,245)=4.52$, $p<.05$), and Digit Symbol ($F(2,245)=6.98$, $p<.01$). Main effects for PTSD were observed on Category Fluency ($F(1,245)=8.81$, $p<.01$), and Delayed Recall ($F(1,245)=15.14$, $p<.01$). Interactive effects between mTBI and PTSD were observed on CPT Omissions ($F(2,245)=4.76$, $p<.01$) and Delayed Recall ($F(2,245)=2.72$, $p<.07$).
Conclusions: Dose-response effects of mTBI were observed on nearly all neuropsychological variables. Veterans with LOC perform most poorly and those with AOC only performed at a level intermediate to veterans with LOC and veterans with no mTBI.
Correspondence: *Hannah L. Combs, M.S., Psychology, University of Kentucky, 3900 Crosby Dr. Apt. 2507, Lexington, KY 40515. E-mail: hannahlanecombs@gmail.com*

J. WEBSTER. Prediction of Progress in a Polytrauma Program using a measure of Symptom Validity.
Objective: The Long Beach Symbol Memory Test is a symptom validity measure developed at the Veteran Affairs Medical Center in Long Beach. This relatively simple measure contains two parts: Part 1 which detects questionable effort and Part 2 which examines if the poor effort might be due to cognitive confusion rather than motivational issues per se. The present research examined if the LBSMT might be predictive of progress in a Polytrauma program.
Participants and Methods: From 223 referrals from the Polytrauma program, ten subjects who performed as though exaggerating and ten subjects who scored normally on the LBSMT were randomly selected. Next, charts were reviewed to retrieve the following data: Days as an active patient in the Polytrauma program; OT visits; Speech Pathology Visits; Physiatrist Visits; and visits to Mental Health during that interval. We made the assumption that greater time in the program and greater numbers of scheduled visits would indicate slower progress in recovery. This was based, in part, on our own experiences being asked to assist rehabilitation staff in planning how to manage patients who were seen frequently but making little progress. Almost invariably, these were cases who had failed our symptom validity measures.
Results: The data from OT visits, Speech Pathology Visits, Physiatrist visits and Mental Health visits were subjected to Analyses of Variance which revealed significantly more appointments (p<.01) for our LBSMT positive than negative groups (OT visits 28.1 vs. 4.7; Speech Pathology visits 27.3 vs. 6.7; Physiatrist visits 10.4 vs.5.2 and Mental Health visits 46.9 vs.11 visits). Also days in which the Veteran was an active patient in the program significantly discriminated groups (Positive LBSMT=961 days; Negative LBSMT= 477.1 days).
Conclusions: These results suggest that poor scores on symptom validity testing appear to predict slow going in a Polytrauma program, even in Veterans with at worst, mild traumatic brain injury.
Correspondence: *Jeffrey Webster, Ph.D., Mental Health, VAMC, Long Beach, CA, Mental Health 116b, 5901 E. 7th Street, Long Beach, CA 90801. E-mail: webjef@hotmail.com*

J.M. STINSON, N.J. PASTOREK, B. MILLER, J. LINCK, A. SIM & J. ROMESSER. The Relation of Postconcussive Symptom Report and Cognitive Testing in an mTBI Population: The Effect of Performance Validity Test Results.
Objective: Self-report of postconcussive symptoms remains the primary method for evaluating possible mTBI-related problems in most clinical settings. However, assessing possible postconcussive symptoms via self-report is especially challenging in combat veterans, given the high prevalence of comorbid psychiatric conditions in this population. Prior research suggests that the relation between self-reported symptoms and objective cognitive deficits is equivocal. The current study sought to understand factors that may impact this relation. It was hypothesized that subjective reports and cognitive performance would be significantly correlated in patients who fail performance validity measures.
Participants and Methods: Participants included 176 OEF/OIF/OND veterans who were referred for neuropsychological testing. Self-reported problems with processing speed, attention, memory and decision making were correlated with corresponding performance on the WAIS-IV Processing Speed Index, Paced Auditory Serial Attention Test, CVLT-II (Trials 1-5), and WCST (Perseverative Responses).
Results: Prior to consideration of performance on validity tests, results indicated that postconcussive symptom report was not significantly correlated with cognitive testing results. When data from those patients who passed and failed validity tests were analyzed separately, however, the postconcussive symptom report was significantly correlated with cognitive test performance in the suboptimal effort group. Specifically, correlations between postconcussive symptom report and cognitive test performance in the domains of memory, processing speed, and decision-making were statistically significant.
Conclusions: This study provides further support for the assertion that self-reported cognitive complaints are not reliably correlated with objective cognitive testing. Importantly, the current study also suggests that when such a correlation is present, response bias may be responsible for the relation.
Correspondence: *Jennifer M. Stinson, MA, Mental Health Careline, Michael E DeBakey VA Medical Center, 2002 Holcombe Blvd, Houston, TX 77030. E-mail: Jennifer.Stinson@va.gov*

J.L. WOODARD, P.E. MAY, M.A. SUGARMAN, A.L. NORMAN & A.T. CACACE. A Neuropsychological Profile of Blast-Induced Tinnitus.
Objective: Blast-induced tinnitus and its relationship with other tinnitus etiologies are complex and not clearly understood. In this study, we

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

investigated relationships between performance indexes on measures from a computerized neuropsychological battery and audiometric indexes of severity and impairment associated with blast-induced tinnitus.
Participants and Methods: Participants were 16 adults (1 female) between 26 and 73 years of age (mean age=51.5 years). Using the Automated Neuropsychological Assessment Metrics (ANAM) Traumatic Brain Injury battery, we examined accuracy, as well as Median Reaction Time (MRT) and Standard Deviation of RT to Correct Responses (SDRTC). Tinnitus measures included audiometric sensitivity, tinnitus loudness (dB), and scores from the Tinnitus Handicap Questionnaire (THQ).
Results: Left ear audiometric sensitivity was significantly ($p<.04$) related to Matching to Sample accuracy (r=-.53, working memory). Tinnitus loudness in decibels was significantly ($p<.05$) associated with Math Processing accuracy (r = -.51, complex processing speed). MRT on Code Substitution (processing speed) was significantly ($p< .02$) related to audiometric sensitivity (r's = .62 and .58 for left and right ears, respectively) and for MRT on Procedural Reaction Time (r's=.53 and .57 for left and right ears, respectively). SDRTC during Code Substitution was significantly ($p<.05$) associated with audiometric sensitivity (r's=.56 and .50 for left and right ears, respectively. SDRTC during Simple Reaction Time was significantly ($p < .03$) related to tinnitus loudness (r=-.70), and impairment on the THQ (r=.61; Total Score, r=.54). The mean THQ total score for the sample was 49.1±18.8.
Conclusions: Measures of working memory, reaction time, and processing speed were associated with tinnitus severity. Slowed MRT, intraindividual reaction time variability, and lower accuracy on these measures in blast-induced tinnitus patients may be associated with difficulty inhibiting attention to distracting tinnitus signals.
Correspondence: *John L. Woodard, Ph.D., Psychology, Wayne State University, 5057 Woodward Ave., 7th Floor, Detroit, MI 48202. E-mail: john.woodard@wayne.edu*

K.M. BURNS, R.D. VANDERPLOEG, H.G. BELANGER, S.J. TOWNS & S.G. SCOTT. Mild TBI and Chronic Pain Associations with Post-Deployment Mental Health Outcomes.
Objective: To examine the odds of post-deployment psychopathology associated with deployment-related mild TBI (mTBI) and deployment onset chronic pain (*deployment onset pain*), controlling for demographics, other pre-deployment and deployment-related traumas/injuries, and post-deployment social support.
Participants and Methods: 1472 members of the Florida National Guard completed online surveys an average of 31.8 months (SD=24.4, range=0-95) after OEF/OIF deployment. Multivariate hierarchical logistic regression was used to determine the odds ratios for the unique contribution of various factors controlling for all other variables.
Results: Post-deployment Major Depression was significantly associated with both deployment-related mTBI (OR: 3.72[1.46–9.43]) and deployment onset headaches (OR: 3.74[1.56–8.99]). Deployment onset back pain did not add significantly to post-deployment depression over these two variables. Good post-deployment social support ameliorated these effects (OR: 0.13[0.04–0.45]) on post-deployment Major Depression.
Post-deployment PTSD was significantly associated with both high levels of combat exposure (OR: 3.33[1.46–9.43]) and deployment onset headaches (OR: 4.31[2.24–8.27]). Deployment onset back pain did not add significantly to post-deployment PTSD over these two variables. Both moderate (OR: 0.30[0.14–0.65]) and high levels of post-deployment social support (OR: 0.08[0.04–0.19]) reduced the odds of post-deployment PTSD.
Conclusions: Both mTBI and deployment onset pain increase the odds of post-deployment Depression, while deployment onset headaches and combat exposure increase the odds of post-deployment PTSD. Good post-deployment social support was protective against post-deployment mental health problems.
In addition to interdisciplinary treatment approaches, an emphasis on timely and targeted pain interventions may protect against chronic pain and subsequent psychopathology. Social support should be cultivated in order to reduce risk.
Correspondence: *Katherine M. Burns, M.Phil., Psychology Service 116B, James A Haley Veterans Hospital, 13000 Bruce B Downs Blvd, Tampa, FL 33612. E-mail: kmburns@gwu.edu*

K.M. BURNS, R.D. VANDERPLOEG, H.G. BELANGER, S.J. TOWNS & S.G. SCOTT. Military Deployment and the Development of Chronic Pain: Mild Traumatic Brain Injury, Blast, Psychological Trauma, and Combat Associations in the Florida National Guard.
Objective: To examine the associations between demographics, pre-deployment mild TBI and psychological trauma, and deployment-related traumas/injuries (i.e., psychologically traumatic events, combat, physical injuries, blast exposure, and mild TBI) with new deployment-onset pain that persisted thereafter (*deployment onset pain*).
Participants and Methods: 1472 members of the Florida National Guard completed online surveys an average of 31.8 months (SD=24.4, range=0-95) after OEF/OIF deployment. Multivariate hierarchical logistic regression analyses were used to determine the odds ratios for the unique contribution of factors associated with deployment onset pain, controlling for all other variables.
Results: Deployment onset headaches were significantly associated with pre-deployment mild TBI (Odds ratio=1.77[1.04–3.03]), deployment-related psychological trauma (OR: 1.78[1.05–3.02]), and deployment-related mild TBI (OR: 3.11[1.78–5.43]).
Deployment onset back pain was significantly associated with deployment-related physical injury (OR: 1.68[1.11–2.53]) and psychological trauma (OR: 1.67[1.14–2.44]), as well as primary blast exposure (OR: 1.98[1.31–2.99]) and deployment mild TBI (1.87[1.16–3.00]).
Conclusions: These findings provide support for the complex etiology of chronic pain and indicate that physical injuries (e.g., mild TBI and other physical injuries), occurring prior to and during deployment, and deployment-related emotional trauma (e.g., psychological trauma and combat), independently play significant roles in the development of new onset chronic pain. Findings indicating that psychological trauma exposure independently contributes to the development of pain conditions are consistent with pain models purporting that life events can impact the individual's ability to cope with pain, as well as biopsychosocial approaches to pain management. Results also suggest that timely and targeted interventions for traumatic body and brain injuries may reduce risk for the development of persisting pain conditions.
Correspondence: *Katherine M. Burns, M.Phil., Psychology Service 116B, James A Haley Veterans Hospital, 13000 Bruce B Downs Blvd, Tampa, FL 33612. E-mail: kmburns@gwu.edu*

K. PAGULAYAN, B. PARMENTER, N. SWENSON, M. WERHANE & E. PESKIND. Prospective Memory in OIF/OEF Veterans with Repeated Blast-Related mTBI.
Objective: Prospective memory (PM) refers to the ability to remember something in the future, such as to complete a task. There is a dearth of empirical research looking at PM in returning OIF/OEF Veterans with a history of repeated blast-related mTBI despite this being a common complaint in this population.
Participants and Methods: OIF/OEF Veterans with (N=14) and without (N=7) a history of repeated blast-related mTBI completed the Memory for Intentions Test (MIST), Patient Health Questionnaire-9 (PHQ-9) and the PTSD Checklist-Military Version (PCL-M). T-tests and ANCOVA were used to evaluate group differences.
Results: Mean number of blast-related mTBIs in the mTBI group was 24.5 + 29.6 (mean number of loss of consciousness was <1 per person). The two groups did not differ in terms of age, education, or PHQ-9 scores ($p>.05$), but individuals in the mTBI group endorsed significantly more PTSD symptoms on the PCL-M. Participants in the mTBI group had MIST Prospective Memory Total Scores that were significantly lower than the control group. Subscale analysis revealed that the mTBI group performed significantly worse on tasks with a 15 minute time delay and

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

on tasks that required a response based on time elapsed (as opposed to an event cue). These group differences remained after PTSD symptoms were controlled for. There were no group differences on the other MIST subscales.

Conclusions: Veterans with a history of repeated blast-related mTBI demonstrated difficulty on prospective memory tasks when there was a long delay interval and their response was un-cued. This pattern held after controlling for symptoms of PTSD. Reduced prospective memory is often reported by Veterans, but is rarely assessed as part of standard neuropsychological assessments. These results suggest that more attention should be paid to this aspect of cognitive functioning. This material is based upon work supported by the US Department of Veterans Affairs, Office of Research and Development Clinical and Rehabilitation R&D Programs.

Correspondence: *Kati Pagulayan, PhD, VA Puget Sound, 1660 S Columbian Way, S-116-MIRECC, Seattle, WA 98115. E-mail: farkat@u.washington.edu*

K.L. HANSON, D.M. SCHIEHSER, E. TWAMLEY, A.J. JAK, A.L. CLARK, J.B. LOHR, D.C. DELIS & L. DELANO-WOOD. Problem Alcohol Use is Associated with Increased Psychiatric Symptomatology and Reduced Processing Speed in Veterans with Mild Traumatic Brain Injury.

Objective: Given that little is known about the role of problem alcohol use in the cognitive and psychiatric outcomes among veterans with mild traumatic brain injury (mTBI), we aimed to: (1) characterize how veterans with mTBI differ from military combat controls on a measure of problem drinking; (2) determine the risk factors for problem alcohol use; and (3) characterize whether it is associated with increased psychiatric symptoms and reduced cognition among veterans with mTBI.

Participants and Methods: Seventy-seven veterans (n=48 with mTBI history; n=29 veteran combat normal controls [NCs]; mean age = 31.9; 14% women) were assessed for problem alcohol use (Alcohol Use Disorders Identification Test: AUDIT), psychiatric symptoms, and neuropsychological (NP) functioning. Participants reporting current (past 30 days) alcohol or substance dependence (DSM-IV criteria) or with a positive toxicology screen were excluded. Only participants who demonstrated optimal effort (64/77) upon NP testing were included in the cognitive analyses.

Results: Compared to NCs, the mTBI group was more likely to score above the AUDIT cut-off score of 8 (26% of mTBIs & <1% of NCs; $\chi 2 = 4.14$, p=.04). Within the mTBI group, higher AUDIT scores correlated with younger age at testing (r= -.45, p=.001) and lower education (r= -.30, p=.007), as well as injury characteristics, including younger age at last TBI (rho= -.38, p=.01) and increased blast-related quaternary effects (rho=.45, p=.02). Compared to mTBI veterans with low AUDIT scores, mTBI veterans scoring above the AUDIT cutoff reported elevated depression (p=.005), anxiety (p=.02), and neurobehavioral symptoms (p=.03). Finally, higher AUDIT scores were associated with slower visuomotor processing speed (p=.02) but were not related to NP functioning in other domains assessed.

Conclusions: These results suggest that mTBI veterans may be at increased risk for problem drinking and emphasize the importance of assessing for and treating problematic alcohol use among veterans with a history of neurotrauma.

Correspondence: *Karen L. Hanson, Ph.D., VA San Diego Healthcare System, 3350 La Jolla Village Drive, 151B, San Diego, CA 92161. E-mail: klhanson@ucsd.edu*

M.E. O'NEIL, S. TUN, G. MONCREIF & D. STORZBACH. Cognitive Impairment in Blast Exposed Veterans with a History of mTBI: A Comparison of Cutoffs for Impaired Scores.

Objective: Compare Veterans with and without mTBI and blast exposure using cutoff scores indicative of cognitive impairment (more than 1, 1.5, and 2 SDs below the mean); to examine group mean differences while adjusting for key variables including age, education, sex, and PTSD

Participants and Methods: Participants were 92 previously deployed OEF/OIF Veterans enrolled at the Portland VA who were grouped according to blast exposure and history of mild TBI (mTBI). We compared mean scores (raw and standardized as well as adjusted and unadjusted for age, sex, education, and PTSD) in groups of previously deployed Veterans with and without histories of mTBI and blast exposure. Participants with poor effort scores were excluded. We also examined proportions of those in each group with impaired scores.

Results: The vast majority of cognitive test mean score comparisons between groups were not statistically significant, particularly when PTSD was adjusted for. Overall, small numbers of Veterans with and without blast exposure or mTBI obtained scores indicative of cognitive impairment. Between 6-39% of Veterans with blast exposure and 5-21% of those without obtained scores more than one SD below the mean on various cognitive tests. Only 0-8% and 1-16% obtained scores more than two SDs below the mean on cognitive tests. Similar to group comparisons of mean scores, proportions of individuals with impaired scores were generally not significantly different based on blast exposure or mTBI, though some memory test impairment was more common in those with blast exposure and mTBI.

Conclusions: Mean scores and other aggregate presentations of result may result in washing out the experiences of a small population of those with a history of blast exposure or mTBI who continue to experience cognitive impairment months after injury. However, because non-injured adults also commonly obtain a certain amount of impaired scores during a standard neuropsychological assessment test battery, such results must be interpreted in this context.

Correspondence: *Maya E. ONeil, PhD, Portland VAMC/OHSU, 3710 SW US Veterans Hospital Rd, Portland, OR 97239. E-mail: maya.oneil@va.gov*

M. TROYANSKAYA, N.J. PASTOREK, R.S. SCHEIBEL, N.J. PETERSEN, H.K. HENSON & H.S. LEVIN. Combat Exposure, PTSD Symptoms, and Cognition Following Blast-Related Mild Traumatic Brain Injury in OEF/OIF Service Members and Veterans.

Objective: To investigate if history of blast-related mild traumatic brain injury (mTBI), intensity of combat exposure, and presence of posttraumatic stress disorder (PTSD) symptoms affect cognitive performance.

Participants and Methods: Participants included 54 Operation Iraqi Freedom /Enduring Freedom service members and veterans who had been exposed to blast and reported symptoms consistent with mTBI and 43 combat-deployed control participants who had no history of blast exposure or mTBI. Participants were selected from a larger research sample based on demonstration of adequate effort on the Word Memory Test. Combat exposure and PTSD symptoms were measured with the Combat Exposure Scale (CES) and PTSD Checklist-Civilian Version (PCL-C). Raw scores from the Controlled Oral Word Association Test, Trail Making Test, Color-Word Interference Test, and Verbal Selective Reminding Test were used to measure processing speed, executive functioning, and verbal memory. Demographics and injury characteristics, overall intellectual functioning as measured by the Test of Nonverbal Intelligence – 4, and total scores from the PCL-C and CES were used as the predictors for each cognitive measure in multivariable linear regressions.

Results: Participants with and without a history of blast-related mTBI did not differ significantly in age, education, post-deployment interval, or current level of intellectual functioning. History of blast-related mTBI was significantly associated with higher PCL-C and CES scores. Multivariable linear regression, however, showed no significant differences in cognitive performance between groups.

Conclusions: History of mTBI, intense combat exposure, and more severe PTSD symptoms were not associated with performance on measures of processing speed, executive functioning, and memory. The absence of effect of mTBI and PTSD on cognitive functioning noted in the current

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

study may be partially explained by the inclusion only of those participants who passed performance validity testing

Correspondence: *Maya Troyanskaya, MD, PMR, Baylor College of Medicine, 6550 Fannin # NB 410, Houston, TX 77025. E-mail: mayat@bcm.edu*

R.T. KIM, L. DELANO-WOOD, D.C. DELIS, J.B. LOHR, A. MATEVOSYAN, K.L. HANSON, A.J. JAK, A.L. CLARK & D.M. SCHIEHSER. The relationship between coping style, executive function, and mood in veterans with mild to moderate traumatic brain injury.

Objective: Preliminary evidence suggests that individuals with traumatic brain injury (TBI) may utilize maladaptive coping styles, such as avoidance or emotional (e.g., self-blame) coping, more than functional task-oriented/problem-solving coping styles, which in turn, can lead to poor psychological and functional outcome. Since executive dysfunction is frequently observed in veterans with history of TBI and may underlie reliance on less problem-focused coping styles, we sought to investigate the relationship between coping style, executive function, and mood in this population.

Participants and Methods: Participants were Veterans (n = 20) with a history of mild to moderate TBI (6.9 mean years since injury) and Veteran controls (n = 18) without a history of TBI. All participants were administered measures of coping (Coping Inventory for Stressful Situations), executive function (Color-Word Interference Test; CWIT), effort (Test of Memory Malingering), depression, anxiety, and Post-Traumatic Stress Disorder (PTSD) symptoms.

Results: Controlling for age, effort, depression, anxiety, and PTSD, TBI Veterans reported significantly greater usage of Avoidance coping compared to controls ($p = .03$); groups did not differ in their use of Task-Oriented or Emotional coping (all p's > .62). In the TBI group, Avoidance coping was significantly associated with worse CWIT Inhibition/Switching ($p = .02$), but was not related to depression, anxiety, or PTSD (all p's > .56).

Conclusions: Reduced executive function is strongly associated with greater usage of a maladaptive avoidance coping style in Veterans with history of mild to moderate TBI; use of avoidance coping cannot be explained by mood, PTSD symptoms or effort. These findings suggest that proper assessment and targeted cognitive interventions that focus on executive dysfunction may improve coping and long-term outcomes in this population.

Correspondence: *Russell T. Kim, B.S. - Psychology, Research, VA San Diego Healthcare System, Veterans Medical Research Foundation, 3350 La Jolla Village Dr., San Diego, CA 92161. E-mail: russelltkim@gmail.com*

S.M. LIPPA, J.R. FONDA, C.B. FORTIER, W.P. MILBERG & R.E. MCGLINCHEY. Polymorbidity: Looking Beyond PTSD and TBI in Returning Service Members and Veterans.

Objective: The present study examined how mild traumatic brain injury (mTBI) and psychiatric comorbidities relate to overall functioning.

Participants and Methods: The presence of mTBI and psychiatric and behavioral comorbidities was assessed in 255 Iraq and Afghanistan service members and Veterans. Hierarchical linear regressions were performed to analyze the relationship between mTBI (as assessed by the Boston Assessment of TBI-Lifetime) and comorbidities (as assessed by the Clinician-Administered PTSD Scale, Structured Clinical Interview for DSM Disorders, Pittsburgh Sleep Quality Index, and McGill Pain Scale-Short Form) and general and specific community level functional status (as measured by the World Health Organization Disability Assessment Schedule II). Age, sex, education, and combat exposure were included as covariates.

Results: The highly prevalent, co-occurring current conditions included sleep (71%), pain (63%), posttraumatic stress disorder (PTSD; 57%), mTBI (39%), depression (29%), anxiety (20%), and substance use (15%). Half of the sample presented with 3 or more comorbidities. The final regression model, which included covariates, mTBI, and psychological and behavioral comorbidities, was the best fitting model for predicting overall functional status (Adjusted $R2 = .565$, $p < .0001$), with mood disorder ($p < 0.0001$), PTSD ($p < 0.0001$), pain ($p < 0.0001$), sleep ($p = 0.0005$), and anxiety disorder ($p < 0.0412$) all significantly related to worse overall functional status. Of note, when the variance for the other predictors was taken into account, mTBI ($p = 0.1321$) was not related to worse overall functional status. Results were similar for specific areas of community level functioning.

Conclusions: OEF/OIF veterans are best described as "polymorbid," with multiple factors relating to their functioning. Treating individual diagnoses in isolation is likely not best approach. Integrative treatment models should continue to be developed to address the multiple comorbidities co-occurring in this cohort.

Correspondence: *Sara M. Lippa, PhD, Boston VA Hospital, 150 S Huntington Ave, JP 182, Boston, MA 02130. E-mail: saralippa@gmail.com*

S.M. JURICK, J.W. ROSEN & A.J. JAK. The Factor Structure of the NSI in a Treatment Seeking Cohort of Veterans.

Objective: The Veterans Administration is extensively using the Neurobehavioral Symptom Inventory (NSI) to measure persistent symptoms in Veterans with a history of mild to moderate traumatic brain injury (mTBI). Despite its frequent use, studies regarding the factor structure of this measure are equivocal. Thus, this study sought to compare a three-factor model found by Caplan et al. (2010) and a four-factor model found by Meterko et al. (2012) in a treatment-seeking sample of Veterans.

Participants and Methods: Three hundred and thirteen Veterans with a history of mTBI and persistent cognitive complaints were referred for comprehensive clinical neuropsychological testing to guide treatment. All Veterans had also completed the NSI and psychiatric symptom self-report measures in the course of their clinical assessment.

Results: Confirmatory factor analyses of the NSI were conducted to examine whether the three-factor model or the four-factor model was a better fit. Model fit characteristics of the four factor model [chi2 (164) = 348.4, p< .0001, CFI = .93, SRMR = .05, RMSEA = .06, Akaike = 18398.8] versus the three-factor model [chi2 (206) = 564.6, p< .0001, CFI = .878, SRMR = .07, RMSEA = .08, Akaike = 16479.5] indicated that the four factor model was a slightly better fit. The factors that emerged were affective, cognitive, somatic, and vestibular. Weak to strong relationships were observed between NSI indices and measures of memory, processing speed, motivation/effort, and psychiatric symptoms.

Conclusions: The underlying factor structure of NSI has implications for the conceptualization of post-concussive syndrome (PCS) in a treatment-seeking sample of Veterans and enhances our understanding of the psychometric qualities of the NSI.

Correspondence: *Sarah M. Jurick, B.A., Psychiatry, University of California San Diego, 9500 Gilman Drive, Mail Code 0603, La Jolla, CA 92037-0603. E-mail: smjurick@gmail.com*

S.M. JURICK, C.C. HAYS, H.J. ORFF, E.W. TWAMLEY & A.J. JAK. Post-concussive Symptom Over-reporting in Iraq and Afghanistan Veterans.

Objective: The Neurobehavioral Symptom Inventory (NSI) is a self-report measure of post-concussive symptoms widely used in Veterans with a history of mild to moderate traumatic brain injury (mTBI). To identify symptom over-reporting on the NSI, Vanderploeg et al. (2013) developed the Validity-10 (V-10), an embedded measure of ten unlikely/low-frequency items as well as a total NSI cutoff score.

Participants and Methods: We examined the V-10 and NSI total cutoff scores in 276 Iraq/Afghanistan Veterans with a history of mTBI who underwent clinical neuropsychological testing and symptom self-report measures (NSI, BDI-II, BAI, and PCL-C).

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

Results: V-10 total raw score was not significantly correlated with demographic variables or injury characteristics (e.g. LOC, PTA, lifetime number of mTBIs; all ps> .05). However, V-10 was significantly correlated with service connected disability rating (r=.33), BDI-II (r=.47), BAI (r=.60), PCL-C (r=.51), CVLT-II Forced Choice (r=-.20) and TOMM (r=-.28; all ps≤.001). Logistic regression revealed that BDI-II (p<.05) and BAI (p<.01) scores predicted who fell above or below the total NSI cutoff score, and the BDI-II (p<.01) predicted performance above or below standard cutoffs on CVLT-II forced choice and TOMM. However, no self-report or performance validity tests (PVT) predicted who performed above or below cutoff on the V-10.
Conclusions: Results indicate that higher V-10 scores are associated with higher disability rating and higher psychiatric symptom endorsement, but lower scores on PVTs. V-10 score was not associated with demographic or injury characteristics. V-10, NSI total score and PVTs each measure slightly different constructs, albeit with overlap. Further research is necessary to investigate the construct of symptom over-reporting in this population as well as to evaluate the V-10 using a criterion measure.
Correspondence: *Sarah M. Jurick, B.A., Psychiatry, University of California San Diego, 9500 Gilman Drive, Mail Code 0603, La Jolla, CA 92037-0603. E-mail: smjurick@gmail.com*

J. NORLIEN, S. MOONEY, J. RAINTREE, E. SEATS & E. HAMRICK. Concordance of Cognitive Complaints and Cognitive Disorder in Concussed Army Personnel.
Objective: There is a relative paucity of research concerning the concordance of cognitive complaints and objective evidence of a cognitive disorder in the military. This study investigated if cognitive complaints during clinical interview and as endorsed on the SCZ-T subscale of the Personality Assessment Inventory (PAI) were correlated with credible evidence of a current cognitive disorder in a Military sample.
Participants and Methods: 33 consecutive Soldiers presented for evaluation in a DoD TBI Clinic [93.9% males; mean(SD) age of 37.9(8.4); 61% Cauc, 12% AA, 21% Hisp; mean(SD) years of edu was 13.4(2.8); 91% E-5 or higher in rank; mean(SD) # of deployments of 3.2(2.9)] - all with a history of LOC ≤5 min. All presented for neuropsychological evaluation.
Results: 91% reported experiencing subjective cognitive complaints during interview. The mean(SD) T-Score of the SCZ-T scale of the PAI was 70.3(16.9), range was 40-102. 70% of the patients demonstrated credible performance validity across multiple indicators. 15% of participants provided credible evidence of a current cognitive disorder. No significant associations between subjective endorsement of cognitive complaints during the clinical interview or SCZ-T and credible evidence for a current cognitive disorder (i.e., rho's = .13 and .16, respectively; both p's>.370).High SCZ-T was correlated with elevations across several PAI scales including Negative Impression Management (NIM; r = .70, p <.001), general anxiety (ANX; r = .71, p <.001), trauma related anxiety (ARD; r = .76, p <.001), and dysphoric mood (DEP; r = .64, p <.001).
Conclusions: While concussed Army personnel are likely to endorse subjective cognitive complaints, these do not appear to be correlated with credible evidence of a cognitive disorder. These results are broadly consistent with civilian based studies that have shown positive associations between subjective cognitive complaints and behavioral health conditions.
Correspondence: *Scott Mooney, PhD, Neuroscience & Rehab Ctr, D.D. Eisenhower AMC, 300 East Hospital Road, Fort Gordon, GA 30905. E-mail: scott.r.mooney@us.army.mil*

S. SORG, M.W. BONDI, D.M. SCHIEHSER, N. LUC, A.J. JAK, A. CLARK, K.L. HANSON, J. LOHR & L.M. DELANO-WOOD. Cognitive and Psychiatric Dissociations between Fractional Anisotropy and Cortical Thickness in Veterans with Mild TBI.
Objective: Studies using diffusion tensor imaging (DTI) have shown lower white matter integrity in veterans with history of mild TBI (mTBI). However, the effect of mTBI on gray matter regions remains understudied in this population. Thus, in a sample of veterans with mTBI, we investigated the relationships among the cognitive effects of mTBI, PTSD symptom severity, and brain structure in terms of gray matter measured via cortical thickness (CT) and white matter integrity measured via fractional anisotropy (FA).
Participants and Methods: Thirty-eight mild TBI and 17 normal control (NC) veteran participants completed neuropsychological and psychiatric testing (e.g., PTSD Check List) with adequate effort, and underwent MRI scanning an average of 4 years following their TBI event(s). Mean CT measures were extracted from 6 frontal and temporal cortical regions of interest and FA measures were extracted from 10 white matter tracts of interest.
Results: Adjusting for age, education, depression, and PTSD symptoms, mTBI participants performed worse than NCs on a memory composite and a test of psychomotor processing speed (p's<.05). CT did not differ between the mTBI and NC groups or correlate with cognitive test scores (p's>.05). Thinner left orbitofrontal CT was associated with higher PCL scores (p<.05). FA was lower in the TBI group than NCs in the left cingulum bundle (p<.05) and genu of the corpus callosum (p<.05). FA correlated with processing speed in seven tracts including the left cingulum (r=.38, p<.05) and genu (r=.50, p<.01). FA did not correlate with PCL scores (p>.05). Left cingulum bundle FA correlated with CT in the left middle frontal (r=.31, p<.05) and orbitofrontal cortices (r=.38, p<.01).
Conclusions: Results demonstrated that gray matter thickness was associated with PTSD symptom severity but not cognition, whereas white matter anisotropy was associated with cognition but not PTSD symptom severity, suggesting dissociable neurobiologic substrates for the cognitive and psychological sequelae following mTBI.
Correspondence: *Scott Sorg, VA Puget Sound Health Care System, 1660 S Columbian Way, Seattle, WA 98108. E-mail: scottsorg03@gmail.com*

J. NOVITSKI, E. LARSON & C. STARR. Relationship between sleep disturbance and cognition in veterans with mild traumatic brain injury and post-traumatic stress disorder.
Objective: Sleep disturbance is often reported by those diagnosed with mild traumatic brain injury (mTBI) and post-traumatic stress disorder (PTSD) and may contribute to persistent symptoms found in veterans with those diagnoses (Vanderploeg et al., 2009). Studies of other populations show that sleep difficulty is associated with cognitive impairment (Westerberg et al., 2010), and such impairment is known to be a frequent complaint of veterans with mTBI and PTSD. However, it is unknown how sleep disturbance may relate to cognitive problems observed in those with mTBI and PTSD.
Participants and Methods: In a group of veterans with a history of mTBI and current PTSD, we examined sleep efficiency as measured by actigraphy; intensity and frequency of disturbing dreams as measured by the Clinician Administered PTSD Scale (CAPS); and cognitive functioning as measured by the Repeatable Battery for the Assessment of Neuropsychological Status (RBANS).
Results: Bivariate analyses showed significant negative correlations between disturbing dreams and RBANS Immediate Memory, Language, Attention, Delayed Memory, and Total Index scores. Multiple regression showed that after controlling for sleep efficiency, higher intensity and frequency of disturbing dreams predicted significantly lower performance on measures of memory and attention. The unexpected finding that disturbing dreams were reported less often in veterans with a history of depression, anxiety, and substance use, suggested that it is unlikely that the effect of disturbing dreams on cognition is secondary to those conditions.

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

Conclusions: These results suggest that disturbing dreams may have a direct impact on memory and attention in mTBI and PTSD patients. This is consistent with findings of Ruff et al. (2012), who found that treating nightmares with prazosin improved cognition in veterans with mTBI and PTSD symptoms. After further study of the role of disturbing dreams in PTSD and mTBI, such findings may inform treatment of veterans with persistent symptoms.
Correspondence: *Julia Novitski, M.S., Psychology, Rosalind Franklin University of Medicine and Science, 525 W. Hawthorne Pl., #2805, Chicago, IL 60657. E-mail: julia.novitski@my.rfums.org*

D.A. NATION, T. ABUYO, K.J. BANGEN, L. DELANO-WOOD, A.J. JAK & M.W. BONDI. Correlates of TBI History in Aging Veterans Presenting with Cognitive Difficulties: A Clinical Case Series.
Objective: We sought to investigate the relationship between cognitive aging and history of traumatic brain injury (TBI) among aging veterans in order to further our understanding of the interaction between TBI and age-related cognitive disorders.
Participants and Methods: A case series of 104 Veterans (age mean=70.5, range=46-89; 94.2% male) referred for neuropsychological evaluation of cognitive difficulties (self- or informant-report) were compared on demographics, cognition, and psychiatric history based on whether there was history of TBI (n=54) or not (n=50). No participants were referred because of a known TBI, but history of TBI was assessed during clinical interview and chart review. Analyses were performed across the entire sample and after stratification by clinical diagnosis [normal cognition, Cognitive Disorder, or Dementia]. The main effects of TBI history and the interaction of TBI history with clinical diagnoses were evaluated by ANOVA. Chi-square analyses compared rates of anxiety, depression, PTSD, and alcohol/substance abuse history.
Results: There was a main effect of TBI history on age at presentation, such that Veterans with a history of TBI were younger than those without a history of TBI (p=.001). Veterans with a history of TBI were also more likely to have a history of anxiety (p=.01) and PTSD (p=.026), but were no more likely to exhibit depression or alcohol/substance abuse. There were no differences in dementia rating scale scores.
Conclusions: Among middle- to older-age Veterans presenting with cognitive difficulties, those with an incidentally discovered history of TBI tended to be younger, potentially suggesting that TBI could influence the age at which cognitive difficulties emerge. Those with a history of TBI were also more likely to have histories of mood and anxiety disorders, suggesting psychiatric factors may play a role in the interaction between cognitive aging and TBI.
Correspondence: *Daniel A. Nation, Ph.D., Psychology, University of Southern California, 3620 South McClintock Ave., Los Angeles, CA 90089-1061. E-mail: danation@usc.edu*

L. BRENNAN, L. DELANO-WOOD, D.A. NATION, D.P. SALMON, K.J. BANGEN, R. AU, M.W. BONDI & D.R. GALASKO. Impact of TBI on Clinical and Neuropathological Findings in Alzheimer's Disease: Role of APOE Genotype.
Objective: Traumatic brain injury (TBI) and apolipoprotein E (APOE) genotype are both independent risk factors for Alzheimer's dementia, but little is known about how these factors may interact to influence the course and neuropathology of Alzheimer's disease (AD). Among autopsy-confirmed AD patients, we compared clinical and pathological findings between those with a history of TBI (TBI+) versus without a history of TBI in APOE4 positive (APOE4+) and negative patients.
Participants and Methods: A group of 58 patients with TBI+ (n=33 with APOE4+) was identified from a sample of autopsy-confirmed AD patients and compared with 62 patients who were TBI- (n=40 with APOE4+). Groups were stratified by APOE4+/- status and compared on basic clinical and demographic characteristics, including clinical diagnosis, global cognition [Dementia Rating Scale (DRS)], age of symptom onset, age at first presentation to memory clinic, and time to death, as well as neuropathological outcome (i.e., plaques and tangle counts, Braak staging).
Results: Patients who were both TBI+ and APOE4+ had an earlier age of dementia onset (p=.026) and longer time from dementia onset to death (p=.037), although the presence of either risk factor alone showed no such association. Conversely, patients who were TBI+ and APOE4- exhibited significantly less AD pathology (lower Braak stage, p=.041), but showed the same level of antemortem impairment (DRS, p>.50).
Conclusions: Findings suggest that among autopsy-confirmed AD patients, those who had a history of TBI and carried one or more copies of the APOE4 allele developed dementia at an earlier age, whereas either risk factor alone showed no such association. In contrast, patients who had a history of TBI and were APOE4- had less severe AD pathology at autopsy, despite exhibiting a comparable level of cognitive impairment during life, potentially suggesting that TBI may exacerbate dementia through another unmeasured pathological process.
Correspondence: *Daniel A. Nation, Ph.D., Psychology, University of Southern California, 3620 South McClintock Ave., Los Angeles, CA 90089-1061. E-mail: danation@usc.edu*

I. HUNT, P. CLAYSON, T. FARRER, R. JONES, E. BIGLER & M. LARSON. Interhemispheric Transfer Time in Chronic Mild Traumatic Brain Injury.
Objective: Studies consistently find neuropsychological changes in mild traumatic brain injury (mTBI) in the acute stage of injury; however, long-term neuropsychological indicators of mTBI have proven difficult to identify. The corpus callosum (CC) is susceptible to axonal damage in moderate/severe TBI. We sought to identify whether CC white matter integrity in the chronic stage of mTBI (post 3 months) can be assessed by comparing inter-hemispheric transfer times (IHTTs) of sensory information in individuals with mTBI and healthy controls. We hypothesized that mTBI subjects would have delayed IHTT latencies relative to controls.
Participants and Methods: 21 individuals with a history of at least one mTBI were recruited an average of 43 months post-injury and matched by gender and age with 21 healthy controls. High-density electroencephalogram (EEG) data were recorded while participants responded to stimuli presented to their left or right visual fields. Occipital P1 and N1 latencies were compared across hemispheres and between groups. A neuropsychological battery was used to assess group differences in cognitive functioning.
Results: Stimuli presented to one visual field resulted in significantly delayed latencies of P1 and N1 peaks in ipsilateral hemispheres ($F=139.07$, $p<.001$ and $F=43.21$, $p<.001$, respectively). However, individuals with mTBI did not differ significantly from controls in P1 or N1 latencies ($F=1.65$, $p=.21$ and $F=0.08$, $p=.78$, respectively). These findings are consistent with the absence of neuropsychological differences between groups (ps>.05).
Conclusions: Individuals with chronic mTBI did not have delayed IHTT latencies relative to controls; however, it is possible that differences exist in the acute stage of mTBI that normalize by the chronic stage of recovery. This would be consistent with neuropsychological studies showing a recovery of cognitive functioning after 3 months post-injury. Non-significant differences between groups in our neuropsychological battery are consistent with this possibility.
Correspondence: *Isaac Hunt, Brigham Young University, 4287 W Queens Ferry Dr, South Jordan, UT 84095. E-mail: isaacjameshunt@gmail.com*

J. FABER, S. ADAM, X. LI, S. MCCAULEY & H. LEVIN. A Longitudinal Investigation of Sleep Quality Following Mild Traumatic Brain Injury: Comparison with Orthopedic and Non-Injured Controls.
Objective: To examine the post-injury trajectory of sleep related problems in adolescents and adults with mild traumatic brain injuries (MTBIs), orthopedic injuries (OIs), and non-injured controls.

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

Participants and Methods: The current study included three groups of 12 to 30 year old participants: 1. individuals sustaining an MTBI, 2. individuals sustaining an orthopedic injury (OI), and 3. non-injured controls. Quality of sleep was assessed at baseline (within 96 hours of injury), and at 1 month and 3 months follow-up sessions using the Pittsburgh Sleep Quality Index (PSQI).
Results: A mixed model approach was used for the PSQI scores to assess recovery pattern. Participants above 25 years of age at the time of their injury in the MTBI group exhibited a sharp increase in their sleep-related symptoms between baseline and one month and continued to exhibit sleep-related difficulties at the three-month follow-up assessment. This pattern contrasted with the modest increase in sleep difficulties reported by younger participants sustaining an MTBI and older participants sustaining an OI between baseline and one-month post-injury. The extent of sleep-related difficulties in younger MTBI and older OI participants returned to near baseline levels at the three-month follow-up assessment. Typically developing individuals did not experience a significant change in their sleep symptoms.
Conclusions: These results suggest that sleep deficits especially in adults sustaining an MTBI may persist long after many other post-concussive symptoms have abated. They also suggest that sleep quality may be an appropriate target for evaluation and intervention following an MTBI.
Correspondence: *Jessica Faber, B. A., Baylor College of Medicine, One Baylor Plaza, Houston, TX 77030. E-mail: jesfaber@gmail.com*

J. MACHAMER, N. TEMKIN & S. DIKMEN. Post-traumatic Symptoms in Patients with Simple and Complicated Mild TBI.
Objective: Examine the contribution of CT abnormalities to symptom reporting at 1 month and 1 year post injury in subjects with mild TBI
Participants and Methods: 129 participants with GCS 13 - 15 and no CT abnormalities (Simple Mild); 252 with GCS 13 - 15 and CT abnormalities (Complicated Mild); 119 Trauma Controls. These 3 groups were compared on the number of new or worse physical, cognitive, and emotional symptoms reported at 1 month and 1 year post injury. Physical symptoms included headaches, dizziness, fatigue and blurred vision. Cognitive symptoms were trouble concentrating and memory difficulty. Emotional symptoms were irritability, loss of temper and anxiety.
Results: At 1 month, both mild TBI groups reported significantly more ($p < .001$) new or worse physical and cognitive symptoms than the Trauma Controls. There were no significant differences between the Trauma Control and Mild TBI groups on the report of new or worse emotional symptoms. At 1 year post injury, both Mild TBI groups continue to report significantly more ($p < .01$) physical symptoms than the Trauma Controls. However, only the Complicated Mild TBI group reported more cognitive and emotional symptoms than trauma controls. There were no significant differences between simple mild and trauma controls on cognitive or emotional symptom reporting.
Conclusions: Soon after injury, Mild TBI, regardless of CT abnormalities report more physical and cognitive symptoms then Trauma Controls. By 1 year post injury, Complicated Mild TBI report more physical, cognitive and emotional symptoms than Trauma Controls while the Simple Mild TBI report only more physical symptoms. These findings suggest that recovery is more difficult in complicated mild TBI. More research is needed to determine outcome following mild TBI with and without CT abnormalities. Furthermore, these results provide support to the validity of subjective complaints in representative TBI cohorts.
Correspondence: *Joan Machamer, University of Washington, Box 359612, 325 Ninth Avenue, Seattle, WA 98104. E-mail: machamer@u.washington.edu*

A.C. PARKS, R.D. MOORE, S.P. BROGLIO, T.M. COVASSIN, C.H. HILLMAN & M.B. PONTIFEX. Cognitive Load Induced Variability In Behavior And Neurocognition In Young Adults With A History Of Concussion.
Objective: With nearly 4 million sport and recreation related concussions occurring annually, understanding the long-term implications of the injury is of increasing importance. The current study examined the persistent effect of concussive injury on behavioral and neurocognitive measures to determine if cognitive load mediates intra-individual variability in performance in those with and without concussion history.
Participants and Methods: Ninety-eight college-aged young adults were separated into groups according to their history of diagnosed concussion (50 healthy control; 48 with a history of one or more concussions). Intra-individual variability of behavioral performance and neuroelectric indices of attention were assessed in response to a low-cognitive load stimulus-discrimination task and a high-cognitive load inhibitory control task.
Results: No significant differences were observed between groups for either mean level performance or intra-individual variability relative to behavioral or neuroelectric measures of performance in response to the low cognitive load task. However, in response to the high cognitive load task, findings revealed poorer response accuracy and smaller P3 amplitude for those with a history of concussion, relative to healthy controls. Further, individuals with a concussive history also exhibited greater variability of reaction time and P3 amplitude.
Conclusions: These findings suggest that cognitive load associated with a given task may be an important consideration in the examination of the long-term effects of concussion history on cognition.
Correspondence: *Matthew B. Pontifex, Ph.D., Department of Kinesiology, Michigan State University, 27P IM Sports Circle, 308 W. Circle Drive, East Lansing, MI 48824. E-mail: pontifex@msu.edu*

S.J. TOWNS, H.G. BELANGER, R.D. VANDERPLOEG, M.A. SILVA, T.S. KRETZMER & K.M. BURNS. Subjective Sleep Quality and Postconcussion Symptoms in Mild TBI.
Objective: Sleep disturbances have been chronicled among patients with a history of traumatic brain injury (TBI). Patients with TBI also commonly report chronic postconcussion symptoms (PCS). Both PCS and sleep quality have demonstrated significant relationships with psychological distress and demographic characteristics. While these relationships have been documented, there has been limited investigation of the direct relationship between sleep and PCS in patients with mild TBI (mTBI). The goal of this investigation is to examine the prevalence of poor subjective sleep in a mTBI sample and examine the relationship between subjective sleep quality and PCS, above and beyond the typical demographic and psychological distress variables.
Participants and Methods: 126 individuals with a history of mTBI completed surveys online. Sleep quality was assessed with the Pittsburgh Sleep Quality Index (PSQI) and PCS with the Neurobehavioral Symptom Inventory (NSI), with the sleep item removed. Demographic information was collected and psychological distress was measured using the Brief Symptom Inventory-18 (BSI-18). Regression analysis was utilized to determine if subjective sleep quality would predict PCS severity, above and beyond demographic variables and psychological distress.
Results: In this sample, 97% of mTBI participants reported poor sleep. Sleep quality significantly accounted for the variance in PCS, above and beyond demographics, time since injury and psychological distress ($p < .005$), though only an additional 3% of the variance in PCS was explained. Partial correlation between sleep quality and PCS (removing psychological distress) was $r = .35$, $p < .001$. Partial correlation between psychological distress and PCS (removing sleep quality) was $r = .76$, $p < .001$.
Conclusions: Results indicate that poor subjective sleep quality is a significant problem in those with mTBI. While sleep is associated with PCS severity, psychological distress is a more potent predictor.
Correspondence: *Stephanie J. Towns, James A Haley VA Medical Center, 13000 Bruce B Downs Blvd, Tampa, FL 33612. E-mail: stephanie.towns@va.gov*

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

M. ENSLEY, M. O'NEIL, S. TUN & D. STORZBACH. The impact of psychiatric distress on a self-report measure of postconcussion.
Objective: Aim 1: Examine the effect of PTSD symptoms on the British Columbia Postconcussion Symptom Inventory (BC-PSI) for blast exposed and non-blast exposed Veterans. Aim 2: Examine the effect of non-PTSD related mental health symptoms on the BC-PSI for blast exposed and non-blast exposed Veterans.
Participants and Methods: Groups of deployed OEF/OIF Veterans from the Portland VAMC. 1: "No Blast" (NB) group reporting no explosion exposure; 2: "Blast-Exposed Non-mTBI" (BEN) group with self-reported exposure to one or more explosions but no acute mTBI symptoms; 3: "Blast-Exposed mTBI" (bTBI) group self-reporting symptoms consistent with DOD/DVA criteria for mTBI. Participants completed the Mini-International Neuropsychiatric Interview (MINI), the PTSD checklist (PCL-M), the Personality Assessment Inventory (PAI), and the BC-PSI.
Results: There were statistically significant differences in BC-PSI total scores between groups, $F(2, 88) = 26.199$; $p < .000$). PCL total scores accounted for much of the total variance, $F(2, 86) = 8.071$; $p < .001$), with PCL items 15, 16, and 17 ranging in significance from $p < .000$-.019. PTSD symptoms reported on the PAI and MINI were statistically significant in the $p < .000$-.001 range. Depression and non-PTSD related anxiety, as indicated by the PAI and MINI, were statistically significant with p-values ranging from $p < .000$-.050.
Conclusions: Symptoms of PTSD, depression, and non-PTSD related anxiety accounted for a significant portion of the outcome variance on the BC-PSI. Findings are consistent with previous research indicating significant association between mental health symptoms and post-concussion symptoms (PCS). Use of a structured clinical interview and psychological outcome measures in conjunction with a PCS measure may allow for improved diagnostics and treatment recommendations.
Correspondence: *Megan Ensley, PsyD, Portland VA Medical Center, 3710 SW US Veterans Hospital Road, Portland, OR 97201. E-mail: megan.ensley@va.gov*

N. SWAN, M. ALEXANDER & N. MADIGAN. Concussion: Relationship of Injury Severity, Cognitive Functioning, and Emotional Factors.
Objective: There are approximately 2 million concussions diagnosed in the US each year. Though symptoms usually clear in days to weeks, for a subset of patients (~10%), symptoms persist and may become debilitating. Psychological responses to injury are often more powerful predictors of post-concussive symptoms than injury factors or acute cognitive deficits. Our objective was to determine the relative roles of injury severity, cognitive function, and emotional factors on symptom severity.
Participants and Methods: Participants consisted of 81 consecutive clinical referrals (age, *M*=37.4; *SD*=13.67; 38 M/43 F) seen for a brief assessment for treatment purposes within 6 months of a reported concussion. Based on patient and medical reports, the AAN 1997 guidelines were used to stratify probable concussion severity in 3 grades. Cognitive measures included standard tests of attention, executive and memory functions (Stroop, TrailsB, CVLT2, CPT2, ROCF). Psychological measures included BAI and BDI2. Symptom severity was assessed by the Rivermead Postconcussion Symptoms Questionnaire (RPSQ).
Results: Correlations and multiple regression were completed. There were no significant correlations among any cognitive measure to the BAI or BDI2 in the entire cohort or for a subset (*N*=48) who completed the RPSQ. Concussion severity was negatively associated (r=-.48, p=.001) with RPSQ. The BAI, BDI2 and RPSQ were all significantly correlated pairwise. Psychological/emotional distress was found to explain 33% of the variance ($R^2\Delta$=.44, $F(8,43)$=5.28, p<.001) in severity of symptoms on the RPSQ above objective cognitive measures and injury severity. Anxiety (BAI), β=.44, p< .05 was the only significant predictor of RPSQ symptoms in the overall model.
Conclusions: Emotional factors play a major role in the generation of post-concussion symptoms. This finding warrants early, aggressive management of anxiety and acute stress before symptoms become chronic. Exploration of other contributing factors in this clinical sample is currently underway.
Correspondence: *Natasha Swan, Ph.D. Clinical Psychology, Cognitive Neurology, Beth Israel Deaconess Medical Center, 330 Brookline Ave, Boston, MA 02215. E-mail: natashamswan@gmail.com*

T. JANTZ, K. LIAO, A. VAS, R. DAVIS, J. RAKIC, S. CHAPMAN & D. KRAWCZYK. Cognitive Correlates of Abstract Reasoning in Chronic Mild TBI.
Objective: To examine the relation between abstract reasoning, and performance on commonly used measures of executive functions, memory, and daily function in adults with chronic mild TBI.
Participants and Methods: This study's data are a subset of an ongoing double-blinded randomized control trial funded by the Department of Defense. Forty-five participants with mild TBI (25 male, 20 female; 33 civilians, 12 veterans) in chronic stages of recovery (> 6 months post TBI), between 18 to 65 years of age ($M = 40.02$, $SD = 14.67$), with an IQ range of 73–129 ($M = 109.27$, $SD = 10.33$) and minimum high school education were included in this study. Mild TBI was defined as a GOS-E score of 6 or 7. Abstract reasoning was measured on the participant's ability to construct generalized meanings from complex texts.
Results: A correlational analysis found significant positive relations ($p \leq .05$) between abstract reasoning ability and frontally mediated executive functions of working memory, innovation, and verbal fluency. Our analysis also found a significant correlation between abstract reasoning and memory, specifically explicit recall of information ($p < .05$). We also found a trend ($p < .10$) for a correlation with inhibitory control.
Conclusions: This study extends prior evidence of the correlation between abstract reasoning and frontally mediated executive functions in adults with moderate-to-severe TBI. These results could lead to a better understanding of the interplay between abstract reasoning abilities and traditional executive function measures. Furthermore, improved understanding of the relation between the functionally relevant skill of abstract reasoning and executive functions could inform the relevance of top-down executive function training programs.
Correspondence: *Tiffani Jantz, M.S. Cognition and Neuroscience, University of Texas at Dallas, Center for BrainHealth, 2200 W. Mockingbird Lane, Dallas, TX 75235. E-mail: Tiffani.Jantz@utdallas.edu*

A. MATEVOSYAN, L.M. DELANO-WOOD, O. ALHASSOON, V.J. FILOTEO, E.B. LANNI, R.T. KIM, K.L. HANSON & D.M. SCHIEHSER. Memory Deficits Differ by Working Memory Performance in Mild to Moderate Traumatic Brain Injury.
Objective: Memory problems are common in the context of mild to moderate traumatic brain injury (mmTBI); however, the nature of memory deficits in this population is not entirely clear. Given the relationship between working memory/executive function (WM/EF) and organization of information for adequate retrieval, we hypothesized that individuals with mmTBI who demonstrate poor WM/EF will present with a retrieval deficit, which is characterized by better recognition or cued recall as compared to free recall.
Participants and Methods: Veterans with a history of mmTBI (n=46; mean years since injury=6.6) and 17 demographically-matched veteran normal controls (VNC) with optimal effort were administered the California Verbal Learning Test (CVLT-II) and the Wechsler Adult Intelligence Scale Digit Span Backwards (DSB) test. The mmTBI group was divided into low WM/EF (LDSB) and high WM/EF (HDSB) using a median split of the DSB scores (raw≤8.5).
Results: A One-Way MANOVA revealed significant differences between LDSB, HDSB, and VNC on measures of total (Trials 1-5), free, and cued recall (all p's ≤ .01), but not recognition (p=.08). Post-hoc analyses revealed that LDSB participants performed significantly worse on total, free, and cued recall compared to VNC, while they performed significantly worse on total and free recall compared to the HDSB group (all p's<.02); no differences in recognition were found between either

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

groups. No significant differences were found on any of the memory measures between HDSB and VNC (all p's>.25).
Conclusions: Results indicate that a subset of mmTBI individuals with poor WM/EF show a retrieval deficit, which is marked by reduced recall relative to recognition. As greater retrieval demands are required for semantic cueing compared to recognition, our results are consistent with a severe retrieval deficit in this particular subgroup. These findings highlight the role of WM/EF in retrieval of information and have implications for targeted assessment and cognitive interventions for specific mmTBI subgroups.
Correspondence: *Adelina Matevosyan, Alliant International University, San Diego, 6622 Olcott St, Tujunga, CA 91042. E-mail: adelinamatevosyan@gmail.com*

K. ROBERTSON, C. MCALISTER & M. SCHMITTER-EDGECOMBE. Automatic and Controlled Processing Abilities Following Traumatic Brain Injury.
Objective: Preattentive (parallel) and attentive (serial) visual search tasks were used to investigate automatic and controlled processing abilities in an acute traumatic brain injury (TBI) population and to predict later recovery.
Participants and Methods: Participants were 32 individuals with moderate to severe TBI who were tested following emergence from post-traumatic amnesia and at approximately 1-year post injury, as well as 32 age and education matched controls. For both visual search tasks, participants searched a visual display that contained either two or eight items and pressed a "yes" key if the target was in the display and a "no" key if it was not. At approximately one year, TBI participants completed the Community Integration Questionnaire (CIQ) and an Employment Scale.
Results: The overall response times of the TBI group were significantly slower than controls on both tasks, indicating that it took the TBI participants longer to identify and respond to stimuli. Consistent with parallel (automatic) processing, when the distractor set size increased in the preattentive visual display, the control group showed no significant increase in search rate (percent slowing= 0.69%). In contrast, the TBI group's search rate increased significantly (percent slowing= 12.27%) and disproportionately compared to controls, indicating difficulty with automatic processing. In the attentive condition, the control group demonstrated the expected serial (controlled) search (percent slowing= 30.32%), with the TBI group exhibiting a disproportionately greater search rate (percent slowing= 50.98%), suggesting that the TBI group was experiencing difficulty with controlled processing. Results of a regression analysis predicting CIQ and job employment revealed that performance on the preattentive task was a unique predictor of later outcome.
Conclusions: These results suggest that poorer automatic processing in the acute phase of TBI may be predictive of poorer overall recovery.
Correspondence: *Kayela Robertson, Washington State University, 24114 E. Sharp, Liberty Lake, WA 99019. E-mail: k.robertson@email.wsu.edu*

T.G. HILL-JARRETT, J.T. GRAVANO, C.N. SOZDA & W.M. PERLSTEIN. Attention Impairment or Generalized Slowing? Cross-Hemispheric Influences of Traumatic Brain Injury on Reaction Time Response.
Objective: Traumatic brain injury (TBI) results in a variety of cognitive disturbances with delayed processing speed cited as a hallmark clinical outcome. This deficit manifests in experimental paradigms as longer reaction time (RT) in TBI patients. It is debated whether RT slowing is an outcome of generalized information-processing slowing or an attention deficit resulting from TBI. Commonly overlooked is the influence of inter-hemispheric communication on RT. We sought to determine the cross-hemispheric contributions of spatial attention and information processing on RT in moderate-to-severe TBI.
Participants and Methods: Event-related potentials (ERPs) were acquired while 10 TBI and 12 control participants performed a Lateralized Attention Network Test with RT recorded. A Crossed-Uncrossed Difference (CUD) measured efficiency of inter-hemispheric processing in response to target stimuli; a similar ERP metric was calculated for cue-related N1 amplitude in response to spatial cues, which reflected hemispheric attention allocation.
Results: TBIs demonstrated classic RT slowing and had larger CUD than controls (ps<.05), suggesting greater efficiency at cross-hemispheric information processing after accounting for RT differences. Cross-hemispheric N1 revealed significant amplitude attenuation in TBI patients in response to spatial cues (p<.05), indicating reduced neural response. A counterintuitive negative relationship was found between CUD and N1 amplitude such that those with proficient attention allocation had poorer inter-hemispheric processing (p<.05).
Conclusions: RT slowing after TBI may be best accounted for by impaired attention. Such attention reduction may be accompanied by a benefit of enhanced inter-hemispheric information transmission. Discussion encompasses mechanisms of between-group differences in attention-information processing relationships and potential compensatory contributors to enhanced cross-hemispheric information processing in TBI.
Correspondence: *Tanisha Hill-Jarrett, M.S., Clinical & Health Psychology, University of Florida, 3301 SW 13th Street Apt D146, Gainesville, FL 32608. E-mail: thilljarrett@phhp.ufl.edu*

T.G. HILL-JARRETT, C.N. SOZDA, J.T. GRAVANO & W.M. PERLSTEIN. Traumatic Brain Injury Influences on the Hemispheric Representation of Visuospatial Attention: Findings from the Lateralized Attention Network Test.
Objective: Attention deficits are among the most commonly reported symptoms following traumatic brain injury (TBI) and are pervasive across injury severity level. While attention is postulated to be asymmetrically represented within the brain, little is known about the mechanisms underlying this purported imbalance and the efficiency of neural subsystems following disruption. This study examined the impact of TBI on the hemispheric integrity of three interacting networks of attention – alerting, orienting, and executive control.
Participants and Methods: Event-related potentials (ERPs) were acquired while 12 moderate-to-severe TBI and 12 control participants performed a computerized Lateralized Attention Network Test (LANT). The LANT permits independent measurement of the attention networks within each cerebral hemisphere. Behavioral reaction time (RT) and error rate data were recorded.
Results: Behaviorally, no group differences were found in RT benefit from temporal or spatial cueing; however, TBI survivors demonstrated significant hemispheric differences for the orienting component such that less benefit was derived from left spatial cues (p<.05). ERP data revealed decreased N1 amplitude recorded over right parietal brain regions in TBI participants during leftward shifts of attention, reflecting reduced efficiency of the left orienting network (p<.01). TBI participants had significantly greater difficulty utilizing spatial cues to overcome conflict created by incongruent targets than controls, suggesting inefficient communication between the orienting and executive control subsystems (p<.05).
Conclusions: Right hemispheric N1 reduction may be a neural marker of alterations of the orienting system following TBI, and decreased efficiency in attention network communication may occur post injury. Findings have implications for potential strategies to overcome orienting deficits and enhance executive functioning within cognitive rehabilitation settings.
Correspondence: *Tanisha Hill-Jarrett, M.S., Clinical & Health Psychology, University of Florida, 3301 SW 13th Street Apt D146, Gainesville, FL 32608. E-mail: thilljarrett@phhp.ufl.edu*

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

C.G. WONG, L.J. RAPPORT, S. MEACHEN, R.A. HANKS, M.A. LUMLEY & K. TELMET HARPER. Behavioral Inhibition and Activation Systems in Moderate to Severe TBI.

Objective: Individuals with moderate to severe TBI may experience long-term deficits, which can contribute to chronic stress. Individual differences in personality have been linked to coping styles, stress reactivity and health outcomes; however, research specific to TBI has been sparse. Grey's theory of Behavioral Inhibition System/Behavioral Activation System (BIS/BAS) offers a neurobiologic view that may be especially relevant to neurobehavioral change associated with TBI. The present study examined BIS/BAS personality correlates of TBI.

Participants and Methods: Eighty-one adults with moderate to severe TBI and 76 of their significant others (SO) participated. Measures included the BIS/BAS scale and the Positive and Negative Affect Schedule (PANAS). Demographic information included age, education, estimated IQ, and injury severity characteristics.

Results: The TBI group endorsed significantly higher BAS than did the SO group. Among the SO group, age was inversely related to BAS scales whereas education and IQ were inversely related to BIS. Age was not related to BIS/BAS and education showed inverse relation to BAS in the TBI group. Injury severity was positively related to BAS. The SO group showed expected patterns of relation between personality and affect; positive affect was associated with BAS, and negative affect with BIS. In contrast, among the TBI group, BAS was positively related to both positive and negative affect.

Conclusions: TBI was associated with intensified BAS but not BIS characteristics. In healthy adults, BAS reflects approach systems such as appetitive motivation and response to signals of reward and nonpunishment, and it has also been associated with impulsivity. BIS reflects anxiety and concern about punishment. Thus, the observed pattern is consistent with the neurobiology of TBI-related personality change, and also with theory regarding the functional independence of the BIS/BAS systems. The BIS/BAS scale shows promise as a personality measure in TBI.

Correspondence: *Christina G. Wong, Wayne State University, 5057 Woodward, Detroit, MI 48202. E-mail: cgwong@wayne.edu*

J. GRIECO & D. MICKEY. Comparison of Processing Speed in Individuals with Anoxic, Closed Traumatic, and Combined Anoxic and Closed Traumatic Brain Injuries.

Objective: The purpose of this study was to determine if differences in processing speed exist between individuals with anoxic brain injury (ANI), closed traumatic impact-based brain injury (TBI), and combined type injuries (CTI). Previous research showed that individuals with TBI displayed a trend of slowed processing speed over individuals with ANI (Hopkins et al., 2005), however other studies indicated poorer cognitive outcomes in ANI (Cullen et al., 2011). It is hypothesized that individuals with CTI will display the slowest processing speed followed by TBI then ANI.

Participants and Methods: Data on the Processing Speed Index (Symbol Search & Digit Symbol subtests) from the WAIS-III was collected from 56 patients (ANI= 8, TBI= 39, CTI= 9) upon discharge from subacute inpatient rehabilitation. ANCOVA and planned contrasts were used to assess for significant differences between groups while controlling for the presence of alcohol and/or illicit substances in the injury.

Results: Processing speed was slowest in individuals with CTI (z = -1.87, sd = 0.55), followed by TBI (z = -1.84, sd = 0.82), and ANI (z = -1.02, sd = 0.53). ANCOVA revealed statistically significant differences between groups after controlling for the presence of substances (F [2, 56] = 3.90, p = 0.02). Use of substances at the time of injury was not statistically related to performance (F [1, 56] = 0.815, p = 0.37). Planned contrasts revealed significantly slower speed of processing in individuals with a TBI (p = 0.00, 95%CI [-1.39,-0.21]) and CTI (p = 0.02, 95%CI [-1.58,-0.10]) compared to solely ANI.

Conclusions: Individuals with CTI displayed slower speed of processing than individuals with TBI or ANI alone upon discharge from subacute rehabilitation. Individuals with CTI and TBI displayed clinical impairment in processing speed, consistent with a previously observed trend (Hopkins et al., 2005). General prognoses regarding cognitive outcomes should be explained specifically to caregivers in terms of both cognitive domain and mechanism of injury.

Correspondence: *Julie Grieco, Neuropsychology, Harvard Medical School, 307 Beacon St., Apt. 2, Boston, MA 02116. E-mail: jgrieco@my.adler.edu*

H.W. MCDERMOTT, D.J. GORDON, H.N. GLUBO, A. BEATTIE, B.S. IM & T.L. BUSHNIK. Comparing TBI Outcomes in a Public and Private Hospital: The Role of Demographic and Socioeconomic Factors.

Objective: The objective of this study was to capture the patient population within NYU-Rusk Traumatic Brain Injury Model System's (TBIMS) two hospital affiliations – one public and one private - and to consider how demographic and socioeconomic factors relate to cognitive change during inpatient rehabilitation. We hypothesized that patients in the public hospital would be more likely to be from a racial minority group, less likely to be insured, and experience poorer rehabilitation outcomes based on these factors.

Participants and Methods: The study was conducted as a retrospective chart review of patients from the public hospital Bellevue Hospital Center (n = 565) and the private hospital The Hospital of Joint Disease (HJD; n = 269). Factors considered in data analysis included cognitive FIM scores, race, age, gender, payer source, and employment status prior to injury.

Results: Results indicated statistically significant differences (at the p <.05 level) between the patients at each hospital: a larger percentage minority population at Bellevue (74.6%) than at HJD (20%); less patients covered by insurance at Bellevue (70.5%) than at HJD (100%); and, older patients at HJD (mean difference of 15 years). Overall, change in cognitive FIM score was not significantly different between the two hospitals, despite the fact that older TBI patients tend to experience less total recovery from TBI. Minority patients at HJD may have experienced greater cognitive FIM change than minority patients at Bellevue, but this finding only trended toward significance (p = .065).

Conclusions: Our findings suggest significant demographic and socioeconomic differences and may suggest differences in TBI outcomes in the patient population between the two hospitals. Further investigations should include more demographic and socioeconomic factors in considering their role in recovery from TBI as well as continue to explore health disparities in general.

Correspondence: *Hannah W. McDermott, BA, New York University, 240 east 38th St, 17th Fl, New York, NY 10016. E-mail: Hannah.McDermott@nyumc.org*

N. BILLINGS, L.J. RAPPORT, H.A. GREENE & R.A. HANKS. Coping Style Predicts Objective and Subjective Well-being after Moderate to Severe Traumatic Brain Injury.

Objective: Research suggests that coping style affects physical and mental well-being; however, little is known about coping style after moderate to severe TBI. Given that physical health and subjective well-being have been linked with general affectivity, associations between coping and well-being might be attributable to a shared relationship with affectivity. This study sought to replicate and extend research examining coping as a predictor of well-being after TBI.

Participants and Methods: Participants were 68 adults with moderate to severe TBI, 6 months to 6 years post injury. Outcomes included Satisfaction with Life Scale (SWLS), Disability Rating Scale (DRS), and an adapted version of the Modified Cumulative Illness Rating Scale (MCIRS). Predictors included age, injury severity (Glasgow Coma Scale), Positive Affective and Negative Affect Schedule (PANAS), and the Coping Inventory for Stressful Situations (CISS; Task, Emotion, and Avoidance scales).

Results: Hierarchical multiple regression examined prediction of SWLS, DRS, and MCIRS. Step 1 included age and injury severity; Step 2,

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

PANAS positive (PA) and negative (NA) affectivity; and Step 3, CISS scales. For SWLS, Emotion and Task coping were the significant predictors in the total model, $R^2 = .32$, $p < .001$; age, injury severity and affectivity did not contribute significantly. For DRS, Task coping contributed the most variance, followed by NA and age; total model $R^2 = .31$, $p = .002$. For MCIRS, age and Task coping added uniquely to the model, followed by Emotion coping, total model $R^2 = .43$, $p < .001$.
Conclusions: Findings confirm prior research that coping style predicts functional and subjective well-being after TBI, independent of injury severity and demographic characteristics. These findings replicate Greene et al. (2013), who observed a relationship between coping style and TBI recovery, including functional and subjective well-being. It extends prior findings to show that coping style also uniquely predicts long-term physical health outcomes after TBI.
Correspondence: *Nia Billings, MS, Psychology, Nia Billings, 5057 Woodward, Detroit, MI 48202. E-mail: niabillings@wayne.edu*

P. SUNDERARAMAN, K. HAGGERTY, J. ZAMZOW & K. LINDGREN. Exploring The Relationship Between Money Management and, Mood and Cognition in People with Chronic Traumatic Brain Injury.
Objective: Understanding whether money management is associated with mood (anxiety, depression) and cognition (processing speed/working memory) after traumatic brain injury (TBI) is critical for guiding clinical decisions to help transition to independent living. The current study investigated the relationship between money management and, mood and cognition in a group with TBI.
Participants and Methods: Neuropsychological and standard rehabilitation outcomes data was collected in a day treatment rehabilitation setting. Two groups were created based on the number of years post injury: TBI≤10 years (n=13) and TBI>10 years (n=15). Participants with TBI≤10 years [mean age=43.81 (13.24) years, mean education=12.73 (1.67) years] were comparable to those with TBI>10 years [mean age=45.75 (8.5) years, mean education=12.53 (1.7) years]. Money management was assessed objectively using the Money and Calculation domain from the Texas Functional Living Scale and subjectively through clinical consensus as measured via the Managing Money and Finances domain from the Mayo-Portland Adaptability Inventory-4. Data for anxiety, depression (using Beck's Anxiety and Depression Inventories) and processing speed/working memory (Trails A and B) was also obtained.
Results: Significant results were found only in the TBI≤10 years group. Specifically, a negative correlation was found between subjective and objective measures of money management (r=-0.61, p=0.01) and between money management and anxiety (r=0.66, p=0.04). Of note, in the TBI group as a whole (n=28), Pearson's correlations did not show significant relationship among any of these variables.
Conclusions: The current finding suggests that the number of years post injury may be moderating the relationship between money management and mood only earlier in the post injury period.Lack of correlation between the subjective and objective indices of money management suggests that these two tests are measuring different and unique aspects of the same construct.
Correspondence: *Preeti Sunderaraman, M.S., Psychology, Drexel University, 2215 Arch St., Apt 403, Philadelphia, PA 19103. E-mail: preetis.ps@gmail.com*

T. NOVACK & K. BALL. The Effect of Visual Perceptual Training on Screening for Driving Using the Useful Field of View Test Following Moderate to Severe TBI.
Objective: Multiple cognitive factors can affect capacity to safely return to driving, including visual processing speed. This study was initiated to determine if a computer based cognitive stimulation task could expedite recovery of visual processing speed as assessed by the Useful Field of View (UFOV® Test).
Participants and Methods: Participants were randomly assigned to control (19) or treatment conditions (18). Treatment involved access to the PositScience® InsightTM training program. Initial assessment included the UFOV and cognitive tests. Six weeks later they were reassessed using the same instruments, and also participated in a driving simulator assessment.
Results: The groups did not differ at baseline in demographics, UFOV, or cognitive test scores. There was no difference in Glasgow Coma Scale score but duration of post-traumatic amnesia was significantly longer for the treatment group, which was treated as a covariate. There was significant improvement on the second and third subtests of the UFOV, as well as the cognitive tests. There was no group difference in UFOV performance. Performance in the driving simulator was also similar for the two groups.
Conclusions: This study does not provide support for use of a computer based cognitive stimulation program to improve visual processing speed. However, the test of the intervention is challenged by the small sample size and the variable amount of treatment time by the participants. Only 11 of those randomized to training completed eight hours on Insight (a full dose). Given the lack of training improvements on cognitive measures, differences in simulated driving would not be expected; however, there was a significant positive correlation between post UFOV and off road accidents in the simulator. Future research should investigate (1) the impact of 8+ hours of training and (2) methods to motivate participants to fully engage in cognitive training.
Correspondence: *Tom Novack, University of Alabama at Birmingham, SRC 530, 1720 2nd Ave. South, Birmingham, AL 35249. E-mail: novack@uab.edu*

Y. GOVEROVER, J. LENGENFELDER & N. CHIARAVALLOTI. Activity Participation after Traumatic Brain Injury.
Objective: Traumatic Brain Injury (TBI) often results in impairments in cognitive skills. Deficits in executive functions, memory and processing speed are prevalent after moderate to severe TBI, and exert a significant impact on daily life functioning. Depression is also common after TBI and can impact daily life. As a result of of these changes in cognition and emotional functioning, individuals with TBI may alter their patterns of participation (e.g. leisure, work, school activities). However, the measurement of participation is often limited to simplistic questionnaires about levels of activity post-injury. Measuring participation using a client-centered approach is not very common in research and rehabilitation. The aim of this study was to compare levels of past and present participation in instrumental, leisure, and social activity between HC and TBI and investigate the relationship between activity participation in each of these domains and cognitive and emotional functioning in persons with TBI who live in the community.
Participants and Methods: Forty seven individuals with TBI and 16 matched healthy adults performed a battery of cognitive tests and rated their effective symptomatology and activity participation.
Results: Participants with TBI demonstrated significantly worse cognitive performance, and reported more fatigue and depressive symptomatology than controls. Participants with TBI also reported significantly lower current activity participation compared to controls. Worse executive function was associated with reduced current activity participation in persons with TBI. When examining the activities individuals continued to engage in from before to after TBI, a significant relationship was noted between executive dysfunction and reduced retained activities post-TBI.
Conclusions: Executive functions are an independent predictor of activity participation in TBI. These results suggest that clinicians must emphasize the role of executive dysfunction during evaluation and treatment of individuals with TBI.
Correspondence: *Yael Goverover, PhD, Occupational Therapy, New York University, 35 West 4th Street, 11th Floor, New York, NY 10012. E-mail: yg243@nyu.edu*

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

Y. CHO & M. SOHLBERG. Training adults with brain injury how to help-seek when lost: A pilot study.

Objective: Effective help-seeking is a critical component of social problem solving, particularly in vulnerable populations such as people with traumatic brain injury who encounter challenges in task completion due to cognitive impairments. Surprisingly there is no research on the assessment or treatment of help-seeking behavior for persons with TBI. We adapted and integrated theoretical and treatment components from three empirically validated interventions that target social problem solving and communication skills including the GIST (Hawley & Newman, 2010), the PSG (Sherr, Langenbahn, Simon, Rath & Diller, 2003) and IPR (Helffenstein & Wechsler, 1982) to design an intervention protocol specifically targeting help-seeking in the context of wayfinding. This poster describes our group treatment protocol NICE (Noticing you have a problem, Identifying the information you need for help, Compensatory strategies, Evaluating progress) and presents preliminary pilot data evaluating its efficacy.

Participants and Methods: Three persons with brain injury were recruited from a brain injury residential program and participated in six group sessions over the course of six weeks using the NICE protocol. Efficacy was measured using the Executive Function Route-Finding Task (EFRT; Boyd & Sautter, 1985) administered pre and post treatment and weekly role play assessments requiring participants to engage with confederate helpers to find a destination.

Results: All three participants improved on the EFRT (Boyd & Sautter, 1985). Improvements were noted in social behaviors related to wayfinding during role plays. All participants reported a high degree of social validity evidenced by improvements on a social behavior scale and generalization of treatment effects to real life help-seeking.

Conclusions: Help-seeking is a constitutive factor in the wayfinding process. The NICE protocol is the first intervention specifically targeting help-seeking in people with TBI. Preliminary evidence supports further investigation of this group intervention.

Correspondence: *Young Susan Cho, University of Oregon, 5284 University of Oregon, Eugene, OR 97403. E-mail: ysc@uoregon.edu*

J. DAHM & J. PONSFORD. Comparison Of Long-term Outcomes Following Traumatic Injury: What Is The Unique Experience For Those With Brain Injury?

Objective: Whilst it has been well-demonstrated that traumatic brain injury (TBI) results in long-term cognitive, behavioural and emotional difficulties, less is understood about how these outcomes differ from those following traumatic orthopaedic injury (TOI). The aim of this study was to compare self-reported outcomes at 5-10 years post-injury for those with TBI, TOI, and uninjured controls. It was hypothesised that participants with TBI would have greater cognitive difficulties; participants with TOI and TBI would have similar functional and physical outcomes, both being poorer than controls; and participants with TBI would have poorer psychosocial outcomes than those with TOI.

Participants and Methods: 88 individuals with complicated mild to severe TBI, and 96 with TOI recruited during inpatient rehabilitation were followed up 5-10 years post-injury, together with 48 controls followed over a similar period. Measures of global functioning (GOS-E), quality of life (SF-36), psychological wellbeing (SCL-90-R, HADS, PCL-S), psychosocial difficulties (SIP), cognitive difficulties (SF-36 COG), pain (BPI), and fatigue (FSS) were administered.

Results: Outcomes for those with TBI and TOI differed significantly from controls, with poorer global functioning, and greater psychological distress and interference from pain. Only TBI participants reported greater cognitive difficulties, fatigue, and anxiety than controls, and were less likely to be employed or in a relationship. Participants with TBI reported greater anxiety, PTSD, psychological distress and psychosocial difficulties than those with TOI. Factors contributing to these findings will be explored.

Conclusions: Both TOI and TBI cause long-term disability, interference from pain, and psychological distress. However, cognitive impairments, unemployment, anxiety and PTSD are more significant long-term problems following TBI. Findings from this study have implications for managing risks associated with these injury groups and tailoring rehabilitation to improve long-term outcomes.

Correspondence: *Jane Dahm, Psychology, Monash University, Building 17, Monash University, Clayton, VIC 3800, Australia. E-mail: jane.dahm@monash.edu*

K.S. CHIOU, G. WYLIE, N. CHIARAVALLOTI & H. GENOVA. Self Report of Functioning and Objective Cognitive Performance Following Severe Traumatic Brain Injury.

Objective: Subjective complaints following traumatic brain injury (TBI) vary greatly. Importantly, self-assessment of functioning after TBI can have significant implications for recovery and the success of rehabilitation efforts. Indeed, studies in mild TBI have shown that reported complaints are predictive of performance on cognitive tasks. This study examined the nature and relationship of self- and other-reports of functioning in three domains (cognitive, affective, and motor) and objective cognitive performance after severe TBI.

Participants and Methods: 17 adults with severe TBI (GCS ≤8) completed a battery of cognitive tests. Participants and an informant also completed the Awareness Questionnaire (AQ), rating the participant's functioning after injury in cognitive (AQ-C), affective (AQ-A), and motor (AQ-M) domains. Correlation analyses were used to determine the relationship between AQ scores and cognitive test performance.

Results: Self-ratings were consistently lower than informants' ratings of participant functioning on the AQ-C, AQ-A, and AQ-M subscales. Self-reported AQ-A scores were negatively correlated with WMS-III Logical Memory Thematic Unit scores. Both self and informant AQ-A subscale scores were negatively correlated with performance on the PASAT, while both self and informant AQ-C scores were negatively correlated with performance on the DKEFS Color Naming task. An additional negative correlation was observed between informants' AQ-C scores and processing speed performance (Symbol Digit Modalities Test, DKEFS Trail Making Number Sequencing and Letter Sequencing).

Conclusions: Adults with severe TBI report worse post-injury functioning than their family members. The observed relationship between higher cognitive test performance and reports of poorer functioning reflects the Dunning-Kruger effect whereby adults with true ability underestimate their competency. Finally, relationships between self-report and actual performance do not generalize across domains.

Correspondence: *Kathy S. Chiou, PhD, Kessler Foundation, 1199 Pleasant Valley Way, West Orange, NJ 07052. E-mail: kchiou@kesslerfoundation.org*

L.A. WIEGAND, K.M. O'DELL, M.P. FAYTELL & H.J. HANNAY. Rates of Neuropsychological Test Completion, Reasons for Non-Completion and Relationship to TBI Severity.

Objective: Neuropsychological testing provides evidence of injury related deficits and helps predict outcome from TBI. Patient testability complicates evaluations. Some tests, not all, are completed by most patients at 3 months post injury. The study examined test non-completion rates and reasons why. We hypothesized that the PASAT would have a high non-completion rate, due to difficulties understanding the task on practice trials. We predicted that injury severity would be related to percentage of tests completed.

Participants and Methods: A sample of 175 participants was obtained retrospectively from a database with complicated mild, moderate or severe TBI consecutively admitted to a Neurosurgery Intensive Care Unit. A neuropsychological battery consisting of 12 tests was administered at 3-month post injury. Codes documented whether the testing was reliable, fully completed and, if not, the reasons why. Best Day 1 GCS served as the measure of injury severity.

Results: The PASAT had the highest non-completion rate (56%) primarily because of difficulty understanding the test requirements on practice trials (31%) that precluded further test administration. Non-completion rates for other tests ranged from 8%-18%. Reasons

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

for non-completion varied. Medical complications (e.g., high fever, respiratory problems etc.) were the most frequent at 3 months post-injury. A one way ANOVA with Best Day 1 GCS as the IV and percentage of tests completed as the DV produced a significant effect of injury severity (Welch's F=7.67, p=.001, df=2,105.96).
Conclusions: While understanding test instructions was the second most prevalent reason for non-completion, primarily from PASAT performance, medical complications was the most frequent reason even at 3 months post injury. This finding has implications for use of the PASAT clinically that will be discussed. As hypothesized, injury severity had a significant effect on test completion percentage. Test completion percentage may be a useful predictor of outcome.
Correspondence: *Lee A. Wiegand, BA psychology, Neuropsychology, University of Houston, 8300 El Mundo St, Apt 702, Houston, TX 77054. E-mail: law6583@alum.uncw.edu*

M.P. FAYTELL, K.M. O'DELL, L.A. WIEGAND & H. HANNAY. Evidence for the GOAT Score as an Indicator of Patient Readiness to Undergo Neuropsychological Testing Post-Traumatic Brain Injury.
Objective: Clinical neuropsychologists use the Galveston Orientation and Amnesia Test (GOAT) to determine patient readiness to undergo neuropsychological testing after traumatic brain injury (e.g. Boake et al. 2001). Utility of GOAT scores for predicting patient ability to complete neuropsychological testing has not been thoroughly documented in the literature. The current study retrospectively compared patient GOAT scores with their ability to complete a neuropsychological battery at three months post-injury.
Participants and Methods: A sample of 169 individuals with complicated mild, moderate and severe traumatic brain injury (TBI) was administered the GOAT and a neuropsychological battery of 12 tests at three months post-injury. Patient completion of each test was scored dichotomously as either completed or not completed. The percentage of tests completed for each individual was determined. These data were analyzed using point-biserial correlations. The sample was then divided into four categories based on GOAT scores (-8 to 40, 41-75, 76-99, 100); percent completion means for each group were compared using a one-way analysis of variance (ANOVA).
Results: GOAT scores were significantly correlated with the completed/not completed variable for all 12 tests (r_{pb} = .29-.55, p < .001). GOAT scores were also significantly correlated with percent completion of the entire battery (Spearman's rho = .48, p < 0.001). All correlational effect sizes were medium to large. The ANOVA revealed significant differences between the means for percent completion across GOAT score categories (Welch's F = 11.64, p < .001, df 3, 37.01).
Conclusions: Readiness to be tested neuropsychologically as measured by GOAT scores is strongly related to whether patients completed neuropsychological testing at three months post-injury, both for individual tests and across the battery. Higher GOAT scores were associated with more completed tests and higher percent completion of the battery.
Correspondence: *Marika P. Faytell, B.A., Psychology, University of Houston, 2925 Helena Street, Houston, TX 77006. E-mail: mpfaytell@uh.edu*

M. ROSSETTI, K.G. DENNY, V. GOVIND, B.E. LEVIN & A.A. MAUDSLEY. Orbitofrontal White Matter Microstructural Abnormalities in TBI and Executive Dysfunction, a DTI Pilot Study.
Objective: Orbitofrontal dysfunction is associated with behavioral and executive deficits following TBI. MRI has been shown to be a sensitive predictor of clinical outcome following severe injury, but its prognostic value is less clear in moderate TBI. This study explored whether diffusion tensor imaging (DTI) of orbitofrontal white matter is linked to executive dysfunction in a sample of subjects following moderate to severe TBI.
Participants and Methods: Nine severe to moderate TBI subjects (GCS 6-12; mean age= 28.2), and nine age matched controls (mean age= 29.8) were administered a neuropsychological battery that included WAIS-IV Digit Span and Matrix Reasoning, semantic fluency, and the Stroop test. TBI subjects were assessed on average at 57 days post injury. Mean diffusivity (MD) and fractional anisotropy (FA) were obtained via DTI acquired at 3T to measure microstructural abnormalities in orbitofrontal white matter.
Results: Independent samples t-tests were used to compare group differences.Significant group differences were observed between groups on select cognitive measures, with the TBI group performing worse than control subjects on tasks of working memory (p=0.004) and executive function (p=0.009). Compared to controls, the TBI group also demonstrated a significant increase in MD in the orbital white matter (p = 0.040). There were no significant differences in FA. Within the TBI group, a significant correlation was found between MD and semantic fluency (r = -0.490, p = 0.040). However, this association did not remain significant after controlling for education.
Conclusions: These findings demonstrate that DTI abnormalities in the orbital frontal cortex may be an important biomarker of microstructural damage underlying cognitive changes following moderate to severe TBI. This investigation supports the use of DTI as a sensitive tool linking white matter with well described executive dysfunction frequently encountered following TBI.
Correspondence: *M. Agustina Rossetti, M.S., Neurology, University of Miami, 1150 NW 14th Street, 1337, Miami, FL 33136. E-mail: mrossetti@med.miami.edu*

M. GILLIS & B.M. HAMPSTEAD. Please Repeat That: Patients With TBI Show Hyperactivation During Early Learning, But A Normal Repetition Suppression Effect.
Objective: Neuroimaging research has shown that patients with traumatic brain injury(TBI) demonstrate hyperactivation during fMRI-based memory tasks. We replicated this in a group of moderate-severe TBI patients who showed multiple areas of hyperactivation as they encoded object location associations(OLAs) relative to healthy controls(HC). However, the effect disappeared when repeated stimuli were used as a control condition. We hypothesized that this may be due to reduced repetition suppression, suggesting a possible mechanism for cognitive fatigue and inefficient encoding after TBI. This study was designed answer two questions:1)do patients with TBI show repetition suppression, and if so,2)is the effect of the same magnitude as in HC?
Participants and Methods: Six TBI patients and 6 HC performed a repetition suppression task during fMRI scanning. In each of 3 functional runs, 5 OLAs were presented over 5 encoding blocks that alternated with 5 retrieval blocks.
Results: Behavioral performances were comparable between groups. During early encoding the TBI group showed large areas of increased activation in the right prefrontal cortex and bilateral posterior parietal cortices relative to the HC. However, the TBI group showed repetition suppression from early to late encoding in visual and spatial processing regions. To compare the magnitude of the effect between groups, we calculated a difference score(beta weights for late minus early encoding) for regions of interest(ROIs) from each contrast. The TBI group showed a comparable repetition suppression effect in almost all of the selected ROIs, and in some regions the TBI group showed a significantly larger effect than HC.
Conclusions: Patients with TBI show hyperactivation during early learning, but a normal repetition suppression effect. Results add to our understanding of altered brain activation after TBI and provide support for rehabilitation techniques that include repeated exposure of small amounts of information to reduce cognitive fatigue and maximize learning.
Correspondence: *M. Meredith Gillis, Ph.D., Emory University, 1441 Clifton Road NE, Atlanta, GA 30322. E-mail: mmgilli@emory.edu*

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

U.M. VENKATESAN, N.A. DENNIS & F.G. HILLARY. Evidence for the Development and Maintenance of Altered Resting-State Functional Connectivity in TBI.

Objective: While TBI is known to result in widespread disruption of neural networks, regional functional connectivity patterns and their developmental trajectories after injury remain unclear, as does the possible risk for later neurodegeneration. To investigate these questions, we conducted resting-state functional connectivity (RSFC) analyses in both subacute and chronic TBI, selecting regions of interest consistently implicated in neurodegenerative disease: posterior cingulate cortex (PCC) and hippocampi.

Participants and Methods: Twenty-two participants with moderate-severe TBI (chronic; avg. years post injury = 2.5) and 19 healthy controls completed resting-state fMRI scanning. Longitudinal analyses were performed with fMRI data for 13 of the individuals with TBI approximately 3-4 months after injury (subacute). Seed regions of interest were derived from previous studies on PCC and hippocampal RSFC and seed-voxel connectivity analyses were performed using the CONN toolbox (Whitfield-Gabrieli & Nieto-Castanon, 2012).

Results: In chronic TBI vs. HC, PCC evidenced greater RSFC to anterior default mode network (DMN) regions. Controls demonstrated more negative RSFC of hippocampi with task-positive network (TPN) regions. Progression from subacute to chronic TBI resulted in decreased positive RSFC of PCC with DMN and increased negative RSFC of PCC with TPN. In contrast, negative RSFC of left hippocampus to TPN decreased from the subacute to chronic phase.

Conclusions: While PCC-DMN hyperconnectivity decreases during recovery from TBI, residual elevations persist into the chronic phase. Concurrently, there is a loss of hippocampal interplay with regions shown to support cognitive control, which may have implications for later cognitive functioning. These results parallel findings in Alzheimer's disease and related literatures, and underscore the importance of longitudinal investigation to probe possible neurodegenerative processes and further cognitive decline after TBI.

Correspondence: *Umesh M. Venkatesan, Psychology, The Pennsylvania State University, 419 Moore Building, University Park, PA 16802. E-mail: umv5002@psu.edu*

C.A. ROMAN, J.A. PINEDA, S.M. RAJTMAJER, G.R. WYLIE & F.G. HILLARY. Decreased White Matter Integrity Predicts Hyperconnectivity Following Traumatic Brain Injury.

Objective: Recent diffusion tensor imaging studies of axonal disruption following moderate to severe TBI (TBI) have shown that diffuse axonal injury (DAI) contributes to functional deficits and aberrant brain activation patterns. What remains unclear, however, is how axonal damage affects global functional connectivity within the brain. The present study investigates the relationship between white matter integrity and functional connectivity during the acute phase of recovery from TBI.

Participants and Methods: Sixteen individuals with TBI ages 19 to 53 years and eleven healthy participants comparable in age were scanned during an fMRI n-back task and DTI protocol. TBI participants were scanned 3-months after emerging from posttraumatic amnesia. Fractional anisotropy (FA), axial diffusivity (AD), and radial diffusivity (RD) values were acquired for 48 white matter ROIs for each subject using FMRIB's Diffusion Toolbox. In addition, SPM 8 and the Group ICA Toolbox (GIFT) were used to identify nodes in the fMRI data for graph theoretical analysis. Two graph theoretical measures (net strength of connections and number of links) were used to evaluate the relationship between axonal injury and global brain connectivity.

Results: Decreased FA in 8 white matter ROIs predicted functional hyperconnectivity in the TBI group. Moreover, decreased FA in the right external capsule and right uncinate fasciculus, predicted increased hyperconnectivity 6-months post injury. In addition, increased RD in 5 white matter ROIs predicted increased hyperconnectivity 6-months post injury for the TBI group but not the HC group.

Conclusions: This study is the first to integrate measurements of axonal integrity and whole-brain connectivity early after moderate and severe TBI. The data reveal important relationships between axonal injury and alterations in brain networks following TBI. The primary finding reveals that axonal disruption results in a paradoxical increase in global brain connectivity metrics (hypeconnectivity).

Correspondence: *Cristina A. Roman, B.S., Psychology, The Pennsylvania State University, 939 Southgate Drive, State College, PA 16801. E-mail: cristina.a.roman@gmail.com*

C.A. ROMAN, S.M. RAJTMAJER, J.D. MEDAGLIA, U.M. VENKATESAN, G.R. WYLIE & F.G. HILLARY. The Rich Get Richer: Brain Injury Elicits Hyperconnectivity in Core Subnetworks.

Objective: There remains much unknown about how neural networks adjust to neurological disruption and the factors associated with recovery after severe traumatic brain injury (TBI). A primary goal in this study was to examine the primary shifts in network topology occurring at 3 and 6 months following TBI.

Participants and Methods: The study participants included 22 individuals with moderate and severe TBI between the ages of 19 and 53 years and 15 healthy control subjects (HCs) of comparable age and education. Individuals with TBI underwent functional MRI data collection and cognitive testing at 3-months and 6-months after emerging from posttraumatic amnesia. Independent components analysis served to separate distinct functional nodes for graph theory analysis of fMRI data. We hypothesized that an early network response to physical disruption is hyperconnectivity and the brain's core subnetweorks (i.e., rich club) are the primary sites where hyperconnectivity is expressed.

Results: Analysis revealed significantly greater number and strength of connections as well as higher clustering coefficient in the TBI sample compared to the HC group. The mean nodal degree at time 1 was significantly and negatively correlated with speed of information processing at time 2 in the TBI sample.

Conclusions: Whole brain analysis of functional MRI data reveal that a common response to physical disruption is functional hyperconnectivity. Hyperconnectivity is most likely to occur in regions such as the posterior cingulate cortex and medial frontal region, core components of the default mode network. These members of the "rich club", or the brain's most highly connected regions, form the backbone to brain functioning and appear to be critical sites of post-injury hyperconnectivity.

Correspondence: *Cristina A. Roman, B.S., Psychology, The Pennsylvania State University, 939 Southgate Drive, State College, PA 16801. E-mail: cristina.a.roman@gmail.com*

J.B. MILLER, M.R. SCHOENBERG & R.M. BILDER. Consolidated Standards of Reporting Trials in Neuropsychology (CONSORT-NP): Guidelines and Recommendations for Neuropsychological Research.

Evidence based medicine (EBM) has been recognized as critical for the future of clinical neuropsychology. Across the medical sciences, the evidence upon which best practices are determined is derived from empirical literature, including randomized controlled trials (RCTs). To facilitate the conduct, dissemination and evaluation of research findings, reporting guidelines have been recommended, including the Consolidated Standards of Reporting Trials (CONSORT) statement. In the health sciences literature, the RCT is typically regarded as an ideal methodology for the assessment of treatment efficacy, and with the increasing application of neuropsychological endpoints in RCTs, it is imperative that neuropsychology adopt similar standards for reporting research findings if we are to remain at the forefront of behavioral medicine. This paper parallels several others related to transportation of reporting standards to neuropsychology (e.g., Loring & Bowden, 2013) and considers unique features of the CONSORT statement pertaining to neuropsychological research. A primary aim of the present paper is to review the CONSORT criteria with particular emphasis on application to the neuropsychology literature, and to RCTs in which neurocognitive data are used as primary or secondary endpoints. We further present new criteria for grading the quality of neuropsychological methods that

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

may be useful not only in clinical trials but also in other clinical and research contexts. Adopting a set of universal reporting standards for clinical trials would yield a multifaceted benefit to the field of neuropsychology, and ultimately serve to strengthen and align the empirical evidence-base by creating uniformity within the literature and increasing methodological transparency. Researchers, clinicians, educators and practitioners, as well as journal editors, reviewers, and ultimately, health care consumers alike have much to gain from implementation of such standards.

Correspondence: *Justin B. Miller, 888 West Bonneville Ave, Las Vegas, CA 89106. E-mail: justin.b.miller@gmail.com*

Cognitive Intervention/Rehabilitation

D. DAVID, D. SHEN, M. ERSEK, J. AMORY & M. CHERRIER. "Again?" Impact of Repeat Test Administration: Practice, Fatigue, and Examiner Effects.

Objective: Neuropsychological tests when administered as part of a comprehensive battery or when repeated are impacted by both participant and examiner factors. These may include demand characteristics of the testing environment, examiner-patient interactions, as well as patient motivation, fatigue, vigilance, and effort. This study examined performance of healthy middle- and older-aged adults given the same battery of cognitive tests three times over a period of one day as part of a study examining medication effects.

Participants and Methods: Seventy-one participants, 35 in the middle-age group (mean age 48.9 yrs) and 36 in the older-age group (mean age 74.4 yrs) participated in this study. The neurocognitive tests measured declarative memory, working memory, and attention. The battery of tests lasted 60 minutes and was given in the morning, after lunch, and again in the afternoon.

Results: Participants demonstrated a decreased performance from baseline on the declarative memory task (Hopkin's Verbal Learning Test total and delayed recall) and one attention task (Digit Symbol Coding) ($P < .05$). In addition, participants demonstrated an improvement from baseline on a working memory task (Letter-Number Sequencing) and one attention task (d2 Test of Attention) ($P < .05$). Results suggest that over the course of one day, participants may demonstrate both declines on some tasks and improvement on other tasks.

Conclusions: It is possible that declines may be attributable to fatigue during some tasks, in contrast to improvement in other tasks secondary to practice effects. Nonetheless, aspects of demand characteristics of the testing environment may also have influenced results. These findings suggest that there are a myriad of factors that can impact the performance of a patient across time, and the pattern of change can include both improvement and decline. Clinicians should consider that both factors can be present within a single battery of tests given over a period of time.

Correspondence: *Diana David, University of Washington, Box 358280, MD-B141, Arnold Building, 1100 N Fairview Ave, Seattle, WA 98109. E-mail: ddavid@zagmail.gonzaga.edu*

R. O'NEIL, R. SKEEL & K. USTINOVA. Cognitive Ability Predicts Motor Learning on a Virtual Reality Game in Patients with TBI.

Objective: Virtual reality games and simulations have been utilized successfully for motor rehabilitation of individuals with traumatic brain injury (TBI). Little is known, however, how TBI-related cognitive decline affects learning of motor tasks in virtual environments. To fill this gap, we examined learning within a virtual reality game involving various reaching motions.

Participants and Methods: Participants included 14 patients with TBI and 15 healthy individuals with different cognitive abilities. All participants practiced ten 90-second gaming trials to assess various aspects of motor learning. Cognitive abilities were assessed with a battery of tests including measures of memory, executive functioning, and visuospatial ability.

Results: Overall, participants with TBI showed both reduced performance and a slower learning rate in the virtual reality game compared to healthy individuals. Numerous correlations between overall motor performance and several of the cognitive ability domains were revealed for both the patient and control groups, with the best predictor of motor performance being overall cognitive ability; both visual memory and visuospatial abilities were also significant predictors of performance in both the early and late stages of learning for the TBI group.

Conclusions: The results provide a starting point for rehabilitation programs regarding which cognitive domains interact with motor learning and thus provide and additional focus for intervention.

Correspondence: *Rochelle O'Neil, M.A., Central Michigan University, 4075 South Isabella Road, Apartment AA 15, Mount Pleasant, MI 48858. E-mail: ONeil1rl@cmich.edu*

A. JAK, C. HAYS, H. ORFF, D. SCHIEHSER & E. TWAMLEY. Depression Limits Post-Concussive Symptom Improvement in Veterans with a History of TBI.

Objective: In a randomized controlled trial, Cognitive Rehabilitation and Symptom Management and Rehabilitation Therapy (CogSMART), was shown to be effective in reducing post-concussive symptoms in OEF/OIF Veterans (Twamley et al., in press). We sought to evaluate CogSMART in a clinical sample of Veterans with objective neuropsychological deficits consistent with a DSM-IV diagnosis of Cognitive Disorder, NOS, a history of TBI, and multiple medical and psychiatric comorbidities.

Participants and Methods: 29 Veterans, ages 23-64, completed 10-12 weeks of CogSMART in either group (n=21) or individual (n=8) format. Assessments of post-concussive (e.g., Neurobehavioral Symptom Inventory; NSI) and depressive symptoms (e.g., Beck Depression Inventory; BDI) were administered prior to and after completion of treatment.

Results: Post-treatment depressive and post-concussive symptoms were equivalent between treatment modalities (group vs. individual) and injury severity (all ps >.14). However, Veterans endorsing only mild pre-treatment depressive symptoms (BDI<18) had significantly greater improvements in post-concussive symptoms on the NSI following treatment than did those endorsing moderate to severe depressive symptoms (BDI>18) (p=.008). Additionally, non-OEF/OIF Veterans (n=12) experienced greater reduction in NSI scores post-treatment than did OEF/OIF Veterans (n=17) (p=.06); there were no differences in initial level of depressive symptoms between Veteran eras (p=.59), but there was a trend towards greater decline in depressive symptoms during treatment for non-OEF/OIF Veterans compared to OEF/OIF Veterans (p=.15).

Conclusions: Consistent with the literature highlighting mood contributions in the persistence of post-concussive symptoms, these results indicate that higher levels of depression can also impede response to treatment for cognitive symptoms. Mood treatment for individuals with persistent post-concussive symptoms should be prioritized in treatment decisions for this complicated clinical group.

Correspondence: *Amy Jak, Ph.D., VA San Diego/UCSD, 3350 La Jolla Village Dr., San Diego, CA 92161. E-mail: ajak@ucsd.edu*

A. VAS, M. KEEBLER, G. RODRIGUEZ-LARRAIN, D. KRAWCZYK & S. CHAPMAN. Neurocognitive Outcomes following Reasoning Training in mild TBI.

Objective: The current study compared cognitive and functional benefits of two programs in adults with mTBI (GOS-e-7, BDI < 20). One training program, SMART, focused on complex reasoning using strategies of strategic attention, integration, and innovation. The second program (Brain Health Workshop, BHW) focused on understanding brain health through education of brain anatomy and effects of lifestyle behavior on brain health. Both group-programs were comparable in training hours, engagement in group discussions, and assignments.

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

Benefits of the programs were compared pre- vs. post-training on complex reasoning, executive function, memory, and daily life skills.
Participants and Methods: The current sample is a subset of a larger DoD funded randomized control trial. Fourteen mTBI participants (3 veterans and 11 civilians) in chronic stages of recovery (> 1yr post-TBI) between 19-60yrs (M=34.07, SD=11.87) received one of the training programs. Out of the 14, 7 received SMART and 7 participated in BHW. Both groups were comparable (p>0.1) on participant characteristics of current age, IQ, chronicity, and SES.
Results: Results showed significant (p<.05) group X time interaction gains in the SMART group on switching and mental flexibility. The BHW group showed significant gains only in processing speed. Group x time analyses also found positive trends (p< 0.1) in the SMART group as compared to BHW on complex reasoning, inhibition, memory, and daily function. Ongoing imaging analyses suggest significant increases resting state cerebral blood flow in SMART participants who were responders as compared to those who were not at an individual level of comparison.
Conclusions: Current findings provide preliminary evidence that adults with mTBI could benefit from complex reasoning training that enhances cognitive performance and functional abilities. Furthermore, the findings highlight the need for higher-order cognitive training even in chronic stages of recovery for the growing number of mild TBIs.
Correspondence: *Asha Vas, PhD, Center for BrainHealth, University of Texas at Dallas, 3213 Wells Drive, Plano, TX 75093. E-mail: asha.vas@utdallas.edu*

T. NOVAKOVIC-AGOPIAN, A. CHEN, G. ABRAMS, A. ROSSI, M. MURPHY, F. LOYA, D. BINDER, J. MUIR & M. D'ESPOSITO. Short and Long Term Outcomes of GOALS Executive Function Training in Veterans with Chronic TBI.
Objective: Impairments in executive control functions, including selection, maintenance, and execution of goal-relevant information and activities are some of the most disabling consequences of brain injury. Goal-Oriented Attentional Self-Regulation (GOALS) training was designed to target these deficits with attention regulation training applied to participant-defined goals. In a pilot study individuals with chronic ABI significantly improved post GOALS, but not control training, on measures of attention/executive function, functional task performance, and goal-directed control over neural processing on fMRI (Novakovic-Agopian, Chen et al 2011; Chen, Novakovic-Agopian et al 2011). The objective of ongoing study is to assess short and long term effectiveness of GOALS training in Veterans with chronic TBI
Participants and Methods: 23 Veterans with chronic TBI and mild-moderate executive dysfunction were randomized to start with either 5 week GOALS or control Brain-Health (EDU) training. Participants that started with EDU switched to GOALS during second 5 weeks. Assessments at baseline, weeks 5, 10 and 6 months included neuropsychological, functional task performance and self-report measures
Results: Post GOALS training, but not post EDU, participants significantly improved on measures of attention/executive function, complex functional task performance, and on emotional regulation and daily functioning self-report. Participants maintained these improvements at 6 month follow-up evaluations, and reported incorporating trained strategies into their daily life
Conclusions: GOALS training may be promising in Veterans with chronic TBI. Improving cognitive control functioning may also improve functioning in other domains such as emotional regulation and functional performance. The challenges and importance of: a) using ecologically valid assessment measures; b) assessing change in functioning at different levels; and c) using participant-defined goals applied to relevant training, will be discussed
Correspondence: *Tatjana Novakovic-Agopian, Ph.D, Neurology, UCSF, SFVA, 661 Myra way, San Francisco, CA 94127. E-mail: tna@cns-site.com*

J.E. FAIR, D.K. BJORNN, S.W. LIEBEL & M.J. LARSON. A Controlled Study Comparing Errorless and Errorful Learning in Moderate-to-Severe TBI.
Objective: Traumatic brain injury (TBI) is often associated with impairment in learning and memory abilities. Errorless learning is an effective technique in improving learning and memory in healthy individuals as well as in some clinical samples. Studies of individuals with TBI, however, are lacking. We examined the effect of a single session where moderate-to-severe (M/S) TBI and healthy control participants received both errorless (EL) and errorful (EF) learning conditions.
Participants and Methods: Individuals with M/S TBI and healthy controls (n=24 per group) were recruited to complete a single session word-learning task with counterbalanced EL and EF learning conditions. EL included presenting a target word and having participants repeat it. EF required them to guess a word when only the first two letters of a word were provided. After each condition participants completed a recognition memory task. Accuracy and response time data were analyzed using repeated measures analysis of variance (ANOVA).
Results: For accuracy data, a Group x Condition (EL, EF) ANOVA revealed a main effect of group that trended toward significance (p=.057). More importantly, there was a significant Group x Condition interaction (p=.05). Controls performed disproportionately better on EL than EF learning relative to the TBI group, with TBI showing no significant difference in accuracy between EL and EF conditions. A Group x Condition x Accuracy ANOVA on response times revealed a main effect of group (p=.03), with the TBI group slower for both conditions. There was also a main effect of Condition on RT, with both groups responding more quickly in the EL than EF condition (p=.05).
Conclusions: Results suggest that for a single training session, healthy individuals showed significant benefit from EL training, but survivors of M/S TBI did not. Data indicate that EL does provide the benefit of faster RTs as compared to EF. Further research regarding the role of number and/or duration of rehabilitation sessions to achieve optimal benefit is needed.
Correspondence: *Daniel Bjornn, BS, Brigham Young University, 1190 North 900 East # 170, Provo, UT 84602. E-mail: daniel.bjornn@gmail.com*

M.A. COLE, L.R. ALAMEDDINE & J.J. GANS. Simultaneous Treatment of Neurocognitive and Psychiatric Symptoms: A Mindfulness-Based Intervention Pilot Study in Comorbid Chronic Mild Traumatic Brain Injury and Posttraumatic Stress Disorder.
Objective: Treating patient populations with significant psychiatric symptomatology *and* neurocognitive deficits can present a unique clinical dilemma. Specifically, progress in psychotherapy can be significantly fettered by cognitive deficits, while neurocognitive rehabilitation efforts can be rendered largely ineffective due to significant psychiatric overlay by, for instance, posttraumatic stress disorder (PTSD) symptomatology. Application of mindfulness-based interventions to address either cognitive or psychiatric symptoms in isolation appears highly efficacious in many contexts; however, it remains unclear as to the extent to which this type of intervention might be helpful in addressing simultaneous neurocognitive disruption and psychiatric symptomatology.
Participants and Methods: In a pre-post design pilot study, 9 veterans with PTSD and a history of chronic mild traumatic brain injury participated in a 9-week mindfulness-based stress reduction class. Neurocognitive and psychodiagnostic measures were administered immediately before and after the intervention.
Results: While controlling for practice effects, measurement of neurocognitive performance revealed significant improvement in processing speed and attention ($p < 0.05$, $d > 0.55$), but minimal improvement in verbal and spatial learning and memory. Regarding psychiatric symptoms, significant symptom reduction was observed for ruminative behaviors (e.g., maladaptive and repetitive focus on certain thoughts) and PTSD ($p < 0.05$, $d > 0.85$). Reduction in anxiety symptoms was also found (trait anxiety, $p = 0.13$, $d = 0.62$).

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

Conclusions: Findings suggest efficacy of mindfulness-based intervention to simultaneously address neurocognitive and psychiatric symptoms, thus warranting randomized controlled trial follow-up. Potential mechanisms for the notably diverse impact of this intervention will also be discussed.
Correspondence: *Michael A. Cole, Ph.D., VA Northern California, 150 Muir Road, Martinez, CA 94553. E-mail: michaelallancole@gmail.com*

A.S. ROSENBLATT, J. DEGUTIS, B. MCCULLOCH, R. MERCADO, W. MILBERG & R. MCGLINCHEY. Training Sustained Attention and Inhibitory Control Improves Attention and Clinical Symptoms in OEF/OIF Veterans.

Objective: OEF/OIF veterans commonly experience poor concentration, sleep difficulties, and symptoms of post-traumatic stress disorder (PTSD) upon return to civilian life. Recent research (Aupperle et al, 2011) suggests that sustained attention and inhibitory control dysfunction may partially underlie several of these post-deployment experiences. We tested whether enhancing sustained attention and inhibitory control through at-home web-based training could improve cognitive functioning and self-reported clinical symptoms.
Participants and Methods: Training group participants (N=14) completed 10 x 36-minute sessions of a not-X continuous performance task that included particular elements to help them stay engaged (e.g., jittered inter-trial intervals and rich, colorful stimuli). This group was compared to a test-retest control group (N=14). All participants completed a battery assessing 4 domains (sustained attention, distractor suppression, verbal memory, and self-reported clinical symptoms) before and after the training/wait period.
Results: Repeated measures MANOVAs revealed significant overall group x pre/post interactions for sustained attention and self-reported clinical measure domains. Specifically, participants in the training group improved significantly on the Attentional Blink task (updating working memory) and showed reduced commission errors on the Gradual-Onset Continuous Performance Test. Participants also reported a significant decrease in dissociative symptoms after training. Exploratory analyses revealed that participants with more severe PTSD symptoms had the strongest post-training improvements in inhibitory control accuracy, PTSD symptoms, and updating working memory.
Conclusions: These results support that sustained attention and inhibitory control are linked to post-deployment complaints and provide evidence that training these mechanisms can lead to improvements in clinical symptoms. They also suggest that web-based attention training can potentially complement more widely accepted PTSD treatments.
Correspondence: *Andrew S. Rosenblatt, BA, Psychology, University of Houston, 4655 Wild Indigo St, Apartment #29, Houston, TX 77027. E-mail: asrosenblatt@uh.edu*

J.F. SUMOWSKI, A. COHEN, J. COYNE & J. DELUCA. Retrieval practice improves delayed recall after one week in persons with severe traumatic brain injury.

Objective: Memory impairment is a common consequence of severe traumatic brain injury (TBI), but there are currently no effective memory treatments. Retrieval practice (RP) is a mnemonic strategy whereby practice retrieving information (self-quizzing) leads to much better subsequent recall than massed restudy (MR) or spaced restudy (SR). We have shown this effect after a short delay (45 minutes) in a previous sample of TBI survivors, and we now investigate whether RP leads to better recall than MR and SR after both short (30 minutes) and long (1 week) delays.
Participants and Methods: In a within-subjects design, ten survivors of severe TBI with memory impairment (<5th percentile) studied 48 verbal paired associates (VPAs) equally divided into MR, SR, or RP learning conditions. Recall for half of VPAs was assessed after 30 minutes, and the other half after one week.
Results: There was a very large main effect of learning condition after the short delay ($p = .00001$; $\eta 2 = .72$). Subjects recalled 46.3% of VPAs studied through RP, compared to only 12.5% through MR ($p < .0001$) and 15% through SR ($p = .002$). SR did not result in better memory than MR ($p=.555$). The large effect of learning condition remained after the long delay ($p = .001$; $\eta 2 = .56$). Patients recalled 11.3% of VPAs studied through RP, compared to 0.0% through MR ($p = .004$) and 1.3% through SR ($p=.011$). MR and SR did not reliably differ from each other ($p = .343$).
Conclusions: RP was essentially the only learning condition to result in successful recall after one week, with most subjects remembering at least one VPA learned through RP. This robust effect among TBI survivors with severe memory impairment engenders confidence that this strategy would work outside the laboratory to improve memory in real-life settings. Future randomized controlled trials of RP training are needed.
Correspondence: *James F. Sumowski, Ph.D., Neuropsychology & Neuroscience, Kessler Foundation Research Center, 300 Executive Drive, Suite 70, West Orange, NJ 07042. E-mail: jsumowski@kesslerfoundation.org*

S.H. MANN, M. PUROHIT & B. ABLITZ. Differential Impact of Education on Recovery from Acquired Brain Injury.

Objective: Previous studies have found evidence for higher education as a protective factor among traumatic brain injury (TBI) and stroke patients regarding post-injury cognitive test scores, consistent with cognitive reserve theories. Another study found that, among TBI patients who completed a neurorehabilitation program, graduating from college was predictive of better recovery and responsiveness to treatment. Limited research is available on the association between education and functional recovery among stroke patients. This study sought to replicate previous research regarding the impact of educational attainment on functional outcomes for TBI patients, and to extend upon it by also examining these effects among stroke patients. It was hypothesized that higher education would be related to better outcomes in both patient groups.
Participants and Methods: Participants included TBI (N=167) and stroke (N=93) patients ≥18 years old who completed a neurorehabilitation program between 2008-2013. Outcome data was based on the difference between admission and discharge scores on the Mayo-Portland Adaptability Inventory-4 (MPAI-4) total and three subscales (Abilities, Adjustment, Participation). Participants in each group (TBI and stroke) were bracketed according to education (low: ≤11 yrs; medium: 12-15 yrs; high: ≥16 yrs). The relationship between education level and each aspect of functional recovery was examined, controlling for age.
Results: ANCOVA analyses revealed that, for the TBI group, high education was related to better prognosis for overall adaptability, psychosocial adjustment, and community participation, although no significant differences were found between education groups with regard to cognitive/physical abilities. In contrast, education did not have a significant impact on any aspect of functional outcome for the stroke group.
Conclusions: Findings suggest that the extent to which education serves as a protective factor for functional recovery may vary depending on type of acquired brain injury.
Correspondence: *Brian Ablitz, Psy.D., NeuroRehab Services at Goodwill NNE, 618 Main Street, Lewiston, ME 04240. E-mail: brian.ablitz@goodwillnne.org*

S.L. ROSS, F.M. GROUZET & R.W. SKELTON. The Benefits of a Semi-Structured Community-Based Group for Brain Injury Survivors.

Objective: Traumatic brain injury (TBI) has an important impact on a survivor's daily functioning but also on their subjective and psychological well-being (Ross, Grouzet & Skelton, submitted). Community-based brain injury societies often offer programming in the group format, and some of these groups address the difficulties experienced post-injury by proposing adaptive coping strategies. The objective of this quasi-experimental study was to examine the effect of such an intervention on

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

survivors' daily functioning, subjective and psychological well-being, and abilities to cope with TBI and get social support.
Participants and Methods: Drawing on validated measures of well-being, coping and social support, and on previous research in our laboratory, we developed a questionnaire that group participants completed on the first and last day of a 20 week program. The program was delivered as 2-hour weekly sessions facilitated by a staff member of the Victoria Brain Injury Society. Since 2009, 41 heterogeneous brain injury survivors completed all sections of both pre- and post-questionnaires.
Results: Significant pre-post improvements were found in daily functioning, everyday satisfaction, emotional well-being (i.e., balance between positive and negative affect) and psychological well-being, as well as perceived social support. In terms of the frequency of use of different coping strategies, there was a significant decrease in self-blame and a significant increase in taking different perspectives on the situation.
Conclusions: We believe these data indicate that this coping skills program produced significant benefits to the brain injury survivors who participated, and that these benefits extended into many different areas of their lives. The results also speak to the potential benefits of community-based interventions more broadly.
Correspondence: *Stacey L. Ross, M.Sc., Psychology, University of Victoria, P.O. Box 1700, STN CSC, University of Victoria, BC V8W 2Y2, Canada. E-mail: slross@uvic.ca*

K.R. THOMAS & M. MARSISKE. Age Trajectories of Everyday Cognition in African American and White Older Adults under Prompted and Unprompted Conditions.
Objective: We investigated how race and verbal prompting interacted with age to predict age trajectories on a performance-based measure of everyday cognition.
Participants and Methods: African American (n=727) and White (n=2,052) older adults from the ACTIVE clinical trial were followed for up to 10 years (mean baseline age=74.12 years; mean education=13.52 years). Participants were given the Observed Tasks of Daily Living (OTDL; an objective measure with tasks involving medication management/finances/telephone use) at baseline and at 1-, 2-, 3-, 5-, and 10-year follow-ups. When participants said "I don't know" or did not respond to an item, they received a standardized verbal prompt, which did not give the answer, but served as a cue to initiate the first step. At each administration, unprompted (sum of items correct without prompting) and prompted (sum of items correct including both prompted and unprompted) scores were derived for each participant.
Results: Multi-level modeling, adjusting for demographics/health/training group, was used to determine the age trajectories of OTDL performance by race. When not prompted, African Americans demonstrated much greater accelerated decline in OTDL performance beginning at about 80-years-old than Whites. When prompted, there was no evidence of differential rates of age-related change between African American and White participants—both groups evinced much shallower decline.
Conclusions: While there was accelerated decline for unprompted performance in African Americans after age 80, very simple prompting effectively equated the age-related changes of African American and White older adults on a measure of everyday cognition. Prompting in neuropsychological testing may be especially beneficial for older African Americans. The discussion considers possible mediators of the accelerated decline in African Americans.
Correspondence: *Kelsey R. Thomas, MS, Clinical and Health Psychology, University of Florida, 1225 Center Drive, PO Box 100165, Gainesville, FL 32608. E-mail: krthomas@phhp.ufl.edu*

D. MECHANIC-HAMILTON, F. GREENFIELD, S. NEGASH, M. LIVNEY, A. BONACQUISTI, P. MOBERG & S. ARNOLD. The Cognitive Fitness Program: A Comprehensive Intervention to Increase Behaviors Associated With Successful Cognitive Aging.
Objective: Older adults are seeking ways to maintain and improve cognition and daily functioning. The Cognitive Fitness Program (CogFit) is a comprehensive clinical intervention designed to put common recommendations regarding compensatory strategies and wellness behaviors into action. This study aimed to evaluate the impact of CogFit on cognition, emotional functioning, and behavior among older adults who participated in the program.
Participants and Methods: Forty subjects with no cognitive complaints, subjective cognitive complaints, or MCI completed CogFit. CogFit is a 2-3 month group intervention in which participants meet 2 times per week for 3 hours. Participants learned compensatory strategies for memory and organizational difficulties, engaged in computerized brain training, and learned how to improve wellness behaviors associated with better cognitive health (e.g., physical exercise, nutrition, mindfulness). Pre and post-CogFit, participants completed measures of neuropsychological functioning and wellness behaviors, self and clinician reports of emotional functioning, and self and partner reports of daily functioning.
Results: We examined the percent increase in compensatory behaviors and changes (repeated-measures t-test) in cognition, emotional functioning, and wellness behaviors. Participants reported an increase in their use of tools acquired from CogFit, wellness behaviors, and knowledge of the importance of wellness behaviors, and improved attitudes toward aging. Neuropsychological data were more variable.
Conclusions: CogFit is a novel and comprehensive clinical intervention to maintain or improve cognitive functioning in older adults. CogFit may improve attitudes toward increasing cognitive and wellness activities. It can serve to support positive and sustained behavior change. Future directions include examination of which populations are best served with this type of intervention, sustainability of effect, and evaluation of the impact of each component of the program.
Correspondence: *Dawn Mechanic-Hamilton, Penn Memory Center, University of Pennsylvania, 3400 Civic Center Blvd., 2 South, Philadelphia, PA 19147. E-mail: mechanicd@uphs.upenn.edu*

L. HANCOCK, J. THELEN, B. ROBERG, L. FLETCHER, J. MCGEE, B. BAKER, S. LYNCH & J. BRUCE. Participant Satisfaction in a Randomized Controlled Trial of Computerized Cognitive Training in MS.
Objective: Cognitive training is becoming a widely studied tool to help a variety of patients preserve or improve cognitive skills. These programs are often challenging and long, which frequently leads to high attrition rates. Despite this, few studies have addressed the satisfaction of individuals who participate in cognitive training. The purpose of this study was to explore patient reactions to their participation in a cognitive training program.
Participants and Methods: Participants were part of a larger double-blind, randomized controlled trial investigating the effect of computerized cognitive training. Seventy-one participants with multiple sclerosis (MS) were initially enrolled in the larger study, but only 40 completed the trial. Participants engaged in computer-based training in their homes for a 6-week period. We collected data regarding adherence to the training program via self-report and analysis of computer-recorded training logs. Participants also completed a questionnaire of their satisfaction with the training program.
Results: In the active training group, 63% attained perfect adherence by objective report and 59% attained perfect adherence by self-report. In the sham training group, 71% attained perfect adherence by objective report and 59% attained perfect adherence by self-report. Overall, 93% of participants reported they were mostly or very satisfied with the training programs. Individual training session length was rated as "just right" by 71% of all participants, and the overall training regimen schedule was reported to be "just right" by 68% of participants. Most participants also reported they would recommend computerized cognitive training to their friends with MS.
Conclusions: A large number of patients failed to complete cognitive training. Among MS patients who completed cognitive training, satisfaction was generally high. Future studies are needed in order to determine whether other patient groups experience similar levels of satisfaction with their cognitive training experience.

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

Correspondence: *Laura Hancock, Ph.D., Psychiatry and Human Behavior, Alpert Medical School of Brown University, The Miriam Hospital, 146 West River St., Suite 11A, Providence, RI 02904. E-mail: laura_hancock@brown.edu*

L. HANCOCK, J. THELEN, B. ROBERG, L. FLETCHER, J. MCGEE, B. BAKER, S. LYNCH & J. BRUCE. Investigating the Effect of Focused Computerized Cognitive Training in Multiple Sclerosis: A Pilot Study.

Objective: Up to 65% of multiple sclerosis (MS) patients experience cognitive deficits, which have been associated with problems managing independent activities of daily living, poor adherence to medications, unemployment, and difficulty driving. Recent research suggests that the core cognitive deficit in MS is likely slowed processing speed. Impaired working memory also impacts cognitive performance in a wide array of cognitive domains. Cognitive training efforts with MS patients to date have failed to concentrate on specific skills or show consistent improvements. The goal of the current study was to examine the effect of a computer-based cognitive training program that specifically targets processing speed and working memory in MS.

Participants and Methods: The investigation involved a double blind, placebo-controlled design. Participants were randomly assigned to an active or sham training group. Forty participants engaged in baseline and follow-up neuropsychological testing, in addition to completing computer-based cognitive training sessions that were held in their homes for a 6-week period. We examined outcomes using alternate forms of neuropsychological tests that measure skills in multiple cognitive domains.

Results: When compared to controls and after correcting for multiple comparisons, participants in the Active training group exhibited significant improvements on a measure of processing speed (Paced Auditory Serial Addition Test (PASAT), p = .003), and data trended toward significance on measures of executive functioning, working memory, and visual memory. Fifty-three percent of patients in the active training group demonstrated reliable improvements on the PASAT.

Conclusions: These preliminary findings suggest that home-based computer training may improve aspects of cognitive functioning in MS, including processing speed. Additional research with larger samples is needed to fully appreciate the potential benefits of working memory and processing speed training in MS.

Correspondence: *Laura Hancock, Ph.D., Psychiatry and Human Behavior, Alpert Medical School of Brown University, The Miriam Hospital, 146 West River St., Suite 11A, Providence, RI 02904. E-mail: laura_hancock@brown.edu*

T.D. VANNORSDALL, D.J. SCHRETLEN, R. JAYATILLAKE, R. SKOLASKY, J. VAN STEENBURGH, J. HERNANDEZ, M. VARVARIS & B. GORDON. Improving Cognition in Healthy Older Adults with Transcranial Direct Current Stimulation.

Objective: Transcranial direct current stimulation (tDCS) involves passing weak direct electrical current through the scalp, producing a polarity-dependent alteration of the electrical potential in underlying cortical tissue. tDCS can improve cognitive and neurologic functioning in patients. However, it is unknown whether tDCS can enhance cognitive functioning in healthy adults experiencing normal age-related declines in cognitive efficiency, or whether specific participant characteristics might impact responsiveness.

Participants and Methods: We administered 1.5mA of anodal tDCS and sham stimulation in counterbalanced order to the left temporoparietal region of 24 healthy adults aged 55 to 80 while they engaged in a variety of cognitive tests. Repeated-measures ANOVAs explored stimulation effects on cognition; task and stimulation condition served as between subject and within-subject effects, respectively.

Results: Anodal stimulation did not alter cognitive performance in the full sample. However, a subset of participants did show improvements relative to sham stimulation. Responders generally had lower IQ than nonresponders but the groups were similar in age, sex, educational attainment, and MMSE scores. After stratifying by median IQ, anodal stimulation increased letter-cued verbal fluency by an average of 2.2 words (SD = 1.8) relative to sham in the 12 participants with IQs of 90 – 110 ($F(1,10) = 6.07$, $p = 0.03$). Trends towards improved performance with anodal tDCS were also found for measures of recognition memory, attention/working memory, and processing speed (ps = 0.05 – 0.08), as was a trend toward slower right hand speed/dexterity ($p = 0.06$) in the same participants.

Conclusions: These results contribute to the growing literature on individual differences in neural responsiveness to brain stimulation. They also suggest that tDCS might have a role in mitigating normal age-related cognitive decline, particularly in persons with lower cognitive reserve.

Correspondence: *Tracy D. Vannorsdall, PhD, Psychiatry, Johns Hopkins University School of Medicine, 600 N. Wolfe Street, Meyer 218, Baltimore, MD 21224. E-mail: TVannor1@jhmi.edu*

K. KINGSLEY & M. ARONSSON. Anti-NMDA Receptor encephalitis: cognitive deficits and treatment.

Objective: The study describes the clinical presentation, cognitive functioning, and recovery after neuropsychological rehabilitation in three cases of confirmed Anti-N-methyl-D-apartate receptor encephalitis. Anti-NMDA receptor encephalitis, an autoimmune disorder, has been associated with symptoms including behavioral changes, irritability, seizures and dyskinesias, as well as memory loss and learning problems. Although the clinical features of the acute disease are well characterized, cognitive long-term outcomes have not been examined in detail.

Participants and Methods: The authors investigated the cognitive levels of performance of three patients, ages 20s through early 30s, with proven anti-NMDA encephalitis, and after recovery from the acute stage of the condition. The participants had variations in medical history. Neuropsychological assessments were employed to measure changes in executive aptitude, memory, attention and overall cognitive functionality.

Results: Substantial and persistent cognitive impairments in executive functioning and memory ubiquitously were observed in all three individuals. The severity of deficits, were heterogeneous for each case. Reductions were prevalent in the realm of executive functioning (initiation), non-contextual and contextual recall & recognition, and working memory. Such deficits may indicate an encephalopathy with hippocampal involvement.

Conclusions: Cognitive deficits in patients recovering from anti-NMDA encephalitis constitute a major long-term morbidity. Such declines in functioning suggest an encephalopathy with frontal and limbic involvement. Treatment efficacy in promoting functional long term recovery needs to be further established.

Correspondence: *Kristine Kingsley, Psy.D., ABPP, Rusk Rehabilitation, NYU Langone Medical Center, 240 East 38th Street, 17th floor, New York, NY 10016. E-mail: Kristine.Kingsley@nyumc.org*

T. CHOI, J. HA, Y. HWANG & S. PYUN. Feasibility and Characteristics of 'Korean Limb and Oral Apraxia Test (KAT)' in Patients with Supratentorial Stroke.

Objective: Few clinical measures exist to examine limb and oral apraxia in Korea. Thus, we developed the 'Korean Limb and Oral Apraxia Test (KAT)' (Pyun et al, 2012), a comprehensive assessment for limb and oral apraxia based upon a cognitive neuropsychological model of limb praxis, and standardized KAT in normal 285 adults. However, application of KAT in stroke patients has not been done before, and therefore we investigated feasibility and characteristics of KAT in supratentorial stroke patients.

Participants and Methods: KAT is composed of total 72 items in 4 domains (meaningless gesture; intransitive gestures; transitive gestures; oral gestures), and a score of each item ranges from 0 to 3 (0, incorrect; 1, partially adequate; 2, adequate; 3, normal) points. Five questions to

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

screen auditory comprehension skills were included as a pretest. We applied KAT in 49 supratentorial stroke patients, and analyzed clinical characteristics.
Results: In 49 patients with supratentorial stroke, the mean KAT scores were significantly lower as compared to normal population in total (190.2 vs 212.4), limb (149.1 vs 165.2) and oral (41.1 vs 47.2) scores. Patients with total score below 2 standard deviation from normal adult mean value were 18 among 49 patients (36.7%). According to the lesion side, the mean KAT scores were significantly lower in left hemispheric stroke patients in limb (right vs left; 159.7 vs 142.8, p=0.047) scores, and with borderline significance in total (203.4 vs 182.2, p=0.053) scores. However, there was no significant difference in oral (43.7 vs 39.4, p=0.125) scores. There were significant correlations between KAT scores and MMSE scores (total, r=0.809; limb, r=0.796; oral, 0.746; p=0.00), in contrast, no significant correlation with age or education level.
Conclusions: Newly developed KAT is a useful and feasible tool to test apraxia for patients with supratentorial stroke. KAT score tends to be lower in left hemispheric stroke patients, and has no significant correlation with age and education level.
Correspondence: *Tae Woong Choi, M.D., Physical Medicine and Rehabilitation, Korea University Medical Center, Inchon-Ro 73, Seoul 136-705, Republic of Korea. E-mail: bigbear0104@naver.com*

S.J. MACOUN, K.A. KERNS & A. SUNG. Direct Attention and Executive Function Cognitive Training in Children with Autism Spectrum Disorder.
Objective: This pilot study represents one of the first wait-list control design outcome studies of direct cognitive attention/EF training in ASD. Most individuals with ASD display co-morbid attention/EF problems, including focusing, shifting, switching, inhibiting, and WM, many at the severity levels seen in ADHD. Direct cognitive interventions for attention/EF in other neurodevelopmental disorders have shown benefits including cognitive, behavioural and academic gains, but this has not yet been explored in ASD.
Participants and Methods: We investigated whether children with ASD could benefit from a direct computerized cognitive training program for attention and WM (Caribbean Quest, CQ) using a process specific approach. Outcome measures included attention and EF, social, behavioural, and academic function. Participants were 21 children diagnosed with ASD (ADI-R and ADOS), with re-confirmation of ASD symptomatology upon study enrollment. Participants completed pre/post-tests of attention/EF and academic fluency. Teachers/parents completed pre/post rating scales assessing attention, EF, behavior, and social function. The CQ was delivered one-to-one within a school setting by a special educator, over 8 to 10 weeks (12 training hours). The CQ includes five 'games', which are self-adjusting and hierarchically more demanding and which aim to strengthen attention/EF through massed practice on tasks exercising aspects of attention/WM.
Results: Results of this intervention, analyzed qualitatively and quantitatively, were mixed. Reliable changes were seen on certain cognitive tasks, with null effects on others. Parent ratings of gains in EF, attention, externalizing behaviours, and social skills were statistically significant.
Conclusions: Some children showed greater benefit from the intervention, possibly related to pre-existing profiles. Results will be discussed with respect to the mixed quantitative and qualitative findings, in addition to future directions.
Correspondence: *Sarah J. Macoun, Ph.D., Educational Psychology, University of Victoria, PO Box 1700, STN CSC, Victoria, BC V8W 2Y2, Canada. E-mail: sjmacoun@uvic.ca*

J. STRANG, L.G. ANTHONY, L. CANNON, K. ALEXANDER, M.A. WERNER & L. KENWORTHY. How to Develop an Effective Intervention through the Participatory Research Process: A Case Example in an Executive Functioning Intervention in High-Functioning Autism Spectrum Disorders.
Objective: Cognitive/behavioral inflexibility is a problem in autism spectrum disorders (ASD). ASD skill targets do not generalize well from interventions to the real world. Executive function (EF) skills pose a particular generalization challenge; EF lab measures show little relationship to real world outcomes. A participatory process research (PPR) approach involving community stakeholders in intervention development could help overcome this disconnect. PPR is "state of the art" in many public health research areas, but has not been tested in ASD intervention development. We developed a school-based intervention to improve flexibility in students with ASD, "Unstuck and On Target," testing PPR techniques.
Participants and Methods: PPR proceeded through 6 stages: 1. classroom observations in an ASD school to identity where students and teachers encounter difficulties; 2. focus groups with parents of children with ASD (N=11), public and private school special education staff (N=6; N=12), and students with ASD (N=17); 3. interdisciplinary team translation of the PPR data into a draft manual; 4. review and revision of manual conducted by two young adults with autism; 5. a two-year feasibility trial of the intervention completed with 12 children in three classrooms, with feasibility data collected; 6. final revision of intervention based on student/teacher feedback.
Results: PPR defined the structure of the intervention, how the intervention was delivered during the school day, what teaching methods should be used, and streamlined the lessons. The resulting intervention is feasible and acceptable to participants (with an over 90% completion rate), proving the achievability of using intensive PPR by including adults, adolescents and children with ASD to develop a new intervention.
Conclusions: This study establishes the achievability of using an intensive participatory process including key stakeholders to develop cognitive interventions for ASD, and offers a model for future ASD and/or EF PPR intervention development.
Correspondence: *John Strang, PsyD, Center for Autism Spectrum Disorders, Children's National Medical Center, 15245 Shady Grove Road Suite 350, Rockville, MD 20850. E-mail: jstrang@cnmc.org*

D. COOL, T. KAEMMERER, M. FONG, K. DUNN, M. GOLLA, M. LACY & D. FRIM. Impact of Brief Training on Cognition in Chiari I Malformation.
Objective: Studies examining the impact of cognitive interventions for children continue to be scant despite the call for such studies decades ago (Abikoff, 1979; Laatsch et al., 2007). In the current study we investigated the efficacy and generalizability of cognitive training on memory and attention in children diagnosed with Chiari I malformation compared to controls.
Participants and Methods: Ten Chiari I malformation participants were recruited from a neurosurgery clinic. Six children (C) acted as controls. Following consent, parents completed history and behavioral questionnaires while children were administered a standardized neuropsychological battery. Chiari I malformation participants completed a 5-week cognitive training program and returned for post-intervention testing. Controls (without intervention) returned at 5 weeks to complete retesting. Chiari I malformation participants had a mean age of 9.56 (SD=2.97), while the C group had a mean age of 8.3 (SD=1.6, p=.16).
Results: For the Chiari I malformation group, analysis of pre-to-post changes showed significant improvements in verbal list-learning [CVLT-C Trial 1 Raw: 6.6 to 8.2; t(9)=3.2, p=.01; CVLT-C Total Learning Raw: 41.2 to 47.1; t(9)=2.5, p=.04] along with attention [Cognitive Assessment System Attention Index Raw: 17.3 to 20.8: t(9)=4.0, p=.003]. Between-group analysis revealed greater improvement on the sustained attention task for the Chiari I malformation group [Planned Connections Raw Change: Chiari I malformation=-38.5 vs. C=7.7; t(9)=-2.6, p=.02]. Parent report revealed no significant behavioral

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

change in executive functioning [Behavior Rating Inventory of Executive Function, t(9)=.258, p=.80].
Conclusions: Preliminary data suggested that cognitive interventions may improve attention in children with Chiari I malformation beyond simple practice effects. Unfortunately, this did not appear to influence parents' perception and thus generalizability is questionable.
Correspondence: *Tobias Kaemmerer, University of Chicago, 2331 N Harding Ave, Chicago, IL 60647. E-mail: botias108@gmail.com*

C.P. MCFARLAND, E.L. GLISKY & M.D. GRILLI. Visual Imagery Improves Inhibition Among Young Adults.
Objective: The successful completion of daily tasks and activities requires not only sound planning and adequate attentional abilities, but also the ability to self-regulate one's behavior, often by inhibiting inappropriate responses. Recently, two studies have revealed that the recitation of implementation intentions (if-then statements; Gollwitzer 1996, 1999) is an effective means of reducing the occurrence of unwanted, inappropriate responses among children with ADHD. The primary aim of the present study was to investigate the effectiveness of implementation intentions in inhibiting task-inappropriate responses among college undergraduates. A second goal of this study was to determine whether the use of visual imagery (i.e., imaging oneself inhibiting an inappropriate response) would also contribute to effective inhibition of goal-irrelevant responses.
Participants and Methods: Forty-eight undergraduates were placed into one of three instructional groups (standard, implementation intention, imagery), and completed a Go/No-Go task of inhibition.
Results: A one-way ANOVA revealed a main effect of instructional condition, $F(2,48) = 3.86$, $p < .05$. Planned comparisons revealed that participants who received implementation intentions were no more likely to successfully inhibit inappropriate responses on a Go/No-Go task than were those who received standard task instructions, $t(30) = 1.58$, $p = .12$. However, participants who imagined themselves inhibiting inappropriate responses committed fewer errors (i.e., inappropriate responses) than participants who received standard instructions, $t(30) = 2.57$, $p < .05$, suggesting that the use of visual imagery resulted in improved inhibitory capabilities.
Conclusions: The results of this study suggest that the use of visual imagery may bolster one's ability to inhibit inappropriate responses, and therefore may represent a novel approach to improving self-regulation in a variety of clinical populations.
Correspondence: *Craig P. McFarland, Psychology, University of Montana, Skaggs Bldg Room 202, Missoula, MT 59812. E-mail: craig.mcfarland@umontana.edu*

M. NEUGNOT-CERIOLI. Validity and efficiency of cognitive interventions with adolescents presenting intellectual and learning disabilities: Preliminary results.
Objective: Learning disabilities affect a large proportion of children and adolescents who attend school, but few validated cognitive interventions exist for these children. A new field in research seeks to intervene with young patients using game-based paradigms since they are more age-appropriate for this population and allow greater motivation. The aim of this study was therefore to develop cognitive intervention programs targeting cognitive difficulties using board and video games. Two distinct programs were created and focused on either verbal or perceptual reasoning abilities.
Participants and Methods: 24 adolescents (M age = 13.11, S.D = 1.2) were recruited in a special education school for adolescents with limited intellectual abilities and severe learning disabilities. They followed two hours of training each week for 8 weeks and were assigned randomly to an intervention group. Cognitive improvements were measured pre and post intervention using classical neuropsychycological tests assessing both verbal and visual reasoning, such as WISC-IV, WASI, TONI-4 and EVIP.
Results: Improvements were observed in both intervention groups, however results varied significantly with respect to initial abilities and due to the heterogeneity of diagnoses.
Conclusions: The findings will be discussed in the context of the development of novel game-based interventions.
Correspondence: *Mathilde Neugnot-Cerioli, University of Montreal, Pavillon Marie Victorin F-473, 90 avenue Vincent d'Indy, Montreal, QC H2V 2S9, Canada. E-mail: mathilde.neugnot@gmail.com*

J.M. ASHFORD, K.N. CLARK, K.M. MARTIN-ELBAHESH, K.K. HARDY, T.E. MERCHANT, R.J. OGG, S. JEHA, L. HUANG, H. ZHANG & H.M. CONKLIN. Predicting Response to Computerized Working Memory Training among Childhood Cancer Survivors.
Objective: Childhood cancer survivors treated with CNS-directed therapy are at significant risk for attention and working memory (WM) difficulties. A computerized WM intervention has proven efficacious in this population but shown variability in individual response to training. This study investigates predictors of WM improvement among survivors of childhood acute lymphoblastic leukemia (ALL) and brain tumors (BT).
Participants and Methods: Cancer survivors identified as having attention or WM deficits completed training with Cogmed as part of a randomized, single-blind, waitlist controlled trial. Participants in the intervention group (ALL=20; BT=10) were asked to complete 25 training sessions at home with phone and internet-based coaching throughout. Up to 5 additional sessions were offered to those with slower training gains (range=21-30 sessions). The waitlist group (ALL=23; BT=9) received no training. A measure of WM (WISC-IV Spatial Span Backward) was administered before and after training as part of a brief neuropsychological assessment. Predictive modeling was completed with relevant demographic and clinical variables using linear regression analysis.
Results: Following training, survivors showed significant improvement in WM (Spatial Span Backward mean increase= 3.13±3.19 vs. 0.75±2.44, p=.002). Modeling revealed that higher abbreviated IQ (β=.07; p<.037) and more Cogmed training sessions (β=.53; p<.025) were predictive of greater WM improvement. Other variables (gender, diagnosis, SES, treatment intensity, age at diagnosis, time since treatment) did not prove significant.
Conclusions: Cogmed training significantly improves WM functioning in a subset of childhood cancer survivors, with dosing of the intervention seemingly playing a role. The association of higher IQ with improvement may reflect isolated WM deficits among responders. Cognitive screening may assist in identifying children with circumscribed WM difficulties who may be most likely to respond to Cogmed so prescribing and dosing may be efficiently targeted.
Correspondence: *Jason M. Ashford, MS, Psychology, St Jude Children's Research Hospital, 262 Danny Thomas Place, MS740, Memphis, TN 38105. E-mail: jason.ashford@stjude.org*

L.E. COX, J.M. ASHFORD, K.N. CLARK, K. MARTIN-ELBAHESH, K.K. HARDY, T.E. MERCHANT, R.J. OGG, S. JEHA, L. HUANG, H. ZHANG & H.M. CONKLIN. Feasibility and Acceptability of a Remotely-Administered Computerized Intervention to Mitigate Cognitive Late Effects Among Childhood Cancer Survivors.
Objective: Survivors of childhood cancer treated with CNS-directed therapies are at risk for deficits in attention and working memory (WM). While efficacious, pharmacological and therapist-directed interventions are limited by medical contraindications and availability of local providers. A computerized intervention (Cogmed) has demonstrated efficacy among individuals with developmental and acquired attention disorders. Neuroimaging studies have revealed brain-related changes suggestive of neuroplasticity. The current study aimed to evaluate feasibility of the remote administration of this intervention among pediatric cancer survivors.
Participants and Methods: Feasibility and acceptability are reported for a computerized WM intervention based on a randomized, control trial. Participants were survivors of childhood brain tumors (32%)

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms.
https://doi.org/10.1017/S1355617714000381

or acute lymphoblastic leukemia (68%) between the ages of 8-16 (Mean=12.2) who were at least one year post-therapy (Mean=5.0). Training consisted of 25 sessions of verbal and visuospatial WM tasks completed over 5-9 weeks with weekly phone-based coaching.

Results: Compliance was strong, with 30 of 34 participants (88%) completing the intervention across 16 states in America. Only 4 participants were removed for non-compliance with none lost to immediate follow-up. Most participants completed the pre- and post- intervention neuroimaging exam (31 and 28, respectively). Participants and their caregivers had the requisite skills to utilize the computer program effectively. Most caregivers reported they were able to find time to complete training sessions (63%), viewed training as beneficial (70%) and would recommend this study to others (93%).

Conclusions: Findings show that Cogmed is both a feasible and acceptable intervention among childhood cancer survivors. This intervention appears to be a promising option for survivors who often do not live close to cancer care centers. A study examining efficacy and neural correlates of change is currently underway.

Correspondence: *Lauren E. Cox, M.A., Psychology, St. Jude Children's Research Hospital, MS 740, Room R4026, 262 Danny Thomas Place, Memphis, TN 38105-3678. E-mail: lauren.cox@stjude.org*

M. GORLYN, J. KEILP, A. BURKE, M. OQUENDO, J.J. MANN & M. GRUNEBAUM. Subjective but Not Objective Cognitive Benefit of Bupropion in MDD.

Objective: Objective and subjective cognitive problems are found in depressed patients. Bupropion, an antidepressant with noradrenergic effects, is purported to be superior for enhancing cognitive performance relative to other antidepressants. We compared treatment-related changes in both a neuropsychological battery and cognitive complaint questionnaire in patients being treated for Major Depressive Disorder.

Participants and Methods: Patients were treated with bupropion (N=26) or paroxetine (N=28) in a randomized, controlled clinical trial, with assessments at baseline and following eight weeks of double-blind treatment. Test battery included measures of psychomotor, memory, working memory and attention functioning. The Cognitive Failures Questionnaire (CFQ) assessed subjective cognitive complaint.

Results: Drug-treatment groups were similar in age, estimated intelligence and baseline depression severity. Both drugs produced comparable improvement in depression severity. Bupropion patients had greater improvement on the CFQ subscale assessing subjective memory (p=.03), but groups had equivalent improvement in objective memory performance. Neither CFQ total score nor subscale scores were correlated with objective memory performance. CFQ scores correlated with mood at both timepoints.

Conclusions: Patients taking bupropion showed greater reduction in subjective memory complaint, but no greater improvement in neuropsychological test performance relative to patients treated with paroxetine. The potential cognitive benefit of specific antidepressants must be carefully evaluated via objective testing. Changes in subjective cognitive performance may reflect a combination of improved mood and the mild, diffuse activation effects of some compounds.

Correspondence: *Marianne Gorlyn, Columbia University/NYSPI, Box 42, 1051 Riverside Drive, NEw York, NY 10032. E-mail: mgorlyn@gmail.com*

Cognitive Neuroscience

N. ALLEN, K. MCCARRON, M. KELLY, A. HULL & C. CAMPBELL. Improved Social Cognition and Mood Following Participation in a Social Cognition Rehabilitation Group for TBI & Psychological Trauma.

Objective: Difficulties with social competence following traumatic brain injury (TBI) are well-established in research literature and include persistent deficits in social cognition tasks such as emotion detection, theory of mind, sarcasm detection, and empathy, as well as impaired social functioning in daily life. Posttraumatic stress disorder (PTSD), anxiety, depression, and other mental health reactions to psychological trauma are often comorbid with TBI and are also associated with impaired social functioning. A yearlong social cognition rehabilitation group for Veterans with TBI and psychological trauma was created using a combined cognitive rehabilitation and psychotherapy approach (McCarron, Kelly, Campbell, & Adams, 2012).

Participants and Methods: The present study collected pilot data before and after group participation. Baseline data assessed TBI symptoms, mental health symptoms, social functioning in daily life, and performance on social cognition measures. Participants were 5 males Veterans, mean age 45, with TBI diagnoses (mild-severe) and heterogeneous psychological symptoms, including PTSD, depression, and anxiety. Measures included the Social Perception subtest from the Wechsler Adult Intelligence Scale (ACS-SPT) and Beck Depression Inventory-II (BDI-II).

Results: Means comparisons revealed significant improvements in the Affect Recognition section of the ACS-SPT ($t(5) = 1.88$, $p = .045$) Additionally, mean BDI-II scores improved 12 points, which is well above the clinically moderate improvement standard of 5 points. (Dworkin et al., 2008).

Conclusions: The improvement in facial affect recognition is significant as facial expressions are considered to be among the most important nonverbal social cues. Furthermore, the decrease in depressive symptoms indicates improved mental health among group participants. This pilot study shows promise for improvements in social cognition and mood among Veterans with TBI and comorbid psychological symptoms, even years after injury.

Correspondence: *Nathaniel Allen, B.S., War Related Injury and Illness Study Center (WRIISC), Department of Veterans Affairs Medical Center, 50 Irving St NW, Washington DC, DC 20008. E-mail: nallenj@gmail.com*

N. ALLEN, C. LOCKWOOD, K. MCCARRON, R. HANDEL & B. SCHWARTZ. Exploring the Relationship Between Static and Dynamic Emotion Recognition: A Study Among US Veterans.

Objective: Facial affect recognition (FAR) is considered one of the most important nonverbal emotional cues in human social cognition. Research reveals that static facial recognition recruits dissociable neural pathways from dynamic emotion detection, indicating distinct components of social cognition.

Participants and Methods: This study examines performance on measures of static and dynamic facial affect recognition in a control sample within a larger study and consisted of 25 Veterans who screened negative for lifetime history of mental illness, traumatic brain injury, other neurological conditions, and recent substance abuse.Measures analyzed include a FAR task, which consists of 112 still photographs of faces displaying fear, happiness, sadness, anger, surprise, disgust, and neutrality and The Awareness of Social Inference Test (TASIT) Section 1A, which is a series of 28 dynamic video scenes depicting happiness, sadness, anger, surprise, revolted, anxiety and neutrality.

Results: FAR and TASIT total score showed a strong positive correlation ($r = 0.619$, $p < 0.001$). In addition, FAR neutral, disgust, and happiness identification were significantly correlated with their TASIT equivalents ($r = .359$, $p = .039$; $r = .635$, $p < .001$; $r = .432$, $p = .015$, respectively). The ability to identify dynamic anxiety and disgust correlated very strongly performance on static identification ($r = .648$, $p < 0.001$; $r = .576$, $p = .001$) and TASIT ($r = .892$, $p < 0.001$; $r = .771$, $p < 0.001$ respectively).

Conclusions: The ability to attend to nonverbal behavior is a crucial piece of social cognition as a whole. Despite evidence of unique neuropathways recruited in static and dynamic emotion detection, performance on these tasks was strongly correlated in the present study. Further research is needed to confirm whether this association differs by types of expression and to explore the impact on real world social intelligence and functioning.

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

Correspondence: *Nathaniel Allen, B.S., War Related Injury and Illness Study Center (WRIISC), Department of Veterans Affairs Medical Center, 50 Irving St NW, Washington DC, DC 20008. E-mail: nallenj@gmail.com*

C.J. EICKHOFF, C. LOCKWOOD, A. HULL, P. SULLIVAN, B. SCHWARTZ & M. REINHARD. Effect of Impaired Sleep and Stress on Cognitive Performance in Veterans.

Objective: Impaired sleep and perceived stress are associated with neurocognitive difficulties in domains of executive functioning and attention. This study examined the impact of stress and sleep difficulties on neurocognitive performance in a sample of veterans with chronic pain.

Participants and Methods: Participants were recruited from the Integrative Healthcare and Wellness (IHW) Program, a complementary and integrative medicine (CIM) clinic at the Washington DCVA War Related Illness and Injury Study Center. The present sample consisted of 20 veterans (12 male, 9 female), mean age 47 (range 29-69), mean educational level attained 15 years (range 9-22 years). Participants were administered measures of cognitive functioning (WAIS-IV Digit Span and Arithmetic, DKEFS Color-Word and Verbal Fluency, Hopkins Verbal Learning Test- Revised, Brief Visuospatial Memory Test- Revised, Trails, Dot Counting Test), a self-report measure of depression (BDI-II), and self-report measures of stress (PTSD Checklist, Perceived Stress Scale, PTSD screener) and sleep (Insomnia Severity Index, Sleep Vigilance Questionnaire) as part of a comprehensive battery.

Results: Results of correlational analyses revealed the following: stress coping skills were significantly correlated with the BVMT-R total recall (PSS positive items r= 0.515, p= 0.020); disrupted sleep was associated with BVMT-R false positives and copy accuracy (r= .496, p= 0.043; r= -0.559, p= 0.020); and verbal fluency was associated with stress and sleep (r=-0.633, p=0.004).

Conclusions: In sum, those who reported less stress performed better on these assessments than those reporting more stress and sleep difficulties. This highlights the need for further investigation into the relationship between stress and sleep and their effect on cognitive performance. The increased prevalence of comorbidity between stress and difficulty sleeping makes it imperative that we use the most effective assessments to discern which condition in the primary cause of distress.

Correspondence: *Christine J. Eickhoff, MA, WRIISC, Department of Veterans Affairs, 50 Irving Street NW, MS 127, Washington, DC 20422. E-mail: Christine.Eickhoff@va.gov*

E. WATSON, J. LOVELESS, K. BICKEL, K. LEHOCKEY, J. HIGHSMITH & E.D. EVERHART. Effects of Emotional Valence on Response Latencies.

Objective: Psychological research is replete with studies demonstrating a relationship between anxiety and threat processing cognitive biases. Research has emphasized the role of these biases to be specific to context and personal relevance. However, there is debate in the field regarding the extent to whether state or trait anxiety contributes most in this relationship. The current study employs an emotional variant of an established color-naming paradigm to provide further clarity in understanding cognitive biases related to anxiety and negative affect.

Participants and Methods: The Type D Personality Scale (DS14) and Behavioral Inhibition and Behavioral Activation (BIS/BAS) Scales were used to operationalize trait affect and relevant personality components, while the Positive and Negative Affect Schedule (PANAS) and the State-Trait Anxiety Inventory (STAI-Y) measured state affect. Eighty undergraduate participants were assessed on measures of personality, state and trait affect, and response latency for an emotional variant of the Stroop task. Positively or negatively valenced target words were randomly ordered among a majority of oppositely valenced words. Participants were instructed to press a button corresponding to the color of each word regardless of emotional valence.

Results: Results of the present study revealed significant correlations between response latency for those participants presented with the trial of positively-valenced target words and BIS (r = .4967, p = .0007), STAI-Y (r = .3628, p = 0.0168), and the Negative Affectivity subscale of the DS14 (r = 0.3318; p = 0.0297). In contrast, response latency for participants presented with the trial of negatively valenced target words were significantly correlated with the DS14 Total Score (r = 0.3466, p = 0.0356) and the DS14 Social Inhibition subscale (r = 0.3464, p = 0.357).

Conclusions: Findings support the relevant roles of both state and trait affect as it relates to processing emotional stimuli.

Correspondence: *Eric Watson, M.S., Graduate Psychology Dept, East Carolina University, 112 Brownlea Drive, APT 14, Greenville, NC 27858. E-mail: Watsone11@students.ecu.edu*

J. GRAVANO, T.G. HILL-JARRETT, C.N. SOZDA & W.M. PERLSTEIN. Neurocognitive and Emotional Correlates of Attentional Networks in Traumatic Brain Injury.

Objective: Difficulties in attention are ubiquitous in traumatic brain injury (TBI). Intact attentional abilities are proposed to be necessary for higher-level cognitive functioning. One model of attention identifies three interactive subcomponents—alerting, orienting, and executive control—which reportedly rely on separate neurotransmitter (NT) systems and neural networks (e.g., Posner). We sought to examine the neuropsychological implications of visual attention subcomponent efficiency in post-acute severe TBI and controls. We hypothesized that the executive subcomponent of attention, which preferentially relies on frontal lobe structures commonly affected in TBI, would correlate with classic neuropsychological measures of frontal lobe functioning.

Participants and Methods: Participants were 12 TBI patients and 12 demographically-matched controls. All underwent neuropsychological testing and performed the Lateralized Attention Network Test (LANT) while their reaction times (RTs) were recorded. The LANT measures RT benefits of cuing (Posner paradigm) and interference costs (Erikson Flanker paradigm) within each hemisphere.

Results: Across all individuals, contrary to our predictions, canonical measures of executive functioning (WCST, Trails A&B) correlated most predominantly with attentional orienting scores, while LANT executive control RTs primarily correlated with measures of mood (p's<.05). Within both TBI patients and controls, similar relationships existed; however, within controls, the latter relationships with mood were not significant.

Conclusions: Orienting of attention may have a stronger executive component than previously implied based on the Posner model of attention. A complicated relationship between mood and cognition exists within TBI, potentially suggesting divergent cognitive and emotional pathways toward "executive dysfunction." Future research is needed to clarify the nature of these relationships.

Correspondence: *Jason Gravano, M.S., University of Florida, 3901 SW 20th Ave # 608, Gainesville, FL 32607. E-mail: jtgravano@phhp.ufl.edu*

J. GRAVANO, D. KAUFMAN, C.N. SOZDA, D. BOWERS, M.S. OKUN & W.M. PERLSTEIN. Neurocognitive and Emotional Correlates of Attentional Networks in Parkinson's Disease.

Objective: Parkinson's disease (PD) is characterized by loss of dopaminergic outflow to cortical and subcortical structures. This is thought to disrupt frontal-subcortical loops, which negatively impacts cognition and emotion. One model of attention identifies three interactive subcomponents, alerting, orienting, and executive control, which reportedly rely on separate neurotransmitter (NT) systems and neural networks. We sought to examine the neuropsychological implications of attentional subcomponent efficiency using both behavioral (reaction time- RT) and neural (event related potentials –ERPs) indices in PD and controls. We hypothesized that the subcomponents of orienting and executive control, which preferentially rely on frontal lobe structures and NT systems affected in PD, would correlate with measures of frontal lobe functioning and mood.

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

Participants and Methods: Participants were 11 idiopathic PD patients and 14 matched controls. All underwent neuropsychological testing and performed the Attention Network Test (ANT) while their RT and EEG were recorded. The ANT measures RT benefits of cuing (Posner paradigm) and interference costs (Eriksen Flanker paradigm).
Results: Across all individuals, executive functioning scores significantly correlated with behavioral indices of attentional subcomponents, especially with the executive control network (r's >.36, p's<.05) in the expected directions. Executive and orienting networks also correlated with mood measures. The magnitude and direction of results largely remained within PDs. Further, neural markers of attentional allocation (amplitude differences in P3 and N1 peak) significantly correlated with several cognitive scores and emotional measures.
Conclusions: Executive and orienting components of attention predict poorer executive function and negative mood (depression/apathy). Future studies are needed to determine the underlying neural and neurotransmitter systems mediating these relations and to determine if these correlations change with extent of pathology.
Correspondence: *Jason Gravano, M.S., University of Florida, 3901 SW 20th Ave # 608, Gainesville, FL 32607. E-mail: jtgravano@phhp.ufl.edu*

M. MATSUI, M. NAKAGAWA, M. KATAGIRI & T. HOSHINO. Brain activity in cognitive conflict using face expression stimuli: A study of near-infrared spectroscopy.
Objective: The Stroop task has been typical used for measuring cognitive functions of inhibition and interference. However, this task has limited applications with young children, because reading ability is required to perform the task. Using a new, non-letter Stroop-like task named the 'happy-sad task,' in which participants are instructed to say 'happy' for a sad face and 'sad' for a happy face, we can assess differences in inhibition in participants from early childhood to adulthood. We investigated whether differences between the happy-sad task and the letter Stroop task could be observed in brain activation, by using near-infrared spectroscopy (NIRS) and skin conductance responses (SCR).
Participants and Methods: Participants were 30 right-handed healthy Japanese volunteers (male=14, female=16; mean age was 23.4 years, s.d.=5.3, age range 18-39 year). NIRS and SCR measurements were conducted during resting periods and when performing the congruent and incongruent conditions of the happy-sad and the letter Stroop task. We focused on the right and left anterior prefrontal cortex and frontal pole, which are known as centers for response inhibition and processing of emotions. This study was reviewed and approved by the Research and Ethics Committee at the University of Toyama.
Results: Results indicated that there was prefrontal activation during both tasks. Especially, the incongruent condition of the happy-sad task resulted in greater activation than the letter Stroop task. In addition, SCR amplitude for the happy-sad task was greater than that for the letter Stroop task.
Conclusions: The results show that there is similar prefrontal activity in a Stroop and a Stroop like happy-sad task of cognitive conflict. In addition, these findings suggest that brain activity in the happy-sad task is associated with suppression of emotions and inhibition of behavior.
Correspondence: *Mie Matsui, PhD, University of Toyama, 2630 Sugitani, Toyama 930-0194, Japan. E-mail: mmatsui@las.u-toyama.ac.jp*

K. NASSEHI, A.E. THORNTON & D.M. BERNSTEIN. A Meta-Analysis: Alcohol Abuse Negatively Affects Social Cognition.
Objective: A meta-analysis was conducted to evaluate the overall effect of alcohol abuse on social cognition. Additionally, this meta-analysis compared effect sizes from various approaches used in the evaluation of the social cognition of alcoholics.
Participants and Methods: Thirty-two studies were aggregated using a comprehensive search of PsycInfo and MEDLINE on how recovering alcoholics perform on affect recognition (facial and prosodic) and Theory of Mind (ToM) (humor processing, empathy, Reading Eyes in the Mind Test i.e. REMT). The Hedges and colleagues' method was used in the meta-analysis to evaluate the effect sizes.
Results: Overall, alcoholism was clearly associated with social cognitive impairments (d=-0.80 C.I.=-0.90 to -0.70, p<0.001); nonetheless the effect sizes were moderated by the various approaches used in the evaluation of social cognition. Specifically the studies using Emotional Facial Expression recognition test (EFE) revealed an effect size of d=-0.76 (C.I.=-0.91 to -0.60, p<0.001) while the studies using REMT revealed an effect size of d=-0.39 (C.I.=-0.66 to -0.12, p=0.005) for the effect of alcoholism on social cognition.
Conclusions: Overall, individuals with alcohol abuse problems show moderate-to-large impairments in social cognition; however, the effect sizes vary from small to large depending on the approach used to evaluate social cognition. The studies using EFE tests revealed a moderate to large effect size while studies using REMT revealed a small to medium effect size. Apparently recovering alcoholics show greater impairment in their capacity to recognize emotion from a face but show only modest impairment on tests that tap directly into mental state reasoning such as tests of ToM.
Correspondence: *Kimia Nassehi, Bachelor's, Simon Fraser University, 2405-2345 Madison Ave, Burnaby, BC V5C 0B4, Canada. E-mail: knaeinit@sfu.ca*

C. PETTIT, I.J. HUNT, S. JIVANI, K. SLINN, D. BJORN, M.J. LARSON & P. STEFFEN. Stress Responsiveness and Performance Monitoring: Potential Sex Differences.
Objective: The purpose of this study was to investigate how stress affects performance monitoring, specifically the error-related negativity (ERN) component of the event-related potential (ERP). To produce stress, we used the Trier Social Stress Task (TSST), which elicits a stress response confirmed by cortisol measurements. We hypothesized that increased state levels of social stress would increase ERN amplitudes.
Participants and Methods: Undergraduate students were recruited and randomly assigned to either a Trier stress group or to a control, non-stressed group [Trier Males n=22, Trier Females n = 14, Control Males n= 16, Control Females n = 20]. Following consent, individuals in the Trier group completed the TSST while control participants listened to a neutral recording. Subsequently, both groups completed a computerized Go-No-Go task while electroencephalogram and event-related potentials (ERPs) were recorded.
Results: Results indicated a main effect of accuracy with more negative amplitudes for error than correct trials (F=57.81, p<.001). No interaction was found between accuracy and condition (F=0.011, p=0.92). A significant effect was found between accuracy, condition, and gender (F=5.020, p=0.028) with males tending to have more positive CRN amplitudes in the control condition and females tending to have more negative ERN amplitudes in the stress condition.
Conclusions: Our hypothesis that stress would have an overall effect on performance monitoring was not supported by our data. However, this study provides preliminary evidence that gender may be a moderator of the effects of stress on electrophysiological indicators of performance monitoring. Specifically, females may respond to stress with heightened processing of errors.
Correspondence: *Cory Pettit, Brigham Young University, 2505 Vintage Rose, Henderson, NV 89052. E-mail: coryjpettit@gmail.com*

K.S. KNUDSEN, P. BENTLER & R.M. BILDER. Entertainment, Mind, and the Brain: A Neurocognitive Approach to Creative Achievement.
Objective: Prior research has suggested a small correlation of creativity with intellectual ability but so far little research has focused on identifying specific neurocognitive factors contributing to creative achievement. By analyzing data from an ongoing study of brain, cognitive function, and creativity, this study aims to analyze the relationship of creative achievement with neurocognitive processes.

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms.
https://doi.org/10.1017/S1355617714000381

Participants and Methods: Healthy young individuals (N=298) aged 21-50 years old with an 8th grade level education or above were paid $50 for their participation.

We examined the factor structure of lifetime creative achievement as measured by the Creative Achievement Questionnaire (CAQ; Carson, Peterson, & Higgins, 2005) using a new scoring system to correct item anchoring bias and positive skew found in the original scoring method. We conducted EFA Principal Axis Factoring method with oblique (oblimim) rotation. When examining the pattern structures, we considered (thought not blindly adhered to) Tabachnick and Fidell's (2001) rule of thumb, .32 for the minimum loading of an item, which equals approximately 10% overlapping variance with the other items in that factor. We then conducted two-tailed Pearson correlations of CAQ factor scores with DKEFS Verbal Fluency, WRAT-4 Reading, and the Remote Associates Test.
Results: A 3-factor solution identified clear creative domains: "Screenwriters" (humor, theater/film, creative writing), "Artists"(visual art, dance, architecture), and "Scientists" (science, invention). Individuals in the domain of screenwriting had small but significant positive correlations of scores on DKEFS-Verbal Fluency, Remote Associates Test, and WRAT-4 Reading with creative achievement.
Conclusions: The findings suggest creative achievement is domain-specific, and that creative achievement in the entertainment industry is associated with high generativity, intelligence and convergent thinking.
Correspondence: *Kendra S. Knudsen, University of California, Los Angeles, 729 Gayley, Unit 209, Los Angeles, CA 90024. E-mail: kendraknudsen@gmail.com*

R. SALAZAR, E.R. APPLEMAN, K. STAVITSKY & A. CRONIN-GOLOMB. Impairments of executive and visuospatial function in motor symptom subtypes of Parkinson's disease.
Objective: Deficits in executive function (EF) and visuospatial function (VS) are common in Parkinson's disease (PD) and have been related to side and type of initial or predominant motor symptom. These relations are not fully understood, and it is unknown whether EF and VS are independently affected in PD. We examined EF and VS with respect to PD motor symptoms, hypothesizing that deficits would relate to the type and side of motor symptom, mainly left-side onset (LPD; especially for VS) and non-tremor (NT) motor symptoms (because of higher prognosis for dementia in NT than tremor patients), relative to right-side onset (RPD) and tremor (T) motor symptoms.
Participants and Methods: We assessed 68 non-demented PD patients and 50 matched NC. Groups were compared with independent samples t-tests and one-way ANOVAs. Pearson correlations examined the relation between EF and VS.
Results: PD performed more poorly than NC on tests of EF [Trail Making Test B-A, Stroop, verbal and non-verbal fluency] and VS [line bisection]. Motor symptoms related to specific cognitive deficits: LPD and NT-PD for VS, as hypothesized, and RPD and T-PD for EF, which was not predicted. The motor symptom side-by-type interaction was significant for non-verbal fluency and Trails, with LPD-NT and RPD-T showing poorer cognitive function. EF correlated with VS in PD (not NC) and was driven by the LPD and NT groups.
Conclusions: These results indicate a relation between EF and VS in PD that is associated with motor symptom profile. LPD and NT-PD resembled patients with parietal deficits, whereas RPD and T-PD resembled those with prefrontal deficits. Deficits were most pronounced in side-by-type conjunctions (LPD-NT; RPD-T). This study is the first to demonstrate this interaction and suggests that specific and interactive PD motor symptoms are related to distinct patterns of neurocognitive dysfunction. This work was supported by R01NS067128 to ACG and 1F31NS061555 to KS.
Correspondence: *Robert Salazar, M.A., Boston University, 1 Fairland St, Roxbury, MA 02119. E-mail: rdsalaz@bu.edu*

L. SALMINEN, P. SCHOFIELD, K. PIERCE, T. CONTURO, D. TATE, E. LANE, J. HEAPS, J. BOLZENIUS, L. BAKER & R. PAUL. Impact of the AGTR1 A116C Polymorphism on Subcortical Hyperintensities and Cognition in Healthy Older Adults.
Objective: The angiotensin II type 1 receptor polymorphism (AGTR1 A116C/rs5186) has been implicated as a risk factor for hypertension, arterial stiffness, and ischemic stroke. Compromised vasculature is a mechanism of suboptimal brain health and abnormalities are often evidenced in white matter as hyperintense signals on T2-weighted MRI. Despite identified relationships between A116C and vascular phenotypes, an independent relationship between genetic status and white matter integrity has not been defined. Further, no study has combined neuroimaging and neuropsychological indices to characterize the functional relevance of A116C in a healthy adult population.
Participants and Methods: The present study examined the impact of the A116C polymorphism on subcortical hyperintensities (SH) and cognition in 49 healthy adults between ages 51-85. SH volume was quantified on whole-brain FLAIR images using a semi-automated approach. Cognitive performance was evaluated using index scores from the Repeatable Battery for the Assessment of Neuropsychological Status.
Results: A dominant statistical model (CC+CA (risk) vs. AA) revealed significantly larger SH volume for C allele carriers ($p < .05$) compared to those with the AA genotype. Cognitive scores did not differ significantly between groups. Differences in SH volume could not be explained by factors such as pulse pressure or body mass index and were not significantly associated with cognitive performance in any domain.
Conclusions: Results indicate that the C116 variant may represent a biomarker for decreased brain integrity in healthy adults independent of vascular phenotypes. Cognition, however, is not influenced by A116C status or SH volume in this cohort. Although SH volume differed significantly between groups, it is possible that white matter damage did not reach a threshold to influence cognitive performance. Longitudinal examination of A116C, SH, and cognition may provide useful information regarding the functional relevance of the C116 variant in healthy populations.
Correspondence: *Lauren Salminen, B.A., Psychology, University of Missouri Saint Louis, 8001 Natural Bridge Road, St. Louis, MO 63121. E-mail: lespr4@umsl.edu*

T. FRY, A. KUNEMUND & J. ANDERSON. Influence of Caffeine on Time Estimation.
Objective: The present study examined the effect of caffeine on time estimation while completing a high attention demanding task. We expected that those in the caffeine condition would produce shorter and less accurate time estimates than those in the placebo condition. In supplemental analyses we explored the impact of executive functioning on time estimation accuracy.
Participants and Methods: 132 participants were randomly assigned into groups provided 200mg of caffeine or a placebo. Participants provided verbal time estimates for intervals of 10, 25, 45, and 60 s while completing a serial addition task. Time estimation accuracy was assessed through absolute discrepancy and duration judgment ratio scores. Accuracy on the serial addition task was measured by the percentage of correct additions for each of the time intervals. Executive functioning was assessed through factor scores of the Dysexecutive Questionnaire (DEX; Executive-Cognition, Self-Regulation, and Metacognition).
Results: Counter to expectations, no group differences were observed in time estimation accuracy. A multiple regression analysis found accuracy on the serial addition task and scores on the Metacognition scale of the DEX significantly predicted time estimation accuracy for longer time intervals in the caffeine condition but not the placebo condition. That is, increases in task accuracy and metacognition scores were associated with more accurate time estimates at the 45 and 60 s time intervals in the caffeine condition, but not at the 10 s or 25 s intervals. No significant predictors emerged at any interval for individuals in the placebo condition.

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

Conclusions: These findings suggest that higher overall metacognitive function may attenuate time estimation accuracy in those whose executive resources are limited by caffeine while completing a high attention demanding task. Our conclusions highlight the need for future research investigating individual variables that influence perception of time.
Correspondence: *Trevor Fry, Psychology, Eastern Washington University, 1404 E. 39th Ave., Spokane, WA 99203. E-mail: tfry04@eagles.ewu.edu*

S. VADNAIS, S.E. LEE, J. KLAVER, J.M. CONSTANCE, L.A. BEYES, A.C. JAGGER, G.A. CASHER & M.Y. KIBBY. Volumetric Differences in the Inferior Frontal Gyrus Predict Verbal Short-Term Memory Performance.
Objective: Functional neuroimaging research suggests that the left inferior frontal gyrus (IFG) is involved with verbal working memory (Uchiyama et al., 2008). The right IFG is involved with inhibition (Lenartowicz, Verbruggen, Logan & Poldrack, 2011). Currently, few studies have examined IFG volume in children in relation to cognitive performance. Therefore, the purpose of this study was to examine how well IFG volume predicts verbal short-term memory (VSTM) performance. It was hypothesized that left IFG volume would predict VSTM but not right IFG volume.
Participants and Methods: Participants included 96 children with reading disability, ADHD or controls, ages 8-12 years, who completed a neuropsychological assessment and MRI scan as part of larger NIH/NICHD funded projects (R03 HD048752, R15 HD065627). The children were administered the Word Lists subtest of the Children's Memory Scale (CMS) and the WISC-IV, along with other measures. The software package Analyze 11.0 was used to measure the volumes. The IFG was manually traced in the sagittal plane after inter-rater and intra-rater reliabilities (rs>.90) were attained.
Results: Two hierarchical multiple regressions were used to predict VSTM controlling for total brain volume and FSIQ (block 1), with IFG volume being entered into block 2. Left IFG, Beta = -.236, t(90) = -2.540, p = .013, predicted Word Lists scores, with smaller volume being associated with better performance on the Word Lists subtest. FSIQ, Beta = .422, t(90) = 4.480, p = .000, was significant in the final equation; however, total brain volume (p = .758) was not. Right IFG volume, Beta = -.095, t(90) = -.991, p = .324, did not significantly predict Word Lists performance.
Conclusions: After controlling for FSIQ and total brain volume, left IFG volume significantly predicted performance on a verbal short-term memory task but right IFG volume did not. These findings are consistent with the functional neuroimaging literature suggesting the left IFG is involved with verbal working memory.
Correspondence: *Sarah Vadnais, B.A., Clinical Psychology, Southern Illinois University, 316 E College #14, Carbondale, IL 62901. E-mail: svadnais@siu.edu*

L.J. ALTMANN, J.P. WILSON, J.M. ELROD & C.J. HASS. Semantic Priming of Action Initiation: Does it have therapeutic potential?
Objective: Action initiation is slowed for many people with stroke, Parkinson's disease, and other movement disorders. The theory of embodied cognition asserts that processing action words can affect the initiation and speed of movement of the referenced body part. Thus, we directly tested whether processing arm-action words might facilitate simple reaching, as a potential adjuvant to traditional reaching therapy.
Participants and Methods: 25 adults aged 18-30 completed a reaching task in baseline and 3 experimental conditions. In all conditions, participants depressed a large button on the desk in front of them until a two-inch green dot appeared on a touch-screen monitor and then touched the dot. The baseline condition included no additional tasks. In the three experimental conditions, word reading, anagram solving, and category generation, participants performed word processing tasks immediately after depressing the button. The green dot appeared at varying inter-stimulus intervals (ISI) of 650 or 1150ms, measured from offset of the voice response. Stimuli included arm-action and non-action words. The dependent variable was the time from appearance of the green dot until button release (RT).
Results: Facilitation of RTs for reaching was found only following word reading at ISI 500. Interference effects following action words relative to baseline reaching were found in the anagram task at ISI 1000 and category generation at ISI 650. Interference effects of any word processing were found in both word reading and category generation tasks at ISI 1150.
Conclusions: This study demonstrates that semantic priming using action words can affect movement of the whole arm. However, reaching was facilitated only in the fastest task (word reading) at the ISI 650. Inhibitory effects of word processing were widespread at ISI 1000. Thus, these results do not support semantic priming as an adjuvant to reaching therapy. Findings illustrate the importance of including a baseline (no language task) condition in this type of study.
Correspondence: *Lori J. Altmann, PhD, Speech, Language & Hearing Sciences, University of Florida, 336 Dauer Hall, Box 117420, Gainesville, FL 32611-7420. E-mail: laltmann@ufl.edu*

Imaging (Functional)

R.J. MELROSE, A.M. JIMENEZ, H. RISKIN-JONES, L. NATTA, S. WILKINS, T. NARVAEZ, S. EL-SADEN, J. BROMMELHOFF & D.L. SULTZER. Functional Connectivity of Fronto-Parietal Networks in Mild Cognitive Impairment.
Objective: In patients with Mild Cognitive Impairment (MCI), poor executive functioning (EF) predicts difficulties in functional abilities. Using resting state fMRI, we sought to examine the connectivity of fronto-parietal (fp) networks thought to underlie EF in MCI.
Participants and Methods: Sixteen patients with MCI and 14 age and education matched elderly controls (EC) completed testing of EF and attention. Functional abilities were self-reported using the Behavior Rating Inventory of Executive Functioning (BRIEF). Resting state fMRI was collected on a Siemens 3T Skyra scanner (epi sequence, TR=2000, 3x3x5mm, 180 images along AC-PC). FMRI data was distilled into independent components using MELODIC in FSL. Resting state networks (RSN) in right fp, left fp, and bilateral prefrontal cortex (PFC) were identified and subject level maps were obtained using dual regression. Maps were compared between groups using SPM8 (cluster level p<.05 FWE corrected) and connectivity values of clusters showing group differences were extracted for analyses in SPSS.
Results: There were no between group differences in the left fp RSN. Within the right fp RSN, MCI showed increased connectivity with the right superior/lateral PFC (BA9/46, 44, 8). Within medial PFC RSN, MCI showed increased connectivity with left anterior/medial PFC (BA 10, 24, 32). There were no regions of increased connectivity in EC. In EC, better attention correlated with less medial PFC connectivity (r=-.70, p<.01). No correlations were observed with EF. Higher scores on BRIEF-Initiation correlated with increased connectivity of right lateral PFC in both groups (EC r=.65, p<.05; MCI r=.67, p<.01) and left medial PFC in MCI (r=.58, p<.05).
Conclusions: MCI is characterized by a period of increased connectivity within frontal networks. Increased connectivity partially corresponds to poorer attention and greater difficulty initiating daily tasks, suggesting it may be an inefficient means of compensating for accumulating pathology.
Correspondence: *Rebecca J. Melrose, PhD, Brain Behavior and Aging Research Center, VA Greater Los Angeles Healthcare System, 11301 Wilshire Blvd., 116AE, Los Angeles, CA 9007. E-mail: rjmelrose@ucla.edu*

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

Invited Address: Update on Acute Effects and Early Recovery after Mild TBI: Lessons from Sports Concussion Research (CE Session C)

Presenter: Michael McCrea

11:30 a.m.–12:30 p.m.

M. MCCREA. Update on Acute Effects and Early Recovery after Mild TBI: Lessons from Sports Concussion Research.
The diagnosis and treatment of mild traumatic brain injury (mTBI) have historically been hampered by an incomplete base of scientific evidence to guide clinicians. Fortunately, the science of mTBI has advanced more in the last decade than in the previous 50 years, and now reaches a maturity point to drive an evidence-based approach to clinical assessment, management, and rehabilitation. Sport-related concussion has proven to be a valuable laboratory for the study of mTBI, yielding many seminal findings that have advanced our clinical and scientific understanding of mTBI. Collectively, findings from clinical and basic science now establish a foundation on which to build integrative theories and testable hypotheses around a comprehensive model of mTBI recovery. This symposium will summarize the latest evidence on the natural time course of acute clinical and physiological effects and recovery after mTBI, as well as integration of the evidence toward a neurobiopsychosocial model of mTBI. Discussion will focus on the translational significance of findings from the sports concussion research model to our broader scientific understanding of mTBI.
Correspondence: *Michael McCrea, PhD, Medical College of Wisconsin, 8701 Watertown Plank Road, Wauwatosa, WI WI. E-mail: mmccrea@mcw.edu*

THURSDAY AFTERNOON, FEBRUARY 13, 2014

Poster Session 3: Language/Aphasia, Visuospatial/Neglect, Multiple Sclerosis/ALS, Subcortical Dementia/ MCI, Drugs/ Neurotoxicology

12:30–1:45 p.m.

Language and Speech Functions/Aphasia

B. YOCHIM, M. YUTSIS & K. BARRERA. The Relationship Between Word Finding Difficulty and Frequency of Spoken Word Use.
Objective: Word-finding difficulty, or anomia, is a common symptom of Alzheimer's disease, Primary Progressive Aphasia, and strokes in the language-dominant hemisphere. It is assumed that patients have more difficulty with rarely-spoken words than with commonly-used words; however, this has not been empirically demonstrated as data on frequency of usage in spoken language only became available in 2009. This study investigated whether naming performance is poorer for words less frequently used in everyday spoken language.
Participants and Methods: Participants were 40 adults (mean age = 74.2, SD = 14.1), with a mean of 14.4 years of education (SD = 2.9). Ethnic background was 68% European American, 18% African American, 10% Asian American, and 5% Hispanic American. Participants were asked to generate a word corresponding to a spoken definition. Stimuli were administered in order of decreasing frequency of word usage in spoken language, according to Brysbaert & New's (2009) corpus of spoken frequencies for American English words.
Results: As words decreased in frequency of usage, fewer participants were able to generate the word ($r = 0.43$, $p < .001$). This effect was not related to educational exposure to the words, as years of education were unrelated to task performance ($r = 0.01$, $p = .98$).
Conclusions: This offers empirical support for the notion that older patients with word-finding problems first show difficulty retrieving rarely-used words before having difficulty finding commonly-used words. This likely reflects decreased semantic access to the word, which may be due simply to frequency of usage in everyday language or later age of learning the word. These results provide evidence to suggest that measures of word-finding should include items of low frequency of usage in order to detect early-stage word-finding problems, while also ensuring that performance on the measure is independent of educational exposure to the items.
Correspondence: *Brian Yochim, Ph.D., Psychiatry, VA Palo Alto Health Care System, MIRECC (151 Y), 3801 Miranda Ave., Palo Alto, CA 94304. E-mail: byochim@stanford.edu*

S. KARIDAS. Does the Use of Personally Relevant Stimuli in Semantic Complexity Training Facilitate Improved Functional Communication Performance Compared to Non-Personally Relevant Stimulus Items among Adults with Chronic Aphasia?
Objective: Training of complex items has been found to result in generalization to untrained, semantically related, less complex items among individuals with stroke-induced aphasia. The purpose of this study was to examine the potential effects of personal relevance on the outcomes of atypical semantic training of ad-hoc categories, and to determine whether the training of personally relevant items had a different effect on functional communication performance.
Participants and Methods: Three individuals with mild-moderate fluent aphasia participated. A Single Subject Research Design with a multiple baseline within and between series was applied. The treatment protocol for this study included category generation and sorting, semantic feature selection, and answering yes/no feature questions.
Results: No effect was observed for either trained or untrained items produced during generative naming for any participant. Results indicated that there was no difference in performance for any of the participants for atypical trained items between personally relevant and non-relevant categories. The discourse analysis revealed that all participants achieved clinically significant improvement on content produced during discourse in the non-relevant topic, but only one participant improved in the personally relevant topic.
Conclusions: This study provides weak support for the use of semantic treatment of atypical exemplars in ad-hoc categories. The study does demonstrate the critical role of replication across labs and across researchers in order to identify key issues in the candidacy, procedures, and outcome measurement of any developing treatment. The findings also suggest that future research should approach group comparisons of atypical/typical versus atypical treatment only to investigate if there is indeed a difference of performance based on atypical and typical stimuli differentiation. On a functional basis, the findings did support the notion that training of atypical items contributes significantly to discourse performance.
Correspondence: *Stephanie Karidas, Ph.D., Communication Sciences and Disorders, University of South Florida, 712 Dorado Ct, Brandon, FL 33511. E-mail: skaridas@mail.usf.edu*

E. VERCHE, S. HERNÁNDEZ, I. QUINTERO & V. ACOSTA. Memory problems in children with Specific Language Impairment.
Objective: The acquisition of learning and memory abilities is linked to the correct development of language, with a qualitative change when language skills are well developed. One way of researching this is studying mnesic performance in people with language disorders. However,

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms.
https://doi.org/10.1017/S1355617714000381

researches interested in memory in language disorders are scarce. With this purpose in mind we have studied learning and memory, verbal and visoespatial, in a sample of children with Specific Language Impairment (SLI).
Participants and Methods: 31 SLI children and 19 control children, aged 6-11 year old participated in the study. Tests used were: TAVECI, Digits subtest from WISC-IV, spatial localization subtest from WMS-III, History subtest from Test of Memory and Learning (TOMAL) and Complex Figure Rey Test.
Results: We found significant differences in verbal and spatial span, logic memory, verbal memory and learning and visual memory.
Conclusions: These results state that in SLI children there are cognitive problems beyond linguistics issues and pointed the need of including memory and learning assessment in the SLI characterization.
Correspondence: *Emilio Verche, Msc Clinical Neuropsychology, Psychobiology and Methodology, University of La Laguna, School of Psychology, University of La Laguna, Campus de Guajara s/n, La Laguna 38071, Spain. E-mail: evercheb@ull.es*

I. QUINTERO, S. HERNÁNDEZ, E. VERCHE, V. ACOSTA & A. HERNÁNDEZ. Executive Dysfunction in Specific Language Impairment.
Objective: There is a growing consensus among the scientific community about the need to consider the neuropsychological performance as an adjuvant in the symptomatic characterization of Specific Language Impairment (SLI). The relationship between the acquisition and use of language with functions of other cognitive domains argue this need. The aim of this study is to assess executive functions performance in children diagnosed with SLI.
Participants and Methods: 31 children with SLI and 19 control children were examined at 6-11 years. The neuropsychological protocol included tests that assess verbal and visuospatial working memory, planning, verbal and design fluency, inhibition and alternations.
Results: SLI group has a poor performance in all variables. Specifically, deficits can be observed in all executive functions assessed except planning.
Conclusions: Our results suggest the need to take into account executive performance in the diagnosis of children with SLI and its implications for the development of effective therapeutic intervention.
Correspondence: *Itziar Quintero, Univerisdad de La Laguna, Campus de Guajara S/N, Santa Cruz de Tenerife 38071, Spain. E-mail: iquifu@ull.edu.es*

G. STEFANATOS, B. EID, M. KERNAN, M. BURCH, H. ZOBEL & S. ROSENBERG. An Unusual Case of Aphasia with Coexisting Auditory Processing Disorder.
Objective: We investigated the relationship between language comprehension deficits and problems in fundamental aspects of auditory processing in a patient (GL) who presented initially with symptoms of Wernicke's aphasia.
Participants and Methods: G.L.was referred for evaluation of his speech and language following an apparent left hemisphere stroke.
Results: G.L obtained a Western Aphasia Battery quotient of 35.9, and demonstrated a pattern of impairment consistent with severe Wernicke's aphasia. Speech was characterized by frequent neologisms, phonemic paraphasias, and semantic paraphasias. Repetition, auditory word recognition, and auditory language comprehension were all severely impaired. However, reading well exceeded his ability to comprehend speech. Further analysis revealed impairment of auditory processing of both verbal and nonverbal stimuli. On the Montréal Amusia Battery, he demonstrated impaired performance on measures of Contour, Scale, Interval, Rhythm, Meter, and Musical Memory. He also performed poorly on a measure of environmental sound recognition. In addition, steady-state auditory evoked potentials to rapid frequency modulations were virtually absent. Neuroimaging results revealed that his recent left temporal stroke had been preceded by a smaller right posterior temporal stroke that was apparently largely asymptomatic.
Conclusions: This case highlights that some patients presenting with early signs of Wernicke's aphasia can demonstrate a pattern of impairment in auditory processing disorders indicative of alternative neuropsychological syndromes. The pattern was most characteristic of word deafness although the coexistence of an amusia and impaired environmental sound recognition suggests the existence of a more general auditory agnosia.
Correspondence: *Gerry Stefanatos, D.Phil., Communication Sciences & Disorders, Temple University, 1701 N. 13th St., Philadelphia, PA 19122. E-mail: stefang@temple.edu*

J.P. WILSON, L.J. ALTMANN, A.A. HAZAMY, E. STEGEMOLLER & C.J. HASS. Differences in Dual Task and Group Effects in Sentence vs. Discourse Production in Parkinson's Disease.
Objective: Language production in Parkinson's disease (PD) has been described as impaired, but this may vary by language task. Further, little is known about how dual tasks may affect different types of language production in PD. We addressed these gaps in the literature by examining sentence and discourse production in single and dual task situations in people with PD and healthy older adults.
Participants and Methods: Fifty-nine cognitively-intact individuals age 43-85 (40 with PD, 19 healthy older adults-HOAs) completed two language tests twice, while cycling and sitting quietly. They produced 20 single-sentence descriptions of line drawings of simple events and a 3-minute discourse sample to an open-ended question. Dependent variables included characteristics of the words produced, overall number of propositions, and measures of syntactic complexity.
Results: Overall, dual task effects dominated in sentence production, while group differences dominated in discourse. Words used in picture descriptions during the dual task were more concrete, imageable and diverse, but less frequent with fewer propositions than in the single task. Thus, picture descriptions showed many significant dual task effects and few effects of group. Dual task discourse showed similar effects in concreteness and imageability. Some indices of syntactic complexity (number of prepositions, verbs per sentence, sentence length, syntactic complexity) showed dual task effects in sentence production but group effects in discourse. On other measures (number of wh- pronouns, adjectives), people with PD performed worse than HOAs regardless of language task.
Conclusions: The apparent presence of language production impairments in PD varies depending on the task used and the dependent variables assessed. In more highly constrained tasks that cue speakers to appropriate content (like picture description), people with PD can show intact performance, but they are more impaired when they must generate content with no contextual support.
Correspondence: *Lori J. Altmann, PhD, Speech, Language & Hearing Sciences, University of Florida, 336 Dauer Hall, Box 117420, Gainesville, FL 32611-7420. E-mail: laltmann@ufl.edu*

J. HUNG, J. REILLY & L. EDMONDS. An Eyetracking Investigation of Semantic Associations among Actions and Objects.
Objective: It is well established that input modality (e.g., word vs. picture) moderates semantic access for objects. Specifically, pictures of objects are thought to have more immediate access to semantics ("picture advantage"). However, the impact of input modality is less clear for action concepts. Thus, we compared semantic processing of pictures and words for objects and actions to determine if access to semantic representations differs across input modality and conceptual domains.
Participants and Methods: We conducted an eyetracking study using two common neuropsychological measures of associative semantic processing: the Kissing and Dancing Test for actions (Bak & Hodges, 2003) and the Pyramids and Palm Trees Test for objects (Howard & Patterson, 1992). We collected behavioral data and monitored patterns of visual search as healthy young adults (N=42) looked at a probe picture/word

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

(e.g., eyeglasses) and decided which of two word/picture responses (eye or ear) was associated with the probe.
Results: Participants demonstrated higher accuracy and slower reaction time with action pictures and words compared to objects. Later time to peak fixation and longer looking time were observed when judging action pictures vs. words. However, no significant behavioral or eyetracking difference across input modality was found for objects.
Conclusions: The object and action semantic categorization tasks demonstrated different behavioral and eyetracking patterns. Unlike previous reports, no evidence of a picture advantage was observed during association judgments for objects (e.g., dog-leash). Further, no pictorial advantage was indicated for action judgments. Current results suggest that pictures do not necessarily have a privileged route to semantic representations and the nature of the semantic relations (e.g., categorical vs. associative) and conceptual domain (e.g., actions) should be taken into account during semantic processing.
Correspondence: *Jinyi Hung, University of Florida, 336 Dauer Hall, University of Florida, Gainesville, FL 32611. E-mail: chingihung@ufl.edu*

H. MERENS & D. SABSEVITZ. Switching and Clustering in Strategic Letter Word Generation: A Lesion Study.
Objective: Strategies for word generation, in particular, clustering and switching, are imperative to sustain verbal fluency, although the brain regions that support these strategies are unclear. This study attempted to examine the relative contributions of the frontal and temporal lobes in clustering and switching behavior in a brain tumor sample.
Participants and Methods: Eighty-two, right-handed, English speaking brain tumor patients were included in this study. 27 left frontal, 19 right frontal, 14 left temporal, and 22 right temporal tumor patients were examined. All patients completed the DKEFS letter fluency task. A modified version of Troyer's method for calculating the number of clusters and switches and the average size of clusters was used.
Results: Results showed that lesions to the left hemisphere resulted in fewer total words generated compared to right hemisphere lesions. Frontal lesions resulted in fewer words generated than temporal lesions. Left hemispheric lesions resulted in smaller phonemic and semantic clusters size, fewer clusters produced, and fewer switches during letter fluency performance. No lobar effects were observed for the latter. .
Conclusions: The study supports a left hemisphere fronto-temporal network in strategic letter word generation.
Correspondence: *David Sabsevitz, Ph.D., Medical College of Wisconsin, 9200 W. Wisconsin Ave, Milwaukee, WI 53226. E-mail: dsabsevitz@mcw.edu*

M.J. HAMBERGER, S.P. PANTAZATOS, C.G. HABECK, A.C. WILLIAMS & J. HIRSCH. Does the Medial Temporal Region Mediate Naming?
Objective: Word finding or "naming" is considered to be mediated by cortical regions in the language dominant hemisphere. The dominant (left) medial temporal region has traditionally been thought to mediate verbal learning and memory, without contribution to linguistic functioning; however, recent studies suggest that the left hippocampal region is critical for naming as well. Notably, these studies investigated naming using visual object naming tasks, without assessing naming based on processing in other modalities. This would be important to sort out, as it is possible that the hippocampal contribution involves visual rather than linguistic processing. Moreover, naming in everyday life typically occurs within the context of auditory-based discourse. Using fMRI in healthy adults, we sought to determine whether hippocampal activation is specific to visual object naming or generalizable across modalities (i.e., visual and auditory). Based on recent findings with surgical temporal lobe epilepsy patients, we hypothesized that visual naming would elicit hippocampal activation, whereas auditory description naming would not.
Participants and Methods: Thirteen healthy adults performed auditory description naming and visual object naming during functional neuroimaging. ROI analyses were performed for the left and right hippocampal regions.
Results: Visual naming elicited left hippocampal activation ($P < 0.05$, corrected), however, no significant activation was observed for auditory naming in the left hippocampus ($P < .05$, corrected). This same pattern was found for the right hippocampus as well.
Conclusions: Results suggest that the hippocampus might not mediate naming, per se. Rather hippocampal activity during visual object naming might be related to visual aspects of the task. These findings carry implications for naming function and naming assessment in patients who suffer injury or undergo surgery involving the medial temporal region.
Correspondence: *Marla J. Hamberger, Ph.D., Neurology, Columbia University, 710 West 168th Street, New York, NY 10032. E-mail: mh61@columbia.edu*

D. CAHANA-AMITAY, A.C. OVEIS, E.A. OJO, J.T. SAYERS, A. SPIRO, L.K. OBLER & M.L. ALBERT. Association of Homocysteine and C-reactive protein with language changes in the aging brain.
Objective: Both Homocysteine (HCY) and C-Reactive Protein (CRP) have been linked to age-related declines in cognitive function. However, little is known about the impact of these biomarkers on language changes among older adults. The present study explores this question. We examined the association of HCY and CRP levels with lexical retrieval and sentence comprehension, language tasks which are challenging to older adults.
Participants and Methods: We tested 304 healthy adults aged 55 to 84 with no history of neurological or psychiatric disorders. Values of biomarkers were obtained from fasting blood assays. Language performance was measured using accuracy scores on four measures: two of lexical retrieval, Boston Naming Test (BNT) and Action Naming Test (ANT), and two of sentence comprehension, embedded sentences (ES) and multiple negatives (MN).
Results: Regression analysis was used, and models were adjusted for age, education, and gender. There was no significant association between CRP and any language measure. HCY, in contrast, was a significant predictor of worse performance on all four language measures: ANT ($p = 0.0002$), BNT ($p = 0.0036$), ES ($p = 0.0023$), and MN ($p = 0.0046$).
Conclusions: HCY alone showed adverse effects on measures of lexical retrieval and sentence comprehension, suggesting that it plays an important role in language changes in the aging brain, much like other vascular and metabolic risk factors found to affect language performance among the elderly. Lack of effect for CRP is likely related to the cross-sectional design of the study. Further research is needed to determine whether the effect of HCY on language in aging is direct or indirect through its effect on other cognitive functions.
Correspondence: *Dalia Cahana-Amitay, Boston University School of Medicine / VA Boston Healthcare System, 150 S. Huntington Ave (12A), Boston, MA 02130. E-mail: dcamitay@bu.edu*

G. KIM, T. GEFEN, M. PETERSON, A. MARTERSTECK, S. WEINTRAUB, E. ROGALSKI, E.H. BIGIO, M. MESULAM & C. GEULA. Concordance between in vivo Structural Imaging and Postmortem Histopathology in Primary Progressive Aphasia with Alzheimer Pathology: A Case Report.
Objective: Primary Progressive Aphasia (PPA) is a dementia syndrome characterized by language impairment with relative sparing of other cognitive domains, including memory, and is associated with atrophy in the language-dominant (usually left) hemisphere. Various pathologies, including the neurofibrillary tangles (NFTs) and amyloid plaques (APs) of Alzheimer's disease (AD), are found in postmortem PPA cases. A prior report showed clinical concordance of AD pathology with the aphasic

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms.
https://doi.org/10.1017/S1355617714000381

phenotype, where PPA cases showed leftward asymmetry of NFTs. In one PPA case, a quantitative MRI scan was obtained before death, and the postmortem brain showed AD pathology. The goal of this study was to investigate concordance between the extent of MRI atrophy during life and density of postmortem histopathologic features in this case.
Participants and Methods: Using unbiased stereology, numbers of neurons, NFTs, and APs were quantified bilaterally in memory-related entorhinal cortex (ERC), and in the following language-related neocortical regions: inferior frontal gyrus (IFG), inferior parietal lobule (IPL), and superior temporal gyrus (STG). Using an MRI obtained within 6 months prior to death, cortical thickness estimates were calculated (FreeSurfer 5.1.0) and compared to a control group of 35 healthy adults.
Results: Compared to controls, the PPA brain displayed MRI peak atrophy in left IPL (FDR, 0.05). Consistent with the anatomy of atrophy in this case, the highest AP and NFT density was found in left IPL, where NFT counts were nearly two-fold higher in the left vs. right hemisphere. Furthermore, neuronal counts were lowest in left IPL, compared to all other regions.
Conclusions: Findings from this PPA case demonstrate concordance between language impairment, in vivo neuroimaging, and postmortem histopathologic features. This study is the first of a larger investigation aimed at exploring the relationships of cognitive phenotype with patterns of atrophy and the cellular aspects of the underlying neurodegenerative disease.
Correspondence: *Garam Kim, Northwestern University, 1630 Chicago Ave. Apt. 307, Evanston, IL 60201. E-mail: gkim@u.northwestern.edu*

Visuopatial Functions/Neglect/Agnosia

J.A. BYARS & K.M. HEILMAN. Higher Levels of Body Image Concern Are Associated With Allocentric Visuospatial Attention Bias.
Objective: The level of importance placed on body image varies widely among healthy individuals, even among people in the same sociocultural milieu with similar body types. Visual attention consists of an egocentric (body-directed) and an allocentric (object-directed) component. Potentially, similar brain mechanisms could influence both direction of visual attention and degree of concern with body image. Our pilot study explored the relationship between visuospatial attention bias and preoccupation with body image in the general population. We hypothesized that higher levels of body image concerns would be associated with more egocentric bias.
Participants and Methods: Participants consisted of 12 individuals (8 women and 4 men) recruited from the general community. They completed measures of body image concerns (assessing body image salience, body image dissatisfaction, and eating disorder symptoms) and visuospatial tasks previously shown to evaluate egocentric versus allocentric bias (radial line bisection, vertical line bisection, and arm length versus fixed distance estimation).
Results: Relationships between body image concerns and visuospatial task performance were investigated using bivariate correlations. Due to the pilot nature of the study, we assessed effect sizes rather than statistical significance. Contrary to our hypothesis, individuals with higher levels of body image concerns appeared to have more allocentric visuospatial attention bias. Effect sizes were small to medium (r's = 0.1—0.4).
Conclusions: In the general population, people with more body image concerns may show increased allocentric visuospatial attention bias. While this study could not evaluate causality, we speculate that increased allocentrically-directed attention to an external, culturally-favored "ideal body" may perhaps drive body image preoccupation, and come at the expense of egocentric attention to one's own real body. Further studies may help elucidate the relationship between visual attention bias and body image concerns.
Correspondence: *Joanne A. Byars, MD, Neurology, University of Florida, HSC Box 100236, Gainesville, FL 32610-0236. E-mail: joanne.byars@neurology.ufl.edu*

J.A. LAFO, J.D. JONES, P. MANGAL, M.S. OKUN, C.E. PRICE, R.M. BAUER & D. BOWERS. Visuoperceptual Task Impairments in Parkinson's Disease: A Pathway-specific Association of Executive Function and Memory?
Objective: Over 30 years ago, Mishkin and Ungerleider proposed a dissociation between dorsal and ventral visual processing streams. Support for this dissociation derives from neuroimaging and lesion studies, including findings that object-based (face matching) and spatial tasks (line orientation) are differentially sensitive to temporal vs. parietal lesions (Tranel et al., 2009). In this study, we tested the hypothesis that impaired face matching (FRT) in Parkinson's disease (PD) patients would be associated with reduced delayed memory (temporal lobe), whereas impaired spatial performance (JLO) would be associated with greater frontal-executive deficits.
Participants and Methods: A convenience sample of 335 idiopathic PD patients underwent multi-domain neuropsychological evaluation. All participants had DRS-2 ≥130. The sample was divided into three groups based on FRT and JLO performance: a) only FRT impaired (N= 35); b) only JLO impaired (N=19); c) both WNL (N=280). Only one individual was impaired on both tasks. Data were analyzed using multiple ANOVA's to determine group differences across memory and executive tasks.
Results: Relative to the WNL group, the FRT group performed significantly worse on a contextual memory task (Logical Memory). In contrast, the JLO group performed significantly worse on executive measures (Trails B, Stroop C-W) and word list learning (HVLT-R), a memory task with high executive load. Groups did not differ in terms of demographics or PD severity.
Conclusions: Hypotheses were supported. Although the majority of PD patients performed normally, two perceptual/spatial phenotypes were identified that were consistent with previously reported dissociations. The coupling of impaired face discrimination with poor episodic memory raises questions as to whether this particular cognitive association might be a marker for decreased integrity of temporal lobe memory systems in PD. Findings will be discussed in terms of theoretical views on memory, object-based recognition, and hippocampal function.
Correspondence: *Jacob A. Lafo, B.A., University of Florida, 550 NE 6th Ave., Gainesville, FL 32601. E-mail: jlafo@phhp.ufl.edu*

A.M. BARRETT, K.M. GOEDERT & M. OH-PARK. Leftward Where bias and rightward distraction in chronic neglect.
Objective: Spatial bias and spatial neglect may result from dysfunctional, asymmetric perceptual-attentional "Where" processing. However, spatial errors may also result from dysfunctional, asymmetric motor-intentional "Aiming." We wished to learn whether 1) as previously reported, chronic right stroke-related spatial neglect is associated with leftward Where bias (Barrett and Burkholder, 2006), 2) visual distraction induces ipsilateral Where errors, and motor cuing induces ipsilateral Aiming errors (Garza et al., 2008).
Participants and Methods: Chronic right stroke survivors with spatial neglect (N+, n = 10, mean age 63.4 yrs), without spatial neglect (N-, n = 26, mean 53.8 yrs), and aged controls (AC, n = 40, mean 58.8 yrs) bisected 96 lines in a computerized task based on Garza et al. (2008). We pseudo-randomized left/ right visual distraction, and left/ right motor cuing in near and far space. We calculated estimates of Where and Aiming bias from mean line bisection errors (in mm).
Results: We analyzed Where and Aiming spatial bias with separate multilevel model analyses using subjects as the random effect and distractor (left, right, none) and motor cuing (left, right) as fixed effects, (Goedert et al., 2013; Rabe-Hesketh and Skrondal, 2012). Mean Where errors in all three were leftward, but N+ Where errors were of larger magnitude (group main effect, p = 0.03). Right distraction occurred

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

only in N+ (group by distractor interaction, p = 0.025) for Aiming but not Where bias. N- participants made left Aiming errors in near, not in far space (p = 0.003).
Conclusions: We replicated previously reported, leftward Where bias in chronic neglect. Future longitudinal research can explore whether ipsilateral neglect caused rightward Aiming errors with right distraction, or whether this is typical in contralesional neglect. N- participants demonstrated near, but not far, asymmetric Aiming. Whether our findings relate to visuo-motor function in stroke /neglect (e.g. fall risk) requires further study. Support: NIDRR/NIH.
Correspondence: *A. M. Barrett, MD, Kessler Foundation, 1199 Pleasant Valley Way, West Orange, AL 07079. E-mail: abarrett@kesslerfoundation.org*

Multiple Sclerosis/ALS/Demyelinating Disorders

S. CHENJI & S. KALRA. Addenbrooke's Cognitive Examination: A possible screening measure for cognitive impairment in ALS patients.
Objective: Frontotemporal degeneration is the substrate for cognitive impairment present in upwards of 50% of patients with amyotrophic lateral sclerosis (ALS). The evaluation of cognition in patients with ALS is a challenge in the clinic, considering the changes are usually subtle and a sensitive and simple neuropsychological test is lacking. The objective of the study was to determine if the Addenbrooke's Cognitive Examination (ACE) was a useful instrument to screen ALS patients with probable cognitive impairment.
Participants and Methods: Sixty-one patients with ALS were administered the ACE.
Results: Twenty-six (42%) scored below a cut-off value of 88. Eleven patients (18%) scored below 83.
Conclusions: The cut-off of 88 revealed a rate of cognitive impairment comparable to that found in other studies, suggesting the ACE may have utility for screening cognitive impairment in ALS. As these cut-off scores were primarily developed for screening patients with other dementing illnesses, there is a need for developing cut-off scores relevant to the ALS population and validating results using expanded neuropsychological batteries.
Correspondence: *Sneha Chenji, MSc (5-year Integrated) in Health Psychology, Centre for Neuroscience, University of Alberta, 10456 76 Avenue NW, Edmonton, AB T6E 1L1, Canada. E-mail: sneha.chenji@gmail.com*

J.F. SUMOWSKI, M.A. ROCCA, V.M. LEAVITT, G. RICCITELLI, G. COMI, J. DELUCA & M. FILIPPI. Paradigm shift in the study of reserve against cognitive impairment in neurologic populations.
Objective: The reserve hypothesis posits that larger maximal lifetime brain growth (MLBG, brain reserve, Satz 1993) and greater lifetime intellectual enrichment (cognitive reserve, Stern 2002) protect against cognitive impairment in persons with neurologic disease. Importantly, MLBG and intellectual enrichment are sources (or proxies) of reserve, not reserve per se. Reserve is best defined as the distance between actual cognitive status and expected cognitive status based on demographics and disease burden (Reed et al., 2008). A patient with intact memory despite substantial disease burden has high reserve. For the first time in any neurologic population, we derived pure measures of reserve for cognitive efficiency (CE) and memory (MEM), and investigated whether MLBG and intellectual enrichment independently and differentially contribute to reserve.
Participants and Methods: Multiple sclerosis (MS) patients (n=153) completed tasks of CE (SDMT, PASAT) and MEM (SRT, SPART), reported early life cognitive leisure (e.g., reading, hobbies), and underwent MRIs to quantify MLBG, T2 lesion load (LL), and cerebral atrophy (grey, white, deep grey, total). We used regression to derive predicted CE based on demographics (e.g., age, sex, education) and disease (e.g., T2LL, atrophy). Reserve for CE was derived as the distance (residual) between actual CE and expected CE predicted by regression. The same procedure was used to derive a pure measure of reserve for MEM.
Results: MLBG significantly contributed to reserve for CE (r=.244, p=.003) but not MEM (r=.048, p=.611). Intellectual enrichment (cognitive leisure) independently contributed to reserve for MEM (r=.203, p=.029) but not CE (r=.134, p=.101). These results are consistent with Sumowski et al. (2013) and research showing stronger heritability of MLBG and CE relative to MEM, which is more impacted by environment.
Conclusions: MLBG and intellectual enrichment make independent and differential contributions to reserve against impairment in cognitive efficiency and memory in MS patients.
Correspondence: *James F. Sumowski, Ph.D., Neuropsychology & Neuroscience, Kessler Foundation Research Center, 300 Executive Drive, Suite 70, West Orange, NJ 07042. E-mail: jsumowski@kesslerfoundation.org*

M. FORTE, M.A. ROSSETTI, V.J. RIESGO, H. KATZEN, A. BRENT, B.E. LEVIN, G.B. RODRIGUEZ, K.W. RAMMOHAN & M.R. ORTEGA. Caprylic Triglyceride as a Potential Treatment for Cognitive Dysfunction in Multiple Sclerosis: A Case Series.
Objective: Memory and executive deficits are common in Multiple Sclerosis (MS) but no treatments are currently approved for MS related cognitive decline. Caprylic triglyceride (CTG), a prescription medical food, raises serum levels of ketones in the brain and has been shown to improve memory in AD. In MS, glucose utilization is thought to be impaired. Ketones may provide an alternative source for energy metabolism and subsequently improve cognition.
Participants and Methods: We report the open label use of CTG in four MS patients with cognitive dysfunction (3 RRMS, 1 SPMS; EDSS range: 2.0-7.0). Patients underwent neuropsychological testing at baseline and 90 days. We examined z-score change in variables of interest: memory/learning (CVLT-II: learning, LDFR; BVMT-learning, DR), processing speed (SDMT), attention (PASAT,3"), verbal fluency (COWAT: phonemic, semantic), visuospatial skills (JLO), language (BNT) and depression (BDI-II).
Results: All patients tolerated CTG; none discontinued treatment. One patient had gastrointestinal discomfort, but no serious adverse events were reported. All patients showed gains on at least 5 of the 10 cognitive variables. Specifically, using a criterion of 0.5 SD change, 4/4 improved on BVMT DR, 3/4 improved on CVLT-II LDFR, BVMT learning, PASAT, and 2/4 showed gains on CVLT-II learning. Two patients reported significant depression and both showed dramatic improvement in BDI-II scores.
Conclusions: This is the first case series reporting use of a nutraceutical for treatment of cognitive dysfunction in MS. Our observations suggest that CTG may have beneficial effects on memory and a modest positive effect on attention and mood symptoms. Overall, these preliminary observations support the need for a double blind placebo controlled investigation examining the safety and efficacy of CTG for cognitive dysfunction in MS. A clinical trial enrolling 144 patients over 3 years is currently underway at our center. Interim results are expected in August 2014.
Correspondence: *Mayte Forte, B.A., Neurology, University of Miami Miller School of Medicine, 1120 NW 14th Street, Miami, FL 33136. E-mail: m.forte@med.miami.edu*

A. FAYAD, A. CANAS, M.A., B. GREENBERG, M.D., M.H.S., D. GRAVES, M.D., S. HUGHES & L. HARDER, PH.D, ABPP. Self-Report of Attention and Psychological Functioning Among Pediatric Multiple Sclerosis Patients and Sibling Controls.
Objective: Multiple sclerosis (MS) is an autoimmune CNS demyelinating disorder. Pediatric MS accounts for approximately 5% of all MS cases. While fatigue, depression, anxiety, and executive dysfunction are

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

well documented in adults with MS, existing research suggests similar problems in pediatric MS patients; however, these problems are poorly understood in children with MS. Research suggests that one-third of pediatric MS patients demonstrate cognitive dysfunction and up to 30% experience depression or anxiety symptoms. Given the unique challenges associated with MS stemming from physical, cognitive, fatigue, motor, and sensory symptoms, the objective of the present study was to examine attention, mood-related symptoms, and school-related variables in pediatric MS patients.
Participants and Methods: Pediatric MS patients (N=12) and their siblings (N=10) completed the Behavior Assessment System for Children, Second Edition (BASC-2), Self-Report. Parents completed a non-standardized questionnaire.
Results: Pearson correlation revealed a statistically significant difference between MS patients and siblings on the Attention Problems, Anxiety, Depression, and Somatization scales, ($p<.05$). Approximately 57% of patients reported elevated (i.e., subclinical or clinically significant) attention problems, while parents endorsed attention problems at a rate of 69%. Similarly, 83% of patients reported elevated anxiety, while 85% of parents endorsed these. Patients and parents endorsed depression at a rate of 58% and 85%, respectively. Most (77%) patients receive educational support services and parents endorsed learning problems at a rate of 69%.
Conclusions: Results suggest pediatric MS patients exhibit difficulties with attention, internalizing mood symptoms, and learning problems. Findings highlight the importance of regular surveillance by neuropsychologists to inform intervention for optimal care management.
Correspondence: *Angie Fayad, Clinical Psychology, UT Southwestern, 6401 Maple Ave., Apt. 3102, Dallas, TX 75235. E-mail: angie.fayad@utsouthwestern.edu*

J. BERARD, L. BERRIGAN, L. REES, M. FREEDMAN & L. WALKER. Practice Effects on Measures of Information Processing Speed in Early-Phase Relapsing-Remitting Multiple Sclerosis.
Objective: Practice effects frequently occur with repeated administrations of neuropsychological tests; leading to the spurious appearance of improved performance over time. The Paced Auditory Serial Addition Test (PASAT) has been shown to be particularly susceptible to these practice effects while the Computerized Test of Information Processing (CTIP) has demonstrated a lack of practice over time. The current study investigates potential practice effects on the CTIP and PASAT in individuals with early-phase relapsing-remitting MS (RRMS).
Participants and Methods: Seventy individuals with early-phase RRMS and seventy-two healthy controls completed the CTIP and 3" and 2" PASAT as part of a larger neuropsychological battery. Tests were administered fifteen minutes (PASAT only), one week, and three years apart.
Results: In both groups, the PASAT showed practice effects across the fifteen minute interval. Across one week, inconsistent practice effects were noted on the PASAT between groups and between inter-stimulus intervals. This inconsistency remained at follow-up. No practice effects were noted on the CTIP across either interval.
Conclusions: Consistent with past literature, PASAT findings suggest susceptibility to practice is a major limitation. The inconsistency at longer intervals suggests multiple contributing factors may impact performance levels over time. As practice was noted for the MS group on the 2" PASAT across all intervals, the use of the 3" PASAT in the Multiple Sclerosis Functional Composite is supported; given it appears less susceptible to practice in this group. CTIP results support its use as a potentially preferable measure of IPS deficits in MS; particularly in the context of repeated testing.
Correspondence: *Jason Berard, Psychology, Ottawa Hospital Research Institute, 501 Smyth Road, Ottawa, ON K1H 8L6, Canada. E-mail: jasonberard@hotmail.com*

A. CANAS, A.D. FAYAD, B. GREENBERG, D. GRAVES & L. HARDER. Longitudinal Neuropsychological Assessment in Pediatric Multiple Sclerosis: Preliminary Findings.
Objective: Multiple sclerosis (MS) is an autoimmune disease of the central nervous system that has been largely regarded as an adult medical condition; however, the occurrence of MS among pediatric patients has been increasingly recognized. While recent research endeavors have attempted to investigate the cognitive impact of pediatric MS, there is relatively limited data related to the neuropsychological manifestation of this disease across time. Consequently, the purpose of the present study was to assess the evolution and impact of MS on cognitive functioning in a cohort of children and adolescents evaluated on two separate occasions.
Participants and Methods: Participants included 20 consecutive pediatric patients between the ages of 9 and 19 years who completed brief neuropsychological screening evaluations as part of their routine clinical care at the Children's Medical Center Dallas Pediatric Demyelinating Diseases Clinic. The screening battery included measures of attention, processing speed, visual-motor integration, and verbal learning/memory. Patients were reassessed after a mean period of 13.8 months from baseline. Group comparisons were performed using a paired samples t-test analysis.
Results: A paired-samples t-test analysis was conducted to compare group performance on a variety of neurocognitive measures at baseline (time 1) and longitudinally (time 2). There was a significant difference in performance on the WAIS-III/WISC-IV Digit Span (M=1.1, SD=2.1); $t(19)=2.34$, $p=.005$ and the CVLT-C/CVLT-II Trial 5 (M=6.8, SD=14.6); $t(19)=2.07$, $p=.005$.
Conclusions: Results suggest that pediatric MS patients exhibit significant cognitive declines in verbal learning and auditory working memory within a relatively short period of time. Findings further support the use of routine neuropsychological screenings to monitor functioning and inform educational and treatment planning.
Correspondence: *Angela Canas, Texas Woman's University, 3700 Orleans Ave, #5235, New Orleans, LA 70119. E-mail: acanas@twu.edu*

J. SPAT, V. D'ORIO, M. SHUMAN PARETSKY, F. FOLEY & R. HOLTZER. The Effect of Time on Clustering and Switching Performance in Individuals with Multiple Sclerosis and Matched Controls.
Objective: Few studies have examined clustering and switching and the effect of time in phonemic and semantic verbal fluency performance in individuals with Multiple Sclerosis (MS) and matched controls, for which the current study sought to examine.
Participants and Methods: Thirty patients with relapsing-remitting MS and thirty matched controls completed phonemic (FAS) and semantic (Animals) fluency tasks, which were divided into three 20-sec intervals without changing the standard administration of the tests. Methods for clustering and switching were consistent with Troyer and colleagues (1997; 1998; 2000).
Results: Linear mixed effect models were conducted, each with a three-level time interval (i.e., 20, 40, 60-secs) serving as the within-subject repeated measures, mean cluster size and switches as the dependent measures, and group status (i.e., MS, matched controls) as the independent variable. Results revealed no significant group differences in mean phonemic cluster sizes, but there was a trend for semantic cluster sizes ($p=.06$), with MS individuals producing slightly more than controls. There was a significant effect of time in the semantic mean cluster size when comparing the first 20-sec to second ($p<.05$) and third ($p<.05$) intervals. There was a significant group by time interaction when comparing the first 20-sec with the last 20-sec interval ($p<.05$). Matched controls produced more semantic mean cluster sizes during the last 20-sec interval when compared to the first 40 seconds in relation to individuals with MS, who produced more during the first 40 seconds. There was an overall significant effect of time for phonemic and semantic switches (all $p<.05$). Production of phonemic and semantic mean

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms.
https://doi.org/10.1017/S1355617714000381

cluster size and switches were significantly associated with executive/speed-of-processing/learning and memory tasks (all p<.01).
Conclusions: These findings suggest that decline in verbal fluency performance in individuals with MS represents decreased efficiency in accessing semantic memory stores over time.
Correspondence: *Jessica Spat, MA, Yeshiva University, 1165 Morris Park Avenue, Bronx, NY 10461. E-mail: spatjl@gmail.com*

D. DENNEY & L.H. LACRITZ. Differential Performance on Trail Making Tests A and B In Multiple Sclerosis.
Objective: The Trail Making Test (TMT) is often impaired in populations with subcortical dysfunction due to the processing speed component. Individuals with multiple sclerosis (MS) may perform poorer on TMT Part B (TMTB) compared to Part A (TMTA) due to the mental flexibility component of TMTB. This study examined differential performance on TMTA versus TMTB in relation to other cognitive measures in individuals with MS.
Participants and Methods: 78 patients [M age=48.7(9.56); M educ=14.7(2.47); 91% Caucasian] with MS were administered the TMT, Digit Span, Boston Naming Test, Verbal Fluency, Wisconsin Card Sorting Test, California Verbal Learning Test-2, PASAT, and Victoria Stroop as part of a clinical assessment. TMTB-TMTA discrepancy scores were computed and correlated with other measures. Factor analysis was also performed to further examine the association between TMT discrepancy scores and other cognitive measures.
Results: Overall TMTA and TMTB T scores were low average [TMTA=43.2(13.21; range=7-75); TMTB=45.0(11.23; range=15-64)]. The mean TMT discrepancy score was 1.74(9.32), but with a large range (-22 to 23), and 56.4% of subjects performed worse on TMTA than TMTB. Despite significant correlations between TMTA and TMTB with most other cognitive variables, TMT discrepancy scores were not associated with other measures. Furthermore, factor analysis revealed that TMT discrepancy scores loaded on its own unique factor.
Conclusions: Lower performance on TMTA versus TMTB may be attributed to deficits in attention, processing speed, visual scanning, and/or motor speed, and was a common finding in the current MS sample. However, TMTB-TMTA discrepancy scores were not associated other measures of attention or processing speed. The explanation for differential performance on TMT tasks may be multifactorial in this sample and merits individualized analysis to best understand the nature of TMT deficits when they occur.
Correspondence: *David Denney, UT Southwestern Medical Center, 5323 Harry Hines Blvd, Dallas, TX 75390-8846. E-mail: david.denney@utsouthwestern.edu*

S.M. LOPES COSTA, E. DOBRYAKOVA, G. WYLIE & H. GENOVA. Effective Connectivity Differences In Processing Speed Deficits in MS.
Objective: Multiple Sclerosis is a neurological disease, diagnosed between 25-40 years old. Although processing speed (PS) impairments are among the most significant and prevalent cognitive deficits, its neural correlates are still poorly understood. The present study aims to examine effective connectivity associated with PS deficits in MS.
Participants and Methods: Individuals with MS and, age and education matched, healthy controls were included in the study. All participants underwent a neuropsychological evaluation (Brief Interantional Cognitive Assessment for Multiple Scleoriss) and a functional magnetic resonance imaging during which they performed a modified version of the Symbol Digit Modalities Task (mSDMT). fMRI data was subjected to effective connectivity analysis with a priori regions (the bilateral dorsal medial prefrontal cortex, the inferior parietal lobule, and the striatum)of interested taken from the Genova et al. (2009) study, where PS deficits were examine with fMRI.
Results: Regarding PS, the MS group performed significantly worse on both the SDMT and mSDMT. Although no significant differences on performance accuracy were found on mSDMT between groups, the MS group performed significantly slower, which express PS compromises. No significant differences were found between groups on memory, as assessed with the California Verbal Learning Test II and Brief Visual Memory Test Revised. While HC show symmetrical connections between prefrontal cortex, caudate and inferior parietal lobule, with information travelling from anterior prefrontal areas to posterior parietal areas, MS individuals show the reverse pattern where inferior parietal lobule sends information to prefrontal cortex.
Conclusions: It is then possible to conclude that the neural networks involved in processing speed differ between HC and MS. Processing speed deficits might arise from PFC not exerting influence on parietal areas as it does in healthy controls.
Correspondence: *Silvana M. Lopes Costa, PhD, kessler Foundation/Rutgers, the state university of New Jersey, 300 executive drive, suite 70, West Orange, NJ 07052-3390. E-mail: scosta@kesslerfoundation.org*

J.D. MCKEEVER, K. PATRICK, J. GOYKHMAN & M. SCHULTHEIS. Prospective Memory in Multiple Sclerosis: Contributions of Encoding and Underlying Neuropsychological Constructs.
Objective: Prospective memory (PM) is the ability to realize intentions in the future, and has emerged as an important everyday functional ability. Investigations of PM among individuals with multiple sclerosis (MS) have demonstrated impaired PM performance. However, PM is a complex functional ability, and the reasons PM is impaired (e.g., deficits in component neuropsychological constructs or PM processing stages) in MS have not been fully explored. The current study set out to a) assess the utility of a novel Selective Reminding PM (SRPM) task in distinguishing the contributions of PM stages to overall PM ability, and b) evaluate the contributions of underlying cognitive constructs to PM performance.
Participants and Methods: Nine individuals with MS (mean age=49.5) were randomly assigned to either: 1) Selective Reminding (SR) condition, in which participants learn PM tasks (to criterion) using a selective reminding paradigm and are later tested with a PM assessment; or 2) One-Trial (1T) condition, identical to SR but participants learn PM tasks over a single learning trial. Neuropsychological testing included measures of verbal memory, associative memory, and processing speed.
Results: Based on PM task performance score, SR group outperformed 1T group, t(7)=1.37, p=.214, d=.95. Significant correlations emerged between PM task performance and: 1) processing speed, r=.72, p=.013; and 2) associative memory, r=.58, p=.030.
Conclusions: These preliminary results suggest that the novel SRPM task may help identify the contributions of different PM processing stages to overall PM performance. Interestingly, PM was correlated with PS and associative memory but not with verbal and working memory; this suggests that efficient processing of PM tasks during encoding may be more important than other aspects of memory in terms of successful PM performance. Though much further study is needed, the SRPM task may help to elucidate the contributions of the encoding component of PM to overall PM ability in MS.
Correspondence: *Joshua D. McKeever, M.S., Clinical Psychology, Drexel University, 6559 15th Ave NW, #521, Seattle, WA 98117. E-mail: jdm324@drexel.edu*

M.M. HADDAD, C. STERLING, E. TAUB, G. USWATTE, A. BARGHI & V.W. MARK. Changes in Amount of Grey Matter in Adults with Hemiparetic Multiple Sclerosis after Undergoing Constraint-Induced Movement Therapy.
Objective: Structural changes in grey matter have thus far been found in adults with chronic stroke and children with cerebral palsy (CP) following treatment with Constraint-Induced Movement Therapy (CIMT), an efficacious behaviorally-based intervention for chronic motor deficit. In an initial RCT, adults with hemiparetic multiple sclerosis (MS) significantly improved in upper-extremity real-world arm use, 4.1 times more than a group receiving dose-matched complementary and alternative medicine (CAM) treatments. This study sought to determine whether

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms.
https://doi.org/10.1017/S1355617714000381

there were changes in amount of cortical grey matter in adults with hemiparetic MS following treatment with CIMT, comparable to the changes found in individuals with stroke and CP given CIMT.
Participants and Methods: Eighteen adults with hemiparetic MS received either CIMT or CAM treatment (n = 9 per group), 35 training-hours per subject. Five participants were male; mean age was 50 ± 8.0 and 51.6 ± 8.8 years for the CIMT and CAM groups, respectively. All participants underwent MRI at pre- and post-treatment. Amount of grey matter was analyzed using longitudinal voxel-based morphometry.
Results: Significant grey matter increases (p's ≤ 0.02) were found in bilateral sensorimotor cortices and hippocampus in the CIMT group at post-treatment compared to pre-treatment. There were no significant grey matter changes in the group who received CAM treatment.
Conclusions: These results show that treatment specifically with CIMT is associated with structural increases in grey matter in adults with hemiparetic MS. The pattern of change in this population was grossly similar to that previously observed in adults with chronic stroke and children with CP who had also undergone CIMT. These findings suggest that rehabilitation that has real-world functional gains generally results in significant structural neuroplastic increases in the brain, regardless of the illness etiology.
Correspondence: *Michelle M. Haddad, University of Alabama at Birmingham, 1631 Lakeshore Ct, Apartment C, Homewood, AL 35209. E-mail: mhaddad@uab.edu*

B. TYSON, J.S. RANDOLPH, S. CRONENWETT, B. OLIVER & H.A. WISHART. The Relationship of Pain and Complex Attention Performance in Multiple Sclerosis.
Objective: Cognitive impairment and pain are chronic problems that frequently co-occur in multiple sclerosis (MS), yet research regarding their relationship is limited. Individuals with MS commonly experience disruptions in complex attention processes such as working memory and rapid set-shifting. These impairments have been associated with the extent of white matter lesions, grey matter atrophy and other brain changes. Even in the absence of neurological disease, individuals with intense pain also demonstrate complex attention deficits. It is theorized that pain and cognition compete for the same pool of limited neural resources. Effective coping skills and white matter integrity have been associated with the ability to prioritize cognitive demands over pain and switch between attending to one or the other. We hypothesized that patients with MS and high levels of pain intensity would show more complex attention impairment than MS patients with minimal or mild levels of pain intensity due to compromised neural resources.
Participants and Methods: Comparisons of 117 MS patients with minimal pain (n=36), mild pain (n=46), and moderate to severe pain (n=35) revealed a significant relationship between level of pain intensity and reduced performance on complex attention tasks, but not with reduced performance on verbal and visual memory tests.
Results: Estimated baseline intellect was the most significant predictor of complex attention impairment, followed by pain intensity and disability level. Fatigue, sleep disturbance, and depression were not significant predictors of complex attention performance. Further, the relationship between pain intensity and complex attention remained when controlling for age, gender, medication use, and total lesion volume.
Conclusions: These findings suggest a specific vulnerability of complex attention in the presence of moderate to severe pain in MS. Additionally, baseline intellect may underlie effective pain coping strategies such as the ability to prioritize cognitive demands over pain.
Correspondence: *Brad Tyson, PsyD, Dartmouth Medical School, PO Box 924, Grantham, WA 03753. E-mail: b.radtyson@yahoo.com*

M.M. SMITH & P.A. ARNETT. Personality Traits in Individuals with Multiple Sclerosis Vs. Controls and Their Relationship to Cognitive Functioning.
Objective: Previous research has suggested personality differences between individuals with multiple sclerosis (MS) and controls, as well as limited evidence for a correlation between maladaptive personality traits and cognitive impairment. This study examined personality functioning using the Five-Factor model and its relationship with cognition in a community-based sample of individuals with MS.
Participants and Methods: Fifty-eight participants with MS and 51 controls completed a neuropsychological test battery and the NEO-Five Factor Inventory (NEO-FFI). The participants with MS and controls were significantly different in age and education, but not gender.
Results: ANCOVA (controlling for age and education) revealed that the MS group was significantly higher on Neuroticism ($F(1, 105) = 5.96$, $p = .016$) and lower on Extraversion ($F(1, 105) = 7.30$, $p = .008$) versus the controls. There were no significant differences between the groups on Openness, Agreeableness, or Conscientiousness. The MS participants performed significantly more poorly than the controls on five out of seven cognitive measures examined. Linear regressions with the personality factors as dependent variables and the SDMT, Digit Span, COWA, and PASAT as independent variables (forward selection) were completed. Controlling for age, gender, and education, regression revealed that no cognitive predictor variables were retained by the model for Neuroticism, Extraversion, Openness, or Agreeableness. Digit Span performance was retained, but ultimately failed to reach significance as a predictor of Conscientiousness ($F(3, 52) = 2.51$, $p = .07$, adjusted R square=0.76, R square change=0.73).
Conclusions: Our results reveal that, while the MS participants did demonstrate significant differences in Neuroticism and Extraversion and poorer cognitive performance versus controls, their ratings on the NEO-FFI had little to no relationship to their cognitive performance, suggesting that participant ratings of personality were minimally related to cognitive dysfunction.
Correspondence: *Megan M. Smith, PhD, Psychiatry, University of Iowa, 200 Hawkins Dr, W278GH, Iowa City, IA 52242. E-mail: megan-m-smith@uiowa.edu*

M. WOJTOWICZ, E.L. MAZEROLLE, A. OMISADE & J.D. FISK. Performance variability is associated with white matter integrity in persons with Multiple Sclerosis.
Objective: Slowing of information processing is commonly observed in multiple sclerosis (MS) patients. However, there is growing evidence that MS patients are also more variable in their processing speed on reaction time (RT) tasks. The causes of this increased performance variability in MS patients are unclear, although RT variability has been found to be associated with MRI white matter hyperintensities in healthy samples. In this study, we examined white matter microstructure and measures of RT variability on a computerized test of attention and information processing speed in MS patients.
Participants and Methods: Nineteen female relapsing-remitting MS patients and 19 gender, age, and education matched healthy controls completed the Attention Network Test-Interactions (ANT-I), as well as DTI scans (1.5T GE MRI, SE-EPI sequence with TR=12s, TE=71ms, 55 directions, b-value=850s/mm2, FOV=260mm2, 128x128 matrix, 45 3mm slices). Relations between ANT-I performance and DTI measures were examined by analyzing fractional anisotropy (FA) maps using tract-based spatial statistics (TBSS).
Results: MS patients were both slower and more variable in their performance on the ANT-I compared to healthy controls ($p < .05$). Amongst the MS patients, less variable performance on the ANT-I was associated with higher FA values in the posterior thalamic radiation and the splenium of the corpus callosum. No significant associations with variability and FA measures were found for control participants and no significant associations for mean RT were observed for either group.
Conclusions: Performance variability on tests of attention and information processing speed appears to be sensitive to microstructural white matter measures in MS patients and may provide a sensitive behavioural index of white matter integrity.

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms.
https://doi.org/10.1017/S1355617714000381

Correspondence: *Magdalena Wojtowicz, Dalhousie University, 1355 Oxford St. LSC, Halifax, NS B3H4R2, Canada. E-mail: m.wojtowicz@dal.ca*

D.J. LIBON, L. SCULL, L. CHOI, D. TABBY, J. EPPIG, T.H. PATTERSON, C.F. LIPPA, H. AYAZ, P. SHEWOKIS, G. WICAS, J. WILCOX & C. SCHNICTER. Assessing Pre-Frontal Neural Integrity in Multiple Sclerosis with Functional Near-Infrared Spectroscopy (fNIR).

Objective: Functional Near-Infrared Spectroscopy (fNIR) uses light in the near infrared range (700-900nm) to monitor neural metabolic activity by tracking changes in oxygenated hemoglobin (oxy-Hb) and deoxygenated hemoglobin (deoxy-Hb). fNIR has better temporal resolution than fMRI. Pre-frontal activity was assessed in patients with Multiple Sclerosis (MS) by combining fNIR with a modified Stroop test.

Participants and Methods: 14 relapsing-remitting MS patients were compared to 13 normal controls (NC); patients had more education (NC-13.6+2.1; MS-16.1+2.3; $p < .008$) and NC were older (NC-54.9+6.3; MS- 45.5+10.6; $p < .009$). Pre-frontal fNIR oxygenated hemoglobin (oxy-Hb) activity was obtained using a sensor pad with 16 optodes and LED's emitting monochromatic light at 730 and 850nm and was obtained while participants were administered the Number Interference Test (NIT); a modified Stroop test. Condition 1: participants solved single addition or multiplication problems (i.e., 7+8; 7x8); Condition 2: mathematical operations were reversed, i.e., patients multiplied when shown an addition problem and vice versa; Condition 3: add when the operand was a green triangle or red square; multiple when the operand was a green square or red triangle. All conditions contained 60 trials entered on a key pad.

Results: On the NIT average reaction time for each trial and total time to completion was faster for NC compared to MS patients for conditions 1 & 2 ($p < .029$, all analyses). Groups performed equally across all 3 NIT conditions when correct responses and errors were tallied. To maintain equal NIT test performance as NCs, patients with MS required greater oxy-Hb for optodes located along the pre-frontal midline. This was seen in all 3 NIT test conditions (optodes 8-12; $p < .05$, all analyses).

Conclusions: Despite equal test performance in MS, fNIR technology revealed impaired pre-frontal activity and corroborates slower NIT reaction times. This technology could be useful to monitor neurocognitive reserve in MS.

Correspondence: *David J. Libon, Ph.D., Dept of Neurology, Drexel University, 245 North Broad St., Philadelphia, PA 19102. E-mail: dlibon@drexelmed.edu*

G. VARGAS & P. ARNETT. Functional Connectivity in the Frontal-subcortical Network as a Vulnerability Factor for Depression in Multiple Sclerosis.

Objective: Multiple Sclerosis (MS) is a chronic demyelinating disease that also causes widespread atrophy and other damage, and thus is a disease that affects neural connectivity. A specific group of brain regions, the frontal-subcortical network, has consistently been shown to be related to depression in the general population. The MS population represents a unique opportunity to study how neuropathology might disrupt this network and make individuals with MS more vulnerable to depression, especially if they also experience psychosocial stressors.

Participants and Methods: Twenty-five individuals with MS completed a functional MRI scan while performing an emotional face matching task, and also completed several self-report measures. Unified structural equation models were generated using a Group Iterative Multiple Model Estimation algorithm to examine effective connectivity during the task. Data were analyzed at the individual and group level, as well as by comparing high and low depression group models.

Results: Participants with fewer subcortical to cortical paths during affective trials and more cortical to subcortical paths during neutral trials had more depression symptoms. Also, the high depression group had fewer connections between the dlPFC and subcortical regions during affective trials, and fewer cortical to subcortical paths and increased sgACC-amygdala connectivity during neutral trials. Furthermore, several of these connectivity measures interacted with psychosocial variables to predict depression.

Conclusions: This study demonstrates the feasibility of testing effective connectivity in an MS population and shows that there are meaningful differences in connectivity that relate to depression symptoms and proneness in this group. More studies are necessary to better understand the differences in connectivity during emotional and non-emotional processing, and the nature of the interaction with psychosocial variables.

Correspondence: *Gray Vargas, Penn State University, 372 Moore Bld, Penn State University, University Park, PA 16802. E-mail: gav111@psu.edu*

Y. GOVEROVER, N. CHIARAVALLOTI, L. STROBER, H. GENOVA, Y. GOVEROVER & J. DELUCA. Activity and participation in MS: The whole is greater than its parts.

Symposium Description: Multiple Sclerosis (MS) can impact multiple aspects of a person's life. This symposium will explore the impact of symptoms of MS on everyday functioning by utilizing the International Classification of Functioning, Disability and Health (ICF) framework (WHO, 2001): body functions, activity and participation. As most research has been in the area of "body function", this symposium will focus on studies which examined activity and participation in MS. The focus will be understanding the link between MS symptoms and their impact on the overall experience of life with a chronic illness such as MS. Such knowledge facilitates the development of successful rehabilitation and strategies to improve outcomes associated with MS (e.g., employment, marital satisfaction). The symposium will also explore and discuss how the rehabilitation of these symptoms (i.e. body functions) can affect and mediate independent functional activity and social participation. This symposium will cover the following "parts" of the "whole" MS experience: First we will describe recent advances in the study of cognition in MS. Secondly, we will present and discuss research investigating how person specific characteristics (e.g. personality) and disease variables (e.g. cognition and fatigue) affect employment. Third, we will describe and discuss new research on emotional processing impairments (i.e. impaired facial affect recognition) in MS, and how they are related to social participation. Fourth, we will describe studies assessing functional everyday life performance in MS. Finally, the discussant will frame all these factors using the ICF model and describe how rehabilitation strategies could mediate the impact of the symptoms discussed on the person as a "whole."

Correspondence: *Yael Goverover, PhD, Occupational Therapy, New York University, 35 West 4th Street, 11th Floor, New York, NY 10012. E-mail: yg243@nyu.edu*

G. YAEL, L. STROBER, N. CHIARAVALLOTI & J. DELUCA. 'Activity limitation' and 'participation' in multiple sclerosis.

The purpose of this presentation is to review and describe studies assessing functional everyday life performance in multiple sclerosis (MS). In particular, this presentation will focus on a study that was designed to examine the variables associated with activity limitation (e.g., cooking) and participation restriction (e.g., unemployment) in seventy-two (72) individuals with MS. Activity and participation outcomes were assessed by self-report. Individuals also underwent a comprehensive neuropsychological test battery assessing memory, executive functions, visual perception, processing speed and completed questionnaires assessing fatigue and depressive symptomatology. Results indicate that education level, visual memory, fatigue and processing speed are associated with employment status, while performance on tasks of working memory, verbal memory, and processing speed are associated with cooking activity. Of particular importance was the finding that processing speed was the only variable significantly related to both activity and participation. Such findings suggest that processing speed may be a primary cognitive factor in MS, greatly impacting activity and participation. Given that

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

processing speed is modifiable, attempts to improve processing speed in MS may result in greater maintenance of employment and daily activities; ultimately improving the lives of individuals with MS.
Correspondence: *Goverover Yael, 35 W 4th street, New York, NY NY. E-mail: yg243@nyu.edu*

H.M. GENOVA & J. LENGENFELDER. Emotional Processing Impairments in Multiple Sclerosis.
Mood disturbances and personality changes have been well documented in MS. However, new research has identified that individuals with MS have significant difficulty with the processing of emotional information. In other words, persons with MS may have difficulty interpreting the emotions of others. These deficits have been identified in the areas of facial affect recognition, interpretation of emotional prosody, and theory of mind. These impairments can negatively affect interpersonal relationships and quality of life. In fact, impaired emotional processing in a variety of clinical populations is associated with depression, and anxiety, as well as cognitive dysfunction in the domains of executive functioning and attention. This talk will discuss the new research in this area, as well as future directions for how these processing deficits can be explored with neuroimaging and potentially treated. Improving the ability of the individual with MS to process emotional information properly can lead to improved social awareness, improved interpersonal relationships, increased social support and ultimately improved quality of life.
Correspondence: *Helen M. Genova, 300 Executive Drive, Suite 70, West Orange, NJ 07052. E-mail: hgenova@kesslerfoundation.org*

N.D. CHIARAVALLOTI. Cognition in MS.
Impairments in multiple aspects of cognitive functioning are common in MS, occurring in more than 50% of the population. Common cognitive symptoms include deficits in complex attention, efficiency of information processing, executive functioning, processing speed, and new learning and memory. These deficits detrimentally affect many aspects of daily life, such as the ability to run a household, participate fully in society, and maintain employment— factors that can all affect the overall quality of life of the patient. It is thus essential that we develop a full understanding of the pattern of cognitive deficits in MS as well as the complex interaction among the various aspects of cognition. Thus, this presentation will focus on the common cognitive profile observed in persons with MS and the interaction between the various aspects of cognition. Both behavioral and neuroimaging data will be discussed.
Correspondence: *Nancy D. Chiaravalloti, 300 Executive Drive, Suite 70, West Orange, NJ 07052. E-mail: nchiaravalloti@kesslerfoundation.org*

L. STROBER. Understanding the complexities of unemployment in multiple sclerosis (MS): The role of person-specific factors.
Rates of unemployment among individuals with multiple sclerosis (MS) are as high as 80%. Given the age at which MS is most common (20 to 50 years of age) and the knowledge that employment is a vital component for psychological well-being, participation, and overall quality of life during these years, efforts to assist individuals with MS in maintaining employment or to assist practitioners in making informed decisions regarding employment is a priority. Over the past few decades, research has focused on increasing our understanding of the factors that lead to these high rates and ways to mitigate such factors. Previous investigations have found female gender, younger or older age, less education, greater disability, and progressive course to be related to unemployment. Other factors include primary symptoms associated with MS such as poor balance and difficulty walking, bladder/bowel incontinence, and heat sensitivity. Secondary symptoms such as fatigue and cognitive difficulties are also reported as significant contributors to leaving the workforce. However, it has previously been shown that these disease variables and demographics only account for 14% to 20% of the variance in predicting employment status. Thus, it has recommended that more attention be given to the role that person-specific factors (e.g., personality, coping, health-related behaviors) have on the decision to leave the workforce. In the proposed symposium, we will present findings pertaining to the role that personality, coping, self-efficacy, and engagement in health-related behaviors has on employment status in MS, above and beyond disease and demographic variables. Such findings highlight the importance of examining the multitude of extrinsic and intrinsic factors involved in decisions which individuals with MS face and the importance of incorporating a snapshot of the "whole" person as opposed to just the disease.
Correspondence: *Lauren Strober, 300 Executive Drive, Suite 70, West Orange, NJ 07052. E-mail: lstrober@kesslerfoundation.org*

Dementia (Subcortical, Specific Disorders, MCI, etc.)

D. CALVO, J. MEISTER, E. GLICKMAN, J. GUNSTAD & M. SPITZNAGEL. The Impact of a 6-Month Exercise Program on Serum IGF-1 and Global Cognition in Mild Cognitive Impairment.
Objective: Recent research suggests physical activity may improve cognition in persons with mild cognitive impairment (MCI). One possible mechanism for this is increased insulin growth factor-1 (IGF-1), a mitogen linked to both physical activity and cognitive function in older adults.
Participants and Methods: Cardiovascular fitness (2-Minute Step Test), global cognitive performance (Modified Mini-Mental State Exam), and serum IGF-1 were assessed at baseline and following 6 months of biweekly moderate-intensity aerobic and strength training.
Results: Repeated measures Analysis of Variance (ANOVA) was conducted to determine pre- to post-exercise changes in cardiovascular fitness, cognitive performance, and IGF-1. Although cardiovascular endurance improved ($p=0.01$), IGF-1 values did not change, and cognitive performance declined ($p=0.04$).
Conclusions: While a 6-month exercise intervention significantly improved cardiovascular fitness, serum IGF-1 remained constant and cognitive function declined. It is possible that higher frequency or intensity exercise is needed to improve cognition and IGF-1; alternatively, individuals diagnosed with MCI may not show the same benefits from exercise as healthy older adults.
Correspondence: *Dayana Calvo, Kent State Psychology, 3877 Lake Run Blvd, Stow, OH 33777. E-mail: dcalvo1@kent.edu*

H.B. ENGLAND, M. GILLIS & B.M. HAMPSTEAD. RBANS Memory Indices are Related to Medial Temporal Lobe Volumetrics in Mild Cognitive Impairment.
Objective: The current study sought to examine the relationship between the Repeatable Battery for the Assessment of Neuropsychological Status (RBANS) Immediate and Delayed memory indices and medial temporal lobe (MTL) volumes in healthy older adults and patients with mild cognitive impairment (MCI).
Participants and Methods: Fifty-seven MCI patients and 43 healthy older controls completed a brief neuropsychological protocol that included the RBANS and underwent structural MRI. Hippocampal and inferior lateral ventricle volumes were obtained using NeuroQuant®, which is an FDA approved, commercially available program that allows clinicians to obtain volumetrics. We correlated the Immediate and Delayed memory indices performances with MTL volumes across the entire sample as well as within each group. Exploratory analyses examined the relationship between memory subtest performances and MTL volumes with each hemisphere.
Results: MCI patients demonstrated significantly reduced RBANS Immediate and Delayed Memory Indices, reduced hippocampal volumes, and increased inferior lateral ventricle volumes relative to controls; findings that replicate previous research. Across all participants, there was a significant relationship between both memory indices and MTL volumes ($p < 0.01$). This relationship persisted for the Delayed Memory Index and hippocampal volumes in MCI. List learning and all delayed

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

recall subtest performances were significantly related to hippocampal volumes bilaterally; there was no evidence of lateralized relationships.
Conclusions: RBANS memory scores are reflective of MTL integrity, especially in patients with MCI; results that further add to the RBANS's clinical utility in this population. However, the lateralizing value of the individual subtests is, at best, limited presumably due to the bilateral nature of the disease process.
Correspondence: *Heather B. England, M.A., Emory University School of Medicine, 1441 Clifton Rd. NE, Suite 150, Atlanta, GA 30322. E-mail: henglan@emory.edu*

J.M. MCCONNELL, D.A. GONZÁLEZ, N.T. YEHYAWI, V.H. BALLDIN, K.J. MCCOY & J.C. MARCEAUX. Mild Neurocognitive Disorder: A Cluster Analysis.
Objective: Most neuropsychological classification research uses mean profiles and between-groups significance tests. This method is useful in distinguishing between disorders, but may ignore idiosyncratic patterns within disorders and suggest individuals with the disorder fit one prototypical pattern. Consequently, some neuropsychologists proposed increased use of cluster analysis (CA; Allen & Goldstein, 2013), a method to group subsets according to homogeneous data-driven patterns. CA has been used to clarify subtypes of various neurocognitive disorders, but not for mild neurocognitive disorder (mild NCD). Using hierarchical cluster analysis, we believed there would be several subtypes of mild NCD.
Participants and Methods: Participants were an archival sample of 52 veterans (75% male) with a mean age of 48.95 (SD=10.33), a mean education of 13.37 (SD=2.45), a low average to high average intellectual functioning, and a diagnosis of mild NCD. We used Trail Making Test (TMT)-A for attention; WAIS-III/IV processing speed index (PSI) for processing speed; California Verbal Learning Test-II Long Delay Free Recall and Rey Complex Figure Test (RCFT) Delayed Recall for memory; RCFT Figure Copy for visuospatial skills; TMT-B and Stroop Color-Word Interference for executive functioning; and Animals, Boston Naming Test, and FAS for language. T-scores were used for all except WAIS PSI and RCF Figure Copy. We clustered neurocognitive profiles of individuals with mild NCD.
Results: Using Ward's minimum variance method, a three-cluster solution provided the most parsimonious clustering with an optimal balance between in-group homogeneity and out-group heterogeneity.
Conclusions: Cluster one was primarily characterized by a relative weakness in language; cluster two by memory; cluster three by attention, processing, and memory. This supports multiple subtypes of mild NCD, which may be secondary to multiple etiological causes of mild NCD. Neuropsychologists may consider their evaluations in context of these data-driven profiles.
Correspondence: *John M. McConnell, M.A., South Texas Veterans Health Care System, Audie L. Murphy VA, 7400 Merton Minter Blvd. 116-B, San Antonio, TX 78229. E-mail: jmmcconnell@bsu.edu*

P. GONZALEZ, M. CASTRO COUCH, S. HANNA, A. LUNDE, J. FIELDS, D. LOCKE & G. SMITH. Prioritization of Treatment Outcomes by Caregivers of patients with Mild Cognitive Impairment Introduction.
Objective: The impact of treatments in meeting caregivers' needs are generally not evaluated (Berger G, et al. 2004). Our aim is to identify which are the most important behavioral outcomes to caregivers of people with mild cognitive impairment rank. This permits later evaluation of the contributions clinical interventions actually have in meeting patient and caregivers' priorities.
Participants and Methods: 33 Caregivers (91% female; Mean age= 71; 54% college graduates) from the Mayo Healthy Actions to Benefit Independence and Thinking (HABIT) program consented to an interview (over the telephone or in person) focused on rank ordering the 12 patient/caregiver centered outcomes assessed in the program. Rank ordering was on scale of 1= most important to 12= least important.
Results: 30% of caregivers reported that quality of life for the patient was the most important treatment outcome. Among the 33 caregivers, this outcome also obtained the highest median rank. Patient self-efficacy in handling their MCI (Median Rank= 4) ranked second. Caregiver quality of life was the highest ranking caregiver outcome (Median Rank=4). Obtaining median ranks from 5 to 8 were: daily function, memory based activities, patient's anxiety, caregiver's self-efficacy, patient's depression and distressing behaviors, and caregiver's anxiety. Caregiver depression (Median Rank= 10) and burden (Median Rank=10) were of least importance among all treatment outcomes, and ranked last in more than 25% of caregivers.
Conclusions: Results reveal that at the MCI stage issues of patient self-efficacy, life quality, and function predominate. Psychosocial stressors like: anxiety, depression, and burden, are not yet a priority in contrast to findings in more advanced stages of dementia (Mittleman, et al. 2004). This validates that with MCI, caregivers are focused in patients' opportunities to gain skills that may sustain self-esteem and compensate for their cognitive decline
Correspondence: *Polaris Gonzalez, BA, Clinical Psychology, Ponce School of Medicine, Street 5 H7 Chalet El Naranjal, Toa Baja 00949. E-mail: pgonzalez@stu.psm.edu*

M. CASTRO, P. GONZALEZ, J. FIELDS, M. YUTSIS & G. SMITH. Longitudinal Changes in Memory Spanning Mild Cognitive Impairment to Early Alzheimer's Disease.
Objective: We have previously found procedural memory to be impaired in Alzheimer's disease (AD) yet preserved in Mild Cognitive Impairment (MCI). MCI thus marks an important transition point in ability to acquire new skills. Given that most research examines cross-sectional group differences, we followed MCI individuals over time to learn more about longitudinal procedural vs. declarative memory decline.
Participants and Methods: Participants (n=16) were recruited from the Mayo HABIT program for MCI and followed for a period of 12 to 24 months. Within that timeframe four (25%) individuals progressed to early AD (DRS-2 ≤ 115 and CDR = 1). MCI and early AD groups did not differ significantly in terms of age or education (Mean = 74, SD = 6; Mean = 16 years, SD = 5). Tests of declarative (DRS-2, AVLT) and procedural memory (Mirror Tracing) were administered at baseline and follow-up.
Results: A within-subjects ANOVA revealed no significant change in procedural memory performance over time, regardless of whether individuals progressed to AD or not [Wilks' lambda (Λ) = .98, $F(2,14)$ = .244, p = .63]. On average, those with AD had declined 9 points on their Total DRS-2 scores. Pairwise comparisons showed that those who progressed to AD had lower DRS-2 baseline scores compared to those that did not [Total: $F(1,10) = 16.8$, p = .002; Memory: $F(1,10)$ = 12.0, p = .006], suggesting earlier onset of decline. All subjects showed significantly better learning scores on the AVLT at follow-up, perhaps due to familiarity with the test ($F(2,14) = 7.56$, p = .016). Despite this, 30-minute delayed recall was impaired and did not differ within or between subjects (Λ = .959, $F(2,14)$ = .598, p = .45).
Conclusions: Our results provide preliminary support for the stability of procedural memory from MCI into early AD, independent of declarative memory impairment. These findings hint that even those with early AD stand to benefit from cognitive based interventions that leverage procedural memory. Larger samples are needed to confirm these findings.
Correspondence: *Melissa Castro, PsyD, Psychiatry & Psychology, Mayo Clinic, 200 First Street SW, Mayo W-11, Rochester, MN 55905. E-mail: castro.couch@gmail.com*

C.J. SANDERS, C. LOW & M. SCHMITTER-EDGECOMBE. Examining Impairment in Planning Ability with Mild Cognitive Impairment.
Objective: Executive functioning (EF), a construct representing a group of higher-level cognitive abilities, has been shown to decline with age. Recent studies also suggest that EF deficits may be common in

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

individuals who present with mild cognitive impairment (MCI). However, few studies have specifically examined planning deficits in individuals with MCI. In the present study, we utilized the "map task" (Sanders & Schmitter-Edgecombe, 2012), an open-ended problem-solving task, to separately evaluate the formulation and execution components of planning ability in individuals with MCI.
Participants and Methods: 37 cognitively healthy older adults and 37 older adults with MCI completed the map task in a real-world campus apartment. Using a map layout of a university apartment, participants were tasked with developing and writing out a strategy (formulation stage) to successfully complete several tasks (e.g., retrieving and filling a water pitcher before placing it in the refrigerator, retrieving a remote control and placing it in front of the T.V., etc.). Subsequently, participants carried out the tasks in the apartment with the aid of their formulated plan (execution stage).
Results: MCI participants performed more poorly than OA controls during both the formulation and execution stages on measures of task accuracy and efficiency. However, both groups were able to adjust and improve task accuracy and efficiency from formulation to task execution. Finally, MCI participants took significantly longer to complete the task and adhered less to their formulated plans during task completion.
Conclusions: Using an open-ended problem-solving task, our study revealed that individuals with MCI experience global planning impairment significantly more severe than would be expected as a product of normal aging. Similar to healthy older adults, the MCI participants were able to make use of environmental cues to update and adjust their strategy during task execution.
Correspondence: *Chad J. Sanders, M.S., Psychology, Psychology, Washington State University, 1704b N. 103rd St., Seattle, WA 98133. E-mail: chaderly5550@yahoo.com*

A.T. FLOWERS, J. AVILA, J. RAZANI, L. APOSTOLOVA, E. WOO & J. RINGMAN. Performance of Participants with Different Subtypes of Mild Cognitive Impairment on an Activity of Daily Living Task.
Objective: The purpose of the current study was to examine performance on an observation-based measure of functional ability in different subtypes of Mild Cognitive Impairment (MCI).
Participants and Methods: Twenty-three MCI participants composed three groups in this study: 8 amnestic-multiple domain, 4 amnestic-single domain, and 11 non-amnestic-single domain. All participants were administered the Direct Assessment of Functional Status (DAFS), which assesses the following domains: 1) orientation to person, place, and date, 2) communication skills; 3) transportation skills, 4) financial skills, and 5) shopping skills.
Results: Results from a MANOVA indicated that group means were significantly different on the DAFS orientation, [F (2, 23)=3.913, p<. 05], and communication subscales [F (2,23) = 9.867, p <. 05].
Specifically, the amnestic single domain group demonstrated poorer performance on the orientation and communication subscales compared to the amnestic multiple domain and non-amnestic single domain groups ($p < .05$), who performed the same ($p > .05$). Additionally, the amnestic multiple domain group performed worse than the non-amnestic single domain group on the shopping subscale ($p <. 05$).
Conclusions: Overall, it appears that the ability to perform activities of daily living may vary by MCI subtype. The ways in which this information can help clinicians and families develop treatment plans that participants will need in order to cope with functional limitations that accompany different forms of MCI will be further discussed.
Correspondence: *Amina T. Flowers, B.A., Psychology, California State University, Northridge, 5454 Brynhurst Avenue, Los Angeles, CA 90043. E-mail: flowersamina@gmail.com*

S. COOLEY, R. CABEEN, D. LAIDLAW, T. CONTURO, E. LANE, J. HEAPS, J. BOLZENIUS, L. BAKER, L. SALMINEN, S. SCOTT & R. PAUL. Changes In White Matter And Gray Matter Microstructure In Mild Cognitive Impairment: A Diffusion Tensor Imaging Study.
Objective: Mild cognitive impairment (MCI) is described as a potential transitional condition between normal age-related cognitive decline and dementia. Research with magnetic resonance imaging (MRI) and diffusion tensor imaging (DTI) has identified significant changes to white (WM) and gray matter (GM) integrity in older adults with MCI compared to cognitively healthy older adults. However, most studies have focused on traditional DTI scalar metrics fractional anisotropy (FA) and mean diffusivity (MD), both of which provide information about neuronal density. Less is known about radial diffusivity (RD) and axial diffusivity (AD) in MCI, which provide information about axonal integrity and myelin, respectively.
Participants and Methods: The present study examined a subset of participants (n=49) that completed baseline imaging from a larger longitudinal study of healthy aging. Participants were divided into two groups based on scores from the Montreal Cognitive Assessment (MoCA), a brief screening tool for MCI. Participants who scored <26 were defined as having MCI; those who scored ≥26 were defined as cognitively healthy. ANOVAs compared DTI values for whole brain, lobes, and WM and GM areas.
Results: Results revealed significantly reduced FA in the MCI group in the temporal and occipital lobes, the cuneus WM, and multiple GM areas. AD and/or RD were significantly increased among the MCI group in the left paracentral and right lateral orbitofrontal GM, and left pericalcarine and paracentral WM.
Conclusions: These results suggest that GM regions involved in visual processing, learning and memory are abnormal in MCI. Further, while axonal and myelination damage was evident in select brain regions as measured by AD and RD, loss of neuronal density was most consistently observed in MCI.
Correspondence: *Sarah Cooley, Psychology, University of Missouri - St. Louis, 1 University Blvd., Stadler 442B, St. Louis, MO 63121. E-mail: sac232@mail.umsl.edu*

J.W. TAM, R.P. FELLOWS, K.N. JOHNSON & M. SCHMITTER-EDGECOMBE. Caregiver Burden among Caregivers of Individuals with Mild Cognitive Impairment (MCI).
Objective: Research on the impact that cognitive and functional limitations of individuals with MCI can have on caregiver burden is relatively limited. We hypothesized that increased cognitive and functional limitations in individuals with MCI and poorer coping strategies in care-partners would significantly contribute to caregiver burden.
Participants and Methods: Participants were 38 individuals with MCI (ages 56-85) and their care-partners (ages 48-85). MCI participants completed a standardized neuropsychological test battery that included the Repeatable Battery for the Assessment of Neuropsychological Status (RBANS). Care-partners completed the following questionnaires: Caregiver Burden (CB), the Coping Self-Efficacy Scale (CSES), and an informant-report of instrumental activities of daily living (IADLs) interview.
Results: In a hierarchical regression model, the RBANS delayed memory score and IADLs together accounted for 29% of the variance in CB ($p = .002$) and the CSES accounted for significant variance above and beyond that accounted for by the cognitive and functional measures [ΔR^2=.10; $\Delta F(1,34)=5.38; p=.03$]. In addition, IADLs [$\beta= .45, t(34)=2.69, p=.01$] and the CSES [$\beta= -.33, t(29)=-2.32, p=.03$] were unique predictors of CB. Exploratory regression analyses predicting the impact of cognitive limitations, informant-reported IADLs and CSES on sub-domains of CB (i.e. strain, isolation, disappointment, emotion, and environment) revealed that IADLs was a unique predictor of all CB sub-domains ($p < .05$), while CSES was a unique predictor of isolation ($p = .01$) and disappointment ($p < . 001$) and approached significance as a predictor of strain ($p = .07$).
Conclusions: The findings demonstrated that the cognitive and especially functional limitations of individuals with MCI significantly

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

contributed to caregiver burden. In addition, effective coping strategies by care-partners of individuals with MCI appear to independently reduce caregiver burden and may be an effective point for early intervention with care-partners.
Correspondence: *Joyce W. Tam, M.A., Washington State University, PO BOX 644820, Pullman, WA 99164. E-mail: jwt140@gmail.com*

W. SONG, C. PERSAD, P. PANDIT, A. DOONG, C. CLINE & B. GIORDANI. Healthy Older and MCI Drivers: Increased Errors When Fatigued and Differences in Cognitive Predictors of Driving Performance.

Objective: We have previously shown that the fatigued older adults with MCI made more errors when driving compared to the healthy older adults. This study examines simulator driving of older adults with and without MCI when they are and are not fatigued, with attention to cognitive predictors of driving ability.
Participants and Methods: Thirty-four healthy older drivers and 17 drivers with MCI aged ≥ 55 years participated in a 60-minute drive designed to illicit fatigue using computerized driving scenarios. Driving errors, speed, and variability in speed and lane position were measured during the first and last 10 minute segments. Participants also completed measures of attention, working memory, executive functioning and fine motor.
Results: Even at the onset of the drive, the MCI group made significantly more driving errors compared to controls, although other aspects of driving performance were comparable. When fatigued, the MCI group made even more errors than controls and showed reduced speed and increased variability in speed and lane position while the control group driving remained relatively stable. No cognitive variables predicted driving performance of controls when not fatigued, though working memory predicted driving errors when fatigued. For MCI, executive functioning predicted driving errors both when fatigued and not fatigued. Attention and motor speed predicted variability in lane position and executive ability predicted driving speed and speed variability of fatigued MCI patients.
Conclusions: Driving is a well-learned skill and the healthy may not utilize higher-order cognitive skills until the situation becomes complex. Healthy controls were able to maintain their driving performance even when fatigued, at which point they appear to rely on working memory to prevent errors. In contrast, MCI relied on executive functioning to control driving errors from the onset. These results support the use of cognitive interventions designed to improve working memory and executive functioning for older drivers.
Correspondence: *Woojin Song, Ph.D., University of Michigan, 2101 Commonwealth Blvd. Ste C, Ann Arbor, MI 48105. E-mail: woojinsong@gmail.com*

J.N. COPELAND, K.L. TRIEBEL, A.C. LAHTI, G. DEUTSCH, R.E. KENNEDY, A.J. KNIGHT, E. MCKINLEY & D.C. MARSON. Cortical Thickness and Financial Capacity in Amnestic Mild Cognitive Impairment.

Objective: Amnestic mild cognitive impairment (aMCI) patients display financial capacity (FC) impairments related to angular gyri volume loss mediated by arithmetic deficits, but not to hippocampal volume loss/memory deficits or volume loss in precuneus and medial frontal cortex (Griffith et al., 2010). The present study used cortical thickness, a more sensitive measure of atrophy in neurodegenerative disease, to investigate financial skill decline in aMCI. Specifically, the study examined cortical thinning in the inferior parietal cortex (IPC), precuneus (PRE), superior frontal cortex (SFC), entorhinal cortex (EC) and parahippocampal gyrus (PHG) and their relationships to FC impairment in aMCI.
Participants and Methods: A cross-sectional sample of 19 aMCI patients, including 11 patients with presumed Alzheimer's disease etiology (aMCI-AD), completed structural MRI, neuropsychological testing, and the Financial Capacity Instrument (FCI) as part of a larger longitudinal NIH funded study. Partial correlations were conducted between FCI scores and cortical thickness, controlling for number of prior visits.
Results: Consistent with previous volumetric studies, FC deficits were strongly correlated with IPC cortical thickness (left $r = .59$, $p < .01$; right $r = .50$, $p < .05$). PRE was also strongly associated with FCI scores (left $r = .56$, $p < .01$; right $r = .61$, $p < .01$). A similar pattern of associations was found in the aMCI-AD subset, but with stronger correlations between bilateral IPC and PRE cortical thickness and FC. Left SFC was also associated with FCI declines ($r = .56$, $p < .05$). Bilateral EC and PHG showed weak associations with FC ($r \leq \pm .28$) in both groups.
Conclusions: These findings continue to emphasize the relationship between IPC and FC. In addition, new associations with PRE and SFC may implicate executive functioning and attention deficits in FC impairment in aMCI. The results also support cortical thickness as a sensitive measure to detect structural brain changes linked to declining FC in aMCI.
Correspondence: *Jacquelynn N. Copeland, Ph.D., University of Alabama at Birmingham, CH 201, 1720 2nd Ave S, Birmingham, AL 35294-1152. E-mail: jcopeland@uab.edu*

J. EPPIG, M.W. BONDI, L. DELANO-WOOD, C. LATOCHA, J. DONOHUE, G. WICAS, T. GIOVANNETTI, C.F. LIPPA & D.J. LIBON. An Empirically-Driven Approach to Compare Petersen versus Jak/Bondi Criteria in the Diagnosis of Mild Cognitive Impairment.

Objective: Our previous research has examined statistically-clustered MCI subgroups identified with Petersen criteria. However, recent studies suggest enhanced reliability and stability of the MCI diagnosis using newer Jak/Bondi criteria. Therefore, we compared cluster-derived MCI subtypes based on both Petersen vs. Jak/Bondi criteria.
Participants and Methods: 137 patients with MMSE scores >24 and intact ADL/IADL functioning were assessed using tests of executive function, language, and episodic memory. Subjects met Petersen criteria if performance on any test fell <1.5 SD below age norms; Jak/Bondi criteria necessitated that patients score <1.0 SD below norms on two test variables in one domain or one test variable in every domain. K-means cluster analyses were performed for each criterion, using 6 and 8 test variables.
Results: Using 6 variables, significantly more patients met Petersen (n= 95) criteria than those defined using Jak/Bondi (n= 84) criteria ($p< .001$). Subsequent cluster analysis of Petersen criteria provided evidence for dysexecutive (n=28), amnesic (n= 25), and mixed (n= 42) subgroups. Jak/Bondi criteria also clustered subjects into dysexecutive (n=43), amnesic (n=23), and mixed (n=18) subgroups. Using 8 variables, 106 patients met Petersen criteria for MCI; 95 subjects met Jak/Bondi criteria for MCI ($p< .001$). Cluster analyses again produced three subgroups for both schemes, although the subgroup proportions changed for the Petersen criteria (dys: n=62, amn: n=22, mix: n=22) but not for the Jak/Bondi criteria (dys: n=52, amn: n=22, mix: n=21).
Conclusions: This study demonstrates that criteria defining MCI yields nuanced differences among subgroups and raises important clinical considerations. Although the subtype compositions (dys, amn, mix) remain relatively similar between Petersen and Jak/Bondi criteria, the number and proportional sizes of those subgroup compositions differ depending upon the number of variables used, suggesting greater instability of MCI subtypes using Petersen criteria.
Correspondence: *Joel Eppig, B.A. in psychology, SDSU/ UCSD, 1205 Colusa St, Apt #3, San Diego, CA 92110. E-mail: joel.eppig@temple.edu*

L. RABIN, C. WANG, M. KATZ & R. LIPTON. A Psychometric Approach to the Classification of Subjective Cognitive Decline and Mild Cognitive Impairment.

Objective: Approaches to diagnosis of MCI differ widely across settings. There is even less consensus regarding the optimal assessment of cognitive complaints, an important component of most definitions of MCI and the core feature of subjective cognitive decline (SCD), a condition marked by significant cognitive complaints but intact

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms.
https://doi.org/10.1017/S1355617714000381

neuropsychological performance that may represent a pre-MCI condition. The current study presents a novel psychometric approach to the classification of MCI and SCD.
Participants and Methods: Participants were 211 non-demented, community-dwelling older adults, aged 70+, from the Bronx, NY. Fist, we carried out an exploratory factor analysis on 13 neuropsychological tests using a principal components analysis (PCA) among robust local norms. Next, cognitive domain scores were calculated as the average of the Z-scores of each test in the domain, using means and SDs from the robust sample stratified by age group (70-79 and 80+). We utilized cognitive complaints items with known reliability and predictive validity for dementia. Subsequently, we derived an optimal cut score based on the Youden index from an ROC analysis, stratified by age group, and based on the cross-sectional association between self or informant complaints and MCI.
Results: The PCA yielded three factors—memory, executive, global/verbal. SCD was classified in 63 participants with scores at or above 1SD on all cognitive factors who exceeded the optimal cut for complaints. MCI was classified in 43 participants whose scores fell below 1SD on one or more cognitive factors and who had a cognitive complaint. The remaining 105 participants, designated as controls, had scores at or above 1SD on all cognitive factors and did not exceed the cut for complaints.
Conclusions: We present a comparison of participants classified using our novel psychometric approach to those classified by clinical consensus. We are further investigating the applicability and utility of the psychometric approach through longitudinal follow-up.
Correspondence: *Laura Rabin, Brooklyn College/CUNY, 2900 Bedford Ave, Brooklyn, NY 11210. E-mail: lrabin@brooklyn.cuny.edu*

E. HESSEN, I. REINVANG, C. ELIASSEN, A. NORDLUND, T. FLADBY & A. WALLIN. Prognosis of amnestic and dysexecutive MCI.
Objective: The present study investigated the prognosis of dysexecutive MCI as a single domain deficit (eMCI) and as part of a multidomain deficit (aMCI + eMCI). Prognosis was also evaluated both compared to patients with single domain aMCI and clinical controls (memory clinic patients with normal neuropsychological status).
Participants and Methods: Patients with mild cognitive impairment (N=307, Mean age: 63 years) were recruited from two university clinics and followed for 2 years. They were divided in sub-categories of MCI based on neuropsychological profiles.
Results: Single domain eMCI accounted for 11% of neuropsychologically impaired patients. Prognosis in this group was mixed, with more than one third reverting to normal after 2 years. When executive dysfunction occurred in addition to amnestic problems, the risk for conversion to dementia was significantly increased. Detailed analysis revealed divided attention and inhibition as domains of dysexecutive function predictive of significant decline in executive tests measuring aspects of speeded cognitive processing.
Conclusions: Future criteria for executive deficit and eMCI should focus on domains of executive function that have shown evidence in this and other studies of sensitivity and significance for predicting decline in cognitive function. A longer follow up period and inclusion of CSF and genetic markers as well as MRI is needed to better determine the further course and etiology of people with mild executive deficits.
Correspondence: *Erik Hessen, PhD, University of Oslo, Krags vei 13, Oslo 0783, Norway. E-mail: erik.hessen@nevropsykologi.no*

N. SUN-SUSLOW, D.A. NATION, L. DELANO-WOOD, D.J. LIBON & M.W. BONDI. Process-based Verbal Fluency Measures Improve Prediction of MCI Diagnosis.
Objective: We investigated the predictive utility of process-based vs. total correct measures of verbal fluency performance through cross-sectional comparisons among three groups [normal cognitive aging (NC), nonamnestic mild cognitive impairment (naMCI), and amnestic MCI (aMCI)]. We also examined whether process-based or total correct measures better predicted diagnostic category at one year follow-up.
Participants and Methods: Nondemented older adults (39 aMCI, 35 naMCI, 39 NC) were compared on total correct and process-based measures from verbal fluency tests (Animals, Supermarket Items, FAS). Process-based indices included perseverative errors, clustering, switching, phonemic repeats, and association index (Animals). ANCOVA tested baseline differences and logistic regression tested whether fluency measures predicted diagnosis at one year follow-up.
Results: Participants with aMCI at baseline performed worse than NC on total correct and process-based indices for all three tests, although those with naMCI only showed reductions on FAS and Supermarket Items (all p's < .05). Process-based scores from Animals and Supermarket items predicted aMCI diagnosis at follow-up [Animal association index (p=.025), Supermarket Items phoneme repetitions (p=.039)], but total correct scores did not. These process-based measures also significantly correlated with verbal memory (Logical Memory, California Verbal Learning Test-II) at follow-up (all p's < .05).
Conclusions: Findings support quantification of process-based approaches to neuropsychological testing to improve test sensitivity and specificity. Although MCI participants exhibited reduced performance on total correct and process-based measures at baseline, process-based measures were better predictors of follow-up aMCI diagnosis, and demonstrated a more specific relationship with memory function, suggesting that these indices can quantify the contribution of memory ability to verbal fluency performance.
Correspondence: *Daniel A. Nation, Ph.D., Psychology, University of Southern California, 3620 South McClintock Ave., Los Angeles, CA 90089-1061. E-mail: danation@usc.edu*

S. VANDERMORRIS, S. SHELDON, M. AL-HAJ, S. COHEN, G. WINOCUR & M. MOSCOVITCH. Autobiographical Episodic Memory is Associated with Open-Ended Problem-Solving in Single-Domain Amnestic Mild Cognitive Impairment (aMCI).
Objective: Problem solving may be critical for sustained functional independence in MCI. Emerging evidence suggests that episodic simulation processes, mediated by the medial temporal lobes (MTL), support the effective solution of ill-defined problems, over and above the contribution of frontally-mediated executive functions. This suggests that individuals with single-domain aMCI may have deficits in problem solving.
Participants and Methods: Participants were 16 individuals with single-domain aMCI (mean age=75, education=15.0; MMSE=28.4) and 16 matched controls. Clinical measures included Trails B, Stroop, Rey Figure, HVLT-2 and WMS-R LM. Autobiographical memory was assessed using the Autobiographical Interview (AI), and ill-defined problem-solving using the Means-End Problem-Solving Procedure (MEPS).
Results: Repeated measures ANOVAs revealed that controls demonstrated greater episodic richness in their autobiographical narratives (i.e., significantly fewer external details, marginally greater internal details on the AI), as well as stronger open-ended problem solving efficacy (i.e., significantly fewer irrelevant steps, marginally greater relevant steps on the MEPS). In individuals with aMCI, there was a positive correlation between episodic richness of autobiographical narratives and open-ended problem solving efficacy (r=.58) that persisted after controlling for executive scores. Correlations between problem solving and executive and memory measures were not significant.
Conclusions: Individuals with single-domain aMCI displayed deficits in autobiographical episodic memory that were associated with deficits in generating solutions to open-ended problems. The relationship of autobiographical memory to problem solving was stronger than the relationship of clinical memory and executive processes to problem solving. Findings have implications for ecological validity of clinical testing and interventions targeting preserved functional independence in aMCI.

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms.
https://doi.org/10.1017/S1355617714000381

Correspondence: *Susan Vandermorris, PhD, Baycrest, 3560 Bathurst St, Toronto, ON M6A 2E1, Canada. E-mail: svandermorris@baycrest.org*

L.R. CLARK, G.H. WEISSBERGER, S.M. JURICK, Y. CHANG, D.M. SCHIEHSER, C.E. WIERENGA, D. HAN, J.T. GRAVANO, S.I. DEV & M.W. BONDI. Faulty Adaptation to Repeated Face-Name Associative Pairs in Mild Cognitive Impairment.

Objective: We investigated whether BOLD responses to face-name associative encoding varies as a function of repetition between older adults with Mild Cognitive Impairment (MCI) and Normal Control (NC) participants. Based on prior work (Han et al 2007; Johnson et al 2004), we predicted that MCI participants would show faulty adaptation (e.g., lack of expected BOLD response decreases with increasing repetition) to repeated face-name pairs in medial temporal and posterior cingulate regions compared to NC participants.

Participants and Methods: 29 NC and 20 MCI participants, matched on gender, age, and education, completed neuropsychological testing and an event-related fMRI procedure consisting of a face-name associative encoding paradigm during which images were either displayed once (New), twice (R1), or three times (R2). We modeled adaptation to face-name pairs using specific contrasts (e.g., New vs. R1, New vs. R2, and R1 vs. R2) and conducted whole brain voxel-wise t-tests to compare groups.

Results: As expected, NCs exhibited decreased BOLD responses to R2 trials compared to New trials in the parahippocampal gyrus, lingual gyrus, right fusiform gyrus, thalamus, left insula, basal ganglia and cerebellum. In contrast, MCIs had greater BOLD responses to R2 trials compared to New trials (all ps≤ .02 after cluster thresholding) across all of the above regions. A similar pattern was observed in the comparison of MCI and NC groups for the R1 vs. R2 contrast. Furthermore, NC participants had better post-MRI recognition memory performance for the repeated stimuli than MCI participants.

Conclusions: Widespread activation of brain regions was associated with novel presentation of face-name pairs. Decreased BOLD responses occurred in the NC group with increasing repetition of stimuli, whereas increased BOLD responses occurred in the MCI group, suggesting faulty adaptation within MCI. Furthermore, activated regions were not restricted to medial temporal lobe memory circuitry, implicating a wider network of regions affected in MCI.

Correspondence: *Lindsay R. Clark, M.S., Joint Doctoral Program in Clinical Psychology, San Diego State University/University of California San Diego, VA San Diego Healthcare System (116B), 3350 La Jolla Village Drive, San Diego, CA 92161. E-mail: ltermini@gmail.com*

D.P. SHEPPARD, H.M. HOLDEN, E. PIROGOVSKY, D.R. NICOLL, S. WOODS, J. FILOTEO, J. COREY-BLOOM & P.E. GILBERT. An Assessment of Instrumental Activities of Daily Living in Huntington's Disease.

Objective: Huntington's disease (HD) is a neurodegenerative disorder characterized by motor, cognitive, and psychiatric symptoms that lead to dependence in instrumental activities of daily living (iADLs) per patient- and proxy-report. However, report-based methods can be biased by lack of insight, depression, and cognitive impairment, which may lead to inaccurate estimation of functional abilities. Performance-based functional measures provide an assessment of functional skill and capacity that does not rely as heavily on patient or caregiver insight and has not been previously examined in HD.

Participants and Methods: The present study examined iADLs in 20 patients diagnosed with mild-moderate HD and 20 demographically similar healthy adults using both performance-based and self-report iADL measures. Self-report measures of iADLs included a modified version of the Lawton and Brody Activities of Daily Living measure and the Medication Management Efficacy Scale (MMES). Performance-based iADL abilities were assessed using the Advanced Finances Test (AFT) and Medication Management Ability Assessment (MMAA).

Results: As compared to the healthy adults, HD patients endorsed greater declines in overall functional abilities. HD patients also reported significantly greater declines specifically in their ability to manage finances and lower (trend level) medication management abilities. HD patients also performed significantly below the healthy adults on the AFT; however, there were no significant between-group differences on the MMAA. Additionally, in the HD group there were no correlations between self-report and performance-based measures of ability to manage finances or medications.

Conclusions: These data suggest that HD patients evidence functional skill deficits in the laboratory (e.g., AFT) and experience declines in everyday functioning per self-report. However, there may be important moderators of the relationship between capacity and manifest functioning (e.g., insight, compensatory strategies).

Correspondence: *David P. Sheppard, San Diego State University, 4377 Piedmont Dr., San Diego, CA 92107. E-mail: dsheppard.sdsu@gmail.com*

E. PIROGOVSKY, D.M. CHALLENER, D.R. NICOLL, E. BREEN, S. GLUHM, J. COREY-BLOOM, P.E. GILBERT & L.J. ROTBLATT. The Visual Spatial Learning Test: Differential Impairment During the Premanifest and Manifest Stages of Huntington's Disease.

Objective: Visuospatial memory impairment has been associated with Huntington's disease (HD); however, little is known about visuospatial memory during the premanifest stage of HD.

Participants and Methods: Visuospatial memory was assessed in individuals diagnosed with mild to moderate HD, premanifest gene carriers for HD (Pre-HD), and controls using the Visual Spatial Learning Test (VSLT). The VSLT is a standardized measure with evidence for validity and published norms. The test requires minimal fine motor dexterity and uses abstract visual stimuli that are difficult to verbalize. The VSLT assesses immediate and delayed memory for designs, positions of the designs, and design/position associations.

Results: The HD group was significantly impaired ($p < .05$) relative to the control and Pre-HD groups on immediate and delayed memory for the designs, positions, and design/position associations. Although there were no differences between the Pre-HD and control groups on immediate or delayed memory for designs or positions, the Pre-HD group was significantly impaired ($p < .05$) relative to controls on immediate and delayed memory for design/position associations.

Conclusions: Thus, memory for object-place associations may be impaired in Pre-HD. The results also indicate that the VSLT is a useful measure of visuospatial memory in premanifest and manifest HD.

Correspondence: *Paul Gilbert, SDSU-UCSD Joint Doctoral Program in Clinical Psychology, 6363 Alvarado Court, Suite 103, San Diego, CA 92120. E-mail: pgilbert@mail.sdsu.edu*

H.M. HOLDEN, D.R. NICOLL, E. PIROGOVSKY, S. WOODS, J. FILOTEO, S. GLUHM, J. COREY-BLOOM & P.E. GILBERT. "Forgetting to Remember" in Huntington's Disease: A Comprehensive Study of Laboratory, Semi-Naturalistic, and Self-Perceptions of Prospective Memory.

Objective: Prospective memory (PM) is a facet of episodic memory that involves the ability to perform an intended action at some designated point in the future. Given the role of PM in essential functional activities (e.g., taking medication at correct time), PM impairment may be a unique risk factor for declines in everyday functioning. Growing evidence suggests that PM is dependent on the integrity of frontal systems, as well as associated executive processes known to be impaired in Huntington's disease (HD). However, no study to the authors' knowledge has investigated PM in this clinical population.

Participants and Methods: The current study examined performance-based, semi-naturalistic (i.e., 24 hour telephone task), and self-reported PM in 20 patients diagnosed with mild-moderate HD and 20 demographically similar healthy adults.

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

Results: Relative to healthy adults, HD participants demonstrated impairment in the semi-naturalistic PM trial and in both time-based and event-based PM in the laboratory, all of which were characterized by omission errors. In addition, PM impairment in HD was demonstrated over and above deficits in global cognition. HD patients were significantly impaired in recognition memory for the content of event-based PM intentions, but demonstrated intact recognition memory for time-based PM intentions. HD and healthy adult participants self-reported comparable PM complaints, suggesting that HD patients may have overestimated their PM abilities.
Conclusions: Taken together, these results suggest that HD is associated with deficits in the strategic aspects of time-based PM, while event-based PM impairment may be related to deficits in strategic processes and retrospective memory for the content of PM intentions. PM deficits in HD also are evident in real-world healthcare compliance situations, which may relate to an apparent meta-memory deficit for PM abilities as indicated by an overestimation of PM performance in the HD patients.
Correspondence: *Heather M. Holden, MA, SDSU/UCSD Joint Doctoral Program in Clinical Psychology, 6363 Alvarado Court, Suite 103, San Diego, CA 92120. E-mail: hholden365@gmail.com*

C. CIMINO, P. JOHNSON, D. BLINKOFF, L. BUTTERFIELD, E. KELLOGG, K. ELLIOTT & J. SANCHEZ-RAMOS. Differences Evident at Time of Testing for the Huntington's Disease Gene.
Objective: Several investigations have demonstrated that individuals who test positive for the HD gene but are not yet diagnosed may demonstrate subtle cognitive and behavioral changes over time that are evident decades before the onset of motor symptoms that define the diagnosis of the disease. This study investigated whether cognitive, affective or behavioral differences between individuals who tested positive versus negative for the gene could be distinguished at the time of genetic testing.
Participants and Methods: Participants included a consecutive series of individuals who sought genetic testing over a two year period at a Huntington's Disease Center of Excellence. Exclusionary criteria included age greater than 60, motor signs at time of testing consistent with or suggestive of HD and/or UHDRS Diagnostic Confidence Level =2, 3,4,5), presence of other neurologic disorder (i.e CHI, seizure disorder), among others. Seventeen gene positive and 27 gene negative individuals comprised the final sample. Total MOCA z score (age and education corrected), BDI-II, AES-Self and AES-Informant were compared across groups.
Results: GP (gene positive) and GN (gene negative) groups did not differ in terms of age or education. Individuals who tested GP scored significantly lower on the MOCA compared to those who tested GN (GP=-.15; Mean GN= .84), scored higher on the BDI=II (GP=11.50, GN=4.19) and score higher on AES-Informant (GP=32.20 and GN=23.39), all p<.01. Interestingly, groups did not diff on AES-Self.
Conclusions: Findings from the present investigation suggest that significant differences between individuals who test GP and GN may exist even at the time of genetic testing. It is important to note that scores for both groups were within normal limits across all measures obtained yet demonstrated significant group differences. The MOCA was sensitive to these group differences as was the BDI=II and AES-Informant while AES-Self was not.
Correspondence: *Cynthia Cimino, PhD., Psychology, University of South Florida, 4202 E. Fowler Ave PCD4118, Tampa, FL 33606. E-mail: cimino@usf.edu*

M.G. GONZÁLEZ, F. JIMENEZ, L. SANDOVAL & F. OSTROSKY. Neuropsychological outcome after unilateral posteroventral pallidotomy in patients with Parkinso Disease.
Objective: Previous research of individuals with Parkinson's disease (PD) following unilateral posteroventral pallidotomy (UPVP) have demonstrated that UPVP improves all the cardinal parkinsonian motor signs while the neuropsychological reports are inconsistent. Some studies reported few cognitive changes, other investigations have more consistently shown both transient and long-term cognitive decline post-operatively.The aim of this study was to investigate the neuropsychological executions following UPVP.
Participants and Methods: Neuropsychological execution was examined at baseline and 12 month follow-up in 10 subjects with advanced PD who underwent UPVP, and comparated with 10 subjects with advanced PD who were candidates to surgery but didn't underwent the procedure. The neuropsychological assessment battery included the following tests: Mini-Mental Parkinson (MMP), NEUROPSI, The Beck Depression Inventory (BDI) and The Beck Anxiety Inventory (BAI). To statistical methods we used the Wilcoxon rank sum test compared pre-operative, 12 month and change values between patients and groups.
Results: Pallidotomy patients revealed benefits in motor symptoms from the surgery in their consistent with previous research. We found mild declines in verbal recognition memory, 12 months after surgery, in both groups which differs from previous studies.
Conclusions: Regarding the long-term neurocognitive outcome following pallidotomy it seems that they are part of the characteristics included in evolution of cognitive decline in patients with PD.
Correspondence: *María G. González, Master, UNAM, Av. Universidad 3000, Mexico City 04510, Mexico. E-mail: lupytaz@hotmail.com*

D.S. BROWN, I.H. BERNSTEIN, S.M. MCCLINTOCK, M. HUSAIN, R. DEWEY, C. CULLUM & L.H. LACRITZ. Use of the Montreal Cognitive Assessment as a Cognitive Screening Measure in Parkinson Disease.
Objective: To assess the utility of the Montreal Cognitive Assessment (MoCA) as a brief screening measure for identifying cognitive impairment in Parkinson disease (PD).
Participants and Methods: 106 participants diagnosed with PD at UT Southwestern Medical Center, who were part of a larger study of cognition and PD, provided data for this study. The MoCA was administered as part of a larger neuropsychological battery that included the Rey Auditory Verbal Learning Test, Brief Visuospatial Memory Test – Revised, Trail Making Test, Wechsler Adult Intelligence Scale – IV (Letter-Number Sequencing and Digit Symbol Coding subtests), and the Peabody Picture Vocabulary Test – 4. Participants were classified as cognitively impaired if ≥ 2 of 9 scores from the battery were ≤ 1.5 standard deviations below the mean. Sensitivity and specificity of the MoCA in identifying cognitive impairment were examined using logistic regression and ROC analysis.
Results: There were no significant differences in gender, age or education between the impaired [n = 21; M(MoCA score) = 19.71 (4.19), range: 8 - 28] and unimpaired [n = 85; M(MoCA score) = 24.45 (2.96), range: 17-30] groups. The MoCA correctly classified 81.1% of participants (logistic regression $p < 0.0001$). ROC analysis yielded an area under the curve of .84. Using a MoCA cutoff score of 24 yielded optimal sensitivity (.81) and specificity (.69) for identifying PD patients with cognitive impairment.
Conclusions: These results provide additional support for use of the MoCA in identifying cognitive impairment in patients with PD. However, the optimal cutoff score of 24 is lower than previous studies have suggested. The impact of motor symptoms on MoCA performance may contribute to the lower cutoff and merits further exploration in a larger PD sample.
Correspondence: *Daniel S. Brown, Bachelor of Music in Jazz Studies and Psychology, Division of Psychology, Department of Psychiatry, University of Texas Southwestern Medical Center, 3443 Mahanna St. #3211, Dallas, TX 75209. E-mail: brown.daniel@gmail.com*

J. ALBERTY & A. TRÖSTER. Confrontational naming errors: A comparison between Alzheimer's disease, Parkinson's Disease Dementia, and normal controls.
Objective: Boston Naming Test (BNT) has been used to examine how semantic memory is affected in various neurodegenerative diseases such

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

as Alzheimer's disease (AD), Huntington's disease (HD), and progressive supranuclear palsy (PSP). Prototypical cortical (i.e., AD) and subcortical (i.e., HD, PSP) dementias differ in error types made on the BNT. Naming is spared in early PD but is affected as dementia develops. Error analysis can inform etiology of naming deficits in Parkinson's disease dementia (PDD). It was hypothesized that PDD would make more perceptual errors than AD, while AD would make more semantic errors than PDD.
Participants and Methods: 47 subjects (21 males; mean age =71): 13 normal controls (NC), 16 AD, and 18 PDD subjects were recruited from University of North Carolina and Barrow Neurological Institute. All subjects were given the 60-item BNT the Dementia Rating Scale (DRS), or the DRS-2. BNT errors were coded according to Hodges et al. (1991) criteria: total number of correct responses (spontaneous); total number of errors; errors of commission; and the proportion of each individual error type to errors of commission. A one way ANOVA assessed differences in number and type of errors on the BNT by diagnosis.
Results: A significant effect was found $F(2, 26.69) = 16.03$, $p<.001$ indicating that AD patients had fewer correct responses than PDD and NC groups. Both PDD and AD subjects made more semantic errors than NC $F(2, 24.33) = 10.61$, $p<.001$. Semantic errors produced were not significantly different between AD and PDD. AD patients made more don't know responses and more errors of commission than NC $F(2, 24.15) = 8.91$, $p=.001$; $F(2, 44) = 8.64$, $p=.001$, respectively.
Conclusions: Both PDD and AD made more semantic errors than NC, but compared to NC only AD was impaired in naming. PDD did not demonstrate more perceptual errors than AD or NC. PDD made semantic errors that resemble AD errors which may relate to the overlap of AD and PD pathology and degradation of semantic networks with disease progression.
Correspondence: *Julie Alberty, Ph.D., Department of Clinical Neuropsychology, Barrow Neurological Institute, 222 West Thomas Road Suite 315, Phoenix, AZ 85013. E-mail: albertyj@gmail.com*

P. MANGAL, J. JONES, J. LAFO, K.D. FOOTE, M.S. OKUN, R.M. BAUER & D. BOWERS. Cognitive and Brain Reserve in Parkinson disease: Predictors of Cognitive Changes over Time.
Objective: While cognitive decline is common in Parkinson disease (PD), its trajectory is highly variable. The basis for this variability is not well understood and has important implications for intervention strategies and quality of life. This study tested the hypothesis that brain and cognitive reserve variables in PD would be associated with cognitive decline over a brief 20 month period. We predicted that higher education, vocabulary knowledge, younger age, disease severity, and the absence of deep brain stimulation (DBS) surgery would serve as potential protective factors.
Participants and Methods: 84 non-demented idiopathic PD patients underwent 2 multi-domain neurocognitive evaluations, approximately 20 months apart. Cognitive reserve predictors included education and WASI-III Vocabulary. Brain reserve predictors included age, disease duration, and presence/site of deep brain stimulation (DBS). Neurocognitive data (executive function [EF], memory, language, processing speed, DRS-2) were analyzed using hierarchical multiple regressions.
Results: As a group, PD patients significantly declined on indices of executive function, processing speed, naming, and total DRS-2 score. Age and Vocabulary, but not education, were significant predictors of decline across these domains. Older age and the presence of DBS lead placement in the subthalamic nucleus (STN) were associated with declines on speeded letter fluency (COWA).
Conclusions: These findings demonstrate that cognitive and brain reserve factors, particularly younger age and stronger vocabulary, may buffer against short-term cognitive decline in PD. DBS surgery itself was not overall detrimental, with the exception of worsened letter fluency associated with STN (but not globus pallidus internus) DBS. Clinically, these findings can inform the prognosis of DBS candidates and individuals with PD, with future research dedicated to longer term follow-up in relation to trajectory of change and dementia progression.
Correspondence: *Paul Mangal, B.S., Clinical Health Psychology, University of Florida, P.O. Box 100165, Gainesville, FL 32610-0165. E-mail: pmangal@phhp.ufl.edu*

E. PIROGOVSKY, D.M. SCHIEHSER, I. LITVAN, S.L. LESSIG, D.D. SONG, K.M. OBTERA, M.M. BURKE & J.V. FILOTEO. Instrumental Activities of Daily Living are Impaired in Parkinson's Disease Patients with Mild Cognitive Impairment.
Objective: Although it is well-known that Parkinson's disease with dementia results in functional decline, little is known about the impact of mild cognitive impairment in PD (PD-MCI) on day-to-day functioning.
Participants and Methods: Forty-one individuals with PD-MCI, 56 PD patients with normal cognition (PD-NC), and 47 healthy older adults were administered two performance-based measures of instrumental activities of daily living (IADLs) that evaluated medication and financial management. PD patient-identified informants also completed a questionnaire about the PD patients' IADL functioning.
Results: While PD-MCI and PD-NC patients showed comparable scores on the informant-based IADL questionnaire, results of the performance-based measures revealed that PD-MCI patients were impaired compared to PD-NC in performance-based medication management, but did not significantly differ in their ability to manage finances. PD-MCI patients also demonstrated significantly lower scores on the performance-based measures of medication and financial management compared to healthy older adults. There were no significant differences between PD-NC and healthy older adults on the performance-based measures of medication and financial management. Performance-based financial and medication management did not correlate with scores on neuropsychological measures in PD-MCI.
Conclusions: Performance-based measures (particularly measures assessing medication management) may be more sensitive to subtle functional declines compared to informant-report in PD-MCI. Since PD-MCI patients showed impairment in performance-based IADLs, but this deficit did not correlate with scores on neuropsychological tests, the ability to perform certain IADLs could be a separate domain of functioning from neuropsychological abilities in PD-MCI. This suggests that measuring IADLs with performance-based measures may add information to the assessment of PD-MCI that is not available with standard neuropsychological measures.
Correspondence: *Eva Pirogovsky, PhD, Psychology, Va San Diego Health Care System, 705 Zanzibar Court, San Diego, CA 92109. E-mail: epirogovsky@gmail.com*

S. KARANTZOULIS, C. QUINN & J.E. GALVIN. The Cognitive Phenotype of Parkinson's Disease.
Objective: Dementia is a recognized sequelae of Parkinson's disease (PD) and diagnostic criteria are outlined but the cognitive phenotype of the mildest forms of impairment is unclear. Evidence suggests the longitudinal course of PD has a core feature of decline in visuospatial abilities, with acceleration of global cognitive abilities 3 years prior to clinical detection of dementia. We sought to better characterize the cognitive profile of PD by examining individual domain scores on the Repeatable Battery for the Assessment of Neuropsychological Status (RBANS), a brief measure of global neurocognitive functioning sensitive to detecting cognitive impairment in various dementia syndromes but not yet fully examined in PD.
Participants and Methods: Fifteen Healthy Controls (HC:M age=71 yrs, M), 18 PD participants with no cognitive impairment (PD: M age=66 yrs), and 17 PD participants with cognitive impairment (PDI: M age = 66 yrs) were included. MANOVA were conducted between groups on all five RBANS Indices, controlling for age, education, and total UPDRS scores.
Results: The HC and PD group performed significantly better than the PDI group across all RBANS Indices, with the exception of Language Index which was comparable across groups (all p's >.05). The HCs were comparable to the PD group on all RBANS Indices except for the

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

Visuospatial/Constructional Index (p=.01). Attention deficits did not discriminate between groups when motor speed was controlled for (all p's >.05).

Conclusions: These preliminary data suggest language decrements are not a core feature of the cognitive phenotype associated with PD but that visuospatial/constructional decrements are an early feature of PD that progress as people become overtly cognitively impaired. Attention decrements, rather than being an independent cognitive factor, appears to be mediated by worsening motor impairments. With these data, we can begin to tease out the individual cognitive impairments that characterize PD needed to improve clinical trial design.

Correspondence: *Stella Karantzoulis, NYU Langone Medical Center, 2nd Floor, New York, NY 10016. E-mail: stella.karantzoulis@nyumc.org*

S.A. SPERLING, K. FUCHS, M.J. BARRETT, B.B. SHAH, M.B. HARRISON, G. WOOTEN & C.A. MANNING. Predictors of Cognitive Diagnoses in Patients with Parkinson's Disease.

Objective: Cognitive impairment in Parkinson's disease (PD) presents early in the disease and contributes to disability. Early accurate detection of mild cognitive impairment (PD-MCI) and dementia (PDD) in PD is critical. This study evaluated measures to predict diagnosis of PD-MCI or PDD.

Participants and Methods: Patients (n = 95) were seen in the Movement Disorders Clinic at the University of Virginia, had a diagnosis of PD, and had neuropsychological testing that included: Montreal Cognitive Assessment (MoCA), Controlled Oral Word Association Test (FAS), Animal Naming, Matrix Reasoning from the WAIS-IV, Trail Making Test A & B, Hopkins Verbal Learning Test-Revised, Beck Depression Inventory-II, and Parts I and II of the Movement Disorders Society-sponsored revision of the Unified Parkinson's Disease Rating Scale. Stepwise multiple regression evaluated which measures best predict diagnosis.

Results: The MoCA accounted for 60% of the variance of diagnosis $F(1,58) = 87.81$, $p < .001$. Next, the HVLT-Discrimination Index and Trails A remained in the regression equation $F(3,56) = 41.94$, $p < .001$ with all three factors accounting for 68% of the variance of diagnosis. In a separate regression that excluded PDD to see if similar factors predict diagnosis of MCI only, the MoCA accounted for 51% of the variance of diagnosis $F(2,50) = 54.07$, $p < .001$.

Conclusions: These results suggest that the MoCA is a sensitive measure in the assessment of PD-MCI and PDD. Alternatively, they could reflect clinician bias and a disproportionate reliance on the MoCA in making diagnostic decisions. To investigate the possibility that clinicians rely on the use of the MoCA to the exclusion of other more sensitive variables, future directions include examining diagnostic assignment by clinicians who are blind to MoCA scores. The inclusion of Trails A suggests the potential importance of psychomotor speed on diagnosis while deficits in recognition memory may indicate greater cognitive impairment, leading to increased cognitive diagnoses.

Correspondence: *Scott A. Sperling, PsyD, University of Virginia, P.O. Box 800394, Charlottesville, VA 22908-0394. E-mail: sas7yr@virginia.edu*

E.T. JOHNSON, N.T. BOTT, T. KIELY, J.L. POLLOCK, J. KRAMER, B. MILLER, N. GALIFIANAKIS, S.L. SMITH, J. ALTY, M. LONES, S. LACY, N. SCHUFF & K.L. POSSIN. Egocentric Spatial Working Memory Is Impaired In Parkinson's Disease And May Share A Similar Neuropathological Basis With Bradykinesia.

Objective: Egocentric (self-based) working memory (EWM) and Allocentric (landmark-based) working memory (AWM) utilize distinct spatial reference frames. Bradykinesia, a slowness of movement, is a major manifestation of Parkinson's Disease (PD). PD patients evidence constricted representations of distances between their bodies and external space; accordingly, we investigated whether EWM is selectively impaired in PD and whether it is associated with bradykinesia.

Participants and Methods: EWM and AWM were compared in 30 patients with PD, 19 with mild cognitive impairment and presumed Alzheimer's disease (MCI-AD), and 67 age, gender, and education-matched controls using ANOVA. Montreal Cognitive Assessment (MoCA) scores were lowest in the MCI-ADs, M=24(2), whereas the PDs, M=27(2), did not differ from controls, M=28(2). Both spatial working memory tests comprised 60 trials of remembering 2 locations over 1-sec delays. The EWM test required location memory in self-based coordinates, and AWM required location memory in landmark-based coordinates. Bradykinesia was measured in 16 of the PD patients using electromagnetic sensors on the thumb and index finger of the more affected side while performing finger tapping (Lones et al., in press).

Results: On EWM, PDs were impaired versus controls, d = -.89, and MCI-ADs, d = -.77; MCI-ADs were not impaired. On AWM, PDs, d = -.70, and MCI-ADs, -.74, were similarly impaired versus controls. Bradykinesia severity correlated with EWM, r=-.50, but not AWM, r=-.16. A regression model to predict bradykinesia severity with MoCA, EWM, and AWM as covariates indicated that EWM was the only one of these cognitive variables to predict bradykinesia.

Conclusions: Whereas AWM was impaired in PD and MCI-AD, EWM was specifically impaired in PDs, who performed worse than even the MCI-ADs. EWM, but not AWM, correlated significantly with bradykinesia. Impaired representation of spatial information in a self-based coordinate system may contribute to bradykinesia or share a similar neuropathological basis.

Correspondence: *Erica T. Johnson, B.A., Neurology, UCSF, 675 Nelson Rising Lane, Suite 192, MC 1207, San Francisco, CA 94158. E-mail: ejohnson@memory.ucsf.edu*

C.A. LINDBERGH, A. PUENTE, J. GRAY, K. CHU, S. EVANS, L. SWEET, J. MACKILLOP & L.S. MILLER. Delay and Probability Discounting as Candidate Markers for Dementia in Older Adults.

Objective: To investigate the potential of delay discounting (DD) and probability discounting (PD) to serve as early detection strategies for Alzheimer's disease (AD). It was hypothesized that older adults with mild cognitive impairment (MCI) would display (1) more impulsive DD, (2) more risky PD, and (3) less consistent discounting preferences relative to healthy controls.

Participants and Methods: 39 healthy and 25 cognitively impaired older adults were recruited from the community (65-85 years, mean age = 76.25, 76.6% female). Exclusionary criteria included a history of neurological illness, substance dependency within the past 5 years, and/or a score of ≤ 20 on the Mini-Mental State Examination.

Participants were diagnosed with MCI based on Albert et al. (2011) criteria. The discounting tasks involved dichotomous choices between smaller, immediate/guaranteed and larger, delayed/probabilistic monetary values. DD impulsivity was operationalized as hyperbolic discounting functions, k, at three magnitudes of award (i.e., small, medium, and large), while PD risk-proneness was operationalized as area-under-the-curve (AUC). Response (in)consistency was calculated based on selections that were (in)congruent with estimated levels of impulsivity/risk-proneness.

Results: The MCI group displayed higher levels of PD risk-proneness [$t(62) = -2.19$, $p = .033$] and response inconsistency [$t(62) = -2.69$, $p = .009$] compared to the healthy group. In addition, DD decision-making was more impulsive and inconsistent in the MCI group, but only for small [$t(62) = -2.49$, $p = .016$] and large [$t(62) = 2.05$, $p = .045$] award magnitudes, respectively.

Conclusions: PD performance holds potential as a preclinical diagnostic instrument for AD, possibly due to the deterioration of brain regions involved in task performance. DD was not as sensitive to the presence of MCI. These results have implications for pre-dementia decision-making across an array of real-life situations.

Correspondence: *Cutter A. Lindbergh, M.A., Psychology, University of Georgia, 1197 Cedar Shoals Dr., Apt. 109, Athens, GA GA. E-mail: cutter.lindbergh@gmail.com*

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

C. SULLIVAN, A. KUEIDER, C. ONYIKE & D. SCHRETLEN. Regression-based Error Analysis in Behavioral Variant Frontotemporal Dementia (bvFTD).

Objective: Identification of behavioral variant frontotemporal dementia (bvFTD) can be challenging in the earliest stages of the disease because these patients often perform normally on traditional neuropsychological measures. Recent evidence suggests that error scores on cognitive testing may prove more sensitive in distinguishing persons with early bvFTD from healthy adults.

Participants and Methods: Using normative data from the Johns Hopkins Aging, Brain Imaging, and Cognition (ABC) study, we created regression-based norms for error scores based on an individual's age, sex, race, education, and estimates of premorbid intelligence. Patients diagnosed with bvFTD were selected from the Young Onset Dementia Clinic at Johns Hopkins Hospital.

Results: General linear models (GLM) evaluated group differences on regression-based error scores. We found that regression-based norms highlighted group differences, with bvFTD subjects making considerably more errors than healthy controls. Case studies emphasize the utility of using regression based error scores, as opposed to overall scores, in identifying executive dysfunction.

Conclusions: Detailed error analysis allows for early identification of bvFTD in subjects who score normally on traditional neuropsychological tests.

Correspondence: *Campbell Sullivan, Psy.D., Johns Hopkins University, 600 N. Wolfe Street, Meyer 218, Baltimore, MD 21287. E-mail: asulli15@jhmi.edu*

A. NGUYEN, D.P. SALMON, M. AHMED & D. GALASKO. Differentiation of Behavioral Variant Frontotemporal Dementia (bvFTD) from Alzheimer's Disease (AD) Varies by Age of Onset.

Objective: International Consensus Criteria for bvFTD base diagnosis upon the presence of salient behavioral alterations that may be supported by deficits in frontal lobe mediated cognitive functions (e.g., verbal fluency). It may be the case, however, that this presentation is modified with aging such that bvFTD is more difficult to distinguish from AD in those with late age of onset (i.e., >65) versus typical early age of onset (i.e., <60).

Participants and Methods: Patients with autopsy-confirmed FTD (n=30) and AD (n=30) were matched for estimated age of onset (EAO), education, and level of dementia at an evaluation a mean of 4 years prior to death. Information from the evaluation was reviewed to determine the presence or absence of 5 behavioral symptoms comprising the International Consensus Criteria for bvFTD. The prevalence of behavioral symptoms, and performance on a verbal fluency test sensitive to frontal lobe dysfunction, was compared separately in bvFTD and AD patients with early (age≤60) or late (age≥65) EAO.

Results: A higher percentage of FTD than AD patients in the early EAO condition exhibited Loss of Sympathy or Empathy (63% vs 13%), Perseverative, Stereotyped or Compulsive/Ritualistic Behavior (63% vs 6%), and Hyperorality and Dietary Changes (50% vs 0%) (all p's <.01). In contrast, there was no significant difference in the percentage of FTD and AD patients exhibiting any of these behavioral symptoms in the late EAO condition (although Apathy was greater in bvFTD than AD in both conditions). Similarly, verbal fluency was significantly lower in bvFTD than AD in the early (p<.001), but not the late, EAO condition.

Conclusions: Current diagnostic criteria for bvFTD are less effective at distinguishing the disorder from AD in those with late age of onset (e.g., >65) than early age of onset. Support from other biomarkers (e.g., functional imaging, CSF biomarkers) may be particularly important in differentiating FTD from AD in patients presenting after the age of 65.

Correspondence: *David P. Salmon, Ph.D., Neurosciences, UCSD, 9500 Gilman Drive, La Jolla, CA 92093-0948. E-mail: dsalmon@ucsd.edu*

T. JERARD, A. RADKE, K. WOOD, B. MILLER, J. KRAMER & V. STURM. Altruistic Giving is Compromised in Behavioral Variant Frontotemporal Dementia.

Objective: Behavioral variant frontotemporal dementia (bvFTD) is a neurodegenerative disease that targets the frontal and anterior temporal lobes and is associated with impairment in emotion and social behavior. In bvFTD, loss of empathy is a hallmark feature but less is known about whether patients also have deficits in prosocial behaviors that promote interpersonal relationships and foster social harmony. Altruistic giving, one type of prosocial behavior in which individuals give to others because it is inherently rewarding and not because they receive any tangible benefits for themselves, may decline in bvFTD because of atrophy in emotion-relevant brain systems that are key for social functioning.

Participants and Methods: A total of 55 participants were included: 9 patients with bvFTD, 9 patients with Alzheimer's disease (AD), and 37 healthy controls. Participants completed a novel computer-based altruistic giving task in which they made monetary decisions. The task included trials in which participants decided whether to give money to the examiner without decreasing their own winnings (altruistic giving trials) and those in which giving to the examiner increased participants' own winnings (control trials).

Results: A 3 (diagnosis: bvFTD, AD, healthy control) x 2 (trial type: altruistic giving vs. control trials) mixed model ANCOVA (controlling for age, education, and Clinical Dementia Rating Scale Sum of the Boxes score) revealed a main effect of diagnosis on altruistic giving, $F(2, 49) = 4.3$, $p < .05$, but not on control trials, $F(2, 49) = 0.3$, n.s. Follow-up pairwise comparisons found that the patients with bvFTD gave the examiner less money than both the healthy control ($p < .01$) and AD groups ($p < .05$).

Conclusions: We found evidence that higher-order social behaviors such as altruistic giving are compromised in bvFTD. Our results extend previous work on socioemotional dysfunction in bvFTD to include prosocial behaviors that are integral for human relationships.

Correspondence: *Tracy Jerard, MA, Neurology, UCSF, 134 Solano Street, Brisbane, CA 94005. E-mail: TracyJerard@Gmail.com*

S. KIELB, A. COOK, C. WIENEKE, A. RADEMAKER, B. WEITNER, M. MESULAM, E. ROGALSKI & S. WEINTRAUB. Episodic Memory Is A Clinical Indicator of Alzheimer Pathology Versus Frontotemporal Lobar Degeneration In Neuropathologically Characterized Primary Progressive Aphasia.

Objective: Primary Progressive Aphasia (PPA) can be caused by frontotemporal lobar degenerations (FTLD) or by atypically distributed Alzheimer pathology (AD) (Mesulam et al., 2008; Gefen et al., 2012). Typical Alzheimer pathology leads to an amnestic syndrome that is known as a dementia of the Alzheimer-type (DAT) (Weintraub et al., 2012). This study examined the ways in which PPA patients with known AD pathology (PPA-AD) differed on memory tests from those with FTLD pathology (PPA-FTLD) and from DAT patients with AD pathology (DAT-AD).

Participants and Methods: Retrospective chart review of 14 PPA-AD, 8 PPA-FTLD, and 8 DAT-AD patients was conducted to assess delayed free retrieval and multiple-choice recognition of words and shapes presented in the visual modality on the Three Words Three Shapes test. Data were analyzed using ANOVA with diagnosis as the between-subjects variable and test condition and material (words, shapes) as the within-subject variables. Subjects did not differ in disease severity at the time of test.

Results: Delayed retrieval for words but not shapes was worse in PPA-AD than PPA-FTLD patients ($p < 0.05$). Delayed retrieval scores did not differ significantly between PPA-AD and DAT-AD patients for words or shapes, but recognition for words was better for PPA-AD than for DAT-AD patients ($p < 0.05$). Both PPA groups had near-perfect recognition scores.

Conclusions: PPA-FTLD patients showed a greater capacity for delayed word retrieval than PPA-AD patients. However, near-perfect recognition scores in both PPA groups suggest intact retention of verbal

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms.
https://doi.org/10.1017/S1355617714000381

information over time, which was not observed in DAT-AD patients. Findings suggest that while PPA-AD patients show more retrieval deficits in verbal episodic memory than PPA-FTLD, they do not show the deficit in verbal retention apparent in DAT-AD.
Correspondence: *Stephanie Kielb, Northwestern University, 320 E. Superior, Chicago, IL 60611. E-mail: stephaniekielb2012@u.northwestern.edu*

A. NORDLUND. Neuropsychological Differences Between Incipient Alzheimer's Disease and Vascular Cognitive Disorder.
Objective: To study the two and four year outcomes of subjects diagnosed with Mild Cognitive Impairment (MCI).
Participants and Methods: Two hundred and fifty subjects diagnosed with MCI were examined with a comprehensive neuropsychological test battery comprising 20 tests covering the cognitive domains speed/attention, memory, visuospatial function, language and executive function and followed up after two and four years.
Results: Forty-five subjects (18%) were lost for follow-up. These subjects did not differ significantly in terms of MCI subclassification, MMSE score or age and education. Of the 205 subjects followed up, 9 (5%) had improved to normal after two years and another 16 after four years. All subjects that improved were single domain MCI. After two years 47 subjects (23%) had progressed to dementia and another 21(8%) after four years. All were multiple domain MCI, both amnestic and non-amnestic. The combination of memory, visuospatial and language impairment was the strongest predictor of progression to Alzheimer's disease after both two and four years. Speed/attention and executive deficits preceded mixed and vascular dementia.
Conclusions: The results suggest that memory impairment alone, or impairment in any one cognitive domain alone, are rather benign conditions. Impairment in several cognitive domains is associated with a more severe outcome over both two and four years. Also, 25% of the subjects who progressed to dementia, including Alzheimer's disease, did not show significant memory impairment at baseline, which suggests that memory impairment is not always the first symptom of even the most common dementia disorders. The cognitive profiles of incipient Alzheimer's disease and mixed/vascular disease differed clearly.
Correspondence: *Arto Nordlund, PhD, Institute of Neuroscience and Physiology, Sahlgrenska Academy at University of Gothenburg, SU/Molndal, Wallinsgatan 6, Molndal 431 41, Sweden. E-mail: arto.nordlund@neuro.gu.se*

D. STEED & S.A. MILLER. Teasing Apart Concurrent and Predictive Influences on Dementia: Vascular and Neuropsychiatric Symptoms.
Objective: Neuropsychiatric symptoms (NPS) are associated with dementia. Taragano et al. (2009) found that NPS, even without cognitive impairments, predict development of mild cognitive impairment in a clinical population. Since cerebrovascular disease is highly associated with NPS, it was hypothesized that development of vascular problems over time would be associated with a greater chance of developing NPS, and consequently, dementia.
Participants and Methods: A sample of 1,052 individuals drawn from a national, longitudinal database (National Alzheimer's Coordinating Center, 2013) was utilized. Demographics in terms of age (M = 74.68, SD = 9.67) and gender composition (Men = 556, 53%; Women = 492, 47%) were similar to Taragano et al. (2009), though ethnic background was predominantly Caucasian (N = 934, 89%). The present sample was drawn from the U.S., whereas Taragano et al. (2009) sample was drawn from an Argentinian population. The present study included impaired and non-impaired individuals and examined progression over time from non-impairment and MCI to dementia on a latent curve analysis of ordinal variables.
Results: Latent growth curve analysis was employed to track the effects of NPS, and vascular problems on the development of dementia (as a latent variable) over time, controlling for TBI effects. The starting point of NPS affects the development of dementia, but the slope (decline over time) of NPS predicted slope of dementia. Because changes in vascular problems were not significant over time, a general latent variable was used to predict all time point's vascular scores. Latent vascular scores predicted both neuropsychiatric problems and dementia problems, but not their changes.
Conclusions: Results were analyzed in light of risk factors of developing dementia and a possibility for preventative care for dementia was presented. It is possible that caring for the individual, particularly in terms of neuropsychiatric issues that are developing, may delay onset of dementia over time.(Grant#U01AG016976)
Correspondence: *Drake Steed, Illinois School of Professional Psychology at Argosy, Chicago, 233 S Chase, Lombard, IL 60148. E-mail: drake.steed@gmail.com*

Drug/Toxin-Related Disorders (Including Alcoholism)

E.S. KORNBLITH & R.M. BOWLER. Association Between Long-term Environmental Mn Exposure and Verbal Fluency in Community-dwelling Adults.
Objective: Manganese (Mn) is an organic element essential for normal functioning but toxic in large doses. Mn accumulates in the brain over time; excessive exposure is associated with parkinsonian-like motor symptoms, cognitive disturbance including executive dysfunction, mood symptoms, and adverse physical health consequences. Low dose, long-term exposure to Mn may result in neurotoxicity and impairment in cognitive function. This study aimed to examine the impact of environmental manganese (Mn) exposure on verbal fluency among long-term residents of three Ohio, USA towns.
Participants and Methods: Data was obtained from an EPA-sponsored study comparing two towns exposed to environmental Mn, Marietta and East Liverpool (EL), with an unexposed control town [Mt. Vernon (Mt. V)]. Adults residing in their respective town for 50 or more years were included in the study (EL: 19 men, 28 women; Marietta: 16 men, 11 women; Mt. V: 8 men, 14 women). Mn exposure was dichotomized based on town residency. Verbal fluency, an executive function, was measured with the Animal Naming test (M=107.62, SD=15.79; adjusted for age and education). A hierarchical multiple regression analysis examined the predictive impact of Mn exposure on verbal fluency. Household income and estimated premorbid verbal IQ were entered as covariates. The WAIS-III Similarities subtest was used as a proxy for permorbid verbal IQ (M=10.09, SD=2.87).
Results: Mn exposure predicted verbal fluency scores after adjusting for IQ and income (R2change=.045, Fchange=4.45, $p<.05$); exposed residents (M=105.74, 66th percentile) had predicted verbal fluency scores 8.25 standard score units (.52 standard deviation) lower than unexposed (M=113.86, 82nd percentile).
Conclusions: These results, taken together with previous research on chronic low-dose Mn exposure, indicate that long-term residency in Mn-exposed towns may have an impact on verbal fluency that cannot be accounted for by age, education, premorbid verbal IQ, or household income.
Correspondence: *Erica S. Kornblith, MA, CSPP San Francisco, 42 Cortland Ave, San Francisco, CA 94110. E-mail: eschimbor@alliant.edu*

R.M. BOWLER, V. GOCHEVA, E.S. KORNBLITH, C. BESELER, M. COLLEDGE, F.G. DU, H.A. ROELS, G. BOLLWEG & D. LOBDELL. Cognitive Function Related to Environmental Exposure to Manganese.
Objective: Marietta and East Liverpool (EL), Ohio have been identified as having elevated manganese (Mn) in air due to industrial pollution. Objectives: To evaluate relationships between distance from the Mn-air source and cognitive function of residents.

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms.
https://doi.org/10.1017/S1355617714000381

Participants and Methods: Cross-sectional data were obtained from an EPA-sponsored study comparing Marietta and EL. A neuropsychological test battery including Stroop Color Word Test, Animal Naming, Auditory Consonant Trigrams (ACT) and Rey-O was administered to study participants (EL=86, Marietta=100) . To estimate Mn-air, U.S.EPA's AERMOD dispersion model was used. Distance from source was calculated using participants' residential address and air miles from facility emitting Mn. A binary logistic regression model controlling for annual household income examined neuropsychological outcomes as a function of distance from source.
Results: There were no age, sex, or employment status differences between towns. Years education was lower in EL (M=12.9) than Marietta (M=14.6) and years residency in town were higher in EL (M=47.0) than Marietta (M=36.1). EL participants resided closer to the Mn source than Marietta (M=1.12 vs M=4.75 air miles) and Mn-air exposures were higher in EL (M=0.269 μg/m3; range 0.10-23.0 μg/m3) than Marietta (M=0.184 μg/m3; range 0.04-0.96 μg/m3). Town differences existed on tests of category fluency, immediate memory, and word reading speed; EL had lower scores. Closer distance to the Mn source significantly increased the odds of impairment (< 2nd %) on ACT 9' [OR=1.26, 95% CI: 1.02-1.55, p=0.032], and 18' delay [OR=1.44, 95% CI: 1.11-1.87, p=0.006] and on Rey-O copy [OR=1.27, 95% CI: 1.01-1.61, p=0.043].
Conclusions: Increased risk of impairment in delayed memory with distraction and visuospatial/executive function were related to residing closer to the Mn source. Environmental exposures are low compared to occupational exposures and small positive findings may be possible early effects of Mn.
This abstract does not necessarily reflect EPA policy.
Correspondence: *Erica S. Kornblith, MA, CSPP San Francisco, 42 Cortland Ave, San Francisco, CA 94110. E-mail: eschimbor@alliant.edu*

J.S. KLINE, A. BOETTCHER, B.D. HILL, M. SANTA MARIA, M. LEFAUVE & M. ROHLING. Historical lead (Pb) exposure is associated with increased cognitive intra-individual variability.
Objective: Several studies have demonstrated an adverse impact of lead (Pb) exposure on cognition, including at concentrations well below 10 μg/dl. Additionally, cognitive intra-individual variability has been reported to be increased by neuropathology. The present study examined differences in cognitive variability in groups with historical Pb exposure.
Participants and Methods: Data from 3 groups were utilized: a high blood Pb level group (HPb>10 μg/dl), a low blood Pb level group (LPb<10 μg /dl), and a control group. 49 individuals comprised the LPb [76% African American, 51% male; mean age=20.14 (SD=1.94) and education=10.88 (SD=1.48)], while 44 individuals fell in the HPb [79% African American, 36% male; mean age=20.18 (SD age=1.9) and education=10.98 (SD=1.68)]. The 25 controls were 48% African American and 36% male [mean age=19.16 (SD=2.29) and education=10.4 (SD=1.56)]. Cases were excluded if they failed Test of Memory Malingering (TOMM) or Green's Word Memory Test (WMT) validity criteria. Intra-individual variability was calculated for each participant by computing the standard deviation (SD) of their individual mean performance on 10 subtests of the WAIS-4 (scaled scores utilized) or their individual overall test battery mean (OTBM) SD.
Results: One-way ANOVA revealed a significant main effect for OTBM SD for the 3 groups ($F(2, 115)=3.436$, $p<.05$). Fischer's LSD post-hoc tests demonstrated a significant difference ($p<.05$) for OTBM SD between the control (mean=1.68, SD=0.33) and HPb groups (mean=2.01, SD=0.63) and between the LPb (mean=1.76, SD=0.58) and HPb groups. The control and LPb groups were not significantly different.
Conclusions: Higher levels of historical Pb exposure are associated with increased cognitive intra-individual variability. These results add to a growing literature demonstrating that neuropathology in general is associated with increased cognitive variability and provide a new methodology specifically for exploring the effects of neurotoxic exposure.
Correspondence: *Benjamin D. Hill, PhD, Psychology, University of South Alabama, UCOM 1032, Mobile, AL 36688. E-mail: bdhill@southalabama.edu*

H.A. BAITZ, A. JONES, M. FRAYN, K.M. GICAS, C.J. GIESBRECHT, F. VILA-RODRIGUEZ, K. PAQUET, A.M. BARR, R. PROCYSHYN, D.J. LANG, W.J. PANENKA, W.G. HONER & A.E. THORNTON. Decision Making in Substance Users: Real-World Risk Behaviour and the Expectancy Valence Model.
Objective: The Iowa Gambling Task (IGT) is widely used to measure affective decision making in substance users and other groups, but the utility of the IGT as an index of real-world risky substance use among marginalized users has yet to be clearly demonstrated. This study employed state-of-the-art computational modeling techniques to investigate the utility of the IGT in a large sample of substance users.
Participants and Methods: Participants were recruited from single-room occupancy hotels in an urban setting (N = 246; age: 23-67; 190 M, 56 F). The IGT was administered as part of a larger neurocognitive battery. Substance use frequency information was collected monthly; in order to capture the overall risk inherent in each participant's pattern of use, harm scores were computed that represent the physical, psychological, and social harms to the user that are associated with the specific substances used and weighted by the frequency of use. A risk perception questionnaire assessed perception of harm related to the use of various substances. The Expectancy-Valence (EV) model was applied to the IGT using hierarchical Bayesian analysis to deconstruct decision making into its component processes (attention to losses, use of recent versus distant previous trials, and consistency of responding).
Results: Less attention to losses on the IGT was associated with a more harmful pattern of substance use ($r = -.14$, $p < .05$) and perception of illicit drugs as being less harmful to users ($r = .14$, $p < .05$). In contrast, overall IGT performance (i.e., proportion of advantageous choices) was not associated with harmful substance use or perception of harmfulness.
Conclusions: These findings support the utility of the EV model of decision making; persons who pay less attention to potentially large losses on the IGT appear to pay less heed to the consequences of harmful substance use in the real world.
Correspondence: *Heather A. Baitz, MA, Psychology, Simon Fraser University, RCB 5246, 8888 University Drive, Burnaby, BC V5A 1S6, Canada. E-mail: heather.baitz@gmail.com*

K. BLOMMAERT, C.M. SMART, B. MULLIGAN, C. PRECHOTKO & K. KERNS. Respond, Don't React: The Influence of Mindfulness on Risk-Taking Behaviour in Adolescents Diagnosed with Fetal Alcohol Spectrum Disorder.
Objective: Fetal alcohol spectrum disorder (FASD) is associated with complex cognitive dysfunction and can contribute to a variety of downstream secondary disabilities and other adverse life outcomes. Behavioural dysregulation, including an increased propensity for risk-taking behaviour, is common in youth with FASD. Mindfulness training (MT) has been shown to be effective with clinical populations affected by dysregulated behaviour, such as adolescents with attention-deficit/hyperactivity disorder (ADHD) and individuals with mild traumatic brain injury (mTBI), and could be of benefit in FASD by enhancing self-awareness and self-regulation.
Participants and Methods: Ten youth diagnosed with FASD, ages 11 – 17, from the Greater Victoria Area underwent eight-weeks of MT tailored for youth with cognitive limitations. Pre/post measurements of intellectual awareness of risk-taking and emergent, in-the-moment risk-taking behaviour were obtained using self-report questionnaires and the computerized task, "Chicken", respectively.
Results: No significant change in intellectual awareness of risk was observed; these scores showed a ceiling effect at the pretesting stage, suggesting that participants already possessed this level of awareness. Within the behavioural measure of risk-taking, participants trended toward taking fewer risks in the moment following MT, showing a

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

more consistent (less variable) performance across trials (t = 2.018, p = 0.074). While the mean number of stops and restarts did not change from before to after training (t = 1.576, p = 0.149), there was a significant increase in total points won (t = 2.475, p = 0.035).
Conclusions: Despite the small sample size, our findings provide preliminary evidence that MT can enhance emergent awareness of immediate risk in youth with FASD, as evidenced by behavioural changes in risk-taking. Results are discussed in terms of application of rehabilitation strategies in persons with FASD.
Correspondence: *Colette M. Smart, PhD, Department of Psychology, University of Victoria, PO Box 1700 STN CSC, Victoria, BC V8W 2Y2, Canada. E-mail: csmart@uvic.ca*

M.J. WILSON, G. VASILEV, K. BOZGUNOV & V. JASMIN. Effects of Psychopathy on Reward-Based Decision-Making in Opiate, Stimulant and Polysubstance Users.
Objective: Substance users often show impaired reward-based decision-making (RBDM) which may be related to psychopathic traits. Effects of psychopathy on RBDM may vary as a function of the type of drug use. Although amphetamine dependence (AD) has been linked to greater RBDM deficits than heroin dependence (HD), these effects are often confounded by high rates of polysubstance dependence (PD). We have previously found that psychopathy is not uniformly associated with impaired RBDM across tasks in pure heroin users. The goal of the present study was to examine relationships between psychopathy and RBDM among individuals with lifetime pure AD, pure HD, and PD.
Participants and Methods: Primary and secondary psychopathy (PP/SP) were assessed in 281 adults (AD = 44; HD = 61; PD = 73; controls = 103) via the Levenson's Self-Report Psychopathy Scale. Neurocognitive measures included the Iowa Gambling Task (IGT), a measure of RBDM under uncertainty; the Cambridge Gambling Task (CGT), an RBDM paradigm with explicit contingencies; and the Monetary Choice Questionnaire, a measure of delayed reward discounting (DRD). Effects of psychopathy and drug user type on RBDM were examined via linear regressions.
Results: PP was negatively associated with IGT performance, $\beta = -.28$, $p = .02$, and positively associated with higher discounting of medium and large rewards on DRD, β's = .25-34, p's < .05. Interaction effects indicated that relationships of PP to IGT and DRD did not differ across drug user types, p's > .07, while PP was only associated with DRD of medium rewards in controls and stimulant users. No effects of PP or SP were detected for CGT performance, p's > .12.
Conclusions: Our findings confirm the IGT is a sensitive measure of psychopathy-associated RBDM deficits in heroin users and extends these findings to AD and PD users. Effects of psychopathy on DRD were also observed across all drug users. In contrast, a measure of RBDM with explicit contingencies was not affected by psychopathy.
Supported by R01DA021421
Correspondence: *Michael J. Wilson, M.A., Psychiatry, University of Illinois at Chicago, 1601 W. Taylor Street, Chicago, IL 60612. E-mail: mwilso31@uic.edu*

M.J. WILSON, K. BOZGUNOV, G. VASILEV & J. VASSILEVA. Reward-Based Decision-Making and Pathological Gambling in Different Types of Drug Users.
Objective: Pathological gambling (PG) is an addictive disorder underpinned by similar neurocognitive mechanisms to drug addiction, including deficits in reward-based decision-making (RBDM). Different classes of drugs (e.g. opiates and stimulants) have distinct pharmacological properties which may lead to differential expression of neurocognitive deficits. The present study explored relationships of RBDM and PG symptoms in Eastern European adults with lifetime histories of amphetamine mono-dependence (AD), heroin mono-dependence (HD), and polysubstance dependence (PD).
Participants and Methods: Participants were 281 adults (AD = 44; HD = 61; PD = 73; healthy controls = 103). PG was assessed via the Addiction Severity Index-Lite and DSM-IV criteria. RBDM was assessed via the Iowa Gambling Task (IGT), which measures RBDM under uncertainty and requires learning task contingencies; and the Cambridge Gambling task (CGT), which assesses RBDM under explicit task contingencies and does not require implicit learning. Multiple linear regressions were computed to evaluate the effects of dummy-coded drug user type and continuous RBDM indices on PG symptoms. Neurocognitive predictor variables included IGT net scores and six indices of CGT performance: overall proportion bet (OPB); risk-taking (RT); delay aversion; risk adjustment; deliberation time; and quality of decision-making.
Results: IGT models did not account for variance in PG symptoms (p's $\geq .40$). Several CGT models explained unique variance in PG (p's < .05), with direct main effects observed for OPB ($\beta = .29$, $p = .02$) and RT ($\beta = .35$, $p = .003$). Interaction effects indicated the relationship between OPB and PG did not differ across drug user types (p's > .09), while RT was predictive of PG for heroin and polysubstance users (p's $\geq .07$).
Conclusions: Our findings indicate that indices of RBDM under known contingencies are externally valid indicators of PG among individuals with histories of polysubstance and pure heroin dependence, but not pure amphetamine dependence.
Correspondence: *Michael J. Wilson, M.A., Psychiatry, University of Illinois at Chicago, 1601 W. Taylor Street, Chicago, IL 60612. E-mail: mwilso31@uic.edu*

L.A. MCCREA JONES & W.V. ADAMS. Neurocognitive Plateau or Decline in Adolescents with Prenatal Alcohol Exposure: Implications for Assessment and Intervention.
Objective: Prenatal alcohol exposure (PAE) is one of the known leading causes of brain injury in children, occurring between 2% and 5% of the general population (USA only; May et al., 2009).Few studies examined age-related changes in samples with PAE. Rasmussen et al (2006) found a significant correlation between Verbal IQ and age in 50 children with PAE. Rasmussen and Bisanz (2009) found greater impairments in verbal executive functioning in their older participants. In these studies, participants ranged from 8 to 16 years old. This present PAE study, the first of its kind, examined neurocognitive age-related differences during 12 to 16 years of age, a time of significant structural brain changes. Recent neuroimaging research with children/youth with PAE revealed altered brain development during adolescence compared to non-exposed controls (Lebel, et al., 2011; Willoughby, et al., 2008).
Participants and Methods: 28 adolescents with confirmed PAE were administered the WISC-IV; WRAML2, selected D-KEFS subtests, and WCST, following standardized procedures. This study utilized a cross-sectional design, and repeated measures/correlational analysis to analyze age-related differences.
Results: Age was significantly and negatively correlated within the moderate to strong range with IQ, memory and executive functioning measures. RM ANOVA revealed a significant main effect for age group ($F(1,26) = 10.28$, $p = .004$, partial $\eta 2 = .283$) on FSIQ. For memory, a significant Index x Age Group interaction was present (Green-house Geisser Correction; $F(1.994, 78) = 3.699$, $p = 0.32$, partial $\eta 2 = .125$). RM ANOVA revealed a significant main effect for Age on the D-KEFS ($F(1,25) = 6.092$, $p = .021$, partial $\eta 2 = .196$).
Conclusions: Younger participants achieved higher mean scores on measures of verbal reasoning, concept formation, verbal memory, verbal fluency, and verbal inhibition than the older participants. Age-related differences were consistent across diagnostic severity. Implications for assessment and intervention are discussed.
Correspondence: *Lisa A. McCrea Jones, PsyD, Graduate Department of Clinical Psychology, George Fox University, 5118 S Dearborn Road, Spokane, WA 99223. E-mail: ljones04@georgefox.edu*

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

J. CATTIE, A. KNIGHT, E.E. MORGAN, S.P. WOODS & I. GRANT. Methamphetamine Dependence is Associated with Deficits in Affective but not Cognitive Theory of Mind.

Objective: Biopsychosocial models of methamphetamine (MA) dependence suggest that neural injury to frontostriatal and limbic circuits may increase risk of deficits in social cognition among chronic MA users. However, the nature and extent of MA-associated deficits in social cognition are presently not well understood.

Participants and Methods: 65 individuals completed a neurocognitive battery including multifaceted assessment of Theory of Mind (ToM), a core aspect of social cognition that encompasses the perspective-taking abilities used to infer another person's beliefs, intentions, or emotions. Age-matched subjects with lifetime histories of MA-dependence (n=33) and healthy (n=32) participants were administered verbal (Combined Stories Test) and nonverbal (Mind in the Eyes) measures of ToM requiring attributions of a full range of mental states.

Results: Wilcoxon signed-rank tests indicated that MA dependent individuals scored lower on both ToM task summary scores (ps < .05), despite comparable performance on non-social reasoning items (ps > .10). Controlling for group differences in gender, a series of multiple regressions predicting component process scores showed that MA dependence was associated with poorer performance on the affective aspects of verbal ToM on the Combined Stories Test (i.e., ability to infer another's unstated intentions or emotions; ps<.05), but not cognitive ToM (ability to infer false beliefs) or Mind in the Eyes (ps>.10).

Conclusions: These findings suggest that chronic MA use is associated with deficits in the affectively-mediated aspects of ToM, which is consistent with MA-associated neurotoxicity in both frontal and limbic circuits. Understanding the presence and magnitude of social cognitive deficits in MA users may aid in the identification of individuals at risk for poor interpersonal functioning, who may benefit from skill-based interventions.

Correspondence: *Jordan Cattie, M.S., SDSU/UCSD Joint Doctoral Program in Clinical Psychology, 86 Rice St, Cambridge, MA 02140. E-mail: jcattie@ucsd.edu*

L.M. SQUEGLIA, J. JACOBUS, T.T. NGUYEN-LOUIE & S.F. TAPERT. Inhibitory Functioning during Early Adolescence Predicts Alcohol and Marijuana Use by Late Adolescence.

Objective: Alcohol and marijuana use during adolescence has been associated with poorer neuropsychological functioning; however, it is unclear if deficits predate substance use initiation. The goal of this prospective study was to understand how neuropsychological functioning during early adolescence (ages 12-14) could predict future involvement of alcohol and marijuana use by late adolescence (ages 17-18).

Participants and Methods: At baseline, participants were 175 alcohol- and marijuana-naïve healthy 12-14 year-olds (41% female) recruited from local schools. Participants completed extensive interviews and neuropsychological tests assessing working memory, sustained attention, verbal learning and memory, visuospatial functioning, planning/problem solving, and inhibition. Each year, participants' alcohol and marijuana use was assessed. By late adolescence (ages 17-18), 105 participants transitioned into heavy use, while 75 remained substance-naïve. Hierarchical linear regressions examined baseline cognitive performance predicting future substance use, controlling for commonly observed predictors of youth substance use (i.e., family history, externalizing behaviors, gender, and age at follow-up).

Results: Poorer baseline performance on tests of inhibition predicted higher follow-up peak number of alcoholic drinks (β=-.15; p<.001), total lifetime drinking days (β=-.15; p<.001), and total marijuana use days (β=-.17; p<.001) by ages 17-18, above and beyond covariates. Performances on other cognitive domains did not relate to late adolescent substance use involvement, and gender did not moderate the effects (ps > .05).

Conclusions: Compromised inhibitory functioning during early adolescence prior to the onset of substance use was related to greater subsequent alcohol and marijuana use by late adolescence. Findings suggest neuropsychological data could be used in preventative interventions to identify teens at risk for initiating heavy substance use during adolescence.

Correspondence: *Lindsay M. Squeglia, Ph.D., University of California San Diego, 3350 La Jolla Village Drive, La Jolla, CA 92037. E-mail: lsquegli@ucsd.edu*

R.M. SCHUSTER, R. MERMELSTEIN & R. GONZALEZ. Assessment of Working Memory Functioning via Ecological Momentary Assessment in the Context of Simultaneous Cannabis and Tobacco Use.

Objective: Concurrent use of cannabis and tobacco is common among young adults and research demonstrates that individuals who concurrently use both substances experience more problematic outcomes than individuals who only use one substance or who use both but not simultaneously. However, few studies have examined the neuropsychological correlates of combined use, which is surprising given that cannabis and tobacco act on similar brain regions and have opposing influences on working memory (WM).

Participants and Methods: This study examined changes in WM during different substance use occasions among 287 young adults (mean age: 21.3 years, 54% female) from a large natural history study of tobacco use. Importantly, cognition was measured via ecological momentary assessment (EMA), a novel ambulatory paradigm that promises broaden the scope of neuropsychological research. We hypothesized that compared to randomly sampled times with no substance use, WM would be enhanced with tobacco, impaired with cannabis, and not significantly different with simultaneous tobacco and cannabis use.

Results: Results of a mixed-effects regression model for multivariate ordinal outcomes revealed that individuals exhibited worse WM when they used cannabis (p=.02) and better WM when they smoked cigarettes (p=.005) compared to non-using times. Further, cannabis was not associated with WM impairments when used with tobacco (p=.36). Importantly, these effects emerged even after accounting for multiple subject- and momentary-level confounds (e.g., GPA, task complexity, negative affect, proximity to peers).

Conclusions: Data from this study provide preliminary evidence that cannabis-induced memory decrements may be masked with tobacco use. This may be valuable to public health efforts given that WM alterations might reinforce continued use of both substances and may serve as a barrier to quitting. The benefits of integrating traditional neurocognitive assessments into ambulatory paradigms to enhance ecological validity are also discussed.

Correspondence: *Randi M. Schuster, M.A., Psychiatry, Massachusetts General Hospital, Psychology Assessment Center, One Bowdoin Square, Suite 701, Boston, MA 02114. E-mail: Rschuste@gmail.com*

Cognitive Intervention/Rehabilitation

D. SZELES, T. CONWAY, D. KENDALL, M. BENJAMIN, I. LEVY, Y. CHANG, I. RICHARDS & B. CROSSON. Targeted Intervention Enhances the Relationship Between Left Hemisphere Lesion Size and Right Hemisphere Lateralization of Activity Following Stroke: an fMRI Study.

Objective: After left hemisphere stroke, perilesional left and intact right homologues represent potential routes of recovery for apraxia of speech and aphasia. Both extent of left hemisphere damage within specific regions of interest (ROIs) and targeted intervention might facilitate distribution of resources across hemispheres. This study examined the relationship between amount of damage in select ROIs and right vs. left hemisphere volume of activity following Multimodal Intensive Treatment for nonword repetition in apraxia of speech. We predicted that ROIs with larger lesions in the left would demonstrate greater right hemisphere activity, and intervention would strengthen this direct relationship.

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

Participants and Methods: The treatment participant was a 63 year old, college educated, right-handed female, three years post-left MCA stroke. She demonstrated anomic aphasia and apraxia of speech prior to initiating 36 hours of intensive treatment. A priori ROIs were bilateral superior temporal gyrus, inferior parietal lobule, inferior frontal gyrus, and precentral/postcentral gyrus. ROI activity was determined using fMRI of nonword repetition. Lesion size was determined using lesion masks and image registration to standard MNI152 space.
Results: As predicted, a direct relationship was seen between left hemisphere lesion size across select ROIs and volume of activity in the right at pre-treatment. Post-treatment, this relationship was strengthened despite reduced volume of activity in both hemispheres. Nonword repetition improved slightly, but with no measurable gain in effect size.
Conclusions: Greater right versus left-hemisphere volume of activity after intervention may represent a shift toward use of the more intact hemisphere after treatment. Reduced activity bilaterally may reflect greater network efficiency with maintenance of existing repetition skills. Overall, at 36 hours of treatment changes in neural activity were evident; however, longer periods of treatment may be necessary for significant behavioral change.
Correspondence: *Dana Szeles, M.S., University of Florida, 1810 NW 23rd Blvd Unit 226, Gainesville, FL 32605. E-mail: dmszeles@phhp.ufl.edu*

Invited Symposium: Ecologically Valid Assessment in Neuropsychology (CE Session D)

Chair: Deirdre Dawson

Discussant: Thomas Marcotte

1:15–2:45 p.m.

D.R. DAWSON, D.R. DAWSON, E. BROMLEY, T. PARSONS, M. SCHMITTER-EDGECOMBE & T. MARCOTTE. Ecologically Valid Assessment in Neuropsychology.
Symposium Description: Traditional measures of assessment in neuropsychology typically require discrete responses to single events and are conducted in carefully, controlled environments thus limiting their ecological validity (generalizability and representativeness). This problem gives rise to the question of where a 'better' set of assessments might come from. This course begins by proposing a set of characteristics for ecologically valid assessment. Second, current research from multi-disciplinary perspectives will be discussed that has aimed to address the problem of developing ecologically valid assessment from four different perspectives: naturalistic assessments (e.g., the Multiple Errands Test), video ethnography, virtual reality (e.g., virtual environment-based neurocognitive assessment) and 'smart' environments. Presenters will address the strengths and weaknesses of these approaches in relation to their ability to characterize the impact of cognitive impairment on everyday life and discuss how different cognitive functions contribute to everyday multi-tasking. As a result of participation in this symposium, the learner will be able to: (1) describe the construct of ecological validity and the challenges inherent in characterizing the impact of cognitive impairment on everyday life; (2) assess the merit of four novel and leading edge research approaches in this area; and (3) critically appraise several specific ecologically valid assessments.
Correspondence: *Deirdre R. Dawson, PhD, University of Toronto, Suite 160-500 University Avenue, Toronto, ON M5G 1V7, Canada. E-mail: ddawson@research.baycrest.org*

M. SCHMITTER-EDGECOMBE. Smart Technologies for Ecological Momentary Assessment and Intervention.
Smart environment technologies have the potential to offer innovations for home-based prevention, early detection, promotion of independent living and ecological momentary intervention. Most current assessment and interventions methods used by neuropsychologists are typically limited to measuring a restricted set of variables at a few discrete time points in an office or laboratory setting. Technologies that make available continuous data captured within the individual's real-world environment could improve diagnostic decision-making and intervention by providing more impartial and frequent measures of change in an individual's functioning. In turn, the data derived from residents living in smart environments could be used to develop more ecologically valid assessment instruments. Research conducted in our smart-home testbed at Washington State University that addresses activity recognition, error detection, functional assessment and prompting-based interventions will be discussed. On-going longitudinal work with elderly participants who are living in their own smart homes will also be briefly discussed. The talk will end with some conversation of smart technology challenges.
Correspondence: *Maureen Schmitter-Edgecombe, Department of Psychology, Washington State University, Pullman, WA 99164-4820. E-mail: schmitter-e@wsu.edu*

T.D. PARSONS. Virtual Reality Environments for Ecologically Valid Neuropsychological Assessment.
Within this presentation, virtual reality-based neuropsychological assessments will be discussed. Emphasis will be placed upon the potential of virtual reality-based neuropsychological instruments to address real world outcomes. The advanced computer interfaces found in virtual reality offer potential for enhancing the accuracy in recording, coding, and storing of a range of neurobehavioral responses elicited from complex stimuli. Virtual environments may be uniquely suited for assessment of daily activities, allowing for presentation of three-dimensional objects in a consistent and precise manner, which participants can then manipulate depending on a range of task demands. The precise presentation and control of dynamic perceptual stimuli (e.g., visual, auditory, olfactory, and haptic) in the virtual environment offers neuropsychologists the opportunity to develop statistically and clinically significant tasks within a virtual world. Research conducted in the Clinical Neuropsychology and Simulation (CNS) lab at the University of North Texas that addresses both "construct driven" and "function led" approaches to virtual reality-based neuropsychological assessments will be discussed. Emphasis will be placed upon the need to develop virtual reality-based neuropsychological assessments that include 1) the control and rigor of technologically advanced computerized laboratory measures, 2) the psychometric rigor of traditional paper-and-pencil assessments, and 3) the representativeness of simulations approximating real life situations. The talk will conclude with some discussion of the need for rigorous analysis of the psychometric properties of virtual environments.
Correspondence: *Thomas D. Parsons, 1155 Union Circle #311280, Denton, TX 76203. E-mail: thomas.parsons@unt.edu*

E. BROMLEY, L. MIKESELL & J.S. BREKKE. Video Ethnography: A Veridicality Approach to the Assessment of Everyday Functioning in Schizophrenia.
Despite recent advances in the neuropsychology of schizophrenia, few methods are available to explore the impact of neurocognition on behaviors performed in usual contexts. Data on the relationship between constructs of neurocognition and behaviors performed spontaneously in everyday settings are needed to characterize intermediate phenotypes of psychotic disorders, verify the clinical relevance of neurocognitive deficits, and identify the phenomenology that treatments would aim to improve. This presentation will describe a veridicality approach to ecological validity in which cognitively-driven, naturally-organized ordinary activities are rated from video. The video ethnography approach is modeled on observational methods used widely in ethology

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms.
https://doi.org/10.1017/S1355617714000381

and education research. Using a follow-along method, ethnographers accompany subjects during activities in naturalistic settings. In a pilot study, we gathered 93 hours of video from 9 subjects with schizophrenia or schizoaffective disorder selected for high or low composite scores on the MATRICS Consensus Cognitive Battery (MCCB). To rate spontaneous behaviors, we modeled a measurement strategy on standard neurocognitive and functional assessments. We validated measures of 4 domains of everyday behavior (i.e., community performance indicators, CPIs): behavioral activity level, goal pursuit, social interaction, and problem solving. High and low MCCB subjects showed statistically significantly differences on all 4 CPIs, and MCCB composite scores were correlated with all 4 CPIs (r .54 -.77; p<.01-.07). This presentation will review the psychometric properties critical to the validation of observational measures including face and content validity, behavioral (i.e., time) sampling, inter-rater reliability, test-retest reliability (i.e., stability across observation sessions), and minimization of reactivity. Video examples of problem solving will be shown to demonstrate similarities and differences with structured assessments.
Correspondence: *Elizabeth Bromley, 10920 Wilshire Blvd, Suite 300, Los Angeles, CA 90024. E-mail: ebromley@ucla.edu*

Symposium 2: Diffusion Tensor Neuroimaging and Cognitive Development from Birth to Young Adulthood

Chair: J. Michael Williams

1:15–2:45 p.m.

J. WILLIAMS, K. OSIPOWICZ, K.E. PATRICK, J. ZAMZOW & A. TART-ZELVIN. Diffusion Tensor Neuroimaging and Cognitive Development from Birth to Young Adulthood.

Symposium Description: The proposed symposium includes four presentations that examined Diffusion Tensor Imaging (DTI), gray matter volumetric studies, and measures of cognitive abilities over the course of brain development. In order to provide a normative standard for development, the NIH sponsored a longitudinal neuroimaging study that enrolled 546 healthy children and adolescents, ages newborn to 18 years (See http://pediatricmri.nih.gov/nihpd/info/). The imaging methods included structural MRI with Diffusion Tensor Imaging. A comprehensive battery of neuropsychological tests and rating scales included the Child Behavior Checklist, Brief Rating Inventory of Executive Function, The Wechsler Intelligence Scales, the Bayley Scales of Infant Development, the California Verbal Learning Test, the Cambridge Neuropsychological Test Automated Battery, Differential Ability Scales, Preschool Language Scale, Purdue Pegboard and the Woodcock-Johnson Psycho-Educational Test Battery. This Symposium will include four presentations covering the relationship of DTI Fractional Anisotropy (FA) and Mean Diffusivity (MD), and gray matter volumetric analyses to cognitive and neuropsychological abilities. The first will introduce the unique DTI methods employed by the project and the general DTI methods used by the investigators. The remaining three presentations will cover the relationship of patterns of brain development revealed by DTI to the patterns of development of language, memory and intelligence and executive control. Each major cognitive domain used multiple measures from the neuropsychological battery. We used linear and curvilinear regression analyses that modeled the relationship of neuropsychological test scores and DTI measures voxelwise, covering the whole brain, and for specific regions of the brain that mediate language, executive control, working memory and other functions. Each presentation will cover the specific methods applied and results for each major cognitive domain.
Correspondence: *J. Michael Williams, PhD, Psychology, Drexel University, 3141 Chestnut St, Philadelphia, PA 19104. E-mail: jw37@drexel.edu*

K. OSIPOWICZ & M. WILLIAMS. Volumetric MRI and DTI Methods to Examine Cognitive Development.

This presentation will review neuroimaging methods used to assess the relationship of cognitive development and brain maturation in children, newborn to young adulthood (total N=546). The general imaging methods used were volumetric studies of T1 and Diffusion Tensor Imaging (DTI) data. DTI was used to compute mean diffusivity maps (MD), and fractional anisotropy maps (FA) all in the patient's own space. The T1 data was then segmented into grey and white matter maps, which were used to generate templates. Next, all data (T1, MD, FA) were normalized to the dataset template. Following preprocessing, the major analyses incorporated linear and nonlinear regression that modeled the relationships of age and cognitive measures to gray and white matter volumes and the DTI measures of Fractional Anisotrophy (FA) and Mean Diffusivity (MD). Higher FA values indicate areas of greater structural complexity. Higher MD values indicate greater diffusion and less structural organization. We analyzed the relationship of each cognitive measure to the gray and white matter volumes over the course of development. This rendered patterns of significant voxels and clusters that represented areas of the brain that developed in synchrony with a set of cognitive abilities. The DTI measures were analyzed in the same manner and results indicated the areas of the brain in which FA and MD changed in synchrony with cognitive abilities. As expected, FA and MD changed with development in reciprocal fashion. In general, the methods used here were consistent with findings of previous studies that only modeled age. This suggests that these methods are valid in the study of the relationship between cognitive and brain development.
Correspondence: *Karol Osipowicz, 1221 West Porter St., Philadelphia, PA 19148. E-mail: dr.o@drexel.edu*

K.E. PATRICK, K. OSIPOWICZ, A. TART-ZELVIN, J. WILLIAMS & J. ZAMZOW. Neuroimaging of Language Among Infants and Very Early Children.

The relationship between brain maturation and very early language development in normal children ages 3 months to 6 years was examined. This is the first study to examine language and brain development in a combined model, using T1 volumetric studies and Diffusion Tensor Imaging (DTI). The subjects (N = 75) with complete data sets were selected from the NIH MRI Study of Normal Development. The subjects were examined at multiple time points across development from infancy through preschool years.

Raw scores from the auditory comprehension and expressive communication subscales of the Preschool Language Scales as well as the naming vocabulary and verbal comprehension subtests of the Differential Abilities Scales were selected for analyses. The neuroimaging studies included gray and white matter volumetric studies, and Fractional Anisotropy (FA) and Mean Diffusivity (MD) derived from DTI. Regression of imaging, age and raw scores on the cognitive tests using a whole-brain model was performed, using a minimum corrected p value of .01.

All the cognitive tests were correlated and had the expected relationships to age. Based on the analysis of FA, age was associated with development of the bilateral cingulum in the left frontal lobe, with unique left hemisphere extension into the ramus of the temporal lobe and involving the inferior longitudinal fasciculus and bilateral superior longitudinal fasciculus. Analysis of MD was associated with bilateral development of the frontal lobes. The relationship between the auditory and expressive language and brain maturation almost completely mirrored the findings regarding age. Development of more refined brain structures in the left frontal and temporal lobes (FA) is associated with greater expressive and receptive language abilities among very young children. In general, the findings support a number of structural theories of language development in which brain maturation constrains the development of language abilities.
Correspondence: *Kristina E. Patrick, 506 S 41st St 2M, Philadelphia, PA 19104. E-mail: kristina.e.patrick@gmail.com*

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

J. ZAMZOW, K. OSIPOWICZ, K. PATRICK, A. TART-ZELVIN & W. MICHAEL. Neuroimaging of Language and Memory Among Children and Adolescents.

We examined the correlation of brain maturation and cognitive development in the areas of language and memory among normal children ages 7-16 (M = 11.55; SD = 2.39). This is the first study to examine the development of the brain and these cognitive abilities in a combined model, using T1 volumetric studies and Diffusion Tensor Imaging (DTI). The subjects (N= 144) were selected from the NIH MRI Study of Normal Development. The subjects were examined at multiple time points across the span of development. Raw scores from the California Verbal Learning Test-Child Version, NEPSY verbal fluency, Wechsler Abbreviated Scale of Intelligence and the Woodcock-Johnson were selected for analyses. The neuroimaging studies included gray and white matter volumetric studies derived from T1 images, and Fractional Anisotropy (FA) and Mean Diffusivity (MD) derived from DTI. Analyses included linear regression of structural imaging and the cognitive tests using a whole-brain model. Performance on measures of semantic knowledge correlated with grey matter density maturation (T1) of the inferior temporal lobes, consistent with the development of the Word Form Area; FA indicated a similar pattern in which greater white matter differentiation in the temporal lobes is associated with higher scores on tests of semantic knowledge; MD in the bilateral frontal lobes correlated negatively with performance ($p < .01$; ke = 1,000). Verbal fluency positively correlated with T1 in the bilateral occipital and orbital frontal lobes and FA in the temporal lobes; MD correlated negatively with verbal fluency in the bilateral frontal lobes ($p < .01$; ke = 1,000). List learning was positively correlated with cerebellum and thalamus T1, negatively correlated with global T1, and positively correlated with FA in the left hemisphere ($p < .01$; ke = 1,000). This study was remarkable in finding patterns of brain development of language and memory that are similar to the findings of functional imaging studies.

Correspondence: *Jessica Zamzow, 2033 Christian St., #1, Philadelphia, PA 19146. E-mail: jb3369@drexel.edu*

A. TART-ZELVIN, K. OSIPOWICZ, K.E. PATRICK, J. ZAMZOW & J. WILLIAMS. Neuroimaging of Set Shifting, Working Memory, and Executive Control.

Introduction: The relationship of the development of executive functions to brain maturation was examined in this study. This is the first study to combine T1 volumetric studies, Diffusion Tensor Imaging (DTI), and executive control measures in a single regression model. Subjects (N= 176), ages 7 to 16 years, with complete imaging studies, were selected from the NIH MRI Study of Normal Development and were examined at multiple time points across the span of age.

Methods: Raw scores from the Brief Rating Inventory of Executive Function (BRIEF) and the Cambridge Neuropsychological Test Automated Battery (CANTAB) executive function tests of Intra-Extra Dimensional Set Shift (IED), Spatial Span, and Spatial Working Memory were selected. The neuroimaging studies included gray and white matter volumetric measures derived from T1 images, and Fractional Anisotropy (FA) and Mean Diffusivity (MD) derived from DTI. The regression of imaging, age, and raw scores on the cognitive tests using a whole-brain model was performed with a minimum corrected p-value of .01 for all analyses.

Results: Age demonstrated expected patterns consistent with brain development. FA increased and MD decreased with age across major areas of the brain, especially the frontal lobes. Behavior control and executive control ratings from the BRIEF correlated with grey matter density maturation (T1 and FA) of the frontal lobes, motor systems and areas involved in language development. The IED scores of the CANTAB correlated with development of the frontal lobes and language areas. Spatial Span and Spatial Working Memory were associated with gray matter development of the entire brain (T1). FA analysis indicated an association with development of the dorsal medial frontal areas.

Conclusion: In general, these findings support a model in which executive and behavioral control are associated with general brain development. Certain measures were also associated with specific frontal lobe development.

Correspondence: *Ariana Tart-Zelvin, 584 Pheasant Ridge Drive, Apt. A, Chubbuck, ID 83202. E-mail: atartz@gmail.com*

Paper Session 2: Aging and Dementia

Moderator: Lisa Delano-Wood

1:15–2:45 p.m.

V.A. GUZMAN, L.B. ZAHODNE, A. NARKHEDE, F.A. PROVENZANO, N. SCHUPF, J.J. MANLY, Y. STERN, J.A. LUCHSINGER, R. MAYEUX & A.M. BRICKMAN. Reconsidering harbingers of Alzheimer's disease: Regional progression of white matter hyperintensities in the community.

Objective: Accumulating evidence implicates small vessel cerebrovascular disease, visualized as white matter hyperintensities (WMH) on T2-weighted MRI, in the pathogenesis and clinical expression of Alzheimer's disease (AD). We previously showed that cross-sectional volumetric measurements of WMH are elevated among individuals at risk for AD, are associated with genetic risk factors for AD, predict rate of cognitive decline in individuals with AD, and predict future AD diagnosis among non-demented older adults, particularly when distributed in parietal lobe regions. In the current study, we sought to determine whether the longitudinal regional progression of WMH predicts incident AD above-and-beyond traditional radiological markers of neurodegeneration (i.e., hippocampal atrophy).

Participants and Methods: Three hundred three non-demented older adults (mean age = 79.24+5.29) received high-resolution MRI at baseline and then again 4.6 years (SD=1.01) later. Over the follow-up interval 26 participants "converted" to AD. Using structural equation modeling (SEM), we calculated latent difference scores of parietal/non-parietal WMH and hippocampus volumes. Within the SEM framework, we determined whether baseline and change scores predicted AD conversion, while controlling for several time-invariant relevant variables.

Results: Smaller baseline hippocampus volume, change in hippocampus volume (i.e., atrophy), and increasing parietal lobe WMH volume but not WMH in other regions, independently predicted conversion to AD.

Conclusions: The findings provide strong evidence that regionally accumulating WMH predict AD onset independent of hallmark neurodegenerative changes typically associated with AD.

Correspondence: *Adam M. Brickman, Ph.D., Taub Institute for Research on Alzheimer, Columbia University, 630 West 168th Street, P & S Box 16, New York, NY 10032. E-mail: amb2139@columbia.edu*

G. WEISSBERGER, T.H. GOLLAN, M.W. BONDI, D.A. NATION, L.A. HANSEN, D. GALASKO & D.P. SALMON. Neuropsychological and Neuropathological Profiles of Hispanic Older Adults with Autopsy-Confirmed Alzheimer's Disease.

Objective: Differing patterns of neuropsychological deficits exhibited by Hispanics and non-Hispanics with Alzheimer's disease (AD) could arise from 1) cultural/language biases in tests that lead to inaccurate clinical diagnosis, or 2) a higher prevalence of concomitant non-AD brain pathology in Hispanics. Thus, we compared cognitive and neuropathological profiles of Hispanics and non-Hispanics with autopsy-confirmed AD.

Participants and Methods: Ten Hispanics in the UCSD AD Research Center with autopsy-confirmed AD who scored >100 on the Dementia Rating Scale at baseline testing were matched to 25 non-Hispanics with autopsy-confirmed AD on the basis of age, education, DRS, and test-death interval. Patients were age- and education-matched to normal-aging controls (10 Hispanic; 25 non-Hispanic). We compared groups on baseline neuropsychological testing and on neuropathological findings at autopsy.

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

Results: All patients were diagnosed with probable AD at baseline. However, 2x2 ANOVAs (cultural group x cognitive status) with baseline measures as dependent variables revealed significant interactions for many measures. Post-hoc comparisons showed an overall pattern in which non-Hispanic AD patients performed worse than Hispanic AD patients, while non-Hispanic controls performed better than Hispanic controls (all ps≤.04). Hispanic AD patients had lower Braak stages and less plaque/tangle pathology than non-Hispanics (all ps≤.04), but more small parenchymal arteriolar disease (p=.03).
Conclusions: Cognitive deficit profiles in AD patients are less salient in Hispanics than non-Hispanics. This may be due, in part, to cultural/language factors that affect test performance among Hispanic controls, and to a combination of less AD pathology and greater vascular pathology in Hispanic than in non-Hispanic AD patients. Nonetheless, probable AD was diagnosed in Hispanics with high sensitivity.
Correspondence: *Gali Weissberger, M.S., Clinical Psychology, San Diego State University/University of California, San Diego Joint Doctoral Program, 811 West Nutmeg St. Apt 401, San Diego, CA 92103. E-mail: gweissbe@gmail.com*

J.S. SKINNER, D. LIU, M. XU, K.A. GIFFORD & A.L. JEFFERSON. Stroke Risk Profile as a Predictor of Cognition in Minority Elders.
Objective: Minority elders are disproportionally affected by Alzheimer's disease, and one explanation is a higher prevalence of cardiovascular diseases (CVD). It remains unclear, though, whether CVD burden and its association with cognition differs across minority groups. The purpose of this study was to examine the association between cardiovascular health and cognitive function in minority elders.
Participants and Methods: National Alzheimer's Coordinating Center data for minority elders (n=1903) free of dementia were analyzed (71±8 years, 76% female). Cardiovascular health was quantified using the modified Framingham Stroke Risk Profile (mFSRP) score, including age, systolic blood pressure, anti-hypertensive medication, diabetes, cigarette smoking, CVD history, and atrial fibrillation.
Results: Linear regressions cross-sectionally related mFSRP to cognitive outcomes adjusting for age, sex, and education for each of the minority groups (i.e., African American, Native American, Hispanic) using Asian participants as the referent. Among Native Americans, higher mFSRP scores (worse vascular health) were associated with poorer global cognition, verbal memory, attention, processing speed, and executive functioning (all p-values<0.04). For Hispanics, higher mFSRP scores were associated with poorer verbal fluency and processing speed (all p-values<0.02). Among African Americans, higher mFSRP scores were associated with poorer executive functioning and slower processing speed (all p-values<0.005).
Conclusions: Differences in the association between cardiovascular health and cognition exist between minority groups. Our findings suggest the link between cardiovascular health and cognitive function may be strongest for Native Americans. Future studies are needed to elucidate relations between cardiovascular health and cognition in minority elders.
Funding: R01-HL11516, R01-AG034962, IIRG-08-88733, K23-AG030962
Correspondence: *Jeannine S. Skinner, PhD, Neurology, Vanderbilt University Medical Center, 2525 West End Avenue, 12th Floor, Suite 1200, Nashville, TN 37203. E-mail: jeannine.s.skinner@vanderbilt.edu*

B.M. BETTCHER, C.L. WATSON, C.M. WALSH, J. NEUHAUS, J.W. MILLER, R. GREEN, N. PATEL, K. YAFFE, B.L. MILLER & J.H. KRAMER. Inflammation Deleteriously Relates to Corpus Callosum Integrity as a Function of Age.
Objective: The contribution of underlying inflammatory processes to aging and neurodegenerative disease outcomes is increasingly recognized; however, little is known about the mechanisms by which inflammatory markers might impact brain structure in cognitive aging. We hypothesized that independent of vascular risk factors, mean levels of corpus callosum (CC) integrity would be lower among subjects with the highest levels of inflammation, and the magnitude of these effects would increase with age.
Participants and Methods: We examined the association between the pro-inflammatory cytokine interleukin-6 (IL-6), white matter integrity, and cognitive functioning in a cohort of 152 healthy, non-demented older adults. Blood levels of IL-6 were obtained and divided into tertiles, and assessments of processing speed were administered. Tract-based spatial statistics were employed to examine fractional anisotropy (FA) of our primary MRI ROI's: the genu, body, and splenium of the CC.
Results: Results demonstrated an inverse association between IL-6 and CC FA. This association was influenced by age, and was independent of vascular risk factors and blood markers; thus, with increasing age, individuals with higher levels of IL-6 evidenced significantly lower CC integrity in all three CC regions (Interaction terms for: Splenium, Beta=-.0023, 95% confidence interval (CI)= -.0035 to -.0012; Body, Beta=-.0029, 95% CI=-.0044 to -.0014; Genu, Beta=-.0039, 95%CI= -.0056 to -.0023; p's <.001). Finally, higher IL-6 levels were related to slower processing speed (p =.04), and this association was mediated by corpus callosum FA.
Conclusions: This study highlights that with increasing age, the negative effects of inflammation become more pronounced, and this association is independent of traditional vascular risk factors; furthermore, it underscores the important, burgeoning role of inflammatory processes in cognitive aging trajectories.
Correspondence: *Brianne M. Bettcher, PhD, Neurology, Memory and Aging Center, UCSF, UCSF Memory and Aging Center- Box 1207, 675 Nelson Rising Lane, Suite 190, San Francisco, CA 94158. E-mail: bbettcher@memory.ucsf.edu*

B. REED & D. MUNGAS. Estimated Reserve Modifies the Effect of Increasing Brain Pathology on Cognitive Decline in Aging.
Objective: Reserve can be understood as a factor that modifies the extent of cognitive decline that brain pathology induces. A strong test of the concept then, is whether reserve modifies the longitudinal change in cognition associated with longitudinal change in level of pathology. We performed such a test using Alzheimer's Disease Neuroimaging Initiative (ADNI) data.
Participants and Methods: Participants were 819 subjects, ages 55 - 90 years, without neurologic diseases other than Alzheimer's disease (AD). At baseline, and then at specified intervals (6 or 12 month) for 2-3 years participants had 1.5 T structural MRI and the ADAS-cog. ADNI is enriched with persons with AD and biomarkers of AD. In prior studies with this cohort temporal lobe volume was one of the strongest predictors of cognition. We therefore used temporal lobe volume as an index of pathology. Reserve was quantified using methods described and validated in Reed et al. (Brain, 2008). Conceptually, the index of reserve is the residual term in a model that decomposes variance in episodic memory test scores into 3 components, one associated with brain structure, one related to demographics, and the residual (Estimated Reserve).
Results: Latent variable modeling was used to test associations between change in temporal lobe volume, Estimated Reserve, and change in ADAS-cog. Results revealed a significant interaction between change in temporal lobe and reserve such the relationship between change in temporal lobe volume and cognitive decline was stronger in those with low Estimated Reserve. A 1 SD greater than average loss of temporal lobe volume resulted in 0.5 SD /year cognitive decline for persons with low reserve, whereas persons with high reserve declined at a rate of only 0.25 SD/year.
Conclusions: These findings provide strong evidence for the construct of reserve and further validate this particular (memory decomposition) approach to its quantification.
Correspondence: *Bruce Reed, PhD, Neurology, University of California, Davis, UC Davis ADC-East Bay, 1 Shields Ave, Davis, CA 95616. E-mail: brreed@ucdavis.edu*

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

Poster Session 4: Attention/ADHD, Learning Disorders, Genetics, HIV/AIDS/Infectious Diseases

2:00–3:15 p.m.

Learning Disabilities/Academic Skills

M. REAMER & D.C. OSMON. Relationship of the Student Adaptation to College Questionnaire to the Big Five Factors in Learning Disability Referrals.

Objective: The SACQ (scales: attachment to university and academic, emotional, and social adjustment) can be used in learning disability test batteries to assess college adjustment, although given recent research the Big Five personality traits may subsume variance of this measure.

Participants and Methods: The present study included 57 consecutive referrals to a university learning disability clinic with a mean age of about 26 (range=18-58).

Results: The NEO-PI R Neuroticism scale negatively correlated with all measures of the SACQ, including academic adjustment (r=-0.32); social adjustment (-.58); emotional adjustment (-.52); and university attachment (-.45). Additionally, the NEO-PI R Conscientiousness scale correlated positively with academic adjustment (.42).

Conclusions: Further research on the incremental validity of the SACQ is warranted, although it would appear that the SACQ could be profitably eliminated from a clinical battery in a learning disability population.

Correspondence: *David C. Osmon, Ph.D., Psychology, University of Wisconsin-Milwaukee, 2441 E. Hartford Ave, Milwaukee, WI 53211. E-mail: neuropsy@uwm.edu*

S.E. PARK & D.C. OSMON. Comparing the components of the Five Factor Model with the Personality Assessment Inventory in learning disability referrals.

Objective: The Personality Assessment Inventory (PAI) and the NEO Personality Inventory – Revised (NEO PI-R) align on three factors. This study assessed for that pattern in a learning disability sample to determine whether the longer PAI could be profitably excluded from the battery.

Participants and Methods: A total of 156 participants were gathered from clients who were referred to the clinic. In order to maximize factorial separation an Image Analysis factor analysis with oblique rotation was completed rather than a principal component analysis. Loadings of .5 or greater were interpreted.

Results: Image Analysis factor analysis with oblique rotation revealed 4 factors with eigenvalues greater than one explaining 74% of the variance. Factor one had the following loadings on Neuroticism and all PAI clinical scales except Antisocial. The second factor had a negative loading from Agreeableness and positive loadings from Mania, Borderline, Schizophrenia, Paranoia, and Antisocial. The third factor had a positive loading from Conscientiousness and a negative loading from Borderline. The fourth factor had a positive loading from Extraversion and negative loadings from Neuroticism, Depression, and Paranoia. All PAI scales had secondary loadings (most more than one) except Anxiety while only Neuroticism from the NEO-PI-R had a secondary loadings. Openness did not have a primary loading.

Conclusions: Present results did not replicate the prior three-factor structure but did have a structure highly consistent with most literature about the Big Five. Additionally, the PAI was subsumed in the NEO-PI-R factor structure such that it can profitably be excluded in a long neuropsychological battery in a learning disability population.

Correspondence: *David C. Osmon, Ph.D., Psychology, University of Wisconsin-Milwaukee, 2441 E. Hartford Ave, Milwaukee, WI 53211. E-mail: neuropsy@uwm.edu*

B.D. HOLCOMBE, I. AREVALO, G. WORTHY & H.M. HILL,. Exploring the Predictive Value of Childhood Obesity on Cognitive and Achievement Test Measures.

Objective: There is a growing volume of research that shows an inverse relationship between obesity and cognition. However, few studies have included child subjects or performance on cognitive and achievement tests. The present study tested the hypothesis that children who met diagnostic criteria for obesity had lower scores on cognitive and achievement subtests.

Participants and Methods: Analyses were conducted using data from the Grade 5 wave of the Early Head Start Research and Evaluation (EHRSE) Study, 1996-2010 (N=2977). Neurocognitive data included the WISC-IV Matrix Reasoning scaled score and ECLS-K math assessment score (calculated using an item-response theory model). Mean scores for Matrix Reasoning and math assessment were 8.39 (SD: 4.65) and 8.46 (SD: 3.29), respectively. Subjects were classified as obese if their BMI fell at or above the 95th percentile for age. Subjects that did not meet the clinical criteria for obesity were excluded from analyses. A simple linear regression analysis was conducted to determine if obesity predicted lower scores on select subtests.

Results: Results showed a non-significant relationship between childhood obesity and math performance on the ECLS-K, β=-.292, t(1489)=-1.099, p>.05. Obesity significantly predicted Matrix Reasoning scores, β=-.436, t(1492)=-2.342, p<.05. This relationship held true after controlling for household income and presence of biological/medical risks among subjects, β=-.478, t(990)=-2.092, p<.05.

Conclusions: It is concluded that perceptual reasoning ability is associated with obesity. Before generalizing these findings, future research should explore the presence of third variables, such as visual-spatial abilities and fine motor skills, which may explain the relationship.

Correspondence: *Billy D. Holcombe, M.A., Department of Psychology, Howard University, 200 K St NW, 414, Washington, DC 20001. E-mail: billyholcombe1@gmail.com*

I.B. KUNKES, M.E. MCKNIGHT, H. ROY & V.P. CULOTTA. A Comparison of Cognitive and Academic Functioning in Middle School-Aged Children with Attention-Deficit/Hyperactivity Disorder Versus Co-Occurring Attention-Deficit/Hyperactivity Disorder and Learning Disabilities.

Objective: This study examined differences in intellectual, academic, and neurocognitive skills among middle school-aged children with ADHD versus ADHD + LD. Past research has revealed findings regarding the severity and nature of deficits across these groups. This study focused on middle school students to determine discrepant measures between the groups and permit the initiation of intervention prior to high school years. It was expected that the ADHD group would demonstrate stronger academic skills but equal deficits in executive functioning compared to the ADHD + LD group.

Participants and Methods: Assessment data for 105 middle school-age children (69 boys, 35 girls) referred to an outpatient clinic was examined. 44 students met diagnostic criteria for ADHD and 61 students met criteria for ADHD + LD. Inclusion criteria included an FSIQ 85 or above and the absence of other neurodevelopmental, psychiatric, or medical disorders. This retroactive, between-group, study examined psychometric differences between the groups.

Results: Independent sample, 2-tailed t-tests revealed multiple significant discrepancies across nearly all measures with the ADHD + LD students earning lower scores. Tables to be included in poster.

Conclusions: Overall, students with ADHD + LD performed poorly compared to ADHD students across most measures of functioning. These students demonstrated significantly greater executive dysfunction than ADHD students. This finding was a surprise given that both groups were presumed to have executive dysfunction. These findings highlight the additive negative impact of a LD upon multiple aspects of cognitive and academic functioning and suggest that these students are at greater risk of academic morbidity. This study also highlights the overlapping nature of attention and learning disorders and the difficulty discriminating

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

cognitive and academic manifestations. Clinical implications of the findings point to the need for early aggressive interventions, and supports for students with ADHD + LD.
Correspondence: *Ian B. Kunkes, M.S., NeuroBehavioral Associates, 223-D Garden Ridge Rd., Catonsville, MD 21228. E-mail: ibkunkes@loyola.edu*

A. HAHN-KETTER, D.M. WHITESIDE, G. WIDMANN, T. KEALEY, K. ORTIZ, L.L. RICE, M. BASSO & B. ROPER. Psychiatric Comorbidity in Adults with Learning Disorders and Attention Deficit Hyperactivity Disorder.

Objective: Symptom similarities between Attention Deficit/Hyperactivity Disorder (ADHD) and Learning Disabilities (LD) produce a high incidence of individuals receiving comorbid ADHD + LD diagnoses. While adults with ADHD have been shown to experience higher rates of comorbid psychiatric diagnoses such as conduct disorder, depression, and anxiety (McGough et al., 2005; McGillivray & Baker, 2009), a paucity of research has investigated the prevalence of comorbid psychiatric conditions with LDs. Due to extant literature's limited focus on ADHD comorbidity, the current study will elaborate on psychiatric comorbidity in adults with LD.

Participants and Methods: The current study examined the interrelationship between individuals diagnosed with either LD (n=83) or ADHD (n=25) who completed the Personality Assessment Inventory (PAI) as part of a comprehensive neuropsychological evaluation. Participants included 44.4% male and 54.6% female with a mean age of 30.95 years. Personality profiles of the each group were compared using T-tests to analyze potential differences between diagnoses on validity and clinical scales from the PAI.

Results: No significant differences were found between LD versus ADHD groups on validity scales of the PAI. The LD and ADHD groups displayed no significant elevations on validity or clinical PAI scales. However, the results indicate significant differences between LD and ADHD groups on the paranoia (PAR) clinical scale ($t(106)= 3.41$, $p<.01$).

Conclusions: Despite previous findings that a diagnosis of ADHD corresponds to higher risk for psychiatric disorders, the current findings indicate no clinical elevations on the PAI for either diagnostic group. Group differences between PAR clinical scales suggest that individuals with a diagnosis of LD versus ADHD may experience different symptomatology in regards to paranoid ideation. Findings begin to distinguish differences between individuals who receive a single diagnosis of LD or ADHD and their psychiatric functioning.
Correspondence: *Amanda Hahn-Ketter, MA, Adler School of Professional Psychology, 2504 N Orchard, Apt 3, Chicago, IL 60614. E-mail: ahahn-ketter@my.adler.edu*

M.D. MCCURDY, T. KORIAKIN, T. ZABEL & L.A. JACOBSON. Screening for Learning Difficulty: Utility of Teacher Ratings on the Colorado Learning Difficulties Questionnaire.

Objective: The present study sought to validate the clinical utility of a brief teacher-reported screening measure for identifying learning difficulties (LD).

Participants and Methods: School-aged children (5-18 years) referred for neuropsychological evaluation were included if they were administered standardized reading or math achievement measures and if previsit screening of academic difficulties via the Colorado Learning Difficulties Questionnaire (CLDQ) was completed by teachers and parents. Of those, 463 youth had Reading CLDQ scores from a reading teacher (M age=9.7±2.6 years, 64% male) and 380 had Math CLDQ ratings from a math teacher (M age=9.2±2.4, 65% male). Sensitivity, specificity and receiver operating characteristic (ROC) curves were examined for specific reading (word reading, decoding, fluency, & comprehension) and math (calculation & problem-solving) difficulties (SS<85). Secondary analyses included 1) repeated analyses in a subsample of elementary-aged youth and 2) logistic regressions examining the added value of teacher ratings over parent ratings when predicting academic impairment.

Results: Selected cut-scores maximized sensitivity (Reading: 89–92%; Math: 89–90%), but specificity was low (Reading: 42–66%, Math: 38–46%); discrimination was better in the elementary subsample. AUC ranged from .76-.87 (Reading) and .76-.77 (Math). Parent and teacher ratings were well correlated (r=.707), but addition of teacher ratings improved classification accuracy across domains. For example, classification of word reading LD improved from 79.4% to 85.8% and inclusion of teacher ratings improved the model fit [$\Delta X2(2)=48.298$, $p<.001$]; at a given parent rating, a one-point increase in teacher ratings increased odds of Reading LD by 4.68.

Conclusions: Examining sensitivity and specificity, teacher responses may more accurately predict children without LD than children with LD. Furthermore, incorporating teacher reports with parent CLDQ ratings improves the classification accuracy relative to use of parent ratings alone.
Correspondence: *Mark D. McCurdy, B.A., Neuropsychology, Kennedy Krieger Institute, 1750 E. Fairmount Ave., 3rd Floor, Baltimore, MD 21231. E-mail: mccurdy@kennedykrieger.org*

S.C. HOLLAND, H.N. JOHNSTON, H.A. KUBAS, R. FRANCCARO, J.C. PIERCY, N.K. KAUFMAN & J.B. HALE. Neuropsychological Functioning Among Children with Math Disabilities.

Objective: Specific learning disabilities (SLD) in math are often determined by conventional psychoeducational assessments resulting in non-specific interventions. Investigating the neuropsychological processing deficits associated with math SLD subtypes may foster specific interventions sensitive to individual needs.

Participants and Methods: Children (146 males, 77 females; M age = 113.20 months, SD = 27.65) primarily in grades one through four (N = 78; 65%) were referred for comprehensive neuropsychological evaluation of learning and/or behavioural difficulties. The Concordance-Discordance Model (C-DM) of SLD identification delineated WISC-IV strength(s) and weakness(es) that led to WIAT-III Numerical Operations (NU) deficits. ANOVAs contrasted children with C-DM NU deficits and clinical sample children without math deficits on visual, linguistic, memory, executive, and graphomotor measures.

Results: Children with NU SLD performed better on the TOMAL–2 Memory for Stories–Delayed Recall ($F(1,105)=7.07$, $p =.009$). They had poorer performance on the WISC–IV Digit Span ($F(1,197)=7.94$, $p =.005$), Digits Forward ($F(1,197)=4.43$, $p =.037$), Digits Backward ($F(1,197)=6.30$, $p =.013$), and Coding ($F(1,197)=8.52$, $p =.004$) subtests. Trends suggested poorer NU SLD performance on the NEPSY–II Visuomotor Precision ($F(1,159)=2.884$, $p =.091$) and the Rey Complex Figure Immediate Recall ($F(1,81)=3.32$, $p =.072$) measures. All WIAT-III math subtests were lower in the NU group (F range 23.44 to 103.24, $p <.001$).

Conclusions: Children with math SLD have neuropsychological deficits that impair math performance, but strengths in lexical-semantic and linguistic skills. Children with C-DM determined NU deficits experienced executive working memory, processing speed, and visual-spatial/constructional deficits that distinguish them from children without math SLD in this clinical population. Identifying the neuropsychological characteristics of math SLD subtypes could lead to specific interventions targeted to the individual needs of affected children.
Correspondence: *Sara Holland, MA, University of Calgary, 205-5201 Dalhousie Dr NW, Calgary, AB T3A5Y7, Canada. E-mail: sara_holland@hotmail.ca*

J. ELIAS, P.T. CIRINO, C. SHARP & P.J. MASSMAN. Algebra Refresher Interventions in Adults and Neuropsychological Correlates.

Objective: There are relatively few experimental math intervention studies, most of these at young ages (e.g., Fuchs et al., 2010). Procedural interventions have been effective in elementary math (Axtell

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

et al., 2009), but the conceptual nature of algebra implies a need for conceptual-based teaching strategies (Sfard & Linchevski, 1994). We hypothesized that students receiving a conceptual algebra intervention would outperform at posttest those receiving a procedural intervention. As in other studies (Prevatt et al., 2010), we also expected working memory (WM), long term memory (LTM), and executive functions (EF) to relate to math outcomes.

Participants and Methods: Participants were undergraduates (N=63) randomly assigned to either a brief procedural (N=31) or conceptual (N=32) algebra intervention. Students were given an algebra pretest and two posttests. Further measures assessed WM, LTM, and EF, as well as reading ability and math anxiety. Analyses focused on ANCOVA and correlations.

Results: Participants in both interventions improved from pretest to posttest (d = .76), but there was no significant difference between the interventions. However, a follow-up post-hoc analysis excluding participants who scored at ceiling or floor on pretest revealed a conceptual group advantage (d=.53). WM, LTM, and EF were not related to math outcomes; however, in the post-hoc analysis, LTM correlated with posttest performance (p=.01).

Conclusions: The study contributes to existing literature in three ways. First, it employs a randomized experimental design addressing the shortage of algebra intervention research (Foegen, 2008). Second, the interventions promoted strong improvement from Pretest to Posttest on an advanced mathematical skill after an intervention that was only 15 minutes long, highlighting its relevance. Third, although initial results did not conform to hypotheses, post-hoc analyses revealed an educationally meaningful effect size in favor of the conceptual treatment group. Thus, future work in this vein is warranted.

Correspondence: *John Elias, M.A., University of Houston, University of Houston, 126 Heyne Building, Houston, TX, TX 77204-5022. E-mail: johne033@gmail.com*

P.T. CIRINO, L.S. FUCHS & T.D. TOLAR. Prediction of Algebra with Arithmetic and Neuropsychological Measures.

Objective: Less is known about advanced math skills relative to the skills of younger children. Algebra is a key outcome for older students, with prior studies implicating working memory, computation fluency, and spatial skills (Lee et al., 2009; Royer et al., 1999; Tolar et al., 2009). Other relevant skills are number sense (Gersten & Chard, 1999), fractions skill (NMAP, 2008), and language skills (learning symbolic associations and vocabulary). The goal was to establish the relative predictive power of these skills at two time points. We expected that number sense, arithmetic and fractions skill, and neuropsychological skills, would all be predictive of algebra.

Participants and Methods: Participants were 303 algebra students in Grades 7 to 9 who were administered measures of number sense (number line estimation and symbolic/nonsymbolic magnitude comparison), computation (basic math facts within and across operation) and fractions, language (WJ-III Visual-Auditory Learning; WASI Vocabulary), and spatial skills (mental rotation, working memory). Regression analyses explored hypotheses, with grade as a covariate.

Results: Nearly all correlations of predictors with algebra skill at both the beginning and end of the year were significant. Early unique predictors in addition to grade were language (visual-auditory learning), computational fluency, fractions, and arithmetic concepts, accounting for R2 = 45%. At the end of the year, predictors were similar, but working memory was an additional contributor, and language was no longer significant, total R2 = 56%. When pretest was considered, only fractions was an additional predictor, R2 = 67%.

Conclusions: Computations, arithmetic concepts, and fractions, along with spatial working memory and language contributed uniquely to algebraic skill, but number sense did not. Prior algebra skill subsumed several predictors, suggesting an indirect effect of these predictors. Further work will expand on these models as well as dissociating procedural versus conceptual algebraic skill.

Correspondence: *Paul T. Cirino, PhD, Psychology, University of Houston, UH TMC Annex, 2151 W Holcombe Blvd, 224a, Houston, TX 77204-5053. E-mail: pcirino@uh.edu*

T. KORIAKIN, L.A. JACOBSON, P.H. LIPKIN, J.R. GRUEN & E.M. MAHONE. Severity of Sluggish Cognitive Tempo Predicts Reading Fluency in Children with Slow Processing Speed.

Objective: Core symptoms of sluggish cognitive tempo (SCT), including lethargy, under activity, and slowness (Penny et al., 2009), are observed in a variety of childhood conditions. SCT and processing speed are considered overlapping yet distinct constructs. Children with ADHD commonly display slowed processing speed; however, slow processing speed is also observed in dyslexia. Therefore, processing speed and components of SCT may account, in part, for the comorbidity between ADHD and reading disorders. The present study examined the relationships between SCT and reading fluency in children with deficits in processing speed.

Participants and Methods: There were 81 children (69% male, M age=11.17±2.31; 51% Caucasian, 45% African American, 4% other; 37% Hispanic ethnicity) who were selected based on scores of 85 or below on the Processing Speed Index (PSI) of the WISC-IV. Performance-based measures included basic reading (Woodcock Johnson-III) and reading fluency (Test of Word Reading Efficiency); symptoms of ADHD (Barkley ADHD Rating Scale) and SCT (Penny SCT Scale) were assessed via parent report. Based on prior research, the SCT Scale comprises three distinct factors: Sleepy/Sluggish, Low Initiation/Persistence, and Daydreamy. Of these, the Sleepy/Sluggish subscale overlaps least with ADHD symptomatology (Jacobson et al., 2012).

Results: After controlling for inattention and basic reading skills, ratings of Sleepy/Sluggish SCT significantly predicted reading fluency (ΔR^2=.016, p=.022). Conversely, this relationship was not observed between reading fluency and the Low Initiation/Persistence (ΔR^2=.000, p=.787) and Daydreamy (ΔR^2=.002, p=.398) SCT subscales.

Conclusions: Among children with slow processing speed, the components of SCT most separable from ADHD symptoms are significantly associated with oral reading fluency. SCT should be considered when assessing reading skills in the context of slow processing speed.

Correspondence: *Taylor Koriakin, Neuropsychology, Kennedy Krieger Institute, 1750 E. Fairmount Ave, Baltimore, MD 21231. E-mail: koriakin@kennedykrieger.org*

M. MARCHAND, M. BEAUCHAMP, M. PETRIDES & G. LEONARD. Motor and Working Memory Abilities in Children with Learning Disabilities.

Objective: Many studies search for common neurobehavioral factors that could account for the plethora of difficulties children with learning disabilities (LD) encounter, targeting for instance motor planning and working memory. The ability to hold information on line together with the aptitude to learn new motor programs are likely basic essentials in acquiring everyday skills as well as being the underpinnings of academic success (especially reading, writing and arithmetic). The purpose of the present study is to examine the relationship between working memory and motor skill in children with LD and LD with attention deficit disorder with or without hyperactivity (ADD/ADHD) given that they often coexist.

Participants and Methods: We studied 234 children with a diagnosis of LD aged 8 to 19 years old (M= 13.11, SD= 2.6) divided into three groups: LD only, ADD/ADHD only and LD with ADD/ADHD. The protocol consisted of measures of IQ (TONI), simple and complex motor coordination (Leonard Tapping), working memory (Petrides Visual Working Memory Task), academic abilities (WIATT III and Woodcock-Johnson), inhibition (BART) and behavioral questionnaires (Conners-3). The children with LD were compared to a control group in the same age range (N = 656, M = 12.38, SD= 3.18).

Results: Results were combined for the three groups. Significant differences in motor performance (Leonard Tapping) between the LD

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

population (LD plus ADD/ADHD) and the control group on simple and complex hand coordination tasks (Sequential Tapping, Bimanual Tapping and Rapid Tapping) were evidenced. The analysis also revealed performance on the motor tasks to be correlated with visual working memory (Petrides Visual Working Memory Task).
Conclusions: Children and adolescents with an LD are not as well coordinated as those without, and the dis-coordination is correlated with a corresponding reduction in visual working memory. Intensive motor training could be beneficial in improving the educational trajectories of children with learning difficulties.
Correspondence: *Marie-Ève Marchand, Montreal Neurological Institute, 3801 University Street, Montreal, QC H3A 2B4, Canada. E-mail: m-e.marchand@hotmail.com*

B. CASTO, M. KAMINETSKAYA, N. BUGESCU, J.M. BLACK, R. HENDREN & F. HOEFT. Brain Mechanisms Underlying Typical Reading despite Poor Phonological Processing.
Objective: Converging evidence from neuroimaging and cognitive-behavioral literature supports a core deficit in phonological processing, in particular, phonological awareness (PA), as underlying reading disabilities. Overlapping brain networks underlying PA and reading include two core brain regions, the left temporoparietal and caudal inferior frontal regions, with some additional regions such as the left occipitotemporal region, important for orthographic processing in reading. We aimed to dissociate the brain mechanisms underlying PA and reading by examining a unique population of children with typical word reading ability despite poor PA.
Participants and Methods: Thirty-nine native English-speaking children in grades 3-5 with poor PA (PA < 90 standard score) and variable reading ability with word reading (single word identification [WID]) at or above PA. Multiple regression using PA and WID scores as regressors was conducted on brain activation induced by a visual real-word rhyme judgment fMRI task.
Results: Multiple regression revealed a double dissociation in two key left frontal regions typically associated with phonological processing (caudal inferior frontal gyrus; IFG) and executive functioning including short-term memory (dorsolateral prefrontal cortex; DLPFC). When controlling for PA skills, activation in left DLPFC increased and IFG decreased as a function of superior WID ability. Conversely, when controlling for WID skills, activation in left IFG decreased and DLPFC increased as a function of poorer PA skills.
Conclusions: Our results showed recruitment of the left DLPFC typically involved in executive functioning and under-reliance on a more phonological region, the left caudal IFG, for successful word reading despite poor PA. Dissociating these processes may contribute to the understanding of successful compensatory mechanisms that children with RD acquire and inform intervention programs by incorporating components designed to strengthen executive functioning.
Correspondence: *Brandi Casto, Palo Alto University, 125 Eureka St., San Francisco, CA 94114. E-mail: bcasto@paloaltou.edu*

K.R. HICKS, H.N. JOHNSTON, J.A. CARMICHAEL, H.A. KUBAS, K.R. FITZER, N.K. KAUFMAN & J.B. HALE. Neuropsychological Functioning Among Children with Reading Decoding and Comprehension Disabilities.
Objective: Multiple neuropsychological determinants of specific learning disabilities (SLD) in reading are seldom ascertained with traditional psychoeducational assessments, which in turn leads to non-specific interventions. Examining the neuropsychological processing deficits associated with reading SLD subtypes may lead to targeted interventions sensitive to the individual needs of affected children.
Participants and Methods: Children (140 males, 75 females; M age = 9.39 years, SD = 2.19) referred for neuropsychological evaluation of learning and/or behavioral issues were given a flexible battery of intellectual, neuropsychological, academic, and behavioral measures. The Concordance-Discordance Model (C-DM) of SLD identification delineated WISC-IV cognitive strength(s) and weakness(es) that led to WIAT-III Word Reading (WR) and Reading Comprehension (RC) deficits. ANOVAs contrasted linguistic, visual, memory, executive, and motoric differences among children identified with C-DM WR and RC deficits with children without reading problems.
Results: Children with WR SLD performed poorer on NEPSY-II Phonological Processing ($F(1,66) = 5.50$, $p = .022$) and Repeating Nonsense Words ($F(1,68) = 4.86$, $p = .031$) subtests, and on the Rey Complex Figure Immediate Recall ($F(1,78) = 4.20$, $p = .044$). Children with RC SLD performed poorer on the TOMAL Memory for Stories Immediate ($F(1,110) = 22.46$, $p < .001$) and Delayed ($F(1,106) = 16.97$, $p < .001$), Word Selective Reminding ($F(1,62) = 5.47$, $p = .023$), NEPSY-II Comprehension of Instructions ($F(1,75) = 4.23$, $p = .043$), and WCST % Conceptual Level Responses ($F(1,67) = 4.22$, $p = .044$).
Conclusions: Children with reading SLD are heterogeneous in neuropsychological presentation and academic need, with distinct processing weaknesses leading to different reading SLDs. Identifying the linguistic, visual, memory, executive, and motoric characteristics among reading SLD subtypes should lead to differentiated instruction targeted to the individual needs of affected children.
Correspondence: *Kelly R. HIcks, MSc, School of Applied Child Psychology, BrainGain Labratory, University of Calgary, EDT 538, 2500 University Drive NW, Calgary, AB T2N1N4, Canada. E-mail: kellyryanhicks@gmail.com*

R. PERNA, A.R. LOUGHAN & J. HERTZA. Early Developmental Delays and Long-Term Outcomes: Emotional and Attention Disorders.
Objective: Developmental delay is diagnosed when children fail to meet developmental milestones in a typical age-expected manner. Although some children catch up and subsequently have normal development, other long-term outcomes are unclear. This study cross-validated earlier research investing subsequent diagnoses after developmental delays.
Participants and Methods: Data on 95 children who completed neuropsychological evaluations. Forty-nine children had a documented history of speech or motor delays prior to age 4 and 46 had no history of delay. Data was collected 4 or more years post delay. Groups (Delay vs. No-Delay) were compared and were similar in age, grade level, and economic status. Data was entered into and analyzed via SPSS. Analysis included descriptive, frequencies, t-tests, and chi-squares.
Results: Children with developmental delays had significantly lower FSIQ's (94.8 vs 85.8; p = .000) and academic achievement scores [Reading (96.5 vs 86.5; p = .030) & Mathematics (93.5 vs 87.0; p = .037], with no significance found between measures of executive functioning or memory. Neither group had mean test scores significantly below FSIQ. Chi-square revealed the delay group to have a higher propensity for an emotional/behavioral diagnoses (84% vs 67%; p = .055) and/or ADHD diagnosis (78% vs 66%; p = .435).
Conclusions: There was no tendency toward focal impairments, though some mild possible decrement to FSIQ and academic achievement. Chi-square showed the delay group to have a higher propensity for an emotional/behavioral and/or ADHD diagnosis, though not reaching significance. It remains unclear if this suggests that the early delays subsequently manifest as behavioral dysregulation or if findings just reflects the high comorbidity of these disorders.
Correspondence: *Ashlee R. Loughan, Ph.D., NeuroBehavioral Associates, 1355 Independence Dr, Augusta, GA 30901. E-mail: aspicer88@yahoo.com*

L.J. ALTMANN, K. JOHNSTON & R. WISEHEART. The Complex Relationship between Word Reading, Nonword Reading, and Spelling.
Objective: Nonword reading is an index of phonological reading skill and is central to theoretical debates about the normal reading process, particularly the Dual Route Hypothesis. However, little is known about the relationship between nonword reading, word reading and

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

cognition in typical adult readers. We tested whether cognitive, linguistic, or spelling abilities contributed to performance in reading real words and nonwords.
Participants and Methods: Twenty-eight young adults ages 18-25 completed a cognitive battery that included tests of executive function (EF), working memory (WM), reading vocabulary (VOC), and phonological awareness (PA). Participants also completed computerized tasks of spelling and reading. Stimuli were drawn from standardized word reading and spelling tests, and from the OED list of most misspelled words. Nonwords were generated by computer, with common morphemes added to match the spelling stimuli in length, bigram and trigram frequency. Hierarchical regressions presented cognitive factors first, and reading variables second.
Results: Nonword reading accuracy accounted for only 7% of unique variance in real word reading accuracy when cognitive abilities (PA, VOC, EF, WM-ns) were entered first (R2=.47). Seventy- four percent of the variance in nonword reading was accounted for by: spelling 34%, word reading 7%, shared variance between spelling and reading 28%, and EF 4%. The contributions of PA, WM and VOC to nonword reading were not significant.
Conclusions: These findings suggest that much of the power of nonword reading for predicting reading accuracy is due to shared cognitive resources. Additionally, in these typical college-aged readers, nonword reading accuracy benefited from knowledge of spelling patterns as much or more than from word reading ability. The relationship between spelling and nonword reading suggests that orthographic knowledge interacts with grapheme to phoneme conversion processes, which is inconsistent with the Dual Route Hypothesis.
Correspondence: *Lori J. Altmann, PhD, Speech, Language & Hearing Sciences, University of Florida, 336 Dauer Hall, Box 117420, Gainesville, FL 32611-7420. E-mail: laltmann@ufl.edu*

R. HOADLEY, C. SOFKO, B.D. HILL & M. MUSSO. Cognitive and academic intra-individual variability in Attention-Deficit/Hyperactivity Disorder (ADHD) and Learning Disorder (LD).
Objective: Cognitive intra-individual variability (IIV) has been demonstrated to increase with neuropathology. We examined both cognitive and academic IIV in ADHD and LD using a dispersion approach.
Participants and Methods: Archival data from 505 psychoeducational evaluations were utilized. Overall demographics: mean age 22.5 (SD 6.1, range 16-68 years), 86% white, and 50% female. Groups: no diagnosis (n=148), ADHD (n=184), and mixed LD (n=173). A version of an overall test battery mean (OTBM) was calculated for each individual for 10 WAIS-III subtest and the WJ-III subtests needed for broad academic domains. All normed scores were converted to standard scores. IIV was measured using the standard deviation (SD) around both the WAIS-III OTBM (mean 102.5, SD 8.7) and WJ-III OTBM (mean 11.8, SD 2.9). This resulted in a cognitive OTBM SD and academic OTBM SD variability score for every individual. Additionally, individual OTBM SDs were also calculated for the WJ-III Broad Reading, Broad Math, and Broad Written Language domains.
Results: Pearson correlation between WAIS-III OTBM SD and WJ-III OTBM SD was minimal, r=.05. Correlations for Broad Reading and Broad Math OTBMs were larger (r=.27) than for Broad Reading and Broad Writing (r=.04) and Broad Math and Broad Writing (r=.05). One-way ANOVAs with Fischer's LSD post-hoc tests were utilized. A significant main effect was found for WAIS-III OTBM SD but not WJ-III OTBM SD. Post-hoc comparisons revealed the LD group was significantly different from the others (p<.01) but ADHD and no diagnosis groups did not differ.
Conclusions: We believe this is the first examination of academic IIV. Unfortunately, this approach did not differentiate between clinical groups in this sample. However, several counterintuitive associations between specific academic domains were noted that require further investigation. Cognitive IIV does appear to have promise as a diagnostic methodology.
Correspondence: *Benjamin D. Hill, PhD, Psychology, University of South Alabama, UCOM 1032, Mobile, AL 36688. E-mail: bdhill@southalabama.edu*

S.T. LI, S.E. TAPSAK & T. SHARIFAN. Contributions of Motor Coordination to Processing Speed and Academic Achievement.
Objective: Processing speed is a predictor of academic achievement and is often impaired in children with learning disorders. Problems arise when attempting to conceptualize the effects of low processing speed on school performance when motor coordination is also a weakness. As fine motor difficulties may lower scores on processing speed tests, we were interested in understanding how motor coordination is related to both processing speed and academic achievement.
Participants and Methods: In a community sample of 90 predominantly Caucasian children ages 6 to 16 (Mean=10.2, SD=3.3; 66.7% female), a battery of measures was administered by a trained graduate student. Motor coordination was marginally correlated with WISC-IV processing speed index (PS; r=.19, ns), and visual-motor integration (Beery VMI) was unrelated to PS (r=.15, ns). Motor coordination (MC) was positively correlated with WIAT-III spelling, arithmetic, and word reading (r=.30, .31, .28; p<.01; respectively). These correlations suggested that motor control was not strongly related to simple speeded tasks, but had a greater association with academics.
Results: Hierarchical regression analyses were conducted to investigate contributions of MC in conjunction with PS to academic achievement. In these regressions, MC and PS had significant unique effects on spelling (β=.26*, β=.21*; R2=.13, F(2,87)=6.55**) and arithmetic (β=.26*, β=.25*; R2=.15, F(2,87)=7.77**); however, only MC was uniquely related to word reading (β=.25*; β=.17ns, p<.001; R2=.11, F(2,87)=5.17**). Overall, motor skills and PS had important contributions to children's academics in this typically developing sample.
Conclusions: In this study, processing speed was not highly impacted by motor coordination; therefore, scores may be less confounded than previously assumed. The assessment of motor coordination and processing speed abilities provide relevant and unique information to the pattern of strengths and weaknesses that characterize a child's neuropsychological profile for learning evaluations.
Correspondence: *Susan T. Li, Ph.D, Pacific University, 190 SE 8th Avenue, Ste. 260, Hillsboro, OR 97123. E-mail: susanli@pacificu.edu*

K. JOHNSTON, L.J. ALTMANN & I. GREEN. Impact of Phonological Awareness, Executive Function and Vocabulary on Reading and Spelling Accuracy in Adults.
Objective: While the cognitive factors influencing reading have garnered much attention, the cognitive predictors of spelling ability are understudied. Spelling research generally focuses on young children or people with reading disabilities, but there are few, if any, studies examining spelling in the normal population. Further, no studies have examined whether phonological awareness (PA) continues to play a role in reading and spelling in adulthood. The current study analyzes the contribution of vocabulary, PA and cognitive abilities to reading and spelling accuracy in college students.
Participants and Methods: Twenty-eight young adults ages 18-25 completed a battery including standard tests of PA, working memory (WM), reading vocabulary, and executive function (EF). The experimental tests included computer-presented tasks assessing spelling and reading. Stimuli came from standardized word reading and spelling tests, and from the OED list of most misspelled words. Principal components analysis yielded orthogonal WM and EF factors from the cognitive data, which were then regressed out of PA scores to eliminate collinearity. Multiple regressions were conducted using WM, EF, PA and vocabulary as independent variables.
Results: Spelling and reading correlated moderately with each other (r2 = .19). PA, reading vocabulary and EF accounted for 40% of the variance in reading efficiency and 44% of the variance in spelling accuracy.

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

Conclusions: These results find no support for a role of verbal memory in spelling and reading accuracy. Instead, findings suggest that spelling and reading ability across the lifespan, not only during the early stages of development, continue to reflect the effects of individual differences in phonological awareness. The contribution of reading vocabulary suggests that exposure to print benefits both reading and spelling performance. Executive function skills may facilitate the inhibition of plausible alternate responses in these tasks.

Correspondence: *Kaitlyn Johnston, Speech, Language, and Hearing Sciences, University of Florida, PO 117420, 336 Dauer Hall, Gainesville, FL 32601. E-mail: kaitlynjohnston@ufl.edu*

C. FRITZ, R. MORRIS, R. SEVCIK, M. LOVETT, J. FRIJTERS & M. WOLF. Predictors of Response to Intervention for Middle School Students with Reading Disabilities.

Objective: Few studies have examined predictors of response to intervention for middle school students with reading disabilities. In younger populations of poor readers, phonological awareness, rapid naming and measures of verbal and performance IQ appear to be important predictors of students who respond to reading interventions depending on the type of reading outcomes measured (e.g., Al Otaiba et al., 2002). However, it is unclear if similar predictors are useful for older, middle school students.

Participants and Methods: Participants were middle school (n = 268) students who qualified for a reading intervention based on low-achievement criterion. All subjects were evaluated before and after one year (>100 of 125 hours) of PHAST Reading, a multiple component reading intervention. Response to intervention was characterized using the reliable change index (RCI; Christensen et al., 1986). Pre-treatment reading (WJ-III Broad Reading), phonological awareness (PA; CTOPP Blending Words), naming speed (NS; RAN-Letters), and verbal and performance IQ (VIQ and PIQ; WASI) were collected.

Results: Of the participants, 69.6% made significant gains in WJ Broad Reading skills as measured using RCI. Logistic regression was conducted using age at intervention and hours of intervention predictors in the first step, and measures of PA, NS, and VIQ and PIQ in the second step. The full model was statistically significant (X (6) = 28.05, p < .000, R2 = .10 (Cox & Snell), .141 (Nagelkerke)). Prediction success overall was 72.4% (94.1% for responders and 22.2% for nonresponders). In the full model only PA made a significant contribution to response to intervention (b = .17, p = .013).

Conclusions: Nearly 70 percent of students with reading disabilities receiving at least 100 hours of PHAST Reading made clinically significant improvements in broad reading skills. Pre-intervention phonological awareness skills appear to be the strongest predictor of response to intervention for middle school students with reading disabilities.

Correspondence: *Cortney Fritz, Georgia State University, 870 Inman Village Pkwy NE, Apt 529, Atlanta, GA 30307. E-mail: cortney.fritz@gmail.com*

R.L. PETERSON, A.B. ARNETT, B.F. PENNINGTON, E. WILLCUTT, S.J. WADSWORTH, R.K. OLSON & J.C. DEFRIES. Does Unequal Variance Cause Uneven Gender Ratios in Both High and Low Reading Ability?

Objective: There is a significant male predominance for reading difficulties, with gender ratios increasing in more severely affected samples. However, mean reading scores for males and females are similar. Hawke, Olson, Willcutt, Wadsworth, & Defries (2009) demonstrated that this apparently paradoxical finding owed to the fact that reading performance is significantly more variable for males than females. Thus, there should also be a male predominance for high reading ability, especially as the cut-off for high ability increases.

Participants and Methods: Participants included 5,052 participants (2,582 males) in the Colorado Learning Disabilities Research Center (CLDRC). The CLDRC includes twin pairs aged 8 to 18 as well as some siblings; children with reading difficulties are slightly over-represented. We analyzed gender ratios for high performance on a composite measure of single word reading, using increasingly stringent cut-offs.

Results: Consistent with previous results in this sample, there was no significant gender difference in mean reading ability, but males showed higher variability. As predicted, there was a male predominance for high reading ability that became stronger with more stringent cut-offs. Cut-off scores of +1, +2, and +2.5 standard deviations yielded male:female ratios of 1.29, 1.74, and 3.51 respectively.

Conclusions: Although the average reading scores of males and females are similar, males are over-represented in both the low and high tails of the distribution because their performance shows greater inter-individual variability. The reasons for the unequal variance are unknown. These results suggest that the meaning of a particular reading score may be different for males and females, and highlight the importance of considering gender-specific norms in clinical, educational, and research settings.

Correspondence: *Robin L. Peterson, Ph.D., Rehabilitation Medicine, Children's Hospital Colorado, 13123 E. 16th Avenue, B285, Aurora, CO 80045. E-mail: robin.peterson@childrenscolorado.org*

ADHD/Attentional Functions

D.W. BEEBE, K.T. BAUM & M.K. STERN. Impact of Sleep Restriction on Critical Skills for Novice Adolescent Drivers.

Objective: Short or disrupted sleep are common in both healthy and brain-injured adolescents. We have previously shown that experimentally shortened sleep causes deterioration in adolescents' academic functioning, attention, mood and mood regulation. In the current study, we focus on the impact of shortened sleep on recently-licensed adolescent drivers, examining skills relevant to driving safety, including vigilance, impulsivity/risk-taking, and affect regulation.

Participants and Methods: 36 healthy adolescents aged 16-18 years, all licensed for <2 years, completed a 3-week sleep protocol in which they completed a baseline week, followed by a sleep restriction week (SR; 6.5 hours in bed per night for 5 nights) and healthy sleep duration week (HS; 10 hours in bed per night for 5 nights) presented in a randomized, counterbalanced order. Adherence to the sleep regimen was verified via actigraphy. Study visits were conducted at the end of each condition. Outcome measures included parent- and self-report questionnaires of sleepiness, attention, impulsivity, and affect regulation, and computerized tests of attention (Psychomotor Vigilance Test) and risk-taking (Balloon Analogue Risk Task).

Results: Teens averaged ~2 ½ more hours of sleep per night during HS than SR, p<.001. Questionnaire and computer data indicated significantly worse attention, and questionnaire data indicated greater sleepiness and worse mood regulation, during SR than during HS (all ps<.05). In contrast, impulsivity and risk-taking did not show a consistent effect of the sleep manipulation.

Conclusions: Shortened sleep hampers important cognitive functions in young drivers. The shortened sleep that typifies adolescence may contribute to teen accidents. Also, given high rates of sleep pathology and daytime somnolence in neurologically-involved adolescents, it is important to screen for treatable sleep conditions to maximize their safety on the road.

Correspondence: *Dean W. Beebe, Ph.D., Beh Med & Clin Psychology, Cincinnati Children's Hosp Med Cntr, 3333 Burnet Avenue, MLC 3015, Cincinnati, OH 45229. E-mail: dean.beebe@cchmc.org*

A.D. PERSAUD, B. FREER & L. TIERSKY. Addiction Acknowledgment and Attention in Adults with Cognitive Complaints.

Objective: The Addiction Acknowledgement Scale (AAS) of the Minnesota Multiphasic Personality Inventory 2 (MMPI-2) is a self-report measure of substance abuse. To date, no studies have examined its relationship with the Paced Auditory Serial Addition Test (PASAT),

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

to explore the domains of executive functioning, especially attention, and substance abuse admission of adults with subjective cognitive complaints.
Participants and Methods: 124 adults who requested evaluation for learning disabilities or adult Attention Deficit Hyperactivity Disorder (ADHD) participated in the study. Cognitive functioning was assessed using the PASAT, which specifically measured attention. Substance abuse acknowledgement was assessed by using the AAS of the MMPI-2.
Results: There was a significant correlation (r= .152, p= .046) between PASAT score and score on the AAS. There was also a correlation trending toward significance between PASAT score and score on the AAS (r= .182, p=.061) with the participants that were not given an LD diagnosis. There was no correlation between PASAT score and AAS score with participants that were given a LD diagnosis (r=.044, p=.380).
Conclusions: Initial findings indicate that there appears to be a relationship between PASAT and AAS in the LD population but that there is a relationship between PASAT and AAS. This is potentially useful information for clinicians to recognize that some factors of a population of cognitive complainers (i.e., LD) may suggest that the PASAT is not related to substance use and abuse.
Correspondence: *Amanda D. Persaud, BA, Clinical Psychology, Fairleigh Dickinson University, 145 Crary Ave, Mount Vernon, NY 10550. E-mail: adpersa@gmail.com*

K.M. KINGERY, M.E. NARAD, T.N. ANTONINI & J. EPSTEIN. Reaction Time Variability Correlations Across Five Neuropsychological Tasks.
Objective: Greater intra-individual reaction times (RTs) among children with ADHD have been demonstrated on a variety of neuropsychological tasks including response inhibition, working memory, and sustained attention tasks. While there are some reports of the test-retest reliability of RT variability (RTV), few reports exist of the cross-test reliability of RTV. The current study investigates cross-test correlations of the RT standard deviation (SD) across five computerized neuropsychological tests.
Participants and Methods: 100 children with ADHD-I (n=52) or ADHD-C (n=48) subtype, and 45 typically developing (TD) children completed choice discrimination, n-back, go/no-go, flanker, and stop signal tasks. Each task required a button press response to computerized stimuli. All tasks had similar stimulus duration and event rate characteristics. Participants completed 360 trials for the n-back, go/no-go, and stop signal tasks and 288 trials for the flanker task. RTs for each trial were recorded and the SD of the RT residuals were calculated for each task and served as a measure of RTV. Children with ADHD had higher levels of RTSD across all tasks.
Results: Of the 10 Pearson correlations representing between-task correlations of RTSD, 8 correlations were significant (p's <.05, r range=.20 to .42). The correlation between RTSD on the flanker and choice task was not significant (r=.08, p=.34), and the correlation between RTSD on the flanker and n-back task was also not significant (r=.12, p=.20).
Conclusions: RTV was highly correlated across a variety of neuropsychological measures and suggests that RTV is a reliable construct. The lower correlations between the flanker task and other tasks may have resulted from the lower number of trials on the flanker task than the other tasks. Fewer trials may have produced less stable and reliable estimates of RTSD for the flanker task thereby resulting in lower correlations for this task. The significant cross-test correlations attest to the psychometric stability of the RTV construct.
Correspondence: *Kathleen M. Kingery, M.A., Psychology, University of Cincinnati, 6611 Greenfield Drive, Cincinnati, OH 45224. E-mail: kateo2004@yahoo.com*

Z. HELD & E. MOES. Assessing Response Time Variability As A Predictor of Cognitive Fatigue.
Objective: In this study, measures of variability in response time and accuracy in the form the standard deviation and the coefficient of variability were compared to mean scores on a variety of tests. The goal was to assess their respective sensitivity and utility in predicting fatigue, sleepiness, and clinical status.
Participants and Methods: This was based on a reanalysis of previous studies in which data was collected from healthy college students (n = 35), individuals with multiple sclerosis and matched healthy controls (n = 28 in each group), as well as high functioning children with Autism Spectrum Disorders (ASD) (n = 17) and neurotypical controls (n = 18) matched on age (8 to 11) and Matrix Reasoning scores (M=10).
Results: The study found that there was no correlation between an increase in response time variability (as measured on the Vigil Continuous Performance Test) and fatigue or sleepiness in healthy college students. Consistent with our hypothesis, a significant positive correlation between consistency of response accuracy across trials on the PASAT and the dependent variable of hours of sleep the night before was found in participants with multiple sclerosis. Contrary to our hypothesis, however, the measures of response time variability (obtained from Conners' CPT-II data) were unable to predict diagnostic group membership and showed no significant differences between participants with autism spectrum disorder and closely matched controls.
Conclusions: Results indicate that response variability was a useful predictor of fatigue based on hours slept the night before for individuals with multiple sclerosis, but not for healthy matched controls, healthy undergraduate students, or children with and without ASD. It is concluded that variability in performance may be a useful indicator of clinical status and dopamine deficiency in specific populations and may show clinical utility in early diagnosis of disorders.
Correspondence: *Zack Held, B.S., Clinical Psychology, Suffolk University, 15 Washburn Street, Apt #2, Dorchester, MA 02125. E-mail: zdheld@suffolk.edu*

K.H. MOYER & A.M. GROSS. Attention and Emotion Regulation in Social Functioning.
Objective: Research findings have suggested attention and emotion regulation are important factors in explaining social functioning. However, the relationship between these processes is unclear. We hypothesize the following: attention and emotion regulation will be related to each other and will be independently associated with social functioning.
Participants and Methods: Individuals (n=103) 18 years of age or older enrolled at a public university were asked to complete online self reports of attention [Barkley Adult ADHD Rating Scale IV (BAARS-IV)], emotion [Difficulties in Emotion Regulation Scale (DERS)], social functioning [World Health Organization Quality of Life 100 (WHO-QOL-100)], and a demographic questionnaire.
Results: Attention (BAARS-IV ADHD Inattention) and emotion (DERS subscales) difficulties were positively correlated ($.253 \leq r \leq .450$, $p \leq .01$). However, significant, independent contributions of attention and emotion to explaining social functioning were suggested by hierarchical regression analyses. After demographic factors were explained, attention regulation accounted for 5.7% - 12.5% ($p \leq .05$) of variability in social functioning (WHOQOL-100 Social, Overall) and emotion regulation explained a further 18.2% - 18.3% ($p \leq .05$). Significant interactions between inattention and emotion regulation processes (e.g., DERS Lack of Emotional Awareness, Nonacceptance of Emotional Responses, Limited Access to Emotion Regulation Strategies, $p \leq .05$) in explaining social functioning were also found.
Conclusions: Attention and emotion, although related, independently contribute to explaining variability in social functioning. Further, attention difficulties may interact with specific emotion regulation processes, factors that may assist in planning intervention.
Correspondence: *Katherine H. Moyer, MA, Georgia Regents University, 320 TELFAIR ST APT B, Augusta, GA 30901. E-mail: kamoyer@gru.edu*

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

L.E. DELGATY, K. STEWARD, A. TAN & M. BUNNER. Effects of Gender and ADHD Subtypes on Neuropsychological Measures of Attention, Executive Functioning and Social Cognition.

Objective: Research comparing performance on neuropsychological measures in ADHD subtypes between genders has generated contradictory findings. To improve diagnostic methods and clinical intervention, a deeper knowledge of how ADHD presents between genders is needed. This study examined attention, executive functioning (EF) and social cognition using age and IQ matched groups to determine relationships between gender, ADHD subtype and performance.

Participants and Methods: Subjects consisted of 39 ADHD-Combined Type (ADHD-CT) and 38 ADHD-Predominantly Inattentive (ADHD-PI) children who ranged in age from 6–15 years. The group included 21 females and 56 males. Each was free of other emotional, psychiatric, developmental and neurological disorders. Measures commonly used when assessing attention and EF concerns were administered to each subject including The Conners CPT-II, WISC-IV, Theory of Mind (TOM) and Affect Recognition (AR) subtests from the NEPSY-II, Behavior Rating Inventory of Executive Functioning–Parent Form (BRIEF-P) and the Child Behavior Checklist.

Results: Two-way ANOVAs were conducted to examine the effect of gender and ADHD subtype on test scores. Significant differences ($p < .05$) were found between gender independent of ADHD subtype on the raw and standard scores of the TOM Verbal subtest and T-scores from the CBCL on the social problems and attention problems scales. No significant effects were found between ADHD subtype or interaction effect of ADHD subtype and gender.

Conclusions: These results suggest that there are differences in social deficits between males and females with ADHD, regardless of ADHD subtype. Specifically, females performed better on objective tasks measuring verbal perception of social cues when compared to male peers. However, parent ratings indicated significantly more social and attention concerns for girls than for boys. Possible reasons for these differences, clinical implications and future research are discussed.

Correspondence: *Lauren E. Delgaty, MA, St. Edward's University, 501 Jones Ferry Rd, Apt Q9, Carrboro, NC 27510. E-mail: ldelgaty@gmail.com*

A. TAN, L. DELGATY, K. STEWARD & M. BUNNER. Sensitivity of Objective Measures of Executive and Social Functioning in Attention Deficit Hyperactivity Disorder.

Objective: Although children with ADHD typically report difficulties with executive function (EF) and social function (SF), studies have demonstrated that the ability to measure these deficits during clinical assessment has been inconsistent. The current study compares Primary Inattentive (PI), Combined Type (CT), and non-ADHD children in order to investigate the sensitivity of objective measures in showing observed deficits.

Participants and Methods: Data were collected from a private neuropsychological clinic. The sample consisted of participants aged 6–16 years (n=73, mean = 9.9, SD = 2.8) separated into three groups (25 ADHD-PI, 25 ADHD-CT and 23 control). All participants were free of comorbid psychiatric and neurological disorders. Objective neuropsychological measures commonly used when assessing deficits in EF and SF were administered to each subject, including Conner's Continuous Performance Test (CPT-II), Working Memory/Processing Speed subtests from the Weschler Intelligence Scale for Children (WISC-IV), and Theory of Mind/Affect Recognition subtests from A Developmental Neuropsychological Assessment (NEPSY-II). Subjective behavioral measures administered included the Behavior Rating Inventory of Executive Functioning (BRIEF) and Achenbach's Child Behavior Checklist (CBCL).

Results: Group differences were assessed using ANOVA's. There were no significant differences found between ADHD and control groups on any of the objective measures of EF and SF. However, significant ($p<.05$) differences were found on almost every component of the subjective measures, regardless of ADHD subtype.

Conclusions: The results from this study suggest that current objective measures of EF and SF are not sensitive enough to distinguish children with ADHD from typically developing children. Subjective measures of these skills may be more important to clinicians when making a diagnosis of ADHD. Other clinical implications and future research directions are discussed.

Correspondence: *Alexander Tan, Austin Neuropsychology PLLC, 7205 Hart Ln #3035, Austin, TX 78731. E-mail: a.tan518@gmail.com*

Z. BLACKHURST, E. FRANCHOW & Y. SUCHY. Executive Problems in Subclinical ADHD: a Difference in Quantity or Quality?

Objective: Executive dysfunction, including problems with inhibitory control and working memory, helps distinguish attention disordered-individuals from cognitively healthy controls (Berlin, Bohlin, Nyberg & Janols, 2010; Holmes et al., 2010). However, it is unclear whether a particular dysexecutive syndrome characterizes those with a diagnosable attention disorder versus individuals with subclinically-high inattention. The purpose of this study was to examine differences in the quantity and quality of executive problems in individuals within and just below the clinical range of attentional problems.

Participants and Methods: 205 adults ages 18-32 (M= 21.41 years, 65.4% female, 70.2% Caucasian) with 11-16 years of education (M= 13.6 years) completed the Behavior Rating Inventory of Executive Function – Adult Version (BRIEF-A) Inhibition, Shifting, Self-Monitoring, Initiation, Working Memory, Planning, and Organization subscales and the Connors' Adult ADHD Rating Scale (CAARS) total ADHD symptoms subscale. CAARS was used to divide participants into groups: Control (T score < 60), Subclinical (T score 61-70), and Clinical (T score > 70).

Results: A multivariate analysis of variance compared groups on their BRIEF-A T scores, showing a Group X Domain interaction [$F(12, 276)= 6.5$, $p<.05$]; for Working Memory and Self-Monitoring, only the Clinical group reported more symptoms than Controls; for Initiation, Clinical and Subclinical groups reported equally more symptoms than Controls; for Shifting, no group differences emerged; for the remaining domains, greater level of ADHD symptoms was related to progressively greater executive complaints.

Conclusions: These results support differences in both the quantity and quality of executive dysfunction in individuals within and just below the range of clinically-disordered attention.

Correspondence: *Zachary Blackhurst, University of Utah, 940 University Village, Salt Lake City, UT 84108. E-mail: zachary.blackhurst@gmail.com*

J. KAMRADT, J. ULLSPERGER & M. NIKOLAS. The Role of Executive Function in Predicting Severity and Impairment in Adult Attention Deficit Hyperactivity Disorder: Tasks versus Ratings?

Objective: Adults with attention-deficit hyperactivity disorder (ADHD) exhibit variable impairments on executive function (EF) tasks (Nigg et al, 2005). Due to this variability, ratings of EF (rather than tasks) have been proposed as an alternative method that better captures symptom severity and impairment among adults with the disorder (Barkley et al., 2006). However, few studies have jointly examined performance across multiple neuropsychological domains and EF ratings together as predictors of severity and impairment among adults with ADHD.

Participants and Methods: 273 adults ages 18-38 years (M=22.6 years, 55.3% male, 62.2% ADHD) completed a comprehensive diagnostic and neurocognitive assessment, which included self and informant ratings of ADHD symptom severity and EF, and tasks of arousal/activation, response inhibition, set-shifting, interference control, and working memory.

Results: Hierarchical linear regression models indicated that tasks of arousal/activation and response inhibition uniquely predicted ADHD symptom dimensions and related impairments. Over and above EF task performance, EF ratings of time management significantly predicted increased inattention ($\beta = .209$, $p<.001$, $\Delta R2=3.9\%$), whereas ratings of restraint predicted increased hyperactive-impulsivity ($\beta = .259$, $p<.001$,

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

ΔR2=6.4%). Furthermore, EF ratings of time management, restraint, and emotion regulation also incrementally accounted for variance in relationship, professional, and daily living impairments over and above EF task performance (ΔR2 range 1.7-7.7%).
Conclusions: Both EF tasks and EF ratings appear to be important and unique predictors of ADHD symptom severity and impairments among adults. Results may have important implications for refining neurobiological theories of the disorder and for assessing ADHD among adults.
Correspondence: *Jaclyn M. Kamradt, BA, Psychology, University of Iowa, 416 S Linn St Apt 8, Iowa City, IA 52240. E-mail: jaclyn-kamradt@uiowa.edu*

M. MCKNIGHT, I. KUNKES & V. CULOTTA, PHD. A Comparison of Cognitive and Academic Functioning in Middle School-Aged Children with ADHD and ADHD with Comorbid Learning Disability: Performance On versus Off Stimulant Medication.
Objective: This study examined the impact of stimulant medication on metacognitive aspects of ADHD and LD through assessment of intellectual, academic, and neurocognitive skills among middle school aged students. Students were diagnosed with ADHD only or ADHD and comorbid LD. Past research has supported the use of stimulants in these groups to positively impact behavior, however the impact on cognitive measures is less clear. It was expected that medicated ADHD and ADHD+LD youngsters would outperform their respective non-medicated controls on most, if not all measures.
Participants and Methods: Assessment data for 105 middle school-age children (69 boys, 35 girls) referred to an outpatient clinic was examined. 44 students met diagnostic criteria for ADHD (23 non medicated, 21 medicated) and 61 students met diagnostic criteria for ADHD+LD (33 non medicated, 28 medicated). Inclusion criteria included an FSIQ 85 or above and the absence of other neurodevelopmental, psychiatric, or medical disorders. This retroactive study examined psychometric differences between the groups.
Results: Independent sample, 2-tailed t-tests revealed no significant discrepancies across any of the measures between ADHD w/ meds vs ADHD w/o meds or between ADHD+LD w/ meds vs ADHD+LD w/o meds.
Conclusions: Overall, students performed no better while on stimulant medication than off, regardless of diagnosis (ADHD or ADHD+LD). These findings raise concern about the efficacy of stimulant medication on the metacognitive aspects of ADHD and co-occuring LD and suggest that documented benefits of stimulants in these groups may be due more to behavioral/impulsivity modification than enhancement of metacognitive skills. Clinically, the need for careful consideration of intended benefit (behavioral vs metacognitive) vs risk of use is emphasized and early exploration of non-stimulant based interventions for the metacognitive deficits of ADHD in preparation for increasing demands of high school is encouraged.
Correspondence: *Megan McKnight, Baylor College of Medicine, 7500 Kirby Drive, Apt 430, Houston, TX 77030. E-mail: memcknig@bcm.edu*

C. WEI & J. SUHR. Examination of the Role of Negative Expectancies on Task Performance in Adults Concerned about ADHD.
Objective: Research in mild TBI has shown that non-neurological factors, such as cueing negative expectations about performance, can contribute to test performance and behaviors seen during neuropsychological interviews and evaluations. Because college students frequently attribute poor academic performance to possible diagnosis of ADHD, the current study sought to examine the role that negative expectations might play in ADHD evaluation. We hypothesized that college students who reported high levels of ADHD symptoms and were cued to a diagnosis threat would perform worse on a complex working memory and attention task compared to college students who also report high levels of ADHD symptoms but were not cued to the diagnosis threat.
Participants and Methods: Participants were 73 undergraduates between the ages 18-32. Individuals were administered the pre-screen ADHD symptom measure then randomly assigned to 1 of 2 conditions: those in the neutral condition were instructed that the study examined students' perceptions of computer games. Individuals within the diagnosis threat condition heard instructions highlighting negative expectations about the relationship between ADHD symptoms and test performance and were told that the tasks they will complete are similar to tests used in ADHD assessments. Following the experimental manipulation each participant was administered the dual 2-back task.
Results: Results showed a significant interaction between pre-screen ADHD self-report and condition (diagnosis threat or control group) in predicting scores on the dual 2-back. There was no difference between the two conditions when pre-screen ADHD self-report symptoms were lower, but the diagnosis threat group performed worse when pre-screen ADHD symptoms were high.
Conclusions: Findings from the current study speak to the importance of identifying non-neurological factors that can influence neuropsychological performance and/or self-report of ADHD symptoms to help improve the accuracy of interpreting diagnostic assessments for ADHD.
Correspondence: *Christina Wei, PhD, Psychology Department, Ohio University, 1301 Kirkmichael Cir, Riverside, CA 92507. E-mail: christina.wei1@gmail.com*

A. ALLART, B. FREER & L. TIERSKY. Cognition and Well-Being: The Relationship Between Executive Function and Quality of Life in Adults With Cognitive Complaints.
Objective: Cognitive deficits can impact subjective quality of life (QOL). Few studies have examined the relationships between impairment in executive functions (EF) and perceived QOL (e.g., Tyson et al., 2008). This study examined the relationship between planning, inhibition, attention, and QOL in individuals who complain of cognitive difficulties.
Participants and Methods: 165 adults who requested evaluation for adult Attention Deficit Hyperactivity Disorder or earning disabilities participated in the study. Planning and inhibition abilities were assessed using the Delis-Kaplan Executive Function System (DKEFS) Tower test and Color-Word Interference Test, respectively. Aspects of attention were assessed using the Paced Auditory Serial Addition Test (PASAT), and reported quality of life was assessed using the Short Form-36 (SF-36).
Results: There was a significant positive correlation between PASAT score and Color-Word Interference Inhibition score with overall QOL (r=.21, p=.005; r=.15, p=.03, respectively), and a trend toward a positive correlation between the Tower score and overall QOL (r=.13, p=.06) indicating that participants who had more deficits in EF had lower scores on the SF-36. Due to limitations of power, separate simple regressions were performed for each of the EF measures. The PASAT provided a unique contribution over demographic variables, accounting for 3.5% of the variance in QOL (p=.015). A multiple regression including all three EF measures indicated a trend towards a relation between QOL and EF, accounting for 5% of the variance in QOL (p=.1).
Conclusions: The results suggest that impairment in EF in adults who complain of cognitive difficulties is associated with lower QOL. Findings indicate that deficits in EF, especially in the domain of attention, may have a significant impact on QOL appraisal in this population.
Correspondence: *Anouk Allart, B.A, Psychology, Fairleigh Dickinson University, 2731 Broadway, Apt 6A, New York, NY 10025. E-mail: anouk.allart@gmail.com*

K.J. GAVIN & K. LOW. Perceptual Asymmetries and Lateralization in Adults with Attention Deficit Hyperactivity Disorder.
Objective: Studies have found support for the theory that ADHD is the result of right hemisphere dysfunction and individuals with ADHD often resemble patients with right hemisphere lesions who show signs of left hemi-spatial neglect. Several studies have attempted to identify differences in lateralization between the ADHD subtypes, although the results have been conflicting. The current study aims to clarify these

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms.
https://doi.org/10.1017/S1355617714000381

conflicting results by controlling for a number of relevant factors including age, gender, and ADHD sub-type.
Participants and Methods: Participants were 90 individuals (80 female) between the ages of 18 and 29. In part 1 of the study, participants completed a screening task comprised of the Edinburgh Handedness Inventory, the Wender Utah Rating Scale, the Adult ADHD Self-Report Symptom Checklist, the Conners Adult ADHD Rating Scale, and a set of questions on demographic information and exclusionary criteria.In part 2, participants found to be eligible completed a line bisection task, letter and shape cancellation task, and a lateralization drawing task.
Results: Results of a line bisection task were not significant, however the overall trends were consistent with those found in previous research. Controls displayed evidence of a slight leftward perceptual bias known as pseudo-neglect. A stronger leftward bias was observed in the ADHD-I group and a contrasting rightward bias was observed in the ADHD-C/H groups. On a cancellation task, the participants with ADHD-C/H made more left- than right-sided omissions, indicative of the expected rightward bias. Additionally, as expected this group also made more left-sided omissions than the ADHD-I group. Results of the lateralization drawing task indicated that both ADHD groups showed a tendency to draw objects more toward the right side than controls.
Conclusions: The results of the study were consistent with predictions and show clear differences between ADHD subtype presentations. Additionally, the lateralization drawing task shows promise as a possible diagnostic tool.
Correspondence: *Kristen J. Gavin, Bates College, 2 Andrews Road, Lewiston, ME 04240. E-mail: kira.gavin81@gmail.com*

J. STELMOKAS, L. CHRISTIANSEN, S. CARTER, S. MOWRER & B. DUPLE. Evaluation of Meta-Cognitive Group Therapy for Adults with ADHD.
Objective: In recent years, research has shown that psychosocial interventions can significantly benefit adults with Attention-Deficit/Hyperactivity Disorder (ADHD). Specifically, Solanto (2011) developed a group meta-cognitive therapy (MCT) that effectively targets the broad behavioral and emotional sequelae commonly associated with ADHD in adulthood. Although we are increasingly learning more about successful nonpharmacological group treatments for adults with ADHD, research addressing the effectiveness of these group interventions in the community has received limited attention.
Participants and Methods: The current study examined changes in participants' scores on the Adult ADHD Quality of Life Questionnaire (AAQoL) and the Barkley Adult ADHD Rating Scale (BAARS-IV) following a manualized group MCT. A total of 50 individuals completed the 12-week group treatment, with a mean (SD) age of 47.28 (10.43). Participants were predominately female (70%), White/Non-Hispanic (86%), employed full-time (44%), married (52%), and completed at least some college education (82%). Additionally, most individuals were taking stimulant medication (84%) and had a history of individual therapy for ADHD symptoms (56%).
Results: Results indicated statistically significant improvement across all subscales for the ADHD quality of life and symptom self-report measures after treatment. Recovery or improvement was found for 40% of total current symptoms of ADHD and 72% of overall quality of life.
Conclusions: These promising results suggest that MCT can significantly improve symptoms of ADHD and quality of life within a community setting. Future directions, including the impact of moderating variables on treatment outcome, will be explored.
Correspondence: *Julija Stelmokas, M.S., Pacific University, 1027 Barton Drive, Apt 101, Ann Arbor, IL 48105. E-mail: Jewels864@gmail.com*

H. SESMA, A.S. HODEL, S.E. VAN DEN HEUVEL, A. SESMA, K.L. WIIK & K.M. THOMAS. Attention in Adolescents Born Moderately Preterm.
Objective: Adolescents born moderately preterm are a large but understudied group within the preterm population. This study's purpose was to determine whether individuals born moderately preterm showed decreased attention in adolescence and whether performance on attention tasks was related to parent report of attention problems.
Participants and Methods: Participants were 23 adolescents born preterm (15 boys) and 29 full term controls (13 boys), tested at age 12-13 years. Adolescents in the preterm group were born at 30-34 weeks gestation with no major neonatal complications. Participants completed the WASI, WISC-IV Digit Span, and CANTAB Spatial Span. Their parents completed the Conners-3.
Results: The preterm group did not differ from the control group on IQ or on specific tasks of attention, though the preterm group had a marginally shorter spatial span on the CANTAB than the control group ($t=-1.8^{\dagger}$). The groups did not differ significantly on parent report of inattentive or hyperactive/impulsive symptoms on the Conners-3, but we observed a trend toward more concerns with inattention in the preterm group ($t=1.9^{\dagger}$). Parent concerns with inattention were in the clinical range for 3 of 23 preterm adolescents (13%) and 0 of 27 full term adolescents. Significant negative correlations were observed between child performance and parent report of attention concerns for the preterm group but not the full term group on both Digit Span (r=-.51*) and Spatial Span (r=-.47*).
Conclusions: Adolescents born moderately preterm without other medical complications demonstrated average ability on measures of attention. Though not statistically significant, the preterm group displayed a marginally shorter attention span for visual information, and their parents reported more concerns with attention problems. The stronger association between parent ratings and performance in the preterm group may reflect increased parent sensitivity to potential attention problems due to their child's preterm status.
Correspondence: *Heather Sesma, PhD, University of Minnesota, 420 Delaware St. SE, MMC 486, Minneapolis, MN 55455. E-mail: hwsesma@umn.edu*

E. AUNE & J. NELSON. The Validity of Self- versus Informant-reports of ADHD Symptoms in College Students: Cognitive and Academic Achievement Outcomes.
Objective: This study investigated the relationship between self- and informant-reports of childhood/current ADHD symptoms and neurocognitive and academic achievement performance.
Participants and Methods: This study is based on data obtained from students at-risk for learning and/or attention disorders that sought a comprehensive psychological evaluation at the University of Georgia Regents' Center for Learning Disorders. The sample (N=207) was comprised of three groups: (1) ADHD; (2) LD; and, (3) ADHD+LD. Participants were classified into three groups based on the results of the evaluation process and clinical diagnoses. Assessments utilized in this study included criterion- and norm-referenced ADHD measures, academic achievement, IQ, verbal memory, working memory, and processing speed tests.
Results: Pearson product-moment and intra-class correlational methods were conducted for all groups and measures. Follow-up multivariate analyses were also performed. Correlation analyses revealed moderate to large within-scale concordance estimates between self- and parent-ratings of childhood/current ADHD symptoms. Weak to moderate correlations were found for self-and parent-ratings across ADHD scales. Behavior ratings had an insignificant correlation with neurocognitive measures and weak to moderate correlation with academic achievement tests. Significant group differences were found on academic achievement tests. Demographic variables moderated the relationship between group affiliation and outcome measures.
Conclusions: Findings suggest that the relationship between self- and parent-ratings is strongest within-scales regardless of time (childhood, current) or informant (self, parent). Overall, neuropsychologists should assign more diagnostic weight to academic achievement results than neurocognitive results when assessing college students for learning and/or attention disorders.

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

Correspondence: *Eric Aune, School Psychology, Ed.S., NCSP, University of Montana, 314 Rowe Drive, Bloomington, IL 61701. E-mail: eric.aune@umconnect.umt.edu*

G.L. IVERSON, J.E. ATKINS, R. ZAFONTE & P.D. BERKNER. Examining Preseason ImPACT® Scores in Adolescent Girls with Attention-Deficit Hyperactivity Disorder.

Objective: Baseline neurocognitive testing is used in amateur sports as a component of a comprehensive concussion management program. Baseline testing might be more important for athletes who have a developmental condition, such as attention-deficit hyperactivity disorder (ADHD). The purpose of this study was to determine whether adolescent girls with ADHD perform more poorly on ImPACT® than girls who do not have ADHD.

Participants and Methods: The initial sample consisted of 2,618 girls between the ages of 13 and 18, who (a) spoke English as their primary language, (b) denied a history of neurological problems (i.e., epilepsy, meningitis, and brain tumors), and (c) obtained valid ImPACT® test scores during preseason testing in 2010. Of this sample, 100 (3.8%) girls self-reported a diagnosis of ADHD. A sample of 100 control subjects was precisely matched on age, sport, and number of self-reported past concussions.

Results: The two groups were compared on the four primary composite scores using mulivariate analysis of variance (MANOVA) followed by univariate ANOVAs. There was a significant multivariate effect [Wilks' Lambda=.91; F(4, 195)=5.1, p<.001, partial eta squared=.095]. The univariate ANOVA results revealed significantly worse neuropsychological test scores for girls with ADHD on the Visual Memory (p<.031; Cohen's d=.31) and Processing Speed (p<.001, d=.57) composites. The groups did not differ on the Verbal Memory or Reaction Time composites. Mann Whitney U tests were used for the Impulse Control composite and the Post-Concussion scale due to non-normal distributions and heterogeneity of the variances. The girls with ADHD had worse scores on the Impulse Control composite (p<.033, d=.44) and they endorsed more symptoms (p<.001, d=.44) than the girls who did not have ADHD.

Conclusions: Girls with ADHD performed more poorly on computerized cognitive testing with ImPACT®, and they reported more subjective symptoms, than girls who do not have ADHD.

Correspondence: *Grant L. Iverson, Ph.D., Physical Medicine and Rehabilitation, Harvard Medical School, 79/96 Thirteenth Street, Charlestown Navy Yard, Charlestown, MA 02129. E-mail: giverson@partners.org*

N.K. SANDEL, P. SCHATZ, M.R. LOVELL & G.S. SOLOMON. The use of psychostimulants among adolescent athletes with reported ADHD impacts computerized neurocognitive baseline test performance.

Objective: Athletes with ADHD demonstrate a lowered performance on computerized neurocognitive testing relative to controls. Limited research has examined whether the use of stimulant medication for ADHD impacts athletes' neurocognitive test performance. This study retrospectively compared the neurocognitive performance of stimulant-medicated and non-medicated athletes aged 13 to 18 (M=15.33; SD=1.39) who reported a history of ADHD at baseline.

Participants and Methods: Stimulant athletes (N=334; 78 females, 256 males) reported the use of psychostimulants and no other psychotropic medications at baseline. Control athletes (N=566; 89 females, 477 males) reported a history of ADHD, but no use of any psychotropic medication at the time of testing. Neurocognitive performance was measured using ImPACT (Immediate Post-Concussion Assessment and Cognitive Testing) a brief computerized test battery yielding four composite scores: Verbal Memory [VerbMem], Visual Memory [VisMem], Visual Motor Speed [VisMotSpd], and Reaction Time [RT] derived from six neurocognitive modules. Multivariate (MANOVA) and univariate (ANOVA) analyses of variance were conducted to evaluate differences between stimulant and control athletes on ImPACT.

Results: On average, stimulant athletes demonstrated an improved performance relative to controls on all ImPACT composite scores: VerbMem: Stim = 85.20(9.44); Control = 82.38(10.07), VisMem: Stim = 73.02(13.19); Control = 71.13(13.34), VisMotSpd: Stim = 37.50(6.96); Control = 34.99(6.67), and RT: Stim = 0.60 (0.08); Control = 0.61(0.08). MANOVA and subsequent ANOVAs revealed significant results with the stimulant group outperforming controls overall (F(4,895) =9.044, p<.000) and on all ImPACT composite scores: VerbMem (F(1,898) =17.212, p< .000), VisMem (F(1,898) =4.234, p=.040), VisMotSpd (F(1,898) =28.804, p<.000), and RT (F(1,898) =5.962, p=.015).

Conclusions: Adolescent athletes with reported ADHD taking stimulants outperform those not taking stimulants on computerized neurocognitive baseline testing.

Correspondence: *Natalie K. Sandel, BS, Widener University, 757 S. 17th St. Apt. 2F, Philadelphia, PA 19146. E-mail: nksandel@mail.widener.edu*

A.B. ARNETT. Joint Developmental Trajectories of Conduct Problems and ADHD Symptoms in Adolescence.

Objective: Conduct problems (CP) and symptoms of Attention Deficit/Hyperactivity Disorder (ADHD) are impairing, salient, and developmentally complex childhood behaviors. Outcomes are more severe when both ADHD and CP are present; thus, understanding the etiology of the joint developmental trajectories of these symptom clusters is crucial to the development of more effective, personalized intervention programs. Hierarchical linear modeling (HLM) was used to examine the shape of change in ADHD and CP over time, the time-lagged influences of one symptom cluster on the other, and the predictors of individual differences in the trajectories of these symptoms over time. We hypothesized that the time-lagged effects of ADHD on CP variability would be stronger than those in the opposite direction.

Participants and Methods: Parents of 313 3rd, 6th and 9th graders completed the Strengths and Difficulties Questionnaire (SDQ) at 3 month intervals across an 18 month period.

Results: On average, CP symptoms decreased across adolescence, while ADHD symptoms remained stable. Males had higher average levels of ADHD and CP symptoms. Being of non-Caucasian ethnicity related to higher average CP levels (B=.37, p<.05), but not to ADHD severity. Between subject differences in average ADHD symptoms accounted for 21% of the variance in CP symptoms; average CP symptoms accounted for 22% of the variance in ADHD. Time-lagged ADHD and CP variability at the within-person level had a small negative association with the opposite construct at the subsequent time point, suggesting some regression to the mean. The final models accounted for 25% of the residual variance in CP, and 14% of the residual variance in ADHD symptoms.

Conclusions: CP and ADHD symptom levels are strongly associated and relate to common between-person differences, such as gender. The effects of individual time-lagged fluctuation in ADHD on CP and vice versa were comparable. Overall, the models explained individual variance in CP symptoms better than they did ADHD symptoms.

Correspondence: *Anne B. Arnett, MA, University of Denver, 7550 42nd Ave. NE, Seattle, WA 98115. E-mail: arnett.anne@gmail.com*

H. FERNANDO, M. VASSERMAN, P. VEKARIA & W. MACALLISTER. Learning Characteristics in Children with Attention Deficit/Hyperactivity Disorder, with and without Comorbid Disorders.

Objective: The present study examines learning characteristics and aspects of attention in a mixed clinical sample.

Participants and Methods: Participants were 64 outpatient children and adolescents (73% male; 66% Caucasian, age 6 to 16 [X=11.27,SD=2.75]). All received the California Verbal Learning Test-Children's Version (CVLT-C), the Conners' Continuous Performance Test (CPT), and a Wechsler scale of intelligence. Diagnoses included: ADHD only, ADHD plus Learning/Language Disorders, or

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

Learning/Language Disorder only. CVLT performances were analyzed to determine the presence of atypical learning curves and learning characteristics differences in ADHD-only versus ADHD with comorbidities. Performances on attention variables were compared between the ADHD only and ADHD+ groups assessing relations between attention and verbal learning.

Results: Overall verbal learning was poorer in ADHD [t(48)=-3.00,p<.01] than control performances in prior samples (i.e., Cutting et al., [1993]). Working memory was poorer in ADHD+ than in the ADHD only group [t(45)=3.02,p<.01], and reaction time was faster in the ADHD only group [t(44)=-2.27,p<.05). The mixed clinical sample used more semantic clustering [t(47)=-2.29,p<.05]. CPT omissions errors were negatively correlated with CVLT Trial 3 (r=-.38,p<.01), Trial 5 (r=-.42,p<.01) and List B (r=-.31,p<.05) after controlling for IQ, while Reaction Time was inversely related to Trial 3 (r=-.35,p<.01), Trial 4 (r=-.39,p<.01), Trial 5 (r=-.40,p<.01) and List B (r=-.37,p<.01). Digit Span performance was unrelated to all CVLT variables. Learning curves did not differ between groups.

Conclusions: The previously identified 'jagged learning' curve was not observed. While aspects of sustained attention correlated with verbal memory performances, verbal working memory did not. Working memory and CPT performances differ between children with ADHD only and those with comorbidities. Overall verbal learning in the current mixed ADHD sample was similar to the pure ADHD sample in the Cutting et al. (1993) study.

Correspondence: *Heshan Fernando, M.A., Child Study Center, NYU Langone Medical Center, One Park Avenue, 7th Floor, New York, NY 10016. E-mail: Heshan.Fernando@gmail.com*

V.M. PETRAUSKAS, J.E. CASEY & J. LONG. The Relationship Between Handwriting in Children with ADHD and Symptoms of Hyperactivity and Impulsivity.

Objective: Children with ADHD often display fine motor difficulties, including difficulties with handwriting. Previous studies have found a relationship between inattention and handwriting fluency. The purpose of the present study was to describe the relationship between symptoms of ADHD and handwriting using digitizing technology and kinematic analysis of children's manuscript and cursive writing.

Participants and Methods: 38 children with ADHD and 28 control children, in grades 4 through 8, completed the Test of Handwriting Skills –Revised (THS-R) manuscript and cursive versions on a digitizing tablet. Parents completed the parent form of the Conners-3. Results on the THS-R were correlated with results on the Conners-3 Inattentive and Hyperactive scales and the DSM-IV-TR inattentive and hyperactive/impulsive scales.

Results: Children with ADHD demonstrated poorer quality handwriting overall on both the manuscript and cursive versions of the THS-R. Greater hyperactivity was associated with greater normalized jerk for manuscript writing (Conners 3 Hyperactive Spearman rho = 0.37; DSM-IV-TR hyperactive/impulsive Spearman rho =0.34). There were no other significant correlations between manuscript writing and other kinematic variables. There were no significant correlations between inattention and any kinematic measures of cursive handwriting.

Conclusions: Children with ADHD demonstrated poorer overall quality of handwriting. Better overall quality of cursive writing was associated with slower and less variable writing speed in children with ADHD. Symptoms of hyperactivity, and not inattention, were associated with less fluent manuscript writing in children with ADHD. In contrast to previous studies, we found a relationship between hyperactivity/impulsivity symptoms, instead of inattention, and handwriting fluency.

Correspondence: *Vilija M. Petrauskas, Psychology, Univ Windsor, 401 Sunset Ave, Windsor, ON N9B 3P4, Canada. E-mail: petraus@uwindsor.ca*

P. GONZÁLEZ-PÉREZ, S. HERNÁNDEZ EXPOSITO, A. DOMINGUEZ & G. RAMÍREZ. Executive Functions Affect Reading Comprehension on ADHD Children.

Objective: ADHD children are diagnosed in relation to some degree of inattentiveness, impulsivity and hyperactivity (DSM-IV-TR, 2002), and show executive deficit that could be influencing the academic performance, specifically the different levels of reading processes. Our main objective was to study whether the performance in executive functions (EF) affect reading comprehension on ADHD children.

Participants and Methods: A Neuropsychological Battery of EF was administered to three groups of participants between 8 and 13 years old. Twenty-seven ADHD children were classified as poor reading comprehenders (reading comprehension test Pc<35), twenty-five ADHD children as normal comprehenders (Pc>50), and a healthy group with twenty-seven children (Pc>50). We evaluated: working memory, planning, verbal fluency, sustained attention, processing speed, cognitive flexibility and inhibition.

Results: We obtained two discriminant functions (Lambda=.262; $\chi 2$=75.082; p=.001) and (Lambda=.622; $\chi 2$=26.610; p=.022). Cognitive functions that best differentiated between pathologicals and healthy groups were working memory (.661), and attention showing the group of healthy subjects, better performance. Perseverative errors of the Wisconsin Card Sorting Test (.446), a measure of cognitive flexibility, discriminated between pathological groups.

Conclusions: Our results show partially that Executive Functions deficit could affect reading comprehension at least population with ADHD.

Correspondence: *Pedro González-Pérez, Bachellor, Psychobiology, University of La Laguna, Faculty of Psychology, Campus de Guajara, La Laguna 38205, Spain. E-mail: pedagon@ull.es*

K.S. TALBOT & K.A. KERNS. Event and Time Triggered Remembering: The Impact of ADHD on Prospective Memory Performance in Children.

Objective: While studies have shown that children with ADHD have more difficulty on time-based (TB) prospective memory (PM) little is known about their event based (EB) PM. Some have suggested that time estimation (TE) may explain differences in TBPM, but none have addressed this empirically. Therefore, we investigated the impact of ADHD on both TB and EB PM and the relationship of TE to these abilities. We also investigated the utility of a self-report measure of PM difficulties modified for parent report to determine parental sensitivity to their child's PM difficulties.

Participants and Methods: Thirty-six children diagnosed with ADHD and 33 aged-matched controls (age range=8-13-years old) were administered three computerized tasks including an EB PM task, TB PM task, and a TE task. Parents also completed a revised Prospective Retrospective Memory Questionnaire (PRMQC).

Results: Children with ADHD scored more poorly than age-matched controls on EBPM ($F(1,66) = 4.01$, $p < .05$), TBPM ($F(1,67) = 4.42$, $p<.05$), and TE ([$F(1,61) = 4.67$, $p < .05$). Interestingly, in contrast to predictions, TE was not reliably related to performance on TBPM. Also, across both groups, performance on the TBPM and EBPM tasks were not related. Parent's perceptions of their children's PM (PRMQC) was related to performance on both TBPM ($r = .318$, $p < .01$)and EBPM ($r =- .309$, $p < .01$).

Conclusions: Children with ADHD presented with deficits in both TB and EB PM and these impairments were not accounted for by their TE abilities. Additionally, parent reports of PM deficits were related to performance on laboratory based PM tasks. Future research should be aimed at examining other potential cognitive factors as predictors of the observed PM deficits in children with ADHD.

Correspondence: *Karley S. Talbot, B.Sc. Honours in Psychology, Clinical Psychology, UVic, 3800 Finnerty Road, Victoria, BC V8N1M5, Canada. E-mail: kdtalbot@uvic.ca*

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

A. BELLOWS, T. KORIAKIN, A. WOODWARD, L. THOMPSON, E. PADDEN & A. PRITCHARD. Effectiveness of Academic Testing Accommodations for Children with ADHD.

Objective: Testing accommodations frequently recommended for children with attention deficit hyperactivity disorder (ADHD) include extended time, a reduced distraction environment, use of a calculator, more frequent breaks, oral presentation of written information, and the ability to respond directly on the test booklet. Although a large number of students with ADHD receive accommodations (Schnoes et al., 2006), there is little empirical evidence supporting their effectiveness within this diagnostic group. The present study investigates the effectiveness of these 6 commonly administered accommodations on reading and math performance in children with ADHD.

Participants and Methods: 64 parents of youth with an ADHD diagnosis in grades 3-8 completed the ADHD Rating Scale IV. Their children's educational records were reviewed and the following data points extracted: individually-administered cognitive and academic testing scores (e.g., WISC-IV, WJ-III, WIAT-II), testing accommodations received (according to an IEP or 504 Plan), and Maryland School Assessment (MSA) scores. The MSA is an annual test of reading and math achievement taken by students in Maryland public schools.

Results: Among youth with ADHD, extended time was the most commonly administered accommodation but receipt of this accommodation did not improve student MSA scores (β=16.16, p=.239; β=6.05, p=.642 for reading and math, respectively), even when scores on a performance-based measure of processing speed (WISC-IV Processing Speed Index) were taken into account. When controlling for academic achievement scores (WJ-III/WIAT-II), only the ability to respond directly on the test booklet was associated with improved MSA scores (β=66.33, p=.024; β=60.54, p=.049 for MSA reading and math, respectively).

Conclusions: Of the 6 commonly administered accommodations assessed, only the ability to respond directly on the test booklet was significantly associated with better scores on standardized reading and math testing for elementary and middle school students with ADHD.

Correspondence: *Alison Bellows, Neuropsychology, Kennedy Krieger Institute, 1750 E. Fairmount Ave, Baltimore, MD 21231. E-mail: bellowsa@kennedykrieger.org*

C.D. HINKLE & S.J. HUNTER. Comparison of Neuropsychological Profiles of Children with Attention-Deficit/Hyperactivity Disorder (ADHD), Reading Disorder (RD), and Comorbid ADHD and RD.

Objective: ADHD and RD are two of the most commonly diagnosed disorders of childhood. These disorders also co-occur in a sizeable percentage of children. Given their high rate of comorbidity, there has been increased interest in better understanding not only the extent to which ADHD and RD co-occur, but why they do. The current study seeks to investigate patterns of executive functioning, memory and learning, and reading achievement in older children and adolescents with ADHD, RD, and comorbid ADHD and RD. Additional research is needed in this area to continue to parse the specific neurocognitive patterns that represent these disorders, which will ultimately provide guidance for how to more appropriately accommodate their respective deficits.

Participants and Methods: This is the completed project from which preliminary data were presented last year. One hundred forty-nine youth were administered a battery of neuropsychological assessments (WISC-IV, WJ-III-NU, CVLT-C, RCFT). Participants were between 11 and 16 years old. Given that prevalence rates for both ADHD and RD are skewed towards males at approximately a 4:1 ratio, enough data were collected to ensure that males constituted approximately 75% of the sample in each diagnostic category.

Results: MANCOVA were conducted to examine differences between the ADHD, RD, and comorbid ADHD and RD groups on each of the measures of executive functioning, memory and learning, and reading achievement, controlling for GAI. ANCOVA were then conducted as a follow-up measure to test for group differences on individual executive functioning, memory and learning, and achievement components.

Conclusions: Results indicate divergent patterns of neuropsychological functioning across these diagnostic groups in the areas assessed. Specific neuropsychological profiles for each diagnostic group across each of these domains, as well as the clinical and research implications of this study, will be discussed.

Correspondence: *Clayton D. Hinkle, Ph.D., Neurology, Medical College of Wisconsin, 710 S. 3rd St. #209, Milwaukee, WI 53204. E-mail: claytonhinkle@gmail.com*

S.M. DYER, S.E. LEE, S.A. VADNAIS, J.M. CONSTANCE, A.C. JAGGER, G.A. CASHER & M.Y. KIBBY. Parent-rated Hyperactivity Predicts Reduced Superior Frontal Cortex Volume in a Mixed Sample of Children.

Objective: Research has demonstrated reduced gray and white matter cortical volumes in children with ADHD; however, recent studies suggest that specific frontal structures may account for these overall differences in volume. Nonetheless, these studies vary as to which specific structure(s) are implicated in ADHD. Thus, our study examined the relationship between superior frontal cortex (SFC) and orbital frontal cortex (OFC) volumes and childhood hyperactivity levels, as rated by their parents.

Participants and Methods: As part of larger NIH/NICHD funded projects (R03 HD048752, R15 HD065627), parents of 133 children (ages 8 to 12 years) with ADHD, reading disabilities, both disorders, and controls completed the Behavior Assessment System for Children (BASC) and structural MRI scans. Using the Analyze 11.0 Region of Interest module, the SFC and OFC were manually traced in the coronal plane. Both inter-rater and intra-rater reliability (rs>.90) of measurement were attained first.

Results: Controlling for age, total brain volume, gender, and handedness, hierarchical linear regressions were performed, predicting right SFC, left SFC, right OFC, and left OFC volume from the BASC parent-rated hyperactivity scale. Parent-rated hyperactivity did not predict right or left OFC volume, ps>.90 after controlling for the variables in block 1. Parent-rated hyperactivity did predict both right SFC, Beta = -.158, t(133) = -1.986, p = .049, and left SFC, Beta = -.210, t(133) = -2.657, p = .009.

Conclusions: After controlling for total brain volume, higher levels of parent-rated hyperactivity were associated with reduced SFC volume but not OFC volume. Although both the SFC and OFC have been associated with ADHD in general, this study indicates that symptoms of hyperactivity are related to SFC volume, whereas OFC volume may be associated with other deficits in ADHD based on the literature. In total these findings contribute to the growing body of evidence suggesting SFC's involvement in ADHD.

Correspondence: *Sarah M. Dyer, M.S., Psychology, SIU Carbondale, 1125 Lincoln Drive, Mail Code 6502, Carbondale, IL 62901. E-mail: sarahdyer@siu.edu*

T.N. ANTONINI, S.P. BECKER, M.E. NARAD, K.M. KINGERY, J.N. EPSTEIN & L. TAMM. Hot and Cool Executive Functions in Children with ADHD and Comorbid Disruptive Behavior Disorders.

Objective: Executive function (EF) deficits are heterogeneous among children with ADHD. The presence of comorbid psychopathology may moderate EF profiles in these children. We examined the association between EFs and comorbid disruptive behavior disorders (DBDs; oppositional defiant disorder or conduct disorder) in children with ADHD. We hypothesized that all participants with ADHD would perform more poorly on cool EF tasks than controls, and that only those with comorbid DBDs would perform more poorly on hot EF tasks.

Participants and Methods: One-hundred, thirty-one children (7-12 years old) participated: 67 with ADHD, 34 with ADHD+DBD, and 30 controls. Cool EF scores included correct trials on a spatial span task (SST) and correct responses and perseverative errors on a card sorting test (CST). Hot EF scores included the discounting gradient (k) from

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

a delay discounting task (DDT) and net scores [advantageous- disadvantageous choices] on a gambling task (GT).
Results: Two MANCOVAs including age as a covariate were used to examine group differences in EFs. EF scores (hot or cool) served as dependent variables. Group served as the independent variable. There was no significant Group effect for hot EF scores. The cool EF Group effect was significant, indicating that cool EF scores differed by group. Post-hoc testing showed significant Group effects for SST correct trials and CST correct responses. In both cases, the ADHD and ADHD+DBD groups had lower scores than controls, but did not differ from each other.
Conclusions: Consistent with prior research, ADHD was associated with cool EF deficits. In contrast with other studies, however, DBDs were not associated with a decrement in hot EFs. Perhaps our sample was too young to understand the hot EF tasks or deficits in this aspect of cognition emerge later in development. Alternatively, our task stimuli may not have had the motivational salience needed to capture deficits in hot EFs.
Correspondence: *Tanya N. Antonini, Texas Children's Hospital, 4055 South Braeswood Blvd., Apt 212, Houston, TX 77025. E-mail: tanya.antonini@gmail.com*

A. WEIGARD & C.L. HUANG-POLLOCK. Lower cognitive processing efficiency and slowed motor preparation do not impair implicit motor sequence learning in ADHD.
Objective: The current study applies a mathematical model of choice response time, the linear ballistic accumulator (LBA: Brown & Heathcote, 2008), to data from a serial reaction time (SRT) task (Nissen & Bullemer, 1987) to investigate the roles of motor preparation and cognitive processing efficiency in school-aged children with and without ADHD's ability to implicitly learn sequences.
Participants and Methods: 75 children with ADHD and 68 same-age controls completed the SRT, in which they indicated which of 4 boxes on a computer screen contained a stimulus by pressing a corresponding button. The task contained 4 training blocks in which an 8-step sequence of stimulus locations was repeated followed by a transfer block containing an alternate sequence. The LBA was fit to response time data, allowing parameters that index cognitive efficiency (drift rate) and motor preparation (Ter) to vary between participant and block.
Results: Children with ADHD displayed less efficient cognitive processing (slower drift rates), $F(1,141)=4.26,\eta2=.03,p=.04$, and slower Ter, $F(1,141)=9.17,\eta2=.06,p=.003$. Ter improved with practice, $F(3,423)=14.44,\eta2=.09,p<.001$, and slowed on the transfer block, $F(1,141)=18.60,\eta2=.12,p<.001$. Drift rate slowed with practice, $F(3,423)=3.63,\eta2=.03,p=.013$, and improved on the transfer block, $F(1,141)=8.49,\eta2=.06,p=.004$. No main effects differed by group (all $p>.20$).
Conclusions: Reduction in motor preparation appears to be responsible for sequence learning benefits in children with and without ADHD. Cognitive efficiency decreased with training but improved during transfer presumably because the development of implicit motor sequences disrupts conscious decision processes. Although children with ADHD displayed lower processing efficiency and slowed motor preparation, neither deficit impeded learning on the task. The results have implications for theories of learning on the SRT task and support dual lines of research suggesting that children with ADHD have slowed motor preparation but unimpaired motor learning.
Correspondence: *Alexander Weigard, BA, Psychology, The Pennsylvania State University, 1507 University Drive, State College, PA 16801. E-mail: asw5097@psu.edu*

L. LANGEVIN, F. MACMASTER, S.G. CRAWFORD, C. LEBEL & D. DEWEY. White Matter Structural Alterations in Developmental Coordination Disorder and Attention-Deficit/Hyperactivity Disorder.
Objective: Developmental Coordination Disorder (DCD) and Attention-Deficit/hyperactivity Disorder (ADHD) often co-occur in children, and are associated with white matter alterations. However, comorbid motor and attention problems are frequently understudied in investigations of white matter changes. We have examined DCD and ADHD together with the aim of identifying white matter etiology for this comorbidity..
Participants and Methods: In children (n=85) with DCD and/or ADHD, we examined three white matter tracts involved in motor and attention processes. Using diffusion tensor imaging (DTI), the corpus callosum, superior longitudinal fasciculus (SLF), and cingulum were analyzed for measures of fractional anisotropy (FA), and mean (MD), radial (RD) and axial diffusivity (AD).
Results: We identified distinct and functionally relevant white matter changes in children with DCD and/or ADHD. Participants with DCD and DCD+ADHD demonstrated FA reductions in regions of the corpus callosum immediately underlying the superior parietal cortex; connecting bilateral components of the primary and supplementary motor cortices. Participants with ADHD and DCD+ADHD displayed FA reductions in the frontal region of the corpus callosum, consistent with previous research. Alterations in the parietal regions of the corpus callosum were correlated with motor performance, whereas alterations in the frontal regions were correlated with attentional performance. Additionally, reductions in the FA of the left SLF were associated with motor output in children with DCD.
Conclusions: Our findings are the first to suggest that callosal alterations comprise a common basis for both motor and attention disorders in children, with associated functional consequences. These findings provide a new avenue for objective diagnosis of ADHD and DCD.
Correspondence: *Deborah Dewey, PhD, Pediatrics and Community Health Sciences, University of Calgary, Alberta Children's Hospital, 2888 Shaganappi Trail NW, Calgary, AB T3B 6A8, Canada. E-mail: deborah.dewey@albertahealthservices.ca*

D. DEWEY, L. LANGEVIN, S.G. CRAWFORD, K.M. BARLOW, J. LEMAY & F.P. BERNIER. Comorbidity is Associated with Impaired Neuropsychological Functioning in Children with Developmental Coordination Disorder, Attention-Deficit/Hyperactivity Disorder and Reading Disorder.
Objective: Comorbidity is the rule for virtually all neurodevelopmental disorders. The primary objective of this study was to examined the influence of comorbidity on neuropsychological functioning in children with developmental coordination disorder (DCD), attention deficit/hyperactivity disorder (ADHD) and reading disorder (RD).
Participants and Methods: 402 children, 6-16 years of age were recruited through family physicians, pediatricians, schools and community organizations. They were assessed on standardized psychometric measures and classified as DCD, ADHD, RD, a comorbid condition or typically developing (TD). The main outcomes were neuropsychological functioning on the NEPSY-II..
Results: MANOVAs were used to investigate group differences. To control for multiple comparisons significance was set at $p<.01$. On measures of attention and executive function, children with DCD+ADHD+RD performed significantly poorer than TD children and children with only DCD or ADHD, Children with RD and comorbid disorders performed significantly poorer than TD children and children with only DCD or ADHD on a measure of phonological processing. On a test of visual memory, children with DCD and comorbid disorders displayed poorer performance than TD children, whereas on a test of verbal memory the DCD+ADHD+RD group performed significantly poorer than the TD, DCD and ADHD groups.. Children with DCD+ADHD and DCD+ADHD+RD scored significantly lower than TD children and children with ADHD only on a measure of visual motor skills. On a measure of visual

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms.
https://doi.org/10.1017/S1355617714000381

perception, children in the DCD, DCD+ADHD and DCD+ADHD+RD groups performed significantly worse than TD children,.
Conclusions: Compared to TD children and children with only DCD and ADHD, children with comorbid disorders were more likely to display impairments across a broader range of neuropsychological functions. To direct more efficacious treatment, children diagnosed with DCD, ADHD and RD need to be investigated for comorbid disorders.
Correspondence: *Deborah Dewey, PhD, Pediatrics and Community Health Sciences, University of Calgary, Alberta Children's Hospital, 2888 Shaganappi Trail NW, Calgary, AB T3B 6A8, Canada. E-mail: deborah.dewey@albertahealthservices.ca*

K.R. MCLEOD, L. LANGEVIN, B.G. GOODYEAR & D. DEWEY. Functional Connectivity of Neural Motor Networks is Disrupted in Children with Developmental Coordination Disorder and Attention-Deficit/Hyperactivity Disorder.
Objective: Developmental Coordination Disorder (DCD) and Attention Deficit/Hyperactivity Disorder (ADHD) are prevalent childhood disorders that frequently co-occur. Evidence from neuroimaging research suggests that disruption of neural motor circuitry could account for their high rate of co-occurrence. The present study used resting-state fMRI to examine functional connectivity in the motor network of children with motor and/or attention problems, with the aim of identifying common neurophysiological substrates underlying DCD and ADHD. In addition, the impact of age on functional connectivity was investigated.
Participants and Methods: Resting-state fMRI scans were performed on seven children with DCD, 21 with ADHD, 18 with DCD+ADHD and 23 typically developing controls. Functional connectivity of the primary motor cortex was compared between each group and controls. The association between functional connectivity of the primary motor cortex and age was also investigated for each group.
Results: Relative to controls, children with DCD and/or ADHD displayed decreased functional connectivity between the primary motor cortex and the bilateral inferior frontal gyri, the right supramarginal gyrus, angular gyri, insular cortices, amygdala, putamen, and pallidum. As age increased, the typically developing controls exhibited increased FC between the primary motor cortex and the bilateral motor and sensorimotor cortices; this was not observed in children with DCD and/or ADHD.
Conclusions: These findings demonstrate that children with DCD and/or ADHD display disruptions in functional connectivity of neural motor circuitry, which could contribute to their problems in motor functioning and attention, and support the existence of a common neurophysiological substrate underlying both motor and attention problems. The absence of increased connectivity with age between the primary motor cortex and brain structures in the motor network in children with DCD and/or ADHD could be a defining feature of these disorders.
Correspondence: *Deborah Dewey, PhD, Pediatrics and Community Health Sciences, University of Calgary, Alberta Children's Hospital, 2888 Shaganappi Trail NW, Calgary, AB T3B 6A8, Canada. E-mail: deborah.dewey@albertahealthservices.ca*

E. BOLINGER, C. COOK & J. SUHR. Relationship of MMPI-2-RF NUC and COG Scales to Malingering in ADHD.
Objective: There is growing awareness of concerns about malingering of ADHD, and growing evidence that such malingering may be detected with measures of noncredible responding. Individuals malingering ADHD may invalidly self-report cognitive symptoms and/or behave in an invalid manner on neuropsychological tests. In the present study, we examined the hypothesis that individuals malingering ADHD (as identified on behavioral measures) would score higher on NUC and COG scales of the MMPI-2-RF, even when accounting for invalid symptom report based on MMPI-2-RF validity scales.
Participants and Methods: Participants were individuals who were referred for neuropsychological evaluation for ADHD/LD concerns and who signed consent for their deidentified clinical data to be used in research. Overall, the sample ranged in age from 18-39. Most individuals were in their second year of university (mean 14 years of education) and 43% were male. Participants were divided into those who failed at least two behavioral indicators of malingering (N=19), and those who failed none (N=32).
Results: Participants were not significantly different in age, education, or gender. Participants did not perform significantly differently on any of the MMPI-2-RF validity scales. The two groups were not different on NUC, p=.38, but the malingerers did score significantly higher on COG, p = .02. Using clinical cutoffs in the MMPI-2-RF manual, there was no difference in percentage who failed any of the validity indicators (p ranges). However, a significantly higher percentage of malingerers scored in the clinical range on NUC, p= .02, and on COG, p=.05 .
Conclusions: Results showed that individuals who fail behavioral malingering tests are likely to endorse high cognitive and neurological symptoms on the MMPI-2-RF, even though they were not detected by standard validity scales. Results reinforce the need to assess for the validity of cognitive complaints in individuals referring themselves for ADHD evaluation.
Correspondence: *Julie Suhr, Ph.D., Psychology, Ohio University, 200 Porter Hall, Department of Psychology, Athens, OH 45701. E-mail: suhr@ohio.edu*

E. BOLINGER, C. COOK & J. SUHR. Further Validation of the CAARS Infrequency Index in ADHD Evaluation.
Objective: A measure of noncredible self-report based on infrequently reported symptoms, the CII, was recently developed for the Conner's Adult Attention Deficit/Hyperactivity Rating Scale (CAARS). The CII was developed based on analysis of items infrequently endorsed by a large sample of university students, including those with diagnosed ADHD and other psychological disorders. Initial psychometric analyses showed that the CII was related to extremely high scores on other CAARS subscales and to noncredible performance (symptom validity and embedded validity measures). The present study provides further validation data for the CII. We hypothesized that the CII should be related to other well-validated infrequency indices on the MMPI-2-RF.
Participants and Methods: Participants were referred for neuropsychological evaluation for ADHD/LD concerns and signed consent for their deidentified clinical data to be used in research. The sample ranged in age from 18-39, with a mean of 14 years of education and 43% were male. Participants for the present analyses had completed the CAARS and the MMPI-2-RF scale as part of a neuropsychological evaluation.
Results: 13 individuals scored clinically high on the CII, based on previously established cutoffs, and were compared to 39 individuals whose scores were not clinically high on the CII. Groups were not different in age, education, or gender. Those who scored clinically high on the CII performed worse on the F-r scale, p<.05, the Fs scale, p<.001, and the RBS scale, p<.005, but were not different on Fp-r, FBS-r, or the Henry-Heilbronner Index. Thus, high scores on the CII were strongly related to noncredible symptom report, both general (F-r effect size = .59), somatic (Fs effect size = 1.00), and cognitive (RBS effect size = .93) in nature.
Conclusions: Results are consistent with interpretations of the CII as indicative of invalid overrreporting of cognitive symptoms on the CAARS. Results reinforce the need to examine validity of self-report in ADHD evaluation.
Correspondence: *Julie Suhr, Ph.D., Psychology, Ohio University, 200 Porter Hall, Department of Psychology, Athens, OH 45701. E-mail: suhr@ohio.edu*

U. DIAZ-ORUETA, B. ALONSO-SÁNCHEZ & G. CLIMENT. AULA Versus d2 Test Of Attention: Convergent Validity and Applicability Of Virtual Reality In The Study Of Reading Disorders. Preliminary Results.
Objective: AULA is a Virtual Reality based neuropsychological test which measures attention processes and motor activity in children

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms.
https://doi.org/10.1017/S1355617714000381

between 6 and 16 years-old on a CPT based paradigm with different tasks and distracting conditions, presented in a virtual scenario of a school classroom (Climent & Banterla, 2011). Mainly used for support in ADHD diagnosis (Diaz-Orueta et al. 2013; Zulueta et al., 2013), its application to assess reading disorders remained so far unexplored. The objective of the current study is to show convergent validity between AULA, a Virtual Reality test to measure attention, and d2 Attention Test, a paper-and-pencil visual cancellation test; and to show AULA's preliminary results in detecting attention problems and information processing patterns in children with reading disorders.
Participants and Methods: Sixty children (42% female), 6-16 years old, were derived for psychological/educational treatment due to reduced school performance. AULA and d2 tests were administered in an alternative order to each half of the sample. Sixty-eight percent of the group presents some type of learning disorders, while the remaining 32% showed no learning-related disorders.
Results: No statistical differences were attributable to test administration sequence. AULA distinguished better than d2 between children with and without reading-writing difficulties (Correct visual answers and visual errors: both $U = 166$, $z = -2.08$, $p<.05$), and convergent validity analyses showed adequate values for correct answers (cos = .944) and concentration indexes (cos = .929), while errors seemed to be measured differently in both tests.
Conclusions: Compared to d2 test, AULA can add value to the evaluation of attention abilities on children with reading-writing difficulties, providing valuable information on these children's information processing patterns.
Correspondence: *Unai Diaz-Orueta, Research and Development, Nesplora, Technology & Behavior, Paseo de Mikeletegi, 54, Of. 13, 54, Donostia-San Sebastian 20009, Spain. E-mail: udiaz@nesplora.com*

K. STEWARD, A. TAN, L. DELGATY & M. BUNNER. Adolescents with ADHD-PI Show Decreased Self-Awareness of Executive Functioning Deficits.
Objective: Recent studies have found that children with Attention Deficit Hyperactivity Disorder (ADHD) lack self-awareness of their social and academic deficits—frequently rating themselves more favorably than external sources. The purpose of the current study was to assess whether adolescents with ADHD-Primary Inattentive subtype (PI) also hold a positive bias towards their executive and emotional functioning.
Participants and Methods: Twenty controls and 26 ADHD-PI subjects, aged 11-16, were included in the study. All participants were free of comorbid emotional, psychiatric, and neurological disorders. Subjects were given the Behavior Rating Inventory of Executive Functioning (BRIEF) Self and Parent forms and the Achenbach Youth Self Report and Child Behavior Checklist. Parent-child discrepancy scores were calculated for each domain within both questionnaires by subtracting the child's T-score from the parent's T-score. Positive discrepancy scores indicate that the child reported fewer difficulties than the parent.
Results: Group differences in the domain discrepancy scores were assessed using independent sample's t-tests. Discrepancy scores for the BRIEF Inhibit, Monitor, Working Memory, Plan/Organization, Task Completion, Behavioral Regulation Index, Metacognition Index, and General Executive Composite domains were significantly more positive ($p<0.05$) in the ADHD-PI group than controls. There were no significant differences in the Achenbach social/emotional domains.
Conclusions: Adolescents with ADHD-PI tend to endorse fewer executive functioning difficulties than what their parents report. In comparison, the self-reports of non-ADHD children were either the same as or more negatively biased than parent reports. This impaired self-awareness in ADHD-PI may hinder treatment efforts if children fail to acknowledge their need to improve executive functioning skills. This study also contradicts other research that found social/emotional positive biases in an ADHD population. Future research directions are discussed.
Correspondence: *Kayla Steward, B.S., Psychology, University of Texas at Austin, 108 E. Dean Keeton, Austin, TX 78712. E-mail: kasteward@comcast.net*

HIV/AIDS/Infectious Disease

K. STEWARD, D. EAGAN, M.M. GONZALES & A.P. HALEY. HSV-1 Seropositivity in Middle Age Associated with Lower Global Intelligence.
Objective: The Herpes Simplex Virus-1 (HSV-1), or the "cold sore virus," is a common neurotropic and neurotoxic pathogen that has been significantly associated with cognitive deficits in psychiatric and older-adult populations. The aim of the current study was to determine if cognitive differences induced by HSV-1 are present in a middle-aged, non-clinical sample.
Participants and Methods: Thirty-seven HSV-1 negative and 51 HSV-1 positive individuals, ages 40-60 years, were included in the study. Fifty-three of the participants (60%) were female. The participants completed a general health assessment including a blood draw to assess HSV-1 positivity and a comprehensive neuropsychological battery that assessed global intelligence, executive functioning, and verbal memory.
Results: Group differences in the cognitive domain scores were assessed with independent sample's t-test. Despite equivalency between the two groups in terms of education ($p=0.14$), global intelligence was significantly lower in the HSV-1 positive group ($p=.01$). No group differences were observed for executive functioning ($p=0.23$) and verbal memory ($p=0.33$).
Conclusions: HSV-1 infection was related to significantly lower global intelligence in otherwise healthy middle-aged adults. This finding is significant as it indicates greater vulnerability towards future cognitive decline in HSV-1 carriers. Due to the cross-sectional design of the study, we were unable to determine if intelligence test performance differences between the two groups were pre-existing, a consequence of HSV-1 infection, or related to common developmental factors. However, since HSV-1 infection is a potential modifiable risk factor for cognitive vulnerability, it is imperative that these issues are examined further in future longitudinal studies.
Correspondence: *Kayla Steward, B.S., Psychology, University of Texas at Austin, 108 E. Dean Keeton, Austin, TX 78712. E-mail: kasteward@comcast.net*

S. JAEHNERT, C. PRINCE, B. FULLER, V. WHEATON, C. ELLIS, M. KOLESSAR, D. KRIZ, J. ANDERSON, K. BERGGREN, H. OLAVARRIA, A.W. SASAKI, M. CHANG, K.D. FLORA, J.M. LOFTIS & M. HUCKANS. A Longitudinal Study Evaluating Neuropsychological And Neuropsychiatric Functions Across Antiviral Therapy In Individuals With Hepatitis C.
Objective: The majority of people with hepatitis C virus (HCV) report adverse side effects during antiviral therapy (ANT), the most common of which include flu-like, neuropsychiatric, and neuropsychological symptoms. However, relatively few studies have attempted to objectively characterize these functions across ANT. Therefore, the current study utilizes a comprehensive battery of well-validated instruments to prospectively characterize neuropsychological and neuropsychiatric functioning in HCV+ patients before, during, and after ANT.
Participants and Methods: Participants were recruited through hepatology clinics in Portland, Oregon. Subjects treated for HCV (ANT+ Group; n = 33) completed three study visits (baseline prior to ANT initiation; three months into ANT; six months post-ANT termination). An HCV+ control group (ANT- Group; n = 31) completed two study visits (baseline and three months later) and were not on ANT during the study period. Neuropsychological measures included the RIST, WTAR, NAB Modules and D-KEFS subtests. Neuropsychiatric measures included the

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

Beck Depression Inventory, Fatigue Severity Scale, Generalized Anxiety Disorder Inventory, and Brief Pain Inventory.
Results: There were no significant differences across groups in terms of demographics (age, gender, race, education, baseline estimated IQ). A 2 (Visit) x 2 (ANT) factorial ANOVA and repeated-measures ANOVA were calculated for each measure. There were no significant ($p \leq 0.050$) differences between ANT+ and ANT- groups on measures of attention, memory, or executive function across study visits. However, there were significant Visit x ANT effects on measures of depression, fatigue, anxiety, and pain.
Conclusions: Results indicate that ANT has a significant effect on neuropsychiatric symptoms (depression, fatigue, anxiety, and pain) that subsides following ANT completion, but ANT does not appear to significantly impact objective neuropsychological performance during treatment.
Correspondence: *Sarah Jaehnert, M.S., School of Professional Psychology, Pacific University, 2925 SE 50th Ave, Apt 32, Portland, OR 97206. E-mail: jaeh9477@pacificu.edu*

P.L. FAZELI, K.L. DOYLE, J. SCOTT, J.E. IUDICELLO, K. BLACKSTONE, E. WEBER, D.J. MOORE, E.E. MORGAN, I. GRANT & S.P. WOODS. Shallow Encoding and Forgetting are Associated with Dependence in Instrumental Activities of Daily Living Among Older Adults Living with HIV Infection.
Objective: Aging and HIV infection are both unique and independent risk factors for verbal memory deficits and declines in real-world functioning. However, we know little about the specific profile of memory deficits that drives declines in instrumental activities of daily living (IADL) across the lifespan in HIV.
Participants and Methods: The current study examined this question in 145 younger (<50 years) and 119 older (≥ 50 years) adults with HIV who completed the California Verbal Learning Test – Second Edition (CVLT-II), the Logical Memory (LM) subtest of the Wechsler Memory Scale – Third Edition (WMS-III), and a modified Lawton and Brody ADL questionnaire.
Results: No significant memory predictors of IADL dependence were observed in the younger cohort, whereas in the older group, IADL dependence was uniquely associated with worse performance on CVLT-II trial 1, total trials 1-5, short and long delayed free recall, savings, and recognition discrimination, as well as elevated recency effects (ps<.05). Poorer immediate and delayed recall of the WMS-III LM was also associated with IADL declines in the older HIV+ adults (ps<.05), although yes/no recognition was intact (p>.10).
Conclusions: Older HIV-infected adults with shallow encoding and forgetting are at particular risk for declines in IADLs. It is possible that the relative fragility of older HIV+ adults' daily lives is more vulnerable to even subtle memory deficits, especially if proper compensatory strategies are not in place. Future research might evaluate whether strategies to deepen encoding and enhance retention may help to improve real-world outcomes in this vulnerable population.
Correspondence: *Pariya L. Fazeli, PhD, Psychiatry, University of California San Diego & HIV Neurobehavioral Research Center, 3720 8th Avenue, San Diego, CA 92103. E-mail: pfazeli@ucsd.edu*

L.C. OBERMEIT, E.E. MORGAN, K. BLACKSTONE, I. GRANT & S.P. WOODS. Antiretroviral Non-Adherence is Associated With a Mixed Encoding/Retrieval Profile of Verbal Episodic Memory in Individuals Infected with HIV.
Objective: HIV-associated deficits in verbal episodic memory are commonly associated with suboptimal combination antiretroviral therapy (cART) adherence; however, it is not well understood how the specific components of memory problems contribute to cART non-adherence.
Participants and Methods: We evaluated memory profiles of 202 HIV+ participants who completed a 30-day assessment of cART adherence using medication event monitoring systems (MEMS). Adherent (≥90%; n = 103) and non-adherent (<90%; n = 99) participants were matched on demographic, substance abuse, and HIV disease characteristics and administered the California Verbal Learning Test – Second edition (CVLT-II) and the Wechsler Memory Scale – Third edition, Logical Memory subtests (WMS-III LM).
Results: On the WMS-III LM, logistic regressions controlling for lifetime major depression revealed relationships between non-adherence and poorer immediate and delayed recall (ps<.05), but no association emerged with retention or yes/no recognition (ps<.10). On the CVLT-II, trend-level associations were observed between non-adherence and worse Total Learning Trials 1-5 and Long Delay Free Recall (ps<.10), with null associations for Retention and Recognition Discriminability (ps>.10).
Conclusions: A mixed encoding/retrieval profile of verbal episodic memory deficits is associated with a higher risk of antiretroviral non-adherence. The stronger relationship between non-adherence and passage recall rather than list learning performance may reflect the importance of contextual features when remembering to take medications (e.g., importance of environmental cues). Targeted interventions to enhance initial understanding and acquisition of medication regimen information and structured dosing schedules may, therefore, enhance cART adherence and improve overall health outcomes among persons living with HIV.
Correspondence: *Lisa C. Obermeit, SDSU/UCSD Joint Doctoral Program in Clinical Psychology, 220 Dickinson Street, Suite B, San Diego, CA 92103. E-mail: lisaobermeit@gmail.com*

M. SILVERBROOK, J. GILL, A. RACHLIS, A. CARVALHAL, E. COLLINS, G. ARBESS, J. BRUNETTA, J. MCCOMBE, S. LETENDRE, T. MARCOTTE, T. BEKELE, A. BURCHELL, J. RABOUD, F. IBANEZ-CARRASCO, C. BOURGEOIS, R. ROSENES, M. ATKINSON, R. REINHARD, P. MCPHEE, F. MCGEE & S.B. ROURKE. HIV and Aging Effects on Neuropsychological Performance and Rates of HAND in Caucasian MSM on cART with Suppressed Plasma Viral Load, Corrected for Repeated Test Administrations: Prospective Results from the OHTN Cohort Study.
Objective: Debate persists about whether increased neuropsychological (NP) impairment occurs in those aging with HIV-infection; minimal data is available on rates of HIV-Associated Neurocognitive Disorders (HAND) in the older HIV demographic.
Participants and Methods: 200 adult Caucasian men (89% gay/bisexual) on cART with suppressed viral load (< 50 copies/μl)completed a brief NP battery testing psychomotor efficiency, working memory, and memory at baseline and 1 year later. To accentuateaging effects, participants were grouped into "younger" (≤ 45 years, n=72; mean 41.0 yrs) and "older" (50+ years, n=128; mean 57.3 yrs) subgroups. Published practice effect normative data for NP changes were used to adjust for repeated test administrations (Cysique et al., 2011).
Results: At baseline, 57% of participants had HAND with rates of 49% in "younger" and 61% in "older" groups. Asymptomatic Neuropsychological impairment (ANI) was most common (62% of those with HAND), with 22% having Mild Neurocognitive Disorder (MND) and 16% with HIV-Associated Dementia (HAD). MANOVA results, after correcting for practice effects, indicated significant main effects of age on NP performance ($p < 0.01$, $\eta 2 = 0.113$), with significant longitudinal interaction between the two age groups in overall NP performance over time ($p = 0.040$, $\eta 2 = 0.021$). Overall performance improved by 0.17standard deviation (SD) units among "younger" participants but worsened by 0.15 SD units among "older" subgroup; the interaction effect observed was driven mainly by changes in the Memory Domain ($p = 0.014$, $\eta 2 = 0.030$).
Conclusions: This is the first Canadian study to examine the rates of NP impairment and HAND in the context of aging. Increases in NP impairment occur in those men aging with HIV, with a high prevalence of HAND in Caucasian MSM on cART with undetectable viral load. Neurobehavioural interventions are critically needed to address these neurological complications and their associated effects on well-being and quality of life.

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

Correspondence: *Max Silverbrook, B.Sc.(Hons), Ontario HIV Treatment Network, 1300 Yonge Street, Suite 600, Toronto, ON M4T1X3, Canada. E-mail: msilverbrook@ohtn.on.ca*

U.S. CLARK, L.H. SWEET, J. MCGEARY, A.M. FOLKERS, K.N. DEVLIN, M.J. PINA, K.T. TASHIMA & R.A. COHEN. The Apolipoprotein E ε4 Allele is Associated with Altered Brain Activation in Individuals with HIV.

Objective: There is growing evidence that the apolipoprotein E (APOE) ε4 allele increases the risk of HIV-associated neurocognitive disorder (HAND), yet the neural abnormalities associated with these changes are not well understood. This pilot fMRI study examined whether the ε4 allele contributes to altered brain functions in HIV+ patients, and whether these changes are associated with cognitive reductions.
Participants and Methods: We included 13 non-demented HIV+ and 14 seronegative (SN) age-matched adults. APOE genotyping revealed 5 HIV+ and 7 SN ε4 carriers. A brief battery of executive function and processing speed tests was administered; a composite z-score was obtained using normative data. Subjects completed an N-Back task during fMRI. Regions of interest (ROI) were defined by significant 2-Back-related response compared to 0-Back ($p<.005$, clusters $>500mm^3$). Mean BOLD signal in each of the resulting 25 ROIs was extracted for each subject.
Results: SN outperformed HIV+ on cognitive tests ($p=.05$; mean $z=.65$ and .18 respectively); groups did not differ in 2-Back accuracy. A series of 2x2 ANOVAs revealed significant HIV by APOE interactions in posterior insula (pIN) and superior parietal lobule (SPL), where the HIV+ ε4+ group displayed less deactivation than HIV+ ε4- ($p's\leq.05$). Similarly, ε4+ groups demonstrated less deactivation in the paracentral lobule (PL) than ε4- groups ($p=.04$). SN displayed greater activity than HIV+ in the lateral prefrontal cortex, anterior insula and precuneus ($p's<.03$). Among HIV+, higher cognitive scores correlated with greater deactivation in the pIN and PL ($p's<.04$).
Conclusions: During difficult cognitive tasks, pIN, PL and SPL deactivations reflect an abandonment of task-unrelated processes in support of sustained performance. Thus, ε4+ status in the context of HIV is associated with neural inefficiencies marked by a reduced ability to disengage nonessential neural processes. Given the correlation with cognitive reductions, this neural pattern may signify increased risk of developing HAND.
Correspondence: *Uraina S. Clark, PhD, Department of Neurology, Icahn School of Medicine at Mount Sinai, One Gustave L. Levy Place, Box 1052, New York, NY 10029. E-mail: urainac@gmail.com*

E.E. MORGAN, E. WEBER & S. WOODS. Elevated Dispersion Differentially Predicts HIV-Associated Prospective Memory Deficits Across Age and Task Settings.

Objective: HIV-associated deficits in prospective memory (PM) are presumed to be driven by deficient monitoring. Dispersion represents poor regulation of cognitive resources that results in elevated within-person variability in performance. This study investigated dispersion as a possible cognitive mechanism of monitoring failures that underlie PM deficits in laboratory and naturalistic settings across the lifespan.
Participants and Methods: 92 Older (≥ 50 years; O+) and 50 younger (≤ 40 years; Y+) HIV+ individuals completed a comprehensive neurobehavioral evaluation. An intraindividual standard deviation was calculated across a battery of z-transformed raw cognitive measures for dispersion. Laboratory PM was assessed with the Memory for Intentions Screening Test (MIST); naturalistic PM was measured by a phone task completed after a 24-hour delay.
Results: Multivariable regressions controlling for mean cognitive performance and demographic, psychiatric, and HIV disease factors were performed. An age by dispersion interaction was revealed on the MIST summary score ($p<.05$), which was driven by a significant negative association between dispersion and PM in the O+ group, and on the 24-hour delay task ($p<.05$) for which higher dispersion related to failure to complete the task among the Y+ only. Higher dispersion was also significantly correlated with worse real-world medication adherence in Y+ ($p=.03$) but not O+ ($p>.05$).
Conclusions: This pattern of findings suggests that dispersion may differentially disrupt monitoring required for successful PM performance across the lifespan based on the task setting. Among O+, dispersion interferes with PM in the laboratory but its negative effect appears to be averted in everyday life, perhaps through use of compensatory strategies. In contrast, among Y+ dispersion disrupts PM-based tasks and activities in the real-world setting only. Results are broadly consistent with the age-PM paradox regarding discordance between performance in laboratory and naturalistic settings by age group.
Correspondence: *Erin E. Morgan, PhD, University of California, San Diego, 220 Dickinson Street, HNRP/TMARC Suite B 8231, San Diego, CA 92104. E-mail: eemorgan@ucsd.edu*

A.S. ROONEY, K. BLACKSTONE, J. BADIEE, J. ATKINSON & D.J. MOORE. Overconfidence is associated with risky decision making in HIV-infected individuals with bipolar disorder.

Objective: HIV infection and bipolar disorder (BD) may adversely impact frontostriatal systems leading to executive dysfunction, impulsive behaviors, risky decisions, and decreased cognitive insight. We hypothesized that dually-affected HIV+/BD+ individuals would demonstrate worse cognitive insight than HIV+/BD- individuals and that poorer cognitive insight would predict risky decision-making behaviors.
Participants and Methods: Fifty HIV+/BD+ and 41 HIV+/BD- participants were administered the Iowa Gambling Task (IGT) and the 6-item Self-Certainty subscale of the Beck Cognitive Insight Scale to assess participants' certainty about their judgment (a higher score indicates disproportionate overconfidence). The outcome variable for the IGT was advantageous minus disadvantageous decks; higher scores indicate less risky card choices.
Results: Contrary to our hypothesis, the HIV+/BD+ group did not differ from the HIV+/BD- group on overconfidence nor IGT score; however, overconfidence was significantly correlated with IGT total in the dually affected HIV+/BD+ group (Rho = -0.42, $p<0.01$) but not within the HIV+/BD- group (Rho = -0.06, $p=0.73$). As expected, the groups differed on the Beck Depression Inventory-I or II (BDI) ($p<0.04$) and the Young Mania Rating Scale (YMRS) ($p<0.01$), with the HIV+/BD+ group reporting increased mood symptoms. In a multivariable model, controlling for YMRS and BDI, overconfidence remained the strongest predictor of IGT performance. The groups did not differ on demographic (i.e., gender, age, education, ethnicity), substance use diagnoses, or HIV disease variables.
Conclusions: Disproportionate overconfidence in ones' judgment is associated with riskier decision making among HIV+/BD+ individuals but not HIV+/BD- persons. Lack of cognitive insight among persons with both HIV and BD may have broad public health implications (e.g., unprotected sex). Targeting excessive overconfidence among persons with bipolar disorder may serve to reduce risk of HIV acquisition or transmission.
Correspondence: *Alexandra S. Rooney, Psychiatry, University of California San Diego, 220 Dickinson St. Suite B, San Diego, CA 92103. E-mail: arooney@ucsd.edu*

J.M. ROSS, S. COXE, R.M. SCHUSTER & R. GONZALEZ. Decision-Making, Conduct Disorder Symptoms, and Level of Cannabis Use Interact to Predict Number of Sexual Partners.

Objective: Risky sexual behavior (RSB) among young adults may lead to sexually transmitted infections and unplanned pregnancies. Conduct disorder (CD) and substance use disorders (SUD), including cannabis use (CU), are often comorbid and associated with RSB. However, little attention has been given to the influence neurocognitive functioning has on these relationships.
Participants and Methods: The cross-sectional sample included 79 cannabis users (ages 17 to 24) assessed on CD symptoms by the

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

Diagnostic Interview Schedule for Children and cumulative lifetime amount of CU by a detailed interview. RSB was assessed by the HIV-Risk Taking Behavior Scale. Decision-Making (DM) was assessed via the Iowa Gambling Task.

Results: Multiple linear regression revealed that the three way interaction of CU, CD symptoms and DM predicted total number of sexual partners, $\beta = .00009$, $t(71) = 2.75$, $p = .008$. Post-hoc analysis revealed that among individuals with poorer DM, CD did not significantly predict number of sexual partners regardless of CU severity. In contrast, among individuals with better DM, number of CD symptoms significantly influenced number of sexual partners, and the magnitude of the relationship differed based on level of CU. Specifically, among participants with better DM, those with greater CU, reported an increase of 5.62 sexual partners for every unit increase in CD symptoms, $\beta = 5.62$, $t(71) = 3.38$, $p = .001$, whereas those with lower levels of CU reported a decrease of 2.96, $\beta = -2.96$, $t(71) = -2.103$, $p = .039$.

Conclusions: Our results suggest that among young adults who may have more intact DM, CU and CD symptoms are more likely to influence engagement in RSB compared to those with poorer DM. Those with greater CD symptoms and high levels of CU will engage in more RSB, while lower levels of CU will result in less engagement in RSB, suggesting that strategies aimed at reducing CU among some youth with CD may help to reduce RSB.

Supported by NIDA K23DA023560, R01DA031176, R01DA033156 (PI: RG)

Correspondence: *Jessica M. Ross, Bachelor of Science, Psychology, Florida International University, 11200 SW 8th St, AHC4, Rm. 452, Miami, FL 33199. E-mail: jmross@fiu.edu*

R. KAMAT, G. BROWN, K. BOLDEN, T. MARCOTTE, S. LETENDRE, R. ELLIS, S. WOODS, R. HEATON & I. GRANT. Apathy is associated with white matter abnormalities in anterior, medial regions in persons with HIV.

Objective: Apathy is a relatively common psychiatric syndrome in HIV infection, but little is known about its neural correlates. Prior studies have noted the involvement of the nucleus accumbens and corona radiata in HIV-associated apathy, however the specificity of these findings with respect to other neuropsychiatric symptoms in HIV is unknown.

Participants and Methods: Nineteen HIV+ and 19 demographically similar HIV-seronegative participants were administered a structured psychiatric interview, and the apathy, disinhibition, and executive dysfunction subscales of the Frontal Systems Behavioral Scale. They also underwent diffusion tensor imaging (DTI). Fractional anisotropy was derived from seven white matter regions in the thalamocorticostriatal circuit. Masks were drawn in standard space and reverse-warped into native space for each subject.

Results: Compared to the seronegative participants, the HIV+ group had significantly greater frontal white matter abnormalities (d's = .54 – 1.28) and higher apathy ratings. In the HIV+ participants, apathy was associated with greater white matter alterations in the ACR, genu, and OMPFC (r's = -.41 - -.60); these associations were independent of depression, and were stronger for HIV+ participants with worse current immune function (i.e., CD4 count < 340). White matter changes in the selected regions were not associated with ratings of disinhibition and executive dysfunction.

Conclusions: These findings suggest that apathy is related to HIV-associated frontal white matter changes, and may serve as a unique and specific behavioral marker of the same. Furthermore, the interplay among apathy ratings, CD4 count, and frontal abnormalities has implications for the utility of early antiretroviral treatment initiation and/or regimens with greater CNS penetration.

Correspondence: *Rujvi Kamat, MS, SDSU/UCSD Clinical Psychology JDP, 150 West Washington, 2nd Floor, San Diego, CA 92103. E-mail: rkamat@ucsd.edu*

K. VAN DYK, S.A. GOLUB, J.B. PORTER, K.J. ROBIN, W.J. KOWALCZYK, J.C. TOMASSILLI, J.J. LY & N.S. FOLDI. Processing Speed in HIV is Impacted by Age and Physical Health Status.

Objective: As the number of older adults with HIV (HIV+) is growing, there is concern about synergistic effects of aging and HIV on cognition. Additionally, changes in physical health can impact cognition in this older HIV+ population. Slowed processing speed is a common neuropsychological finding in HIV and aging, but the additional effects of physical health decline are not known. We hypothesized that older HIV+ adults with worse physical health status would be most vulnerable and demonstrate slowest processing speed.

Participants and Methods: 42 non-demented HIV+ individuals ranging in age from 30-75 were grouped using a 2x2 design, into Young (<50) and Old (50+), and High and Low Health status as determined by a median split of Physical Health Summary Scores on the Medical Outcomes Study HIV Health Survey. Processing speed measures included Grooved Pegboard, Trails (DKEFS), Verbal Fluency and a Simple Reaction Time (SRT) test capturing the Foreperiod Effect at varied interstimulus intervals (ISI's).

Results: Analysis of main effects showed slowed performance in the Old Group on DKEFS Trails 5 and Grooved Pegboard ($p<.05$), and fewer words generated on a Letter Fluency task ($p<.05$), whereas the Low Health Group was slower on DKEFS Trails 4 ($p<.05$) and generated fewer words on a Category Fluency task ($p<.01$). The Old Group and Low Health Group both demonstrated slower reaction time on the SRT task ($p<.05$) and there was a trend for an Age Group X Health Group X ISI interaction ($p=.06$), such that the Young group with Low Health status performed comparably to the Old group with Low Health status.

Conclusions: Our results showed 1) in HIV, processing speed is slowed in older adults as well as adults with low health status; 2) contrary to our hypothesis, slowed reaction times were observed in low health across both age groups, with different tasks sensitive to these effects. Assessment of processing speed in HIV should include varied measures and the impact of physical health on cognition should be considered across all ages.

Correspondence: *Kathleen Van Dyk, M.A., Psychology Department, City University of New York, Graduate Center & Queens College, 65-30 Kissena Boulevard, SB-E31S, Queens, NY 11367. E-mail: KVan_Dyk@gc.cuny.edu*

C.A. DUFOUR, M.J. MARQUINE, P.L. FAZELI, R. ELLIS, I. GRANT & D.J. MOORE. Physical Exercise and Neurocognition in Hispanic and Non-Hispanic White HIV-infected Adults.

Objective: Neurocognitive impairment (NCI) remains prevalent in HIV-infected (HIV+) persons. Physical exercise (PE) is a modifiable lifestyle factor that might help ameliorate this impairment. Culturally relevant biomedical and psychosocial factors might alter the relationship between PE and NCI, therefore, we sought to examine the effect of ethnicity on the association between PE and cognition among HIV+ adults.

Participants and Methods: Participants included 79 Hispanic and 156 non-Hispanic White community-dwelling HIV+ adults from the UCSD HIV Neurobehavioral Research Center (Age: M=48.0, SD=10.5; Education: M=13.2, SD=3.37; 74.3% male; 65.8% AIDS; median current CD4=553[IQR=349-810]). A standardized neurocognitive battery assessed global and domain-specific NCI. PE was quantified by time reported in exercise (increased heart rate) in the last 72 hrs. Participants were dichotomized into those who reported PE (n=35) and those who reported no PE (n=200). Covariates examined included demographics, HIV disease characteristics, and mental/physical health status.

Results: The proportion of participants who reported PE was comparable in Hispanics (17.7%) and non-Hispanic Whites (26.9%) ($p=.12$). Multivariable models including PE group, ethnic group and their interaction, along with a priori predictors of exercise that differed between ethnic groups and were associated with cognition in univariable analyses, showed a significant main effect of PE on global cognition, processing speed, working memory, executive function, and motor function

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

(ps<.05). There was also a significant interaction in processing speed and working memory, which indicated a significant association between PE and cognition in non-Hispanic Whites (p<.05), but not in Hispanics.
Conclusions: The impact of PE on processing speed and working memory among HIV+ adults may differ among ethnicities. Future studies including neuroimaging might shed light on this disparity, and interventions may need to be appropriately tailored for the population being served.
Correspondence: *Catherine A. Dufour, B.S., HNRP, University of California, San Diego, 220 Dickinson Street, Suite B, San Diego, CA 92103. E-mail: Cadufour@ucsd.edu*

K.L. DOYLE, E.E. MORGAN, S. MORRIS, D.M. SMITH, S. LITTLE, J.E. IUDICELLO, K. BLACKSTONE, D.J. MOORE, I. GRANT, S.L. LETENDRE & S.P. WOODS. Real-World Impact of Neurocognitive Deficits in Acute and Early HIV Infection.
Objective: The acute and early period of HIV-1 infection (AEH) is characterized by neuroinflammatory and immunopathogenic processes that may alter the integrity of neural systems and neurocognitive functions. However, the extent to which central nervous system changes in AEH confer increased risk of real-world functioning (RWF) problems is not known.
Participants and Methods: In the present study, 34 individuals with AEH and 39 seronegative comparison participants completed standardized neuromedical, psychiatric, and neurocognitive research evaluations, alongside a comprehensive assessment of RWF that included cognitive symptoms in daily life, basic and instrumental activities of daily living, clinician-rated global functioning, and employment.
Results: Results showed that AEH was significantly associated with an increased risk of dependence in RWF, which was particularly elevated among AEH persons with global neurocognitive impairment (NCI). Among those with AEH, NCI (i.e., deficits in learning and information processing speed), mood disorders (i.e., Bipolar Disorder), and substance dependence (e.g., methamphetamine dependence) were all independently predictive of RWF dependence.
Conclusions: Findings suggest that neurocognitively impaired individuals with AEH are at notably elevated risk of clinically significant challenges in normal daily functioning. Screening for neurocognitive, mood, and substance use disorders in AEH may facilitate identification of individuals at high risk of functional dependence who may benefit from psychological and medical strategies to manage their neuropsychiatric conditions.
Correspondence: *Katie L. Doyle, University of California, San Diego, 220 Dickinson Street, Suite B, San Diego, CA 92103. E-mail: kldoyle@ucsd.edu*

L.A. CYSIQUE, R.K. HEATON, A. CARR & B.J. BREW. Validity, nature and profile of HIV-associated neurocognitive disorder in a high-functioning and optimally treated cohort: relevance to research and clinical practice.
Objective: Australia, like other English-speaking countries has relied on US neuropsychological (NP) normative standards to determine the prevalence of neurological disorders. The Australian HIV+ population is largely comprised of men who have sex with men (MSM) and most are high functioning. The study objective is to assess whether the US NP normative standards are optimally performing in this subgroup.
Participants and Methods: Ninety virally suppressed HIV+ and 49 HIV-negative (HIV-) men (respectively 86% & 85% MSM; age 56.1±7.6 & 54.2±6.6, education 14.4±2.6 & 15.1±2.6, and premorbid verbal IQ 110.1 ±5.6 & 111.8± 6.1) undertook standard NP testing. The raw NP data were transformed using: 1. US standards (unadjusted scaled scores and demographically corrected T-scores); and 2. Using local z-scores (HIV- scaled scores transformed into z-scores) which were applied to the HIV+ group. To determine HIV-associated neurocognitive disorder prevalence, we used a standard definition of impairment based upon a battery-wide summary score: the Global Deficit Score (GDS).
Results: The local-based GDS yielded optimal sensitivity and specificity in discriminating between the two groups (HIV- = 14% vs. HIV+ = 53%; p<.0001). This definition was significantly associated with age and also cardio-vascular risk factors, but not with HIV disease markers. On the other hand the slightly less optimal US-based GDS (HIV- = 10% vs. HIV+ = 28%; p<.02) was associated with historical AIDS status.
Conclusions: Population norms are needed in Australia possibly with both education and premorbid abilities corrections (oral reading, vocabulary comprehension) to account for especially high and low functioning subgroups. For clinical practice, one should carefully consider whether use of US or local norms is best in HIV+ persons who are similar to those in this study and/or may differ from the general adult populations in either Australia or the US. Further research is needed to determine whether US norms generalize better to the broader Australian population.
Correspondence: *Lucette A. Cysique, Ph.D., St. Vincent's Hospital Applied Medical Research Centre, The University of New South Wales, 405 Liverpool Street, Level 8, Darlinghurst, NSW 2010, Australia. E-mail: lcysique@unsw.edu.au*

K. BLACKSTONE, S. KWAN, B. GOUAUX, A. POQUETTE, J. MONTOYA, A. ROONEY & D. MOORE. Predictors of Psychotropic Medication Non-adherence Among HIV+ Individuals Living with Bipolar Disorder.
Objective: HIV infection and bipolar disorder (HIV/BD) are highly comorbid and lead to fronto-striatal disruption, emotional dysregulation and neurocognitive impairment. Psychiatric and cognitive factors have been linked to antiretroviral nonadherence; however, predictors of psychotropic adherence among HIV+ individuals with psychiatric comorbidities have not been explored. The present study evaluates predictors of psychotropic nonadherence among HIV/BD individuals.
Participants and Methods: Psychotropic medications of 50 HIV/BD participants were tracked for 30 days using Medication Event Monitoring Systems (MEMS). Participants completed neurocognitive, neuromedical, and psychiatric batteries.
Results: Mean psychotropic adherence rate was 78%, with 56% of participants achieving ≥90% adherence by MEMS. Younger age, greater current depressive symptoms, younger onset of depressive symptoms, greater number of previous psychiatric hospitalizations and suicide attempts, poorer time-based prospective memory, worse executive functions and working memory, and more negative attitudes and self-beliefs toward medications were univariately predictive of worse overall psychotropic adherence (p<.10). A multivariable model, including a representative variable from each area assessed (i.e., age, current depressive symptoms, executive functions, medication attitudes and self-beliefs), accounted for 27% of the variance in psychotropic adherence (p<0.003), in which current depressive symptoms and more negative attitudes toward medications were uniquely associated with poorer psychotropic adherence.
Conclusions: Greater current depressive symptoms and negative beliefs regarding medications may be the strongest indicators of poor psychotropic adherence among HIV/BD individuals, even when accounting for other psychiatric and neurocognitive factors. Adherence interventions in HIV/BD may benefit from tailoring approaches to mood stabilization and education on the role of psychotropic medications.
Correspondence: *Kaitlin Blackstone, MS, Psychiatry, SDSU/UCSD Joint Doctoral Program, 220 Dickinson Street, Suite B, San Diego, CA 92103. E-mail: kaitlin.blackstone@gmail.com*

J.M. HEAPS, L. BAKER, E. WESTERHAUS, R. PAUL & B. ANCES. Relationship Between Risky Decision-Making and Neurocognitive Performance in Older HIV+ and HIV- Adolescents.
Objective: Recent studies have linked poor decision-making with HIV-associated neurocognitive disorders (HAND), risk behaviors, and altered mood states in an adults. However, decision-making in HIV adolescents (18-24 years) without substance use disorders has not been

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms.
https://doi.org/10.1017/S1355617714000381

well described. We propose that HIV+ adolescents will perform worse on decision-making tasks, the Iowa Gambling Task (IGT) and Balloon Analog Risk Task (BART), compared to HIV- adolescents. Additionally, poor decision-making will be associated with greater risk behaviors, mood, and cognitive function.
Participants and Methods: HIV+ (n=25) and HIV- (n=18) older adolescents were administered measures of executive function (EXFX; Trails B, Letter-Number sequencing, Digit Symbol, and Letter Fluency), a risk questionnaire (RAB) and the Beck Depression Inventory. EXFX measures were standardized to normative scores and averaged to create a single domain score. In addition, each participant also completed the IGT and BART to assess decision-making. Frequency of high risk and low risk deck choices were recorded across trial blocks for the IGT, adjusted pump count was calculated for the BART.
Results: T-tests indicated there were no significant differences between the HIV- and HIV+ groups on the IGT or BART. Regression analyses revealed that increased frequency to select high-risk decks on the IGT was a function of poor performance on EXFX tasks (R2=0.17, p=.028). Depression symptoms were positively correlated with RAB sex (r=.38, p<.01) and drug risk (r=.28,p=0.04), but not IGT, BART, or EXFX.
Conclusions: Adolescents with executive deficits show poor decision-making on the IGT regardless of HIV status, mood, or other risk behaviors. Different cognitive processes may moderate sexual risk behaviors and risky decisions on the IGT. Conversely, the lack of an association between risk behavior on the IGT and RAB may be due to the discrepancy in the types of risk being measured. Further studies of decision-making processes in older adolescents are warranted.
Correspondence: *Jodi M. Heaps, Ph.D., Research and Evaluation, Missouri Institute of Mental Health, 5400 Arsenal St, St Louis, MO 63139. E-mail: jodimheaps@umsl.edu*

A. GONGVATANA, A. BISCHOFF-GRETHE, E. MORGAN, S. ARCHIBALD, C. FENNEMA-NOTESTINE, S. WOODS, G. BROWN & I. GRANT. Chronic Methamphetamine Use and HIV Infection Are Associated with Alterations in Regional Brain Volumes and Cortical Thickness.
Objective: Methamphetamine (MA) use is a major risk factor for HIV transmission and an important contributor to neural injury in HIV-infected people. Research regarding their independent and combined effects has been mixed. This study examined the impact of MA use characteristics and HIV infection on structural brain alterations.
Participants and Methods: We examined 13 HIV+ and 18 HIV- individuals with MA use history using high resolution T1 MRI. Volumes of cortical areas, subcortical nuclei, white matter, and ventricles, in addition to regional cortical thickness measures were derived using Freesurfer automated segmentation. A multiple linear regression model was fitted with age, HIV serostatus, MA dependence status, average amount of use per occasion, period of abstinence, age of first use, and intracranial volume as predictors of each structural brain measure. A model selection algorithm based on AIC was used to maximize model parsimony.
Results: Older age and HIV seropositivity were associated with widespread reduction in brain volume and cortical thickness, and increased ventricular volume. Higher average amount of use was associated with reduced total cortical volume, and cortical thinning in areas spanning the frontal, temporal, and parietal lobes. MA dependence was associated with reduced volumes of the nucleus accumbens and globus pallidus, and thinning of the precentral gyrus. Longer abstinence was associated with lower globus pallidus volume, and higher thickness in the caudal middle frontal and parahippocampal gyri. Younger age of first use was associated with higher nucleus accumbens volume, and higher cortical thickness primarily in frontal lobe areas.
Conclusions: Independent of the effects of age and HIV serostatus, more recent and heavier MA use and current MA dependence were generally associated with cortical and subcortical cerebral atrophy. Surprisingly, younger age of first MA use was associated with increased frontal cortical thickness, possibly related to alteration in neurodevelopmental trajectory.
Correspondence: *Assawin Gongvatana, Ph.D., Psychiatry, University of California, San Diego, 220 Dickinson Street, Suite B (8231), San Diego, CA 92103-8231. E-mail: agongvatana@ucsd.edu*

R. FAMA, S.A. SASSOON, M.J. ROSENBLOOM, T. ROHLFING, A. PFEFFERBAUM & E.V. SULLIVAN. Anterior Cingulate and Thalamic Volumes are Correlates of Verbal Fluency in HIV Infection, Alcoholism, and their Comorbidity.
Objective: HIV infection (HIV) and chronic alcoholism (ALC) are each associated with its own pattern of neuroanatomical and cognitive compromise. Individuals comorbid for both conditions (HIV+ALC) carry liability for compromise from each disease. We examined whether verbal fluency performance would have disease-specific correlates of phonological and semantic fluency.
Participants and Methods: Structural MRI and verbal fluency data were acquired in 14 HIV, 45 ALC, 15 HIV+ALC, and 33 normal controls (NC). Fluency scores, age- and education-corrected based on controls, revealed a mild phonological fluency deficit in HIV. Regional brain volumes, derived from MRI using the SRI24 brain atlas expressed in headsize- and age-corrected Z-scores, revealed deficits in cortical (lateral frontal and parietal) volumes especially in HIV groups and modest deficits in subcortical regions (insula, anterior cingulate, thalamus) predominantly in ALC groups.
Results: In HIV, phonological (p=.033) and semantic (p=.021) fluency related to anterior cingulate volumes. In ALC, phonological (p=.030) and semantic (p=.032) fluency related to thalamus volumes. Both anterior cingulate (p=.048) and thalamus (p=.042) volumes related to phonological fluency in HIV+ALC; semantic fluency related only to anterior cingulate volume. Multiple regression examining the contribution of the anterior cingulate and thalamus volumes to phonological and semantic fluency indicated that anterior cingulate volume predicted both phonological and semantic fluency in HIV, whereas the thalamus predicted both fluencies in ALC. In HIV+ALC, anterior cingulate and thalamus volumes together accounted for approximately 33% of variance in phonological fluency and 38% in semantic fluency.
Conclusions: These results lead to the conclusion that dissociable neural substrates underlie verbal fluency in HIV and ALC, while both brain regions are implicated in diminished verbal fluency production in HIV+ALC comorbidity.
Support: AA017347, AA017168, AA010723
Correspondence: *Rosemary Fama, Ph.D., Department of Psychiatry and Behavioral Sciences, Stanford University School of Medicine, 1901 Emory Street, San Jose, CA 95126. E-mail: rfama@stanford.edu*

L. BAKER, E. WESTERHAUS, J. HEAPS, B. BASCO, S. WILLIAMS, R.H. PAUL & B. ANCES. Impact of HIV serostatus on cognition and risky decision making in adolescents.
Objective: Numerous studies have identified cognitive impairments due to human immunodeficiency virus (HIV) in adults. However, fewer studies have examined cognition and associated risk behaviors in adolescents with sexually transmitted HIV. Adolescence is an important developmental window as the brain has not fully matured and individuals are prone to engage in risky behavior. Further, research has demonstrated that cognitive processes influence risky behavior. In the present study, we hypothesized that HIV+ adolescents would exhibit greater cognitive dysfunction and risky behavior than those without HIV. Additionally, a significant association would exist between self-reported risky behavior and cognition.
Participants and Methods: We examined these relationships in 40 adolescents between ages 18-24 who completed the Risk Assessment Battery (RAB) along with Trail-Making A and B, Hopkins Verbal Learning Test-Revised, Digit-Symbol Modalities Test (WAIS-III), Animal Fluency, Verb Fluency, FAS, Letter Number Sequencing, and Grooved Pegboard. We compared neuropsychological performance and total RAB

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

scores in education-matched HIV+ (n=20) and HIV- (n=20) participants using domain specific multivariate analyses, controlling for age and sex.
Results: HIV+ performed significantly worse than HIV- adolescents on Animal Fluency (p <. 01), Verb Fluency (p <. 01), and FAS (p < .01). A trend level difference was observed on psychomotor tasks, with Grooved Pegboard performance lower in HIV+ than HIV- adolescents (p < .05). HIV+ adolescents had significantly greater risk scores on the RAB (p <. 01) compared to HIV- adolescents. However, no relationship existed between neuropsychological performance and RAB scores for either group.
Conclusions: This study demonstrates that HIV is independently associated with poorer cognition and increased risky behaviors in adolescents. Cognitive performance, however, is not influenced by risky behavior suggesting that other mechanisms may be responsible for elevated risk scores in HIV+ adolescents.
Correspondence: *Laurie Baker, M.A., University of Missouri- St.Louis, 300 N. 4th Street, # 504, Saint Louis, MO 63102. E-mail: lauriebaker@umsl.edu*

E.T. WESTERHAUS, L.M. BAKER, J.M. HEAPS, B. BASCO, S. WILLIAMS, S. DOWLING, R.H. PAUL & B.M. ANCES. Influence of HIV on Cognitive Function Across the Lifespan.
Objective: Individuals with human immune deficiency virus (HIV) exhibit impaired neuropsychological performance, particularly on tests sensitive to subcortical processes. Studies conducted to date have focused on particular age groups and it remains unclear whether the pattern of neuropsychological difficulties is conserved across the lifespan. The present study addresses this issue by determining the neuropsychological signature of HIV across the lifespan.
Participants and Methods: 139 HIV+ individuals were selected from studies of HIV and cognition. The sample was primarily male (78%) and African American (70%) aged 18-82 years old (y.o.). Participants were included if they were currently on stable anti-retroviral therapy, had no history of neurological conditions (e.g.seizures) or current substance abuse/dependence. Participants were divided into three groups: adolescents (18-24 y.o., n=36), adult (25-49 y.o., n=69) and older adult (50-82 y.o., n=34). A brief neuropsychological battery (Trail-Making A & B, Hopkins Verbal Learning Test, Digit-Symbol) was administered to all participants. Raw scores were standardized using demographically adjusted normative data and averaged to create a composite score (NPZ-4).
Results: Using an ANOVA, NPZ-4 differed across groups (F=6.69, p<0.01). Post-hoc tests revealed older adults scored significantly higher (m= -0.08) than the adult group (m=-0.56, p<0.01) and the adolescent group (m=-0.79, p<0.01) after correction for multiple comparisons.
Conclusions: HIV may have a greater impact on neuropsychological performance during adolescence compared to older age. The overall performances across the three groups were within the average range, indicating group differences were relatively minor. Nevertheless, the performance of the older group may reflect a survivorship bias, less substance abuse, or better medication adherence compared to younger HIV+ patients. Longitudinal studies are needed to identify moderators that may be deleterious to neuropsychological performance in HIV+ patients.
Correspondence: *Elizabeth T. Westerhaus, MA, Neurology, Washington University School of Medicine, 660 S. Euclid Ave., CB 8111, St. Louis, MO 63110. E-mail: westerhause@neuro.wustl.edu*

K. NAN, A. AU, I. CHAN, P. LI & S. WOODS. Profile and Vocational Relevance of Deficits in Prospective Memory Among Chinese Adults Living with HIV Infection.
Objective: A considerable body of research in the United States over the past 10 years shows that HIV infection is associated with mild-to-moderate deficits in prospective memory (PM), which entails the delayed execution of intentions and is an important predictor of poorer health-related outcomes, including medication non-adherence. Whether PM is clinically relevant to the HIV epidemic in the international arena (e.g., China), where HIV is highly prevalent and impactful on public health, remains to be determined.
Participants and Methods: In this study, we examine the cross-cultural generalizability of PM in 56 HIV+ persons and 73 HIV-seronegative demographically-matched participants from Hong Kong using a culturally adapted version of the Memory for Intentions Screening Test (MIST-HK) and Comprehensive Assessment of Prospective Memory: reason for forgetting; CAMP-HK).
Results: HIV+ participants scored systematically lower than the HIV- subjects on both time- and event-based PM as measured by the MIST-HK and had significantly higher PM complaints of forming/encoding intentions as measured by the CAMP-HK (p< .01), Evidence of concurrent validity was provided by HIV-associated deficits in retrospective memory, executive functions, and information processing speed in this same cohort (p< .05). Within the HIV+ group, lower scores on the MIST-HK were significantly associated with higher PM complaints (beta= -.487, p<.01) and, unemployment (X2 (4) 19.54, p<.05), independent of other cognitive functions (e.g., retrospective memory).
Conclusions: These results support the cross-cultural relevance of PM to neuroAIDS by demonstrating HIV-associated deficits in both laboratory and self-report measures of PM. Moreover, these findings expand evidence for the ecological validity of PM as measured in the laboratory by showing strong, independent associations with PM complaints in daily life and unemployment among persons living with HIV infection in Hong Kong.
Correspondence: *Kurt Nan, Psychology, Department of Applied Social Sciences, The Hong Kong Polytechnic University, Yan Oi Tong Au Suet Ming Child Development Centre for Giftedness, The Hong Kong Polytechnic University, Hung Hom, Kowloon, Hong Kong, Kowloon 0000, Hong Kong. E-mail: kurtnan@gmail.com*

K.N. DEVLIN, D.J. LIBON, T. GIOVANNETTI, W. DAMPIER, V. PIRRONE, M.R. NONNEMACHER, C. LIPPA, J.M. JACOBSON & B. WIGDAHL. Metabolic Factors Are Associated With Cognitive Decline in HIV-1-Infected Persons.
Objective: Recent research has suggested that vascular and metabolic risk factors, including obesity and adiposity, may contribute to neuropsychological dysfunction in HIV-1-infected (HIV+) persons; however, to our knowledge, no studies have linked these factors with longitudinal cognitive change. The present longitudinal study examined whether body mass index (BMI), waist circumference (WC), waist-to-height ratio (WHtR), and changes therein predict cognitive decline in an HIV+ sample.
Participants and Methods: 102 HIV+ adults aged 27-65 enrolled in the DREXELMED HIV/AIDS Genetic Analysis Cohort were administered a modified form of the HIV Dementia Scale yielding scores for psychomotor speed, memory, visuoconstruction, and overall performance. Height, weight, and WC were measured and used to calculate BMI and WHtR. Clinical information was obtained from medical records. All data were obtained at baseline and at follow-up an average of 17.5 ± 7.0 months later. Change scores were calculated for metabolic and neurocognitive data.
Results: Age, substance use, depression, HIV variables (current and nadir CD4, current and peak log viral load, infection duration, AIDS indicators, ART status), and metabolic factors (either baseline BMI, WC, WHtR; or change in BMI, WC, WHtR) were entered as predictors of neurocognitive change in multiple linear regression analyses. Greater baseline WHtR significantly predicted psychomotor slowing (β = -0.73, p = .03) and overall neurocognitive decline (β = -0.70, p = .04). Longitudinal increases in BMI (β = -0.23, p = .04) and WC (β = -2.16, p = .03) significantly predicted psychomotor slowing.
Conclusions: This study provides novel evidence suggesting metabolic risk factors and changes therein are associated with longitudinal cognitive decline in HIV+ persons. Clinical trials designed to modify metabolic and vascular risk with the aim of preventing or reversing

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

neurocognitive impairment in HIV-1 should be considered for future research. Funding sources: NIH R01 NS32092, R01 DA19807, T32 MH079785.

Correspondence: *Kathryn N. Devlin, Sc.B., Department of Psychology, Temple University, 1701 North 13th Street, Weiss Hall, Philadelphia, PA 19122. E-mail: kathryn.devlin@temple.edu*

M.J. MARQUINE, D. MOORE, M. CHERNER, R. ELLIS, R. DEUTSCH, D. FRANKLIN, S. LETENDRE, A. COLLIER, C. MARRA, D. CLIFFORD, B. GELMAN, J. MCARTHUR, S. MORGELLO, D. SIMPSON, A. MCCUTCHAN, R. HEATON & I. GRANT. HIV-infected Hispanics are at Increased Risk for Neurocognitive Impairment.

Objective: HIV disproportionately affects Hispanics, yet little is known about neurocognitive impairment (NCI) among HIV-infected (HIV+) Hispanics. We compared the rates of NCI in large well-characterized samples of HIV+ Hispanics and non-Hispanic Whites.

Participants and Methods: Participants included English-speaking HIV+ adults assessed at six U.S. medical centers (186 Hispanics, 626 non-Hispanic Whites). For overall group, Age: *M*=42.4, *SD*=9.1; 86% Male; Education: *M*=13.2, *SD*=2.7; 58% had AIDS. NCI was assessed with a comprehensive battery covering seven domains, with normative corrections for age, education and gender. Covariates examined included HIV disease characteristics, and medical and psychiatric comorbidities.

Results: Compared to non-Hispanic Whites, Hispanics had higher rates of global NCI (44% vs. 56%), and domain NCI in executive function, learning, and working memory. Hispanics were younger, less educated, more likely to be female, had lower current and nadir CD4 counts, higher rates of AIDS, were more likely to be on ART and less likely to have a history of depression. There were no significant group differences in rates of substance use or overall comorbidity rating. Hispanics continued to have more global NCI (*OR*=1.6, *CI*=1.1-2.2, *p*=.01) after adjusting for significant covariates. Higher rates of global NCI were observed among those of Puerto Rican (*n*=57; 74%) than Mexican (*n*=69, 42%) origin/descent; this disparity persisted in models adjusting for significant covariates (*OR*=3.2, *CI*=1.5-7.2, *p*<.01).

Conclusions: HIV+ Hispanics are at increased risk for NCI compared to non-Hispanic Whites. In the present sample of English-speaking Hispanics those of Puerto Rican origin/descent largely drove this disparity. Differences in rates of NCI were not completely explained by worse HIV disease characteristics or comorbidities. Future studies might explore culturally relevant psychosocial and biomedical factors that might explain these health disparities and inform the development of culturally relevant interventions.

Correspondence: *Maria J. Marquine, PhD, University of California San Diego, 220 Dickinson Street, Suite B (MC 8231), San Diego, CA 92103. E-mail: mmarquine@ucsd.edu*

E. WEBER, K. BLACKSTONE, S.L. LETENDRE, I. GRANT & S.P. WOODS. Differential Influence of Time-Based Prospective Memory Across Age and Antiretroviral Pill Burden on Adherence in HIV-Infected Adults.

Objective: Time-based prospective memory (TBPM) is important for optimal antiretroviral adherence in HIV infection, but little is known about role of age, pill burden, and environmental cofactors that may moderate this relationship.

Participants and Methods: The present study examined these cofactors in 117 older (age≥50) and 82 younger (age≤40) HIV-infected adults who completed a standardized measure of prospective memory (Memory for Intentions Screening Test [MIST]) and the Prospective Memory for Medications Questionnaire (PMMQ), in the context of a comprehensive neurocognitive, psychiatric and neuromedical evaluation. Participants also underwent 30 days of antiretroviral adherence tracking using an electronic pill bottle (Medication Event Monitoring System [MEMS]), with adherence classified as taking at least 90% of prescribed doses.

Results: Within the younger sample, however, an interaction emerged (χ^2=6.78;p=0.0092), such that TBPM was related to adherence only in participants with low antiretroviral pill burden (χ^2=13.39;d=1.09;p=0.0003). Further exploring this relationship, a Wilcoxon Rank Sum test showed that younger HIV-infected individuals with low antiretroviral pill burden were less likely to use external prospective memory-based compensatory strategies to manage their medications than younger HIV+ individuals with high pill burden (e.g., pillboxes; χ^2=4.79;d=0.40;p=0.0285).

Conclusions: Overall, these findings indicate that, contrary to clinical expectations, younger HIV+ individuals with smaller pill burdens may be at risk for antiretroviral nonadherence secondary to TBPM impairment; this relationship may be driven by a lack of adherence compensatory strategy deployment in this group.

Correspondence: *Erica Weber, HIV Neurobehavioral Research Center, 220 Dickinson Street, Suite B, San Diego, CA 92103. E-mail: eweber@ucsd.edu*

J.E. IUDICELLO, D. ROSARIO, E.E. MORGAN, R.J. ELLIS, S.P. WOODS, I. GRANT, R.K. HEATON & S.L. LETENDRE. Elevated levels of vascular endothelial growth factor (VEGF) are associated with neurocognitive impairment in HIV disease and methamphetamine dependence.

Objective: METH and HIV are highly prevalent, commonly co-occur, and exert adverse independent and combined effects the central nervous system, including neurovascular injury and neurocognitive impairment (NCI), but the extent to which these two adverse consequences are linked remains unknown. This study sought to determine whether levels of vascular endothelial growth factor (VEGF), a biomarker of vascular injury, would be elevated in METH and HIV and associated with greater NCI.

Participants and Methods: Participants included 80 individuals classified by METH dependence diagnoses (M+/M-) and HIV serostatus (H+/H-) into four study groups: M-H- (n=20), M+H- (n=21), M-H+ (n=21), and M+H+ (n=18). VEGF was measured by immunoassay in plasma obtained from each participant, who also completed a comprehensive neurocognitive evaluation.

Results: Group comparisons revealed significantly higher VEGF levels in M+H+ individuals relative to both single risk factor groups (M+H- and M-H+; ps < 0.05; Cohen's ds = 0.82 and 0.84, respectively) and the comparison group (M-H-, p < 0.01; Cohen's d = 1.08). Correlational analyses revealed that within the entire study sample (n=80), VEGF levels were significantly associated with worse functioning in two neurocognitive domains, working memory (WM, Spearman's rho=0.30; p=0.02) and speed of information processing (SIP, Spearman's rho=0.25, p=0.05).

Conclusions: These findings provide preliminary evidence suggesting that METH and HIV in combination may confer even greater risk for vascular injury than either risk factor alone, and that METH- and HIV-associated vascular injury may play an important role in the incidence and persistence of NCI. Understanding the vascular processes underlying METH- and HIV-associated NCI is critical for development of novel, more effective pharmacological treatment approaches for neurological and neurocognitive decline in these increasingly common risk conditions.

Correspondence: *Jennifer E. Iudicello, Ph.D., Psychiatry, HIV Neurobehavioral Research Program, University of California, San Diego, 220 Dickinson Street Suite B, MC 8221, San Diego, CA 92103. E-mail: jiudicello@ucsd.edu*

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

S. ROURKE, A. RACHLIS, J. GILL, A. CARVALHAL, J. MCCOMBE, C. KOVACS, J. BRUNETTA, G. ARBESS, A. BURCHELL, J. RABOUD, R. ROSENES, R. REINHARD, T. BEKELE, S. CHOI & T. MARCOTTE. Impact of HIV-associated Neurocognitive Disorders on Quality-adjusted Life Years and Medical Costs: Results from The Ontario HIV Treatment Network Cohort Study.

Objective: To examine the impact of HIV-associated Neurocognitive Disorders (HAND) on health-related quality of life (HRQOL), quality-adjusted life years (QALYs) and health care costs.

Participants and Methods: Participants were 1,026 adults with HIV in Toronto, Canada; mean age 45 years; 78% men; 82% on combined antiretroviral therapy (cART). HRQOL was assessed with the Health Utilities Index Mark 3 system (HUI3). Brief neuropsychological (NP) test battery: HVLT–R, Grooved Pegboard, WAIS-R Digit Symbol, and WMS-III Spatial Span. NP scores were converted to Global Deficit Scores (GDS) using Carey et al, 2004. GDS and cognitive symptoms were used to determine HAND status: NP-Normal (42% NP-N, n=435), Asymptomatic Neurocognitive Impairment (38% ANI, n=388), Mild Neurocognitive Disorder (16% MND, n=166), and HIV-associated Dementia (4% HAD, n=37). ANOVA/ANCOVA methods were used to estimate HUI3 scores for each HAND category. QALYs were estimated using adjusted HUI3 scores. HAND-related medical costs were estimated using cost parameters from Yeung et al, 2005.

Results: Overall mean HUI3 score was 0.70 (NP-N=0.74, ANI=0.78, MND=0.46, HAD=0.59). Adjusted mean HUI3 scores were lower (NP-N=0.55, ANI=0.59, MND=0.40, HAD=0.40) and differences between NP-N and MND and NP-N and HAD groups, were statistically significant ($p<0.05$). Those with MND or HAD (n=203) lost 30.5 QALYs/year due to presence of NP impairment as compared to NP-N. Additional medical cost associated with NP impairment among the 203 people with MND or HAD is approximately $1.33 million/year. Extrapolating prevalence of HAND in our sample to people with HIV in Ontario (n=27,420), we estimated that about 5,400 people have MND or HAD–this translates into 810 QALYs lost/year and medical cost associated with MND/HAD alone to be approximately $35.4 million/year.

Conclusions: HAND significantly impacts HRQOL, QALYs, and health care costs. Effective clinical management of HAND could lead to gains in QALYs and considerable savings in medical costs.

Correspondence: *Sean B Rourke, PhD, Psyhciatry, The Ontario HIV Treatment Network, 600- 1300 Yonge st, Toronto, ON M4T 1X3, Canada. E-mail: sean.rourke@utoronto.ca*

S. ROURKE, A. JUSTICE, J. RABOUD, A. RACHLIS, J. GILL, A. CARVALHAL, J. MCCOMBE, C. KOVACS, J. BRUNETTA, G. ARBESS, A. BURCHELL, R. ROSENES, R. REINHARD, T. BEKELE & T. MARCOTTE. The Veterans Aging Cohort Study Index Predicts Neuropsychological Impairment in HIV/AIDS: Results from The Ontario HIV Treatment Network Cohort Study.

Objective: To examine the utility of the Veterans Aging Cohort Study (VACS) Index (Justice et al, 2010), a combined measure of HIV and non-HIV markers, in predicting neuropsychological impairment (NPI) in HIV.

Participants and Methods: Study sample included 400 adults with HIV receiving care in Toronto, Canada; mean age 42 years; 76% men; 78% on combined antiretroviral therapy (cART); and 63% had undetectable plasma HIV-RNA. VACS Index was generated by summing pre-assigned "risk" points for HIV (CD4, HIV-RNA), and non-HIV (anaemia, liver injury, and renal injury, and hepatitis C) bio-markers. Data on medical comorbidities (diabetes, hypertension, cardiovascular diseases, and lung diseases) were also obtained. Brief neuropsychological (NP) battery administered: HVLT–R, Grooved Pegboard, WAIS-R Digit Symbol, and WMS-III Spatial Span. NP scores were converted into Global Deficit Score (GDS) using published algorithms (Carey et al, 2004). GDS cut-off of 0.5 was used to classify individuals with NP impairment (NPI). Logistic regression method was used to examine association between the VACS Index and NPI.

Results: Half (52%) of sample had NPI. The VACS Index ranged from 0 to 111 with mean of 19 (standard deviation: 15.7) and median of 16 (interquartile range: 6-28). In univariate analysis, five-point increment in VACS Index was associated with increased odds of NPI (OR=1.12; 95% CI: 1.05-1.20, p=0.001). In multivariate regression, five-point increment in VACS Index was associated with 13% increased odds of NPI (AOR=1.13; 95% CI: 1.04-1.23, p=0.005), after adjusting for covariates. In addition to the VACS Index, diabetes (AOR=5.77; 95% CI: 1.85-17.98, p = 0.003) and lung diseases (AOR=2.83; 95% CI: 1.13-7.07, p = 0.025) were also associated with greater odds of NPI.

Conclusions: Our results suggest that neurocognitive performance is strongly influenced by level of physiologic injury and that interventions to mitigate this injury will likely improve neurocognitive function.

Correspondence: *Sean B Rourke, PhD, Psyhciatry, The Ontario HIV Treatment Network, 600- 1300 Yonge st, Toronto, ON M4T 1X3, Canada. E-mail: sean.rourke@utoronto.ca*

A. KARIMIAN, A.J. STEINER, E. LÓPEZ, D.J. HARDY & K. SMITH. Performance-based measures of visuospatial functioning used to screen for HIV-Associated Neurocognitive Disorders (HAND) within the monolingual Spanish-speaking population.

Objective: As neurocognitive impairment is a frequent complication of HIV-1 infection in Spanish-speaking adults, a lack of studies assessing HIV-1-associated neurocognitive disorders (HAND) in these populations raises serious clinical concern (Gonzalez, et al., 2009; Mindt et al., 2003). In addition to being appropriately translated, instruments also need to be modified, normed, and validated accordingly (Ardila, 2000; Goodkin et al., 2002). The aim of this study was to explore the sensitivity of two commonly used measures of visuospatial functioning, Block Design (BD) and Matrix Reasoning (MR), in detecting the neurocognitive deficits typically associated with HAND.

Participants and Methods: We hypothesized that the HAND group would perform significantly worse than the non HAND group on both BD and MR. We assessed 83 Spanish-speaking participants (11 females, 72 males, mean age = 45.00, SD = 8.12; mean education = 10.41, SD = 3.43). Study exclusion criteria included severe dementia and other neurological, psychiatric, or medical disorders.

Results: Using a Pearson's correlation, this study demonstrated a significant relationship between the BD and MR (r = .495). An ANCOVA controlling for education and age revealed that the HAND group (M = 21.26, SD = 9.11) performed significantly worse than the non HAND group (M = 30.64, SD = 10.86) on BD [$F(1, 79) = 31.29$, $p < .0001$, $\eta 2 = .28$]. Similarly, the HAND group (M= 7.37, SD = 3.63) performed significantly worse than the non HAND group (M = 9.87, SD = 4.34) on MR [$F(1, 79) = 13.62$, $p < .0001$, $\eta 2 = .147$].

Conclusions: The current study's findings contribute to previous research by establishing a significant positive correlation between BD and MR for this particular population. Furthermore, it demonstrates appropriate usefulness of BD and MR as an additional tool for screening and detecting HAND within the monolingual Spanish-speaking HIV-1-seropositive adults.

Correspondence: *Ahoo Karimian, M.A., Psychology, Pepperdine University GSEP, 2606 Granville Ave, Los Angeles, CA 90064. E-mail: akarimia@pepperdine.edu*

A. STEINER, A. KARIMIAN, E. LÓPEZ, D.J. HARDY & K. SMITH. Verbal fluency measures used to assess HIV-1-Associated Neurocognitive Disorders (HAND) within the monolingual Spanish-speaking population.

Objective: It is difficult to diagnose HIV Associated Neurocognitive Disorders (HAND) in monolingual Spanish-speaking adults due to limited validated screening measures that have been adequately translated into Spanish (Wilkie et al., 2004). Culturally sensitive measures used to assess phonemic and semantic verbal fluency with Spanish speakers are scarce, as the Controlled Oral Word Association Test (COWAT) FAS has frequently been used to assess both English and Spanish speakers.

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

However, Artiola i Fortuny and Mullaney (1997) pose that COWAT PMR is more appropriate for use with Spanish speakers than the FAS. This study added to the literature (Iudicello et al., 2007; Rippeth et al., 2004) by determining if the Spanish version of the COWAT was sensitive to neurocognitive deficits associated with HAND. We hypothesized that the non HAND group would perform significantly better than the HAND group on both the PMR and Animals trial.

Participants and Methods: This study had 83 Spanish-speaking participants (72 males, 11 females, mean age = 45.00, SD = 8.12; mean education = 10.41, SD = 3.43). Study exclusion criteria were severe dementia and other psychiatric, neurological, or medical disorders.

Results: Using a Pearson's r, this study demonstrated a strong relationship between the PMR and Animals trial (r = .512). While controlling for age and education, ANCOVA reveal that the non HAND group (M = 38.04, SD = 9.81) performed significantly better than the HAND group (M = 27.53, SD = 8.55) on the PMR trial [$F(1, 79) = 40.93$, $p < .0001$, $\eta 2 = .34$]. Furthermore, the non HAND group (M = 18.16, SD = 4.10) performed significantly better than the HAND group (M=13.87, SD=4.44) on the Animals trial [$F(1, 79) = 26.13$, $p < .0001$, $\eta 2 = .25$].

Conclusions: This study adds to previous research by establishing a strong positive correlation between the PMR and Animals trial. In addition, findings demonstrate appropriate usefulness of the COWAT PMR and Animals to screen and detect for HAND in monolingual Spanish speaking HIV-1-Seropositive adults.

Correspondence: *Alexander Steiner, M.A., CSPP at Alliant International University, Los Angeles, 1816 Purdue Ave #103, Los Angeles, CA 90025. E-mail: Alexsb812@aol.com*

Genetics/Genetic Disorders

E.L. FISHER, R. SEVCIK & M. ROMSKI. Cognitive Development in a Young Child with Mucolipidosis Type IV over Time: A Case Report.

Objective: Mucolipidosis Type IV (ML IV) is a neurodegenerative disorder caused by mutations in the MCOLNI gene and characterized by severe psychomotor impairments. Neuroanatomically, people with ML IV exhibit white matter demyelination. Reports on the cognitive development of people with ML IV are limited, but suggest typical language milestone achievement may be between a 3 and 18 month level. There is also variability in reports of whether people with ML IV make developmental progress, regress, or remain static after infancy. This study examines the longitudinal development of a young child with ML IV who participated in an augmentative/alternative communication (AAC) intervention study.

Participants and Methods: The child was diagnosed with ML IV at 4 months. As part of the AAC study, she received three evaluations between 26 and 50 months of age, that included the Mullen Scales of Early Learning (MSEL) and the Vineland Adaptive Behavior Scales (VABS).

Results: At 26 months, the child performed in the Very Low range ($T \leq 20$) on all domains of the MSEL, except Receptive Language, which was a relative strength (T = 37; AE = 22 mo.). Her most severe impairments were in Gross Motor ($T \leq 20$; AE = 7 mo.) and Expressive Language ($T \leq 20$; AE = 7 mo.). A comparison of the VABS profile at 29 months and 50 months revealed improvements in raw scores but declines in Standard Scores in all domains. She learned to use 13 new words with a speech-generating device (SGD) during AAC intervention.

Conclusions: These results add to literature on the clinical manifestations of ML IV and indicate that although children with this disorder have deficits in all domains, they may be most severely affected in gross motor or oral motor development and have relatively strong receptive language. Moreover, this child made progress in all domains of adaptive functioning, but at a slower pace than typically developing children. She also gained expressive vocabulary via the AAC intervention, and this experience may have supported her development.

Correspondence: *Evelyn L. Fisher, B.A., Georgia State University, 2227 Spring Walk Ct, Chamblee, GA 30341. E-mail: efisher7@student.gsu.edu*

R. RAO & J. MILLER. Neurocognitive Profile of Partial Trisomy 2q: A Case Study.

Objective: Although there is a wealth of literature exploring the phenotypic presentation associated with various chromosomal anomalies, there are very few studies of children with pure duplications or triplications of the proximal part of chromosome 2q due to the rarity of this aberration. No consistent pattern of clinical features has been established in the handful of individual case reports reviewed in the existing literature, though cognitive sequelae ranging from developmental delay to profound intellectual disability have been cited.

Participants and Methods: We present the case of an 11 year old, right handed, Caucasian male diagnosed at 23 months of age with partial trisomy of chromosome 2q16-21. This patient presented with a history of low birth weight, mild hypotonia with ligamentous laxity resulting in fine and mild gross motor delays and associated delays in adaptive functioning, short stature necessitating growth hormone therapy, strabismus, heart murmur, cystic kidney disease, clinodactyly, and dysmorphic facial features. A longstanding history of increased distractibility and limited span of attention resulting in a prior diagnosis of Attention Deficit/Hyperactivity Disorder (AD/HD) was reported, as was a history of academic delays and problems with pragmatic language.

Results: Neuropsychological evaluation revealed intact visual memory skills, basic visual constructional ability, and rote language skills in the context of broad cognitive impairments including a FSIQ of 59 and moderately low adaptive functioning skills, the combination of which supported a clinical diagnosis of Mild Mental Retardation/Intellectual Disability.

Conclusions: The current case illustration provides an initial model of the cognitive and behavioral phenotype associated with triplication of 2q16-21 to be used as a basis of comparison for future investigations of this rare anomaly.

Correspondence: *Julie Miller, Psy.D., Kettering Medical Center, 3533 Southern Blvd, Kettering, OH 45429. E-mail: julie.miller@khnetwork.org*

F.W. BYLSMA & E. SIEG. Precocious Onset of Genetically Confirmed Huntington's Disease.

Objective: A young man (EB) with short genetic-testing confirmed Huntington's disease (HD) mutation (Huntingtin: 41/22 CAG repeats; paternal transmission; EB is the 4th generation of males with known symptoms) was seen for neuropsychological assessment with complaints of declining cognitive and functions status beginning at age 16. The diagnostic question was whether these deficits represented the effects of HD or resulted from alternate causes.

Participants and Methods: EB has a female fraternal twin; she was the larger twin, born first, excells academically and attended college (genetic status unknown). They were born by emergency C-Section 9 weeks premature. In the early years of his life, EB was a typical child reaching developmental milestones appropriately. He attended regular school classes, and performed well. Onset of symptoms was at age 16, when he became anxious, depressed, confused, and had sleep disturbance; attempted sucide (rode his bike into a pond).

Results: EB was tested on 3 occasions — 2006 (16), 2011 (21) and 2013 (23) . IQ test scores reflect a decline in full scale IQ (low average to mildly impaired) and performance IQ (borderline impaired to mildly impaired) but well retained verbal IQ (average range) — consistent with predicted premorbid IQ. Slow processing speed is a prominent feature of his presentation. He is extremely perseverative in speech pattern, and long delays (30+ seconds) of his response to a question are typical — though his answers are usually correct.

Neurologically, there is evidence of only mild chorea-form movements and dystonic posturing in his hands, he is quite rigid and has poor

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

balance. He demonstrates weak grip strength, poor fine motor dexterity, and slow tapping speed.
His affective state has stabilized with pharmacological intervention. He lives in a group home/workshop currently.
Conclusions: A case of earlier-than-expected onset of HD symptoms in a young man with a 41-CAG repeat Huntingtin mutation. Possible onset-accelerating factors will be discussed.
Correspondence: *Frederick W. Bylsma, PhD, Neuropsychological Services PC, 3375 N Arlington Heights Rd, Suite J, Arlington Heights, IL 60004. E-mail: fbylsma@neuropsych1.com*

M. NEUGNOT-CERIOLI. Neuropsychological profiles of individuals with cobalamin C disease.
Objective: Cobalamin C disease results from a mistake in the metabolism of B12 vitamin. It is known to cause retinopathy, hydrocephaly, epileptic episodes and mental retardation, however its specific cognitive profile has yet to be described.
Participants and Methods: 9 patients aged between 1-11 to 24 years underwent neuropsychological assessment. Patients completed either intellectual or developmental tests according to their age and/or an adaptive behaviour questionnaire.
Results: 6 patients presented with both visual and intellectual deficiency, ranging from light to profound, whereas the other 3 patients had no visual handicap and presented limited to average intelligence. Relative strengths were identified in memory domains.
Conclusions: Cobalamin C disease can result in varying cognitive profiles. Visual and intellectual deficits can be present though they are not systematic. Strengths in memory and socialization abilities are frequently found. Presence of early medical complications appears to be a good indicator of later visual and neuropsychological problems. Given the heterogeneity of cognitive profiles in these patients, neuropsychological assessment is recommended to help orient appropriate interventions.
Correspondence: *Mathilde Neugnot-Cerioli, University of Montreal, Pavillon Marie Victorin F-473, 90 avenue Vincent d'Indy, Montreal, QC H2V 2S9, Canada. E-mail: mathilde.neugnot@gmail.com*

M.W. FONG, L. BENSON, T. NADER & M. LACY. Neuropsychological Profile in Spinocerebellar Ataxia 17 (SCA 17): A Case Report.
Objective: Spinocerebellar ataxia (SCA) 17 is a subtype of SCA that has 36 classified genotypes. It is a rare genetic disorder characterized by ataxia, cognitive decline, dystonia, and parkinsonism. Imaging studies have been conducted to identify the underlying morphology associated with SCA-17. However, to the best of our knowledge, no neurocognitive profile of individuals with SCA-17 has ever been reported. More importantly, research suggests that individuals with different SCA subtypes display a subtype-specific impairment of cognitive functions (Klinke et al., 2010). Therefore, the aim of the current study was to document a neuropsychological profile of an individual with SCA-17.
Participants and Methods: A 77-year old Caucasian female with a confirmed genetic spinocerebellar ataxia (SCA-17) was referred for a neuropsychological evaluation at a medical center. The Repeatable Battery for the Assessment of Neuropsychological Status (RBANS), Boston Naming Test (BNT), Mini Mental Status Exam (MMSE), and Wide Range Achievement Test-Fourth Edition (WRAT-IV) were administered by a trained psychometrician.
Results: Results revealed that the individual demonstrated average pre-morbid intellectual ability (WRAT-IV Reading standard score = 95) with a MMSE of 24 yet significant cognitive impairment across domains with a sparing of language skills (Language Index score = 96; BNT T = 44). Attention was shown to be the most affected cognitive domain (Index score = 49) followed by delayed memory (Index score = 52) and visuospatial/constructional abilities (Index score = 53).
Conclusions: This is the first neurocognitive profile published associated with SCA-17. SCA-17 appears to be associated with attention, memory and spatial deficits, yet intact language skills, suggestive of an involvement of a fronto-subcortical network. Based on a review of the literature, language appears to be relatively spared in this disease across subtypes and may assist with differential diagnosis.
Correspondence: *Mandy W. Fong, Illinois Institute of Technology, 3105 South Dearborn, Chicago, IL 60616. E-mail: wfong1@hawk.iit.edu*

E. ALMKLOV, H. KIM, R.M. ROTH, J.C. FORD, H.A. WISHART, J. RANDOLPH, L.A. FLASHMAN & T.W. MCALLISTER. Structural and Functional MRI in Relation to Glutamate Receptor Gene (GRIN2B) Polymorphisms.
Objective: GRIN2B is a subunit of the NMDA ionotropic glutamate receptor that is highly expressed in frontal, parietal, temporal and subcortical regions, and plays an important role in cognition via regulation of synaptic plasticity. Single nucleotide polymorphisms (SNPs) of the GRIN2B gene have been implicated in susceptibility to obsessive compulsive disorder (OCD) as well as heterogeneity of brain structure in the disorder. In this study we explored whether a GRIN2B SNP previously implicated in OCD, located in the 3′-untranslated region (5072T/G), is related to brain structure and function in healthy adults.
Participants and Methods: Participants were 72 adults (24 female, 48 male) 18-60 years of age (M=27.2 SD=11.9) screened for psychiatric, neurologic, and systemic illness. GRIN2B genotyping (GG=18, GT=30, TT=24) was performed using a 3300 SNP targeted panel developed in partnership between the Dartmouth Neurogenetics Group (DNG) and Affymetrix (Affymetrix Inc., Santa Clara, CA). All participants completed a high resolution T1-weighted structural MRI scan (sMRI) and a subset (n=51) completed a functional MRI scan (fMRI) during which they were administered a block design visual-verbal 3-back working memory task, both on a Phillips 3T scanner. The GRIN2B subgroups were compared using sMRI voxel-based morphometry (VBM) and on the fMRI 3-back > 0-back contrast, implemented using SPM8.
Results: Groups were equivalent for age, gender, handedness, and task performance. Analyses showed greater volume in the left anterior cerebellum ($p<.001$) and greater fMRI activation in frontal-parietal working memory circuitry ($p<.01$) in the GG group relative to groups with a T allele.
Conclusions: Given the associations we found between genotype and brain structure/function in healthy adults, future studies exploring the role of this gene in OCD and other neuropsychiatric disorders should include healthy adults and consider gene-disease interactions in the interpretation of findings.
Correspondence: *Erin Almklov, Dartmouth College, 7 Kimball St Apt 3, Lebanon, NH 03766. E-mail: ealmklov@gmail.com*

A.M. POPA, M. FEIGON, M. VERNALE, L. PIPER, R. MOLOKIE, M. GOWHARI, J. HASSAN, N. PLISKIN & D. NYENHUIS. The Relationship of Premorbid Intelligence to Educational Achievement in Individuals with Sickle Cell Disease.
Objective: The Wechsler Test of Adult Reading (WTAR; Psychological Corporation, 2001) measures premorbid level of intellectual functioning. Research indicates that premorbid intelligence drops significantly below the population mean in children that have suffered from a stroke (Hogan, Kirkham, & Isaacs, 2000). Individuals with Sickle Cell Disease (SCD) are more likely to miss school, which may contribute to overall academic achievement and intellectual functioning. However, there is a lack of data that investigates premorbid intelligence in adults with SCD. This study investigated: 1) differences in premorbid functioning between SCD and control groups, and 2) examined the relationship between school attendance and premorbid functioning in individuals with SCD.
Participants and Methods: All subjects (N = 64) completed the WTAR, and a self-report measure of estimated number of missed school days through high school (as part of a larger study examining cognition and psychosocial functioning).
Results: ANCOVA was used to compare the differences between the SCD and control group on premorbid functioning. After controlling for the demographic factors, history of stroke, and missed school days,

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

results indicated a significant difference between the groups (WTAR VIQ F(1,122) = 10.14, p =.002; WTAR PIQ, F(1,122) = 12.12, p = .001; WTAR FSIQ F(1,122) = 11.93, p = .001. Interestingly, school attendance did not predict premorbid functioning.
Conclusions: The SCD group demonstrated poorer premorbid functioning with and without evidence of early stroke. Missed school days did not predict premorbid functioning in the SCD group. Although the amount of missed school days for both groups were similar, the SCD group had more education. Since the controls performed better on the WTAR than the SCD group, it implies that individuals with SCD are still at an early academic disadvantage and have cognitive deficits. Future studies are needed to examine the implications of SCD on intellectual functioning.
Correspondence: *Ana M. Popa, Bachelor of Science, Illinois Institute of Technology, 5120 W Birchwood Ave, Skokie, IL 60077. E-mail: apopa@hawk.iit.edu*

R. FEE & V.J. HINTON. Cognitive Skills of Boys with Becker Muscular Dystrophy Are More Similar to Peers than to Boys with Duchenne Muscular Dystrophy.
Objective: To determine whether boys with Becker Muscular dystrophy (BMD) perform better on cognitive tests than boys with Duchenne muscular dystrophy (DMD). Dystrophinopathies are muscle diseases characterized by progressive muscular weakness and classified by abnormal expression of the protein dystrophin in skeletal muscle and brain. In DMD, the more severe form, there is progressive muscle weakness and the full dystrophin isoform is absent from muscle while in BMD physical decline is slower and dystrophin is present in an altered form. Children with dystrophinopathy have cognitive deficits, likely related to loss of brain-expressed dystrophin. Given that physical phenotype is due to amount of dystrophin in muscle, we hypothesized that a similar finding would extend to cognitive phenotype. We hypothesized that cognitive impairments in boys with BMD will be less severe than in boys with DMD.
Participants and Methods: Participants: 145 with DMD, 21 with BMD, and 56 unaffected siblings. Measures: Peabody Picture Vocabulary Test (PPVT), Ravens Coloured Matrices (RCM), Digit Span (DS), and Woodcock-Johnson Achievement Reading composite (WJR). A one-way analysis of variance was run for each measure. Alpha was set at .05.
Results: All four ANOVAs were significant (PPVT F(2, 219)=8.46, RCM F(2, 207)=8.39, DS F(2, 170)=15.62, WJR F(2, 147)=9.10, p<.05). Post-hoc pairwise testing revealed that the DMD group performed significantly more poorly than controls on all measures, while the BMD group did not differ from controls on any measure. On Digit Span, there was also a significant difference between the BMD and DMD groups such that BMD group performed better (Digit Span mean, sd: DMD=7.55, 3.14; BMD=9.50, 3.42;control= 10.64,3.39).
Conclusions: Boys with BMD look more like controls than boys with DMD on cognitive tests, with the biggest difference observed on digit span. These data suggest that that the presence of an altered dystrophin isoform is associated with improved cognitive function.
Correspondence: *Robert Fee, MA, PhD(inprogress), CUNY/Columbia Univeristy, 630 West 168th St PH 19, New York, NY 10032. E-mail: rf237@columbia.edu*

R. PIERPONT, E. TWOROG-DUBE & A. ROBERTS. Attention and Executive Functioning in Children with Noonan Syndrome.
Objective: Emerging research indicates that gene mutations within the RAS-MAPK signaling cascade, which cause Noonan syndrome (NS) and related disorders, affect neurophysiologic activity in brain regions involved in attention and executive functions. Despite the considerable impact that attention problems can have on academic achievement and social-emotional development, little is known about the functioning of individuals with NS within this domain. The aim of the present study was to determine whether children with NS are at heightened risk for ADHD symptoms, and to investigate three key aspects of behavioral attention: auditory attention, sustained attention and response inhibition.
Participants and Methods: Children and adolescents with NS (n = 32) and their unaffected siblings (n = 16) between the ages of 6 and 17 years were administered standardized tests of intellectual functioning and attention. Parent report measures of ADHD symptoms and executive functioning were also collected.
Results: Whereas intellectual functioning was within the average range for the group of children with NS as a whole, over 50% of children with NS exhibited clinically elevated symptoms of inattention and/or hyperactivity. Moreover, individuals with NS performed significantly poorer on all three aspects of behavioral attention relative to their unaffected siblings and the normative population. Response inhibition was particularly impaired in the NS group.
Conclusions: The current results indicate a higher frequency of attention problems and executive dysfunction in NS, including difficulties with sustained attention and response inhibition. It is therefore recommended that all children with NS be screened for symptoms of ADHD. Notably, our results support the hypothesis that Ras proteins may be important regulators of inhibitory frontal and striatal networks. Further investigation of behavioral sequelae of genetic syndromes may help to identify important molecular and neural pathways leading to ADHD more broadly.
Correspondence: *Rene Pierpont, PhD, Department of Clinical Behavioral Neuroscience, University of Minnesota, Mayo Mail Code 486, 420 Delaware Street SE, Minneapolis, MN 55455. E-mail: pier0053@umn.edu*

N. BREI, C. CASNAR, F. VAN DER FLUIT, C. MAMBWE, S. WALDRON, S. HUNTER & B. KLEIN-TASMAN. Relations of Language Functioning to Attention, Functional Communication, and Social Skills in Young Children with NF1.
Objective: Neurofibromatosis 1 (NF1) is a genetic neurodevelopmental disorder affecting approximately 1 in 3,000. Research on language problems in young children with NF1 is limited despite findings suggesting difficulties. Study goals were to characterize early language functioning and relations to attention problems, functional communication, and social functioning in children with NF1.
Participants and Methods: Participants were 30 children with NF1 (20 males,10 females), ages 4 to 6 years (M =4.57,SD=.62). The Clinical Evaluation of Language Fundamentals – Preschool 2 was administered to assess language in detail. Parent report measures of attention problems, functional communication, and social skills were administered.
Results: Mean language performance at the index and subtest level showed no significant differences from the normative mean at the p=.01 level, with a trend toward lower performance in the Receptive Language domain (t[26]=-2.28, p=.03). However, elevated rates of difficulty were observed. About 1/4 showed difficulty (performance at least 1 SD below the mean) in Core Language skills, and over 1/3 showed difficulty on at least one language index. Attention problems were not significantly related to language functioning. Correlations with parent ratings indicated trends for all language indices except Receptive Language and significant correlations with functional communication, developmental social disorders, and social skills.
Conclusions: Children with NF1 may be vulnerable to language problems. It appears that attention difficulties alone (often seen in children with NF1) do not account for receptive language difficulties. Language difficulties measured in the lab setting translate to communication and social functioning in real-world settings.
This research was supported by funds from the UWM Research Growth Initiative, University of Chicago CTSA (UL1 RR024999), NF MidAtlantic and NF Midwest.
Correspondence: *Natalie Brei, B.A., Psychology, University of Wisconsin-Milwaukee, 2441 E. Hartford Avenue, 325 Garland Hall, Milwaukee, WI 53211. E-mail: nbrei@uwm.edu*

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

J. KIEFEL, R. FEE, S. CYRULNIK, E. LEAFER & V.J. HINTON. From Preschool to School-Age: Neurocognition and Adapative Functioning of Boys with Dystrophinopathy.

Objective: To follow development of cognitive and adaptive skills over time in children with dystrophinopathy. Dystrophinopathies (Duchenne muscular dystrophy) are characterized by progressive muscular weakness and lack of the protein dystrophin in muscle and brain. Prior research from our group has found younger boys with dystrophinopathy have more generalized deficits than school-aged boys. The current study followed a sample of boys with dystrophinopathy over 4 years to examine cognitive and adaptive skills at 3 time points, to determine whether gains in performance are made across time.

Participants and Methods: 20 boys with dystrophinopathy who were between 3 and 6 years of age at initial testing.

Measures used: Peabody Picture Vocabulary Test (PPVT), Expressive Vocabulary Test (EVT), Wide Range Assessment of Visual Motor Ability (WRAVMA), and Vineland Scales of Adaptive Behavior.

Design: boys received evaluations over 4 years.

Data Analysis: Four repeated measure ANOVAs were run on composite scores. Significant finidngs were followed by subtest analysis. Alpha was set at .05.

Results: Mean sd age of boys in years, time 1-3: 5.05 +- 0.89; 7.25 +-0.85; 9.15 +- 0.87.

repeated measure ANOVA was significant for WRAVMA composite score which increased over time. $F(2,16) = 5.01$ $p<.05$. Effect was due to improved performance ion Drawing $F(2,17) = 8.41$, $p<.05$. Drawing mean +- sd at time 1-3: 87.58 +- 17.77; 92.68 +- 22.22; 103.26 +- 17.10. Performance on the PPVT also showed improved performance across time which approached significance $F(2.19)= 3.43$, $p=.055$. PPVT mean, sd at time 1-3 (96.35 +- 14.38; 96.50 +- 23.52; 101,05 +- 13.67. No significant changes were found on any other measures.

Conclusions: Between the age of 5 and 9, boys with dystrophinopathy show some improvements in drawing and receptive vocabulary. Adaptive functioning, expressive vocabulary, visual matching, and fine motor speed remain constant. Importantly, no declines in cognition or motor functioning are seen.

Correspondence: *Jacqueline Kiefel, PHD, Dept of Neuropsychology, Children's Healthcare of Atlanta, 1001 Johnson Ferry road NE, Atlanta, GA 30342. E-mail: jackie.kiefel@choa.org*

N.J. GOODRICH-HUNSAKER, Y. DENG, E.A. BEATON, K. ANGKUSTSIRI, I. LECKLITER, J. ENRIQUEZ, M.H. BUONOCORE & T.J. SIMON. Altered fornix and cingulum integrity in children with chromosome 22q11.2 deletion syndrome and relationships with affective and adaptive functioning.

Objective: The hippocampus and associated limbic pathways (e.g., fornix and cingulum) play an important role in affect regulation and adaptive function. Previous studies show children with 22q11.2DS have elevated anxiety and disrupted fornix connectivity. Affective states associated with stress and anxiety in children with 22q11.2DS may predict risk / resilience profiles for later psychosis. What remains unknown is: (1) to what extent limbic connectivity is also altered in children with 22q11.2DS; and, (2) whether or not there is a significant relationship between affective / adaptive function and limbic connectivity.

Participants and Methods: The current study includes 42 children (aged 7-14 years) with 22q11.2DS and 30 age- and gender-matched typically developing (TD) children. Using a probabilistic DTI fiber-tracking algorithm (ConTrack), the fornix body and cingulum were reconstructed in each individual's native brain space. Fornix and cingulum tract integrity were correlated with age, gender, anxiety, and adaptive function.

Results: We found that fornix and cingulum integrity was reduced bilaterally in children with 22q11.2DS compared to TD. Results from our correlation analyses showed that left fornix body integrity was reduced with increased anxiety and depression and with reduced adaptive functioning skills.

Conclusions: Results from this study validate our previous study looking at hippocampal connectivity and provide the first evidence that the cingulum in children with 22q11.2DS is disrupted. Such differences in the body of the fornix and cingulum in children with 22q11.2DS suggests that there are many changes occurring within the limbic system, which has the potential to significantly impact attention, emotions, learning, and memory. Further research is needed to understand these potential changes in children with 22q11.2DS and how these alterations impact other domains of cognitive functioning.

Correspondence: *Naomi J. Goodrich-Hunsaker, PhD, University of California, Davis, 2825 50th Street, Room 1362, Sacramento, CA 95817. E-mail: njhunsaker@icloud.com*

K. WALSH & C. SEMERJIAN. Cognitive and Psychological Factors Associated with Social Functioning in Children with NF1: Application of the Socio-Cognitive Integration of Abilities (SOCIAL) Model.

Objective: Executive function (EF) has been posited to play a role in social functioning. Children with NF1 exhibit deficits in both areas, making them an ideal population to examine this relationship. This study aims to examine the association between executive dysfunction and social impairments in children with NF1.

Participants and Methods: This is a cross-sectional, retrospective study of children with NF1 ages 4 to 17 (Mean=9.82; SD=3.5). Gender was 54% male, and average IQ was 95.12 (SD=16.6). The CBCL and the Parent BRIEF were administered as part of a full clinical neuropsychological evaluation. Pearson correlations were computed between the eight EF domains (BRIEF) and the Social Problems scale (CBCL). Next, a partial correlation was computed controlling for Internalizing symptoms (CBCL). Finally, linear regression analysis was employed to determine the unique variance of neuropsychiatric and EF impairments on social problems.

Results: Bivariate correlation analysis yielded statistically significant relationships between all domains of EF and social problems (GEC $p=.000$; $r=.45$). Significant relationships were also identified between Internalizing symptoms and social problems ($p=.000$; $r=.62$). Only Inhibit ($p=.000$; $r=.44$) and Monitor ($p=.000$; $r=.50$) remained significant once Internalizing symptoms were entered. Regression analysis revealed that Internalizing symptoms and Monitor contributed significantly to the model.

Conclusions: Beauchamp & Anderson's integrated SOCIAL model provides a framework for conceptualizing the influences of cognitive and psychological factors on social competence in children with NF1. Further elucidation of the relationships between the model's components will be valuable in developing empirically supported interventions to achieve better outcomes for children with NF1.

Correspondence: *Karin Walsh, Children's National Medical Center, 111 Michigan Avenue NW, Washington, DC 20010. E-mail: kwalsh@childrensnational.org*

E.B. LEAFFER, R.J. FEE & V.J. HINTON. Digit Span Performance in Children with Dystrophinopathy: A Verbal Span or Working Memory Contribution?

Objective: To examine whether digit span forward or backward underlies the decreased performance on digit span in children with dystrophinopathies. Poor digit span performance has been repeatedly observed in boys with dystrophinopathy; however what underlies these deficits is unknown. We postulated a "core deficit" in verbal span in this population. To test this, we examined digit span length from the perspective of Baddeley's working memory model, such that digits forward measures verbal span (defined as memory capacity recruiting the phonological loop), and digits backward measures verbal span and recruits central executive processes. We hypothesized that boys with dystrophinopathy have decreased verbal span, so that both digits forward and backward will be shorter compared to controls.

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

Participants and Methods: We compared 170 boys with dystrophinopathy to 95 unaffected sibling controls, aged 6 to 16. General intellectual function was estimated by the Peabody Picture Vocabulary Test. Performance on WISC-III digit span subtest was examined using scaled scores and maximum digit spans forward and backward that were converted to z-scores using normative data. Between group analyses using a one-way ANOVA (α=0.05), with estimated intellectual function as a co-variate were run.
Results: As expected, probands performed worse than controls on Digit Span, even after accounting for IQ (mean, sd: Probands 8.0, sd 3.0; controls 10.7, sd 3.1; $F(2,262)=61.07$, $p<0.01$). Additionally, for span forward and backward, probands performed worse after co-varying for IQ, (span forward z-score mean, sd (Probands -0.3, sd 1.1; controls 0.2, sd 1.0; $F(2,262)=19.5$, $p<0.01$), span backward z-score (Probands -0.7, sd 1.1; controls 0.2, sd 1.0; $F(2,262)=43.2$, $p<0.01$).
Conclusions: Poor digit span performance appears to be due primarily to decreased ability to rehearse digits in the phonological loop. Although the central executive may also contribute to overall poor performance, there is an underlying deficit in the storage of the phonological loop.
Correspondence: *Emily B. Leaffer, MPH, Columbia University, 630 West 168th Street, PH 19, New York, NY 10019. E-mail: ebl2121@cumc.columbia.edu*

V.J. HINTON, R. FEE & S. CYRULNIK. Language Skills in Preschool Boys with Dystrophinopathy.
Objective: To examine language in preschoolers with dystrophinopathy. Dystrophinopathies are characterized by progressive muscular weakness and lack of the protein dystrophin in muscle and brain. Affected school-aged boys have selective language deficits, while younger boys have more generalized cognitive impairment. Older boys scored significantly lower on CELF Concepts & Directions and Recalling Sentences subtests than sibling or disability matched controls, reflecting difficulty on tests that rely on immediate verbal memory (or verbal span). For the current study, we tested preschool boys on the CELF-P and hypothesized that they will have generalized language impairment, yet will still have a profile of lowest scores on tests of verbal span.
Participants and Methods: Participants: 29 probands and 21 unaffected sibling controls (3-5 years). Measures: 6 subtests from Clinical Evaluation of Language Fundamentals-Preschool (CELF-P). Data analysis: A MANOVA (2 group x 6 measure) was run on subtest scaled scores, with post hoc pairwise testing. Profile analysis compared individual subtest scores to mean of subtest scores and significant differences were determined according to criteria in the CELF-P manual. Alpha was set at .05.
Results: MANOVA omnibus F was significant $F(6, 41) = 3.99$, $p<.05$. Probands performed significantly worse than controls on four subtests (mean difference + se): Linguistic Concepts (-3.46 + 1.09), Basic Concepts (-3.29 + 1.05), Recalling Sentences (-3.90 + 0.94), and Word Structure (-3.55 + 0.91), but did not differ on: Sentence Structure (-1.72 + 1.06) and Formulating Labels (-1.64 + 0.91). Proband profile analysis indicated that Formulating Labels was a strength (7/29 performed significantly above level expected) and Recalling Sentences was a weakness (9/29 performed significantly below level expected).
Conclusions: Preschoolers with dystrophinopahy have significant language impairments with a profile that suggests weakest performance on tasks that rely on intact verbal span.
Correspondence: *Veronica J. Hinton, PhD, Sergievsky Center & Department of Neurology, Columbia University, P & S Box 16, Columbia University, 630 West 168th Street, New York, NY 10025. E-mail: vjh9@columbia.edu*

L. GULLER, D.Y. HAN, J.P. HARP & A.J. ANDERSON. Cognitive Phenotype of PARK2-Associated Early-Onset Parkinson's Disease in Two Siblings.
Objective: Cognition is thought to be resilient in patients with early-onset Parkinson's disease (EOPD) with PARK2 mutation on chromosome 6. However, evidence for reduced cognitive risk in PARK2-related EOPD has focused on dementia prevalence using dementia-specific clinical screenings (Alcalay et al., 2010; Khan et al., 2003) and index scores insensitive to individual, domain-specific performance (Lohmann et al., 2009). Comparatively, screening and in-depth neuropsychological testing used in combination have revealed significant cognitive differences between two brothers with PARK2 mutations, one with mild dementia and the other largely intact (Benbunan, Korczyn, & Giladi, 2004). This study reviews cognition in another sibling duo with PARK2 mutation.
Participants and Methods: Two sisters with PARK2 EOPD were examined, a 35-year-old left-handed woman (S1) and a right-handed 53-year-old (S2). Estimated premorbid status, memory, processing speed, language, visuospatial skills, and executive skills were assessed in light of pertinent baseline and demographic factors.
Results: S1 evidenced baseline reading and learning disorder, with nonverbal capacities slightly stronger than verbal. Learning was weaker than retention. Verbal slowing was evident, and semantic fluency was impaired more than phonemic. Line orientation was impaired, but block design was intact. S2 displayed stronger verbal than nonverbal capacities, with intact processing speed, learning, and recall. Language and visuospatial skills were within normal limits, with relative weakness in confrontation naming. High-level executive functions were relatively preserved for both sisters.
Conclusions: Variance in cognitive phenotype in PARK2 EOPD shows the importance of baseline cognitive factors in estimating cognitive performance in genotype groups, so far absent in extant literature. It is intriguing that both sisters displayed relatively intact high-level executive functions, perhaps reflecting the smaller cognitive impact of PARK2 found elsewhere in the literature.
Correspondence: *Amelia J. Anderson, Ph.D., University of Kentucky Neurology, 740 South Limestone Street, L-454, Lexington, KY 40536. E-mail: amelia.anderson@uky.edu*

Featured Debate: Best Practices for Enhancing Cognitive Recovery: Restoration, Compensation, and Can we Tell the Difference? (CE Session E)

Moderator: John Whyte

3:00–4:30 p.m.

J. WHYTE. Best Practices for Enhancing Cognitive Recovery: Restoration, Compensation, and can we tell the difference?
Researchers and clinicians have debated for years the relative merits of attempts to restore impaired cognitive function vs. attempts to provide clients with ways to compensate for those impairments in order to achieve important functional goals. Restorative approaches hold out the promise of a more general benefit, since the restored process, arguably, would result in improvement in a wide range of activities that were formerly limited by the cognitive impairment being treated. Yet many are skeptical that such approaches are effective at all. In contrast, compensations provide more obvious and direct evidence of efficacy (the task that could not be performed before treatment now can be completed), but raise the concern that almost as many compensations may be needed as there are tasks to be performed. Further complicating this debate is the fact that many treatments are difficult to classify clearly as restorative or compensatory. Thus, their efficacy or inefficacy doesn't clearly settle the controversy. In this debate, 6 clinical and research experts in neuropsychological rehabilitation will address the pros and cons of restorative vs. compensatory approaches to cognitive impairment, as well as the thorny definitional confusion that limits a clear resolution of this issue.
Correspondence: *John Whyte,, PA. E-mail: jwhyte@einstein.edu*

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

Paper Session 3: Child and Adult Survivors of Childhood Cancer

Moderator: Mary Beth Spitznagel

3:00–4:30 p.m.

S. NA & T.Z. KING. Effects of Radiotherapy on an Attention and Working Memory Task in Adult Survivors of Pediatric Brain Tumors.

Objective: Extant literature on adult survivors of pediatric brain tumors show that individuals who have undergone radiotherapy (RT) exhibit poorer cognitive outcomes than survivors without radiotherapy (NRT), years after treatment. This study explored the effect of RT on an attention (AT, 0-back) and working memory (WM, 2-back) task over time; we hypothesized that RT group would perform more poorly on the task across runs relative to the healthy control (HC) and NRT groups.

Participants and Methods: A letter n-back task was administered to RT (n=22; M age=25.0(4.1); 45% F; years since diagnosis=16.5(5.8)), NRT (n=21; M age=25.3(4.7); 57% F; years since diagnosis=17.4(6.3)) and HC (n=22; M age=25.1(3.24); 55% F) groups. The task consisted of 5 runs (20 minutes total). A 3 (Group: RT, NRT, HC) x 2 (Time: Runs 1&2, Runs 4&5) x 3 (Load: 0, 1, and 2back) mixed ANOVA was conducted, with Time and Load as repeated measures. D prime was used as an index of accuracy.

Results: There was a significant main effect of group, $F(2, 62)=4.1$, $p=.02$, $\eta p^2=.12$. Contrasts revealed that RT were less accurate than HC ($p=.02$), while NRT and HC were not significantly different. As load increased, participants were less accurate at each level, $F(2, 124)=29.3$, $p<.05$, $\eta p^2=.32$. There was a significant interaction between time and load, $F(2, 124)=13.6$, $p<.05$, $\eta p^2=.18$, indicating that performance over time differed for each load. For 0back, there was a decrease in accuracy over time; for 2back, all groups improved over time.

Conclusions: Consistent with previous literature, RT had a negative impact on cognitive performance. The RT group performed lower than HC at the beginning and end of AT and WM tasks, well over a decade after diagnosis and treatment. However, the RT group exhibited the same learning patterns across five runs as HC and NRT for AT and WM tasks, with decreasing AT accuracy and increasing WM accuracy over time. Implications of these findings for n-back fmri studies in clinical samples will be discussed.

Correspondence: *Sabrina Na, Georgia State University, 235 Lincoln Court Avenue, Atlanta, GA 30329. E-mail: s.diana.na@gmail.com*

B.C. MCDONALD, D.R. WESTFALL, J.N. BAILEY, L.K. STICKANS, J.D. WEST, J.L. RENBARGER & A.J. SAYKIN. Altered Working Memory-Related Brain Activation after Leukemia Chemotherapy and Relationship to Academic Functioning.

Objective: Children treated with chemotherapy for acute lymphoblastic leukemia (ALL) have been shown to demonstrate cognitive impairment relative to healthy controls (HC), including in executive functions such as working memory (WM). As there has been limited investigation of the neural substrate of these deficits, this study examined WM-related brain activation after ALL chemotherapy using functional MRI (fMRI) and assessed the relationship to academic performance.

Participants and Methods: 23 children >3 years post ALL chemotherapy (mean age 11.7 yrs, 10 female) and 21 demographically matched HC (mean age 12.8 yrs, 13 female) completed an fMRI auditory-verbal n-back WM task, neuropsychological (NP) testing, and parent behavioral ratings (CBCL and BRIEF).

Results: ALL patients evidenced lower processing speed, executive function, and global NP scores than HC. Parent ratings were elevated for ALL relative to HC only for the BRIEF emotional control scale. Groups had comparable n-back performance, but ALL patients showed greater brain activation than HC during the most challenging WM condition (2-back), particularly in frontal regions. Within the ALL group, increased frontal activation correlated with better task performance. Relative to those without parent-reported academic difficulty, ALL patients with academic difficulty showed lower frontal lobe activation, 2-back performance, verbal memory, and global NP functioning, and higher parental concerns on several CBCL and BRIEF scales.

Conclusions: In the context of comparable task performance, the finding of greater frontal brain activation in children after ALL chemotherapy relative to HC suggests compensatory recruitment of neural circuitry to support WM processing. This interpretation is supported by a positive correlation between frontal activation and task performance in the ALL group. ALL patients with academic difficulty showed lower frontal activation and greater cognitive and behavioral concerns, demonstrating a putative neural correlate of chemotherapy-related changes.

Correspondence: *Brenna C. McDonald, Indiana University, 355 W. 16th St., GH Suite 4100, Indianapolis, IN 46220. E-mail: mcdonalb@iupui.edu*

T.M. BRINKMAN, G.T. ARMSTRONG, C. KIMBERG, A. GAJJAR, D. SRIVASTAVA, L.L. ROBISON, M.M. HUDSON & K.R. KRULL. Social Cognitive Deficits In Adult Survivors Of Childhood Brain Tumors.

Objective: Pediatric brain tumor survivors are at risk for neurocognitive impairment, yet little is known about social cognition in long-term adult survivors of childhood brain tumors.

Participants and Methods: Neurocognitive functions and social cognition were evaluated in two groups of adult survivors of pediatric brain tumors 1) infratentorial tumors (n=36, 17% no CRT, 25% focal CRT, 58% CSI) and 2) supratentorial tumors (n= 28, 47% focal CRT, 53% no CRT) participating in the SJLIFE long-term follow-up protocol. Age-adjusted standard scores were calculated for measures of intelligence and social cognition. Impairment was defined as performance <10th percentile of national norms. Multivariable general linear models were used to examine associations between social cognition and tumor location after adjusting for Full Scale IQ.

Results: As a group, a significantly larger proportion of brain tumor survivors were impaired on measures of affect naming (30%, $p<0.001$) prosody-face matching (40%, $p<0.001$), and prosody-pair matching (41%, $p<0.001$) than expected. Full scale IQ did not differ significantly between groups (Infratentorial=86.2 vs. Supratentorial=92.1, $p=0.17$), nor did age at diagnosis or time since diagnosis. After adjusting for Full Scale IQ, infratentorial tumor survivors performed significantly worse on measures of social perception ($F(1,55)=7.5$, $p=0.008$), prosody-face matching ($F(1,55)=13.3$, $p=0.001$) and prosody-pair matching ($F(1,55)=7.7$, $p=0.008$). Tumor location remained a significant predictor after accounting for radiation treatment.

Conclusions: Adult survivors of pediatric brain tumors demonstrated considerable impairment on measures of social cognition, with greater impairment observed for survivors of infratentorial tumors. Observed impairment suggests pervasive impact on social skill development and acquisition. Future studies will examine the impact of social cognition on functional outcomes.

Correspondence: *Tara M. Brinkman, PhD, Epidemiology and Cancer Control, St. Jude Children's Research Hospital, 262 Danny Thomas Place, MS 735, Memphis, TN 38105. E-mail: tara.brinkman@stjude.org*

L.M. JACOLA, J.M. ASHFORD, K.N. CLARK, K. MARTIN-ELBAHESH, R. CUNNION & H.M. CONKLIN. Clinical Utility of the DKEFS for Identifying Executive Dysfunction in Childhood Cancer Survivors.

Objective: Childhood cancer survivors treated with CNS-directed therapy are at increased risk for impairments in executive function (EF), a construct comprised of a broad spectrum of cognitive abilities. Specific assessment of EF is critical for cognitive monitoring and the implementation of efficacious interventions. This study investigates the clinical utility of the Delis Kaplan Executive Function System (DKEFS) in survivors of childhood cancer.

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms.
https://doi.org/10.1017/S1355617714000381

Participants and Methods: Survivors of acute lymphoblastic leukemia (ALL, n=85, age=11.85±2.35, time from treatment=5.09±2.73) and brain tumor (BT, n=43, age=11.90±2.49, time from treatment=5.14±3.10) completed DKEFS Trail Making (TM) and Color-Word Interference (CWI) subtests. Parents completed the Behavior Rating Inventory of Executive Function (BRIEF). Participants were categorized as below average performers on the DKEFS (Scaled≤6) and at risk on the BRIEF (T≥61).
Results: Rate of below average performance was significantly higher than the normative expectation for the BT group on measures of sequencing, shifting and inhibition (TM Letter Sequencing χ^2=14.39, p<.01; Letter-Number Sequencing χ^2=17.72 p<.01; CWI Inhibit/Switch Errors χ^2=8.77, p<.01) and for the ALL group on inhibition (CWI Inhibit χ^2=6.32, p<.02). Parents rated BT participants as having significantly greater risk for problems with shifting (BRIEF Shift χ^2=14.39, p<.01). No elevated risk on BRIEF Inhibition was seen for either group (χ^2=.02 [BT], 2.49 [ALL], p=ns). Correlational analyses revealed no significant relationships among the BRIEF Shift or Inhibit scales and performance on DKEFS measures in the BT group (p=.06-.78) or between BRIEF Inhibit and CWI Inhibit in the ALL group (p=.10).
Conclusions: Findings highlight the diversity of EF problems experienced by childhood cancer survivors. Comprehensive assessment is critical to understanding the impact of executive dysfunction across settings. Performance and rater measures may offer complimentary information and direction for individualized recommendations.
Correspondence: *Lisa M. Jacola, Ph.D., Department of Psychology, St. Jude Children's Research Hospital, 262 Danny Thomas Place, Mail Stop 740, Memphis, TN 38105. E-mail: lisa.jacola@gmail.com*

A. STUDAWAY, C. KIMBERG, J. LUXTON, T. BRINKMAN, L. ROBISON, M. HUDSON, G. ARMSTRONG & K.R. KRULL. Longitudinal Decline in Verbal Intelligence and Memory Problems Among Adult Survivors of Childhood Acute Lymphoblastic Leukemia.
Objective: Long-term survivors of childhood acute lymphoblastic leukemia (ALL) treated with cranial radiation therapy (CRT) are at risk for cognitive impairment. The purpose of this study was to determine whether memory problems are associated with decline in verbal intellect as survivors mature into adulthood.
Participants and Methods: 102 adult survivors of childhood ALL (mean [range] age at diagnosis = 5.0 [0.8-15.3] years; current age = 38.5 [26.6-54.7] years), treated with either 18 Gy or 24 Gy CRT were recruited from a large institutional cohort. Survivors completed intelligence testing an average of 3.5 years post-therapy and were re-tested with the Wechsler Abbreviated Scales of Intelligence and the California Verbal Learning Test-II (CVLT-II) 27.6 years later. The association between current CVLT-II performance and change in IQ was examined.
Results: Verbal IQ declined an average of 10.3 points (p< 0.0001) over the 27-year follow-up, with no significant decline in Performance IQ. 53 survivors (52%) demonstrated a decline ≥ 10 points, while 49 (48%) demonstrated no substantial change. Survivors demonstrating a decline performed significantly lower on CVLT-II Trial 5 than survivors without a decline (p< 0.02), though no difference on Trial 1 was observed. A trend for lower learning slope was apparent in survivors with Verbal IQ decline (p<0.06). This reduced rate of new learning was further reflected in lower performance on List B recall (p< 0.008), as well as reduced short-delay (p< 0.04) and long-delay (p<0.05) free recall. Delayed recall in the group with Verbal IQ decline did not improve with semantic cueing (p= 0.04).
Conclusions: The results of this study suggest that difficulties in storage and retrieval of new information are associated with decline in verbal intelligence over time. Longitudinal follow-up of aging survivors is recommended.
Correspondence: *Kevin R. Krull, Ph.D., Epidemiology & Cancer Control, St. Jude Children's Research Hospital, 262 Danny Thomas Place, MS 735, Memphis, TN 38105-2794. E-mail: kevin.krull@stjude.org*

H.M. CONKLIN, M.A. SCOGGINS, J.M. ASHFORD, M.M. JONES, K.N. CLARK, K. MARTIN-ELBAHESH, K.K. HARDY, T.E. MERCHANT, S. JEHA & R.J. OGG. Change in Brain Activity among Childhood Cancer Survivors Participating in Computerized Working Memory Training.
Objective: Working memory (WM) deficits are a core cognitive impairment among childhood cancer survivors. These deficits may underlie declines in IQ and be indicative of neurodevelopmental disruptions, particularly in networks engaging the prefrontal cortex (PFC). In this study, fMRI was used to investigate neural correlates of WM improvement associated with a computerized WM intervention in childhood cancer survivors.
Participants and Methods: Survivors of acute lymphoblastic leukemia (ALL) or brain tumor (BT) with WM deficits (n=68) were randomly assigned to a computerized WM intervention (23 ALL/11 BT, age= 12.2±2.5) or a wait-list control group (24 ALL/10 BT, age= 11.8±2.4). The intervention group completed 25 training sessions at home with weekly, phone-based coaching. Cognitive assessments and fMRI scans (intervention group only) were completed pre- and post-intervention.
Results: Survivors completing the intervention (n= 30; 88%) demonstrated significantly greater improvement than controls on WISC-IV Spatial Span Backward (3.1±3.2 vs 0.8±2.4, p=.002) and WISC-IV WM Index (9.2±9.2 vs 4.0±8.2, p=.022). Areas of robust neural activation during a spatial WM task included superior parietal lobule, ventral and dorsolateral PFC, middle and superior frontal gyri (p< 0.05, corrected). There was a significant reduction in PFC activation pre- to post-intervention (p<0.05 corrected). When dividing the group at the median change score for Spatial Span Backward or the WM Index, those with less improvement showed greater right dorsolateral PFC activation pre-intervention (p<0.05, corrected).
Conclusions: Neural networks activated during a spatial WM task were consistent with the neuroimaging literature. WM training was associated with a reduction in activation of PFC regions, with those showing less benefit having greater pre-intervention activation. Survivors who require greater executive control for successful WM performance may be less responsive to intervention, which could assist in selection of patients for cognitive training.
Correspondence: *Heather M. Conklin, Ph.D., Psychology, St. Jude Children's Research Hospital, 262 Danny Thomas Place, Mail Stop 740, Memphis, TN 38105-2794. E-mail: heather.conklin@stjude.org*

Symposium 3: Preclinical Alzheimer's Disease: Biomarkers, Functional Relevance, and Preventative Strategies

Chair: Ozioma Okonkwo

Discussant: Sterling Johnson

3:00–4:30 p.m.

O.C. OKONKWO, D. RENTZ, C. ROE, C. PETTIGREW, K. RODRIGUE, O. OKONKWO & S. JOHNSON. Preclinical Alzheimer's Disease: Biomarkers, Functional Relevance, and Preventative Strategies.
Symposium Description: It is now recognized that the pathognomonic hallmarks of Alzheimer's disease (AD) begin to accumulate decades before the emergence of clinical symptoms. While there is broad consensus regarding the biomarker alterations that characterize this preclinical stage of AD, the clinical relevance of these early changes is only now being elucidated. Likewise, there is great interest in uncovering potential strategies for delaying the progression of the pathophysiological and behavioral features of this disease stage. This symposium brings together scientists from some of the leading preclinical AD research groups in the nation to address these issues. Specifically, Dr. Dorene Rentz will discuss interrelationships among amyloid burden, synaptic integrity,

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

and cognitive function in cognitively normal adults enrolled in the Harvard Aging Brain Study. Dr. Catherine Roe will present evidence that abnormalities in cerebrospinal fluid phosphorylated tau-181 (ptau181) and ptau181/β-amyloid42 are predictive of errors committed during an on-road driving test among enrollees in the Adult Children Study. Dr. Corinne Pettigrew will present data from the BIOCARD cohort concerning the relationship of medial temporal lobe atrophy, APOE4 status, and cognitive reserve with time to symptom onset during preclinical AD. Dr. Karen Rodrigue will show how health factors such as hypertension can modulate the aggregation of cerebral amyloid among healthy older adults in the Dallas Lifespan Brain Study. Dr. Ozioma Okonkwo will discuss how engagement in physical activity might ameliorate age-associated alterations in key AD biomarkers such as β-amyloid, glucose metabolism, and hippocampal volume among at-risk adults in the Wisconsin Registry for Alzheimer's Prevention. Finally, in keeping with the theme of this year's INS meeting, Dr. Sterling Johnson will lead a discussion on the challenges that must be addressed in order for scientific advances to better inform clinical practice in preclinical AD.

Correspondence: *Ozioma C. Okonkwo, PhD, University of Wisconsin-Madison, 600 Highland Avenue, CSC J5/156M, Madison, WI 53792. E-mail: ozioma@medicine.wisc.edu*

D. RENTZ. Detecting Cognitive and Behavioral Evidence of Preclinical AD.

Objective: Recently published commentaries propose that the time to intervene in Alzheimer's disease (AD) is during a preclinical stage when the underlying pathophysiological changes are occurring up to 15 years in advance of clinical symptoms. This is a stage when individuals are defined as clinically normal (CN) but exhibit evidence of amyloidosis, neuronal injury and very subtle cognitive / behavioral decline. These individuals are now the target population for planned secondary prevention trials in the treatment of AD. Therefore understanding the imaging and cognitive biomarkers that are predictive of preclinical AD is critical, not only for research but for neuropsychological practice as well. Participants: In this symposium, I will present work from the Harvard Aging Brain Study, which includes 250 CN individuals, ages 65-90 who have had extensive cognitive evaluations, APOE genotyping, Magnetic Resonance Imaging scans and both C11 Pittsburgh Compound B (PiB PET) and 18F-flourodeoxyglucose (FDG PET) imaging. Methods: Recent work has focused on determining whether synaptic integrity using FDG PET and amyloid beta (Aβ) deposition with PiB PET can dissociate normal aging from preclinical AD. More recently, Tau PET imaging has been inaugurated to understand the role of neurofibrillary tangles in preclinical AD. Results: Relationships between these imaging predictors and their associations with episodic memory, executive function and subjective cognitive concerns will be discussed. The mediating effect of cognitive reserve and APOE4 carrier status will also be explored. Conclusions: Our results suggest that 1) Aβ burden and synaptic dysfunction independently predict episodic memory performance in CN older adults and 2), synaptic dysfunction but not Aβ deposition contributes to executive performance. Cognitive reserve mediates these relationships.

Correspondence: *Dorene Rentz, Departments of Neurology, Brigham and Women's Hospital and Massachusetts General Hospital, Boston, WI MA. E-mail: DRENTZ@partners.org*

C. ROE. Preclinical AD Biomarkers are Associated with Poorer Driving Performance: Preliminary Results.

Objective: To determine whether preclinical AD is a risk factor for poor driving performance.

Participants and Methods: Data from the first 42 participants enrolled and tested in a larger study were used. Participants were aged 65 years and above, cognitively normal (Clinical Dementia Rating = 0), and took part in a 60-minute, in-traffic (12 mile), standardized road test along a predetermined route. The test includes a mixture of driving skills and both quantitative and qualitative ratings of driving performance. Participants took part in clinical and psychometric assessments, lumbar puncture for cerebrospinal fluid (CSF) collection, and amyloid imaging for Pittsburgh Compound B (PIB) uptake. Preclinical AD was defined based on abnormal values of the CSF biomarkers Aβ42, tau, ptau181, tau/Aβ42, and ptau181/Aβ42; and PIB uptake. CSF biomarker values were assigned to high and low groups using a median split. General linear models were used to test whether there was a difference in mean number of driving errors for individuals with, and without, preclinical AD.

Results: Participants with higher levels of ptau181 had more errors on the driving test than did those with lower levels (6.4 vs. 3.7, p=.045) and participants with higher ptau181/Aβ42 levels had more errors than those that did not (6.5 vs. 3.6, p=.032) in models adjusted for age, gender, education, and APOE ε4 status. CSF Aβ42, (p=.451), tau (p=.206), and tau/Aβ42 (p=.351) levels were unrelated to number of driving errors. Amyloid uptake values were not available at the time of abstract submission but will be discussed during the presentation.

Conclusions: Although more work is needed, these preliminary data suggest that some biomarkers of preclinical AD are related to driving performance.

Correspondence: *Catherine Roe, Washington University School of Medicine, 660 South Euclid; Campus Box 8111, St. Louis, MO 63110. E-mail: cathyr@wubios.wustl.edu*

C. PETTIGREW, A. SOLDAN, O. SELNES, M. ALBERT, M. WANG, Y. LU, L. YOUNES, T. RATNANATHER, T. BROWN, S. MORI & M. MILLER. Medial Temporal Lobe Atrophy, APOE status, Cognitive Reserve and Risk of Clinical Symptom Onset During Preclinical AD.

Objective. This study examined the relationship of medial temporal lobe (MTL) atrophy (as measured on MRI), Apolipoprotein (ApoE) status, and cognitive reserve (CR) with time to symptom onset during preclinical Alzheimer's disease (AD).

Participants and Methods. This study includes 256 individuals from the BIOCARD cohort who were cognitively normal and middle-aged (M = 57.2 years) at baseline. Participants have been followed prospectively for up to 17 years (M = 8 years) with annual clinical and cognitive assessments; 55 participants have developed MCI or AD dementia.

We examined three regions of interest (ROI) on baseline MRIs: hippocampal volume, entorhinal cortex thickness, and amygdala volume. Measures were obtained from a semi-automated method, using large deformation diffeomorphic metric mapping (LDDMM).

Cox regression models were used to determine whether MTL ROIs were associated with time to onset of clinical symptoms and whether the presence of an ApoE-4 allele and an individual's level of CR at baseline modify this association.

Results. The mean time from baseline to the onset of clinical symptoms was approximately 6 years. Increased risk of progressing from normal cognition to onset of clinical symptoms was associated with lower right hippocampal volume, and lower mean entorhinal cortex thicknesses (all RRs < 0.75). Amygdala volumes were not significant. Having at least one APOE e4 allele increased the risk of clinical symptom onset (RRs >1.35), while higher CR reduced the risk (RRs < 0.55). However, MTL ROIs did not interact with either ApoE status or CR, indicating each is independently associated with clinical symptom onset.

Conclusions. These results demonstrate that MTL neurodegeneration during preclinical AD is associated with time to onset of clinical symptoms that are a harbinger of a diagnosis of MCI. Furthermore, this association is independent of ApoE status and cognitive reserve.

Correspondence: *Corinne Pettigrew, Johns Hopkins University School of Medicine, 1620 McElderry Street, Baltimore, MD 21205. E-mail: cpettigrew@jhmi.edu*

K. RODRIGUE, K. KENNEDY, M. DEVOUS & D. PARK. Amyloid Deposition in Healthy Aging: Impact of Vascular and Genetic Risk.

Objective: Beta-amyloid (Aβ) protein deposition is a marker of Alzheimer's Disease (AD) that is apparent in least 20% of cognitively normal

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

elderly. Identification of the most salient risk factors that increase the likelihood for beta-amyloid deposition is critical for targeting individuals who are most at risk for the neuropathological changes associated with AD. The primary objective of the study was to test the hypothesis that healthy middle aged and older individuals with vascular risk factors such as hypertension would show greater Aβ than those without such risk. We further hypothesized that hypertension, in combination with genetic risk factor APOE ε4, would show the highest Aβ deposition.
Participants: Participants consisted of 117 cognitively normal adults, ages 47-89, screened to be free of significant age-related disease.
Methods:Participants underwent Aβ PET imaging with radiotracer Amyvid. Participants were genotyped for Apolipoprotein E and were classified as e4+ or e4-. Participants were classified in the Hypertension group if they reported a medical diagnosis of hypertension or if blood pressure exceeded 140 systolic/90 diastolic.
Results: Results revealed a significant Genetic Risk × Hypertension interaction, where participants with both hypertension and at least one e4 allele, showed significantly greater amyloid burden than those with only one risk factor or no risk factors. Secondary analyses showed that increases in pulse pressure were strongly associated with increases in mean cortical amyloid, especially in the genetic risk group.
Conclusions: These findings suggest that it is important to consider genetic risk for AD in the context of health factors such as hypertension. Vascular disease is a prevalent age-related condition that is highly responsive to both behavioral modification and medical treatment. Proper control and prevention of vascular risk earlier in the lifespan may ameliorate or delay future cognitive decline in older age.
Correspondence: *Karen Rodrigue, The University of Texas at Dallas, 1600 Viceroy Drive, Suite 800, Dallas, TX 75235. E-mail: krodrigue@utdallas.edu*

O.C. OKONKWO. Physical Activity Modifies Alzheimer Biomarkers in Preclinical AD: Evidence from the Wisconsin Registry for Alzheimer's Prevention.
Objective: Results from AD clinical trials testing novel disease-modifying therapeutics have been disappointing. Therefore, there is great urgency for alternative approaches to halting the global crisis posed by AD. This study examined whether engagement in physical activity might alter the age-dependent evolution of AD-related brain changes in a cohort of at-risk, middle-aged adults.
Participants and Methods: Enrollees in the Wisconsin Registry for Alzheimer's Prevention underwent T1 MRI (n=317), PiB-PET (n=189), and FDG-PET (n=153) imaging. Their responses on a self-report measure of current physical activity were used to compute MET-hours/week scores, which were then used to classify the subjects as either Physically Active or Physically Inactive based on AHA guidelines. The subjects also completed a comprehensive neuropsychological battery that assessed 8 domains: Immediate Memory, Verbal Learning & Memory, Visual Learning & Memory, Story Recall, Working Memory, Speed & Flexibility, Visuospatial Ability, and Verbal Ability. Regression analyses were used to test whether the known effect of age on AD biomarkers and cognition was modified by physical activity, after controlling for relevant covariates.
Results: We observed significant age*physical activity interactions on hippocampal volume (p=.025), amyloid burden (p=.015), and glucose metabolism (p=.015) such that, with advancing age, Physically Active subjects had less shrinkage of the hippocampus, slower accumulation of amyloid, and attenuated glucose hypometabolism. Similar findings were observed on cognitive domains of Immediate Memory, Visuospatial Ability, and Verbal Ability.
Conclusions: In midlife, engagement in physical activity is associated with an attenuation of the deleterious influence of age on key AD biomarkers. Longitudinal analyses would help clarify the extent to which midlife participation in physical activity protects against the development of AD and related disorders in later life.
Correspondence: *Ozioma C. Okonkwo, UW-Madison; 600 Highland Ave, CSC J5/156M, Madison, WI 53792. E-mail: ozioma@medicine.wisc.edu*

Poster Session 5: Symptom Validity/Effort Testing, Forensics, Assessment/Psychometrics/Methods in Adults and Children

3:30–4:45 p.m.

Malingering/Effort Testing

A.R. LOUGHAN, R. PERNA, J. LE & J. HERTZA. TOMM10e Utility: Assessing Effort in Children.
Objective: Symptom validity testing (SVT) during child neuropsychological evaluations is evolving toward greater sensitivity and time efficiency. Although a commonly used SVT is the Test of Memory Malingering (TOMM); many clinicians agree this measure is quite lengthy. Recent investigations have explored the administration of the initial 10 items (TOMM10e) rather than the standard 150 items in predicting adequate effort in adults. This study investigated the TOMM10e's utility in children.
Participants and Methods: Data was collected on 194 children (boys=63%, girls=37%; age range 6-18) who were referred due to academic and behavioral problems. No children were involved in litigation, custody disputes, or recent accidents. This was a mixed clinical sample. Neuropsychological evaluation data was analyzed via SPSS. The TOMM10e was calculated by computing the number or correct responses on the first 10 items of TOMM Trial1. Overall analyses included frequencies, sensitivity (SN), specificity (SP), positive predictive value (PPV), and negative predictive value (NPV).
Results: Mean FSIQ was average [89.3 (17.5)]. Scores on Trial2 ranged from 31 to 50, M=48.4 (SD=3.1). Scores on TOMM10e ranged from 5 to 10, M = 9.24 (SD = 1.1). Of those who scored above the TOMM10e proposed cutoff in adults (n = 156), 97% (n = 152) went on to meet/exceed the cut score for Trial2. TOMM10e scores were significantly positively correlated with TOMM Trial2 scores (r = .410, p = .000). For TOMM10e, the optimal cutoff scaled score was >8, resulting in SN of 53% and SP of 96%. TOMM10e scores of >8 also resulted in 96% NPV.
Conclusions: This data supports a high likelihood of passing Trail2, if a score >8 is demonstrated on the TOMM10e. Only administering TOMM10e to determine effort could be extremely time and diagnostically efficient. Validation studies are needed in this area of research.
Correspondence: *Ashlee R. Loughan, Ph.D., NeuroBehavioral Associates, 1355 Independence Dr, Augusta, GA 30901. E-mail: aspicer88@yahoo.com*

A.R. LOUGHAN, R. PERNA, J. LE & J. HERTZA. TOMM Trial 1 Continues to Prove Validation of Effort in a Pediatric Sample.
Objective: The utility of pediatric symptom validity tests (SVT) has increased in popularity. A common SVT is the Test of Memory Malingering (TOMM). Clinicians have questioned if one trial alone is sufficient for predicting adequate effort on the TOMM. Our hypothesis is that children who pass TOMM Trial1 will go on to pass Trial2.
Participants and Methods: Data was collected on 194 children (boys=63%, girls=37%; age range 6-18) who were referred due to academic and behavioral problems. No children were involved in litigation, custody disputes, or recent accidents. This was a mixed clinical sample. Participants completed a neuropsychological evaluation. Data was entered into and analyzed via SPSS. Analyses included frequencies, sensitivity (SN), specificity (SP), positive predictive value (PPV), and negative predictive value (NPV).
Results: Mean FSIQ was average [89.3 (17.5). Scores on TOMM Trial1 ranged from 25 to 50, M=44.8 (SD=4.9). Scores on Trial2 ranged from

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

31 to 50, M=48.4 (SD=3.1). On Trial1, 36% (n=70) of the sample scored below the established cutoff. Of those who scored above the TOMM Trial2 cutoff on Trial1 (n = 124), 98% (n = 122) went on to meet/exceed the cut score for Trial2. TOMM Trial1 scores were significantly positively correlated with TOMM Trial2 scores (r = .552, p = .000). For Trial1, the optimal cutoff scaled score was >40, resulting in SN of 80% and SP of 91%. Trail 1 scores of >40 also resulted in 98% NPV.

Conclusions: Considerable and growing data support a high likelihood of passing Trail2, if Trial1 was passed. Our results indicate that a score <40 on Trial1 is suspicious of poor effort and highly likely to fail the TOMM. If a passing score is achieved during Trial1, 98% of cases also achieved sufficient scores on Trial2. Only administering Trial1 to determine effort could be time and diagnostically efficient.

Correspondence: *Ashlee R. Loughan, Ph.D., NeuroBehavioral Associates, 1355 Independence Dr, Augusta, GA 30901. E-mail: aspicer88@yahoo.com*

E. MONTAGUE, E.A. LONG, L.D. STANFORD & D.T. PULSIPHER. Optimizing test performance with feedback about effort for adolescents with mild TBI.

Objective: Although most adolescents demonstrate full cognitive recovery by 10 days following concussion, a significant subset report residual neuropsychological complaints. There is growing interest in evaluating cognitive effort to ensure that post-concussive cognitive deficits are not overstated. However, limited data are available to inform clinical practice on procedures related to effort failure. This study aims to explore the impact of having a frank discussion with adolescents following effort test failure.

Participants and Methods: 55 consecutive referrals (mean age = 15.1 years) for neuropsychological evaluation following concussion were evaluated ≥3 weeks post injury (mean time since injury = 126.2 days). 17 (31%) adolescents failed a formal effort test administered prior to beginning neuropsychological evaluation. After a discussion about effort with a licensed neuropsychologist, 15 passed additional effort measures, and the assessment was continued, while 2 were excluded for continued failure. Deficit scores were calculated for 13 neuropsychological measures administered as part of a standard battery and summed to create a global deficit score (GDS) for each participant.

Results: GDS was similar for the high and low effort groups (d = .01). GDS was unrelated to time since injury, total number of concussions, self-report of post-concussive symptoms, or premorbid psychological diagnoses. GDS was negatively correlated with Full Scale IQ (r=-0.36, p<0.01).

Conclusions: Contrary to expectations, adolescents who initially failed a formal effort measure did not show evidence of greater impairment on subsequent measures of neuropsychological function, providing preliminary support for the importance of discussing effort openly with adolescents. The correlation between poor neuropsychological performance and lower IQ suggests that deficits are related to premorbid individual differences rather than concussion.

Correspondence: *Erica Montague, Ph.D., NeuroDevelopmental Science Center, Akron Children's Hospital, Considine Professional Building, 215 W. Bowery Street, Akron, OH 44308. E-mail: emontague@chmca.org*

H. SCHNEIDER, J.W. KIRK & E. MAHONE. Utility of the Test of Memory Malingering (TOMM) in Preschool Children with and without ADHD.

Objective: There is growing consensus that formal assessment for non-credible performance is a necessary component of pediatric neuropsychological assessment practice. The purpose of the current study was to establish the utility and validity of the Test of Memory Malingering (TOMM) in preschool and early elementary school children with and without ADHD.

Participants and Methods: A total of 69 children (ages 4-7 years, M=5.7 ± 0.9) were recruited as part of a longitudinal study of brain development. The sample included 35 typically developing controls (14 girls, 21 boys) and 34 children with ADHD (11 girls, 23 boys). ADHD diagnosis was based on modified DSM-IV criteria and determined through structured psychiatric interview and parent ratings. All three trials of the TOMM were administered.

Results: There was no significant difference in VIQ between groups. After controlling for age, there were no significant group differences on TOMM Trial 1 or Retention; however, Trial 2 performance for controls (M=47.8 ± 3.8), was significantly better than performance of children with ADHD (M=43.2 ± 10.4; p=.01). Within the ADHD group, Trial 2 performance was not significantly associated with either VIQ or ADHD symptom severity. Across groups, performance on all three TOMM trials improved significantly with increasing age (all p≤.001). This association, particularly for Trial 2, was driven primarily by higher rates of poor performance among the youngest children in the ADHD group (50% of 4-year olds), whereas 86% of controls and 80% of children with ADHD age 5 and older performed the task with more acceptable rates of accuracy (score of ≥45). In the entire sample, 86% of controls, but only 67% of children with ADHD, met published adult cutoff criteria by Trial 2.

Conclusions: Most typically developing children ages 4 and above can complete the TOMM with acceptable rates of accuracy. Conversely, children with ADHD, especially those younger than age 5, show unacceptably low pass rates on the TOMM, regardless of ADHD severity or IQ.

Correspondence: *Heather Schneider, Kennedy Krieger Institute, 1750 E Fairmount Ave, Baltimore, MD 21231. E-mail: schneiderh@kennedykrieger.org*

N.M. DEGAIL, O.A. SANTOS, B. GREEN, A.J. KOZLOWSKI, M.M. LANGENKAMP & D.C. OSMON. ADHD Feigning Questionnaire In College Students.

Objective: Performance Validity Tests (PVT) suggest about a 40% percent base rate of malingering for ADHD. However, a positive PVT indication is an indirect measure of malingering that may have many moderating variables. The purpose of this study was to assess ADHD malingering by survey.

Participants and Methods: 506 psychology undergraduate students completed an anonymous online survey in exchange for extra-credit. The questionnaire included 140 questions about ADHD prevalence, feigning, demographic, licit and illicit substance use and its effects.

Results: 27% (137/504) reported using marijuana and 78% (393/505) reported using alcohol. 81 (16%) out of 504 students reported being diagnosed with ADHD. 113 of 482 (23%) students reported buying non-prescribed Adderall; 53% (60/113) reported taking Adderall recreationally and 17% (20/115) reported selling Adderall to another person. 166 of 503 (33%) students reported knowing someone who pretended to have ADHD. Only 14 (3%) of 492 students reported ever pretending to have ADHD. Of those 14 students, 10 (71%) reported to have been successful at pretending.

Conclusions: The present results are suggestive of a gap between base rate of ADHD feigning as determined by the present methods (3%) versus use of PVT (~40%). Results found a high base rate of ADHD diagnosis (16%), but a low base rate of admitted feigning ADHD (3%). While admission may be constrained, the relatively high rate of admission of marijuana use (27%), alcohol use (78%) and non-prescribed Adderall purchase (23%) would argue against constraint. Conversely, 33% of students reported knowing someone who feigned ADHD; however, it is not clear from the wording exactly how this question was construed (e.g. some seemed to have construed the question more broadly to mean not just feigning ADHD during an evaluation). Results need clarification and replication in different regions of the country and ideally with a population-based sample rather than a convenience sample.

Correspondence: *Octavio A. Santos, BA, Psychology, University of Wisconsin-Milwaukee, 2511 N. HUMBOLDT BLVD APT 2, MILWAUKEE, WI 53212. E-mail: osantossolano@gmail.com*

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

L.M. SILVA, R. WILSON, H. LUU, J. RUBIN, J.W. FINK, R.C. LEE, N.H. PLISKIN & K. THULBORN. Depressive Symptomatology, Abnormal Neuroimaging Findings, and Symptom Validity Performance in Electrical Injury.

Objective: New-onset depressive symptomatology has been shown to frequently emerge following electrical injury (EI). There has also been evidence that established symptom validity measures such as the FBS of the MMPI-2 may not accurately capture exaggeration of symptoms in this population. While level of effort is a factor that must be considered when attempting to interpret test results, patterns of depressive symptomatology and performance on validity measures have not been extensively investigated in this population.

Participants and Methods: We examined MMPI-2 FBS scores and levels of depressive symptomatology as measured by the BDI-II and MMPI-2 Depression Scale in a sample of 64 adults between the ages of 19 and 62 (mean = 43.8 years; 87.5% male) who had experienced an electrical injury. Of these, 36 had abnormal neuroimaging results (56.3%).

Results: There were no significant differences in MMPI-2 FBS scores or reported levels of depressive symptomatology between those participants with normal neuroimaging (NN) results and those with abnormal (AN). However, significant relationships with FBS scores differed between groups: The AN group evidenced a significant relationship between FBS scores and reported level of depressive symptomatology, whereas the NN group did not. An analysis of variance showed that the effect of level of depressive symptomatology on FBS scores was significant for the AN group, accounting for 56% of the variance in FBS scores. This effect was not significant for the NN group, as level of depressive symptomatology accounted for only 17% of the variance in FBS scores.

Conclusions: These results suggest a differential impact of depressive symptomatology on symptom validity performance in the portion of the EI population with abnormal neuroanatomical imaging results. Further examination is needed to determine the nature of the relationship between neuroanatomical factors and depressive symptomatology in electrical injury, as well as what impact they might have on symptom validity performance.

Correspondence: *Lynette M. Silva, Ph.D., Psychiatry, Univ of Illinois at Chicago, 912 South Wood St, NC 747, Chicago, IL 60612. E-mail: lynettesilva@gmail.com*

C. GRILLS & P. ARMISTEAD-JEHLE. Performance Validity Test And Neuropsychological Assessment Battery Screening Module Performance In An Active Duty Sample with a History of Concussion.

Objective: The current study examined the base rate of failure on a well-established Performance Validity Test (The Word Memory Test) in a military sample and the corresponding impact on a neurocognitive screening battery (Neuropsychological Assessment Battery Screening Module [NAB-S]).

Participants and Methods: We performed a retrospective chart review of consecutive referrals for neurocognitive screening in an outpatient Army Concussion Clinic over an approximately three year time period (N=615). The mean age and education of the sample was 28.75 (range=19-51) and 12.38 (SD=1.31; range 8-18), respectively. In order to determine the impact of PVT performance on cognitive test performance, a PVT composite index was calculated in a manner similar to Green, Rohling, Lees-Haley and Allen (2001). The primary validity scales of the WMT were converted to standardized scores using normative data from the WMT manual and then averaged.

Results: Thirty-nine percent of the sample failed the WMT according to the standard cut scores. The WMT composite index was positively associated with overall neurocognitive test performance as measured by the NAB Total Screening Index ($r = .56$, $p < 0.05$) and accounted for 31% of the variance in neurocognitive test performance. As expected, the effect size for PVT performance on overall neurocognitive test performance was large (Cohen's $d = 0.95$). Age was negatively but only slightly associated with performance on the composite index ($r = -0.10$, $p < 0.05$). Education was not significantly correlated with WMT composite index performance ($r = 0.01$, $P = .75$). Finally, there was no significant difference in PVT performance across ethnic groups, $F(5, 609)=1.85$, $p=.09$.

Conclusions: The current results replicate previous research in this population highlighting the noteworthy base rate of PVT failure and the large impact of PVT performance on neurocognitive testing. The routine use of PVTs in this population appears further supported.

Correspondence: *Chad Grills, Ph.D., Concussion Clinic, Schofield Barracks, USAHC-SB, Bldg 672, Schofield Barracks, HI 96857. E-mail: chad.e.grills.civ@mail.mil*

D. PAULSON, M.D. HORNER & B.L. DAVID. A Comparison of Two Embedded Effort Indices for the RBANS in a Memory Disorders Clinic.

Objective: Effort testing has become increasingly recognized as an integral aspect of cognitive evaluations with older adults. This study evaluates both a recently proposed embedded RBANS Effort Scale (RBANS ES) and a modified embedded effort index, the Charleston Revised Index of Effort for the RBANS (CRIER), in a sample of older veterans who were referred to a memory disorders clinic.

Participants and Methods: The sample included 234 patients who did not receive a dementia diagnosis and could be identified as having either suboptimal (n = 45) or adequate (n = 189) effort. Criteria for adequate effort included a passing TOMM score and behavior consistent with good effort throughout the examination. Criteria for suboptimal effort included both a failing TOMM score and examination behavior suggestive of poor effort, such as unusual errors or error patterns in test results. The CRIER was calculated as follows:

CRIER = List Recall + Story Recall + Figure Recall + Digit Span + List Recognition - GDS

Results: Mean age was 68.2 years (SD = 9.9). Mean participant education was 12.8 years (SD = 3.1) and mean MMSE score was 26.6 (SD = 3.3). The RBANS ES predicted suboptimal effort with poor sensitivity (.42) but acceptable specificity (.71). Results supported the use of an initial cut-score to reduce false positives. The CRIER demonstrated excellent sensitivity (.84) and specificity (.90) for the prediction of suboptimal effort. In receiver-operator analysis, the RBANS ES produced AUC of .71, whereas the CRIER produced AUC of .94.

Conclusions: The CRIER was found to be a valid embedded effort index in this sample of older adults referred to a memory disorders clinic. The RBANS ES did not reliably predict effort in this sample. While embedded effort indices cannot replace performance validity tests, the CRIER shows promise as an accurate, easily-calculated embedded effort index. Future research should work to replicate these findings in other samples.

Correspondence: *Daniel Paulson, PhD, Department of Psychology, University of Central Florida, 4000 Central Florida Blvd, Psychology Building 99 Ste 320, Orlando, MI 32816. E-mail: Daniel.Paulson2@ucf.edu*

N.J. PASTOREK, D. PROTO, B. MILLER, J. LINCK, A. SIM & J. ROMESSER. Incremental Effect of Declining Performance Validity Test Scores on Several Cognitive Measures in OEF/OIF/OND Veterans with a History of Mild Traumatic Brain Injury.

Objective: Exposure to traumas during the wars in Iraq and Afghanistan has resulted in a large population of veterans with histories of mild traumatic brain injury (mTBI), with performance validity test (PVT) failure rates as high as 58% being reported in this cohort. The aim of the current study is to evaluate the construct validity of one PVT, the Word Memory Test (WMT), in this unique cohort by testing the hypothesis that incremental declines on the WMT should be associated with similar declines on cognitive testing.

Participants and Methods: The sample included 184 veterans with a history of mTBI referred for neuropsychological evaluation at five Veterans Affairs hospitals. The effect of WMT failure was examined with

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

respect to normatively corrected scores on CVLT-II Long Delay Free Recall, WAIS-IV Digit Span and Processing Speed Index, and WCST Perseverative Responses.
Results: An ANOVA with only two WMT groups (Pass versus Fail) demonstrated that the Fail group performed worse than the Pass group on all cognitive measures (ds = -0.69 to -1.01). Analysis of six WMT groups (Pass=92.5-100%; Caution=85-90%; Fail1=75-82.5%, Fail2=65-72.5%, Fail3=55-62.5%, Fail4<55%), however, showed that group differences between the WMT Pass group and the other five groups did not consistently emerge on all cognitive tests in comparison to the same non-Pass group. Post hoc analyses indicated that, relative to the WMT Pass group, worse memory was first shown in the Caution group, worse attention and executive skills were first shown in the Fail1 group, and worse processing speed was first shown in the Fail2 group. Furthermore, there was little evidence of continued decline in cognitive performance when comparing Fail2, Fail3, and Fail4 groups.
Conclusions: While failure on PVTs generally equates to lower performance on cognitive measures, this effect first manifests at different levels of PVT failure across different cognitive tests and declining PVT scores are not consistently associated with incremental declines on cognitive testing.
Correspondence: *Nicholas J. Pastorek, Ph.D., Michael E. DeBakey VA Medical Center, 2002 Holcombe Blvd, RECL 117, Houston, TX 77030. E-mail: nicholas.pastorek@gmail.com*

C. SOFKO, K.J. DUNHAM, S. SHADI, R.L. DENNEY & R.L. FAZIO. A Rarely Missed Items Index for the Repeatable Battery for the Assessment of Neuropsychological Status (RBANS).
Objective: The purpose of this study was to develop and validate a Rarely Missed Items (RMI) Index for the RBANS. The goal was to develop a RMI with a clinical sample with a dementia diagnosis and low mean RBANS scores; the extant Effort Scale and Effort Index excluded either those with dementia or advanced Alzheimer's and involved calculating formulas which can decrease efficiency.
Participants and Methods: The first part of the study involved the creation of the RMI using a clinical sample (N=53) with a mean RBANS Total Score of 57.1 (SD = 11.8) and the second part involved validation in a coached student simulator sample (N=43). A quasi-experimental research design was used. The RMI was created by conducting item analysis on the individual items of the RBANS (Form A) for the clinical sample to identify those items answered correctly by at least 83.6% of the clinical sample. A logistic regression analysis was conducted with these items and those that contributed significantly ($p < .05$) to the model were included in the final Index. The validation portion of the study involved calculating a RMI score for each subject and then a Receiver Operating Characteristic analysis was performed on the entire sample.
Results: The regression model was statistically significant ($\chi 2$ (9,96) = 62.541, $p < .001$). Cox and Snell R Square and Nagelerke R Square values indicated between 47.9% and 64.1% of variability was explained by the RMI. When all three items of the RMI were missed, sensitivity to poor effort was found to be 81.4% and specificity to genuine impairment was found to be 92.6%. The ROC area under the curve was .873, with a standard error = .040, 95% confidence interval =.794 to .951.
Conclusions: The resulting RMI consists of three items: chair, pencil, and clothespin from Picture Naming. This RMI was developed with a population with low RBANS Total Scores and may provide a more efficient means of assessing effort while maintaining an AUC of .873. It requires further validation.
Correspondence: *Channing Sofko, MA, University of South Alabama, 787 Howes Run Road, Sarver, PA 16055. E-mail: csofko@gmail.com*

K.D. WILLIAMSON, H.L. COMBS, J.P. HARP, L.H. MASON, M. EDMUNDSON & D. BERRY. Discriminating Between ADHD, ADHD With a Comorbid Psychological Disorder and Malingered ADHD in a College Sample.
Objective: The study examined the efficacy of various neuropsychological measures for differentiating ADHD and comorbid ADHD from malingered ADHD in a college sample. The hypotheses were: 1) individuals malingering would perform worse on dedicated effort measures and embedded effort indices than individuals with ADHD only and comorbid ADHD; 2) the comorbid ADHD group would perform similarly to the ADHD only group on all tests except intelligence and achievement measures; and 3) the DMT, LMT, TOMM, and NV-MSVT would show the best sensitivity to feigning with high specificity for ADHD.
Participants and Methods: The sample consisted of 76 undergraduate students at a large state university including 23 nonclinical individuals assigned to malinger ADHD (NLM), 9 nonclinical individuals responding honestly (NLH), 22 individuals with ADHD only (ADHD-H), and 22 individuals with comorbid ADHD diagnoses (ADHD-CO). The study utilized a simulation design with NLM instructed to feign ADHD while other groups responded under standard instructions. Dedicated effort tests including the TOMM, LMT, DMT, b Test, and NV-MSVT and embedded indices from the WAIS-IV and WJ-III were administered under instruction.
Results: Most dedicated effort tests were able to differentiate NLM from NLH. Non-parametric Kruskall-Wallis and Mann-Whitney U follow-up contrasts were utilized to compare group test performance. Test operating characteristics were calculated. A logistic regression was conducted to determine the optimal combination of tests to administer.
Conclusions: NLM performed significantly worse than the clinical groups on most variables examined. The WAIS-IV and WJ-III indices did not adequately differentiate NLM and ADHD-CO. ADHD-CO performed significantly worse than ADHD-H on the WJ-III variable. The TOMM, LMT, NV-MSVT, and CTIP performed well in the context of comorbid ADHD, but the DMT did not. The LMT, TOMM and NV-MSVT were the optimal combination of tests.
Correspondence: *Kimberly D. Williamson, B.A., Psychology, University of Kentucky, 3600 Brookewind Way, Apt. #4205, Lexington, KY 40515. E-mail: kimberly.williamson2@uky.edu*

J. ROBINSON, N. PASTOREK & B. MILLER. Serial Position Effects in Effort Test Failures.
Objective: Serial position effects in word learning measures such as the California Verbal Learning Test – 2nd edition (CVLT-II), have been robustly shown in populations with genuine memory impairment. While this effect, with impairment in primacy of information presented in memory impaired individuals, has been examined in simulators of impairment, a dearth of research exists examining these effects in a clinical sample failing effort indicators. The purpose of the present evaluation was to examine serial position effects in individuals presenting with cognitive complaints following mild traumatic brain injury. We hypothesized that individuals failing effort measures would not show the same effects seen in genuine memory impairment.
Participants and Methods: As part of a larger battery of tests, the California Verbal Learning Test - 2nd Edition and Green's Word Memory Test (WMT), was administered to 40 patients referred to a polytrauma clinic at a Veteran's Affairs medical Center following possible mTBI. From these patients, t-tests were conducted to compare individuals failing the WMT (N=24) with those who passed (N=16).
Results: The groups did not differ with respect to primacy effects ($p > .05$), but did differ in portion of the middle ($p = .008$) and end ($p = .025$) recalled, with the failures recalling less from the middle and more from the end.
Conclusions: Overall, the results suggest that effort test failures do not show patterns consistent with patients of genuine memory impairment. These results may help to serve as a useful embedded validity measure with further validation using a larger sample. Additionally, these effects may help frame patterns of memory problems in feedback with patients.

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

Correspondence: *Jordan Robinson, Michael E. DeBakey VAMC, 3023 Broadmead Dr, Houston, TX 77025. E-mail: Jayking.robinson@gmail.com*

D. PROTO, N. PASTOREK, B. MILLER, J. ROMESSER, J. LINCK & A. SIM. The Influence of Successive Numbers of Validity Test Failures on Neuropsychological Testing Performance in Individuals with a History of Mild Traumatic Brain Injury.

Objective: Performance (PVT) and symptom (SVT) validity tests are recognized as necessary components of neuropsychological examination. Practice guidelines have suggested the use of more than one such measure as effort levels might fluctuate across the testing session. However, prior research has indicated that failing even a single PVT can influence overall testing results. The purpose of the current study was to examine the effects on individual cognitive domains of successive numbers of failed PVTs in individuals with a history of mild traumatic brain injury (mTBI). It was hypothesized that greater numbers of failed PVTs would be associated with progressively reduced cognitive testing results.

Participants and Methods: 162 consecutively-referred veterans who screened positive for mTBI were seen for neuropsychological assessment; mean age = 31.9(7.2) years, education = 13.2(1.6) years. Evaluated cognitive domains included processing speed (WAIS-IV Processing Speed Index), executive functioning (Trail Making Test B, FAS), sustained attention (PASAT), and learning and memory (CVLT-II). PVTs consisted of the Word Memory Test, the TOMM, Reliable Digit Span, CVLT-II Forced Choice, WCST Failure to Maintain Set, and the Rey 15-item test. Levels were created for 0 (i.e., controls), 1, 2, 3, and 4+ PVT failures using published cut-off scores.

Results: Significant differences in effect sizes (Cohen's d) were found between controls and each of the successive levels of PVT failure as well as between the 1 and 2 PVT failure groups across multiple cognitive domains.

Conclusions: While the failure of at least two PVTs is sometimes utilized as a threshold for identifying suboptimal performance, the current findings indicate that failure of even a single PVT can result in significantly reduced neuropsychological testing results across multiple cognitive domains. These data suggest that not interpreting such results with caution could lead to possibly erroneous identifications of cognitive decline in individuals with mTBI.

Correspondence: *Daniel Proto, Ph.D., Michael E. DeBakey VA Medical Center, 2002 Holcombe Blvd., RECL-117, Houston, TX 77030. E-mail: dproto1@tigers.lsu.edu*

K. MCCULLOCH, N.J. PASTOREK, N.M. WISDOM, J. ROMESSER, J. LINCK, A.H. SIM & B.I. MILLER. Incremental Classification Accuracy Across the Test of Memory Malingering (TOMM) Trials.

Objective: The Test of Memory Malingering (TOMM; Tombaugh, 1996) is a standalone, forced-choice measure of visual recognition memory and is a commonly utilized performance validity test. While the TOMM manual primarily encourages interpretation of Trials 2 and Retention (except in the instance where Trial 1 performance is below chance), evidence is mounting that normatively-derived Trial 1 cut scores may result in a more sensitive indicator of invalid test performance. This study seeks to determine whether there is incremental validity with the addition of each of the three TOMM trials.

Participants and Methods: Eighty-eight participants were referred for neuropsychological evaluation following the completion of a Comprehensive TBI Evaluation. Participants completed the TOMM and Word Memory Test to evaluate agreement using receiving operator characteristic (ROC) techniques. An optimal TOMM Trial 1 cutoff was selected with a high specificity (≥0.95) and the greatest subsequent sensitivity; traditional cutoffs for Trials 2 and Retention were utilized.

Results: Using a TOMM Trial 1 cutoff at <43 resulted in a sensitivity of 0.64 and a specificity of 1.00. Interpretation of trials beyond Trial 1 (TOMM Trials 1 and 2; TOMM Trials 1, 2, and Retention) did not change sensitivity and specificity values. Furthermore, the ROC area under the curve remained constant at 0.82 for each of the three incremental trial combinations. No individuals were additionally classified as failing due to the interpretation of TOMM Trials 2 and Retention.

Conclusions: This study provides further support for the use of a normatively-derived cut score on TOMM Trial 1 an indicator of performance invalidity and also suggests that, in some populations, TOMM Trials 2 and Retention may not incrementally improve classification beyond Trial 1.

Correspondence: *Katie McCulloch, M.A., Psychology, University of Houston, 126 Heyne Building, Houston, TX 77204. E-mail: katiemccull@gmail.com*

K. MCCULLOCH, N.J. PASTOREK, N. SESTITO, M. TROYANSKAYA, R. SCHEIBEL, J. ROMESSER, J. LINCK, A.H. SIM & B.I. MILLER. Evaluation of Symptom Validity with the Neurobehavioral Symptom Inventory.

Objective: The Neurobehavioral Symptom Inventory (NSI) is a measure of post-concussive symptoms. Vanderploeg (2013) has developed and evaluated three embedded NSI scales for identifying invalid symptom reporting: the six most infrequently endorsed NSI items (LOW6), the five NSI items most highly correlated with the Mild Brain Injury Atypical Symptoms scale (NIM5), and the combination of these 10 non-overlapping items into one scale (Validity-10). The NSI total score was also investigated for its ability to classify invalid symptom report. The current study attempted to determine if NSI symptom domain scores (somatic/sensory, cognitive, and affective) could also be utilized to identify possible invalid symptom reporting and cross-validate the use of previously developed scales and the total score for comparison.

Participants and Methods: Receiver operating characteristic techniques were utilized with the Word Memory Test as the criterion.

Results: In a research sample of 116 Operation Enduring Freedom/Operation Iraqi Freedom (OEF/OIF) veterans with a history of deployment-related mild traumatic brain injury (TBI), a total score cutoff of ≥59 on the NSI yielded a sensitivity of 0.28 at a specificity of 0.95. When the specificity was held at approximately 0.95, all other symptom domain and previously developed scales resulted in lower sensitivity values (≤0.21). When results were validated within a second sample of 109 OEF/OIF/Operation New Dawn veterans referred for neuropsychological services following a Comprehensive TBI Evaluation, the previously derived total score cutoff resulted in a sensitivity of 0.29 at a specificity of 0.95. With an exception of the affective symptom domain (sensitivity=0.31), all other embedded scales yielded lower sensitivity values.

Conclusions: The NSI total score may be the easiest scoring method for clinicians and also the most effective for identifying possible symptom magnification of those methods investigated.

Correspondence: *Katie McCulloch, M.A., Psychology, University of Houston, 126 Heyne Building, Houston, TX 77204. E-mail: katiemccull@gmail.com*

P. KLAS, E. JEFFAY & K. ZAKZANIS. Validity of the Neuropsychological Symptoms Assessment (NPSA): Preliminary Results.

Objective: We sought to develop a self-reported measure of malingered neuropsychological symptomatology, entitled the Neuropsychological Symptoms Assessment (NPSA). It is a simple questionnaire of 60 Yes/No items. We sought to investigate whether the NPSA could be used to differentiate feigning and non-feigning individuals and if performance on the NPSA correlated with performance on other measures of symptom validity.

Participants and Methods: Data was collected from a random sample of litigating patients with traumatic brain injury (n = 130) who were referred for neuropsychological assessment due to complaints of cognitive impairment. A two-tailed t-test was used to compare NPSA performance in feigning and non-feigning individuals. Pearson's r correlations were computed to evaluate concordance with other tests of symptom validity.

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

Results: Feigning individuals scored significantly poorer than non-feigning individuals on the NPSA ($p < 0.01$), and performance significantly correlated with performance on the TOMM Trial 1 ($r = -0.603$, $p < 0.01$), Trial 2 ($r = -0.518$, $p < 0.01$), & Retention ($r = -0.424$, $p < 0.01$), Rey-15 Item Test Total Correct ($r=-.339$, $p < 0$ .05), Total Intrusions ($r = 0.363$, $p < 0.01$), Recognition Hits ($r = -0.484$, $p < 0.01$), & False Positives ($r = 0.467$, $p < 0.01$), Dot Counting Test ($r = 0.430$, $p < 0.01$), and VSVT Easy Items ($r -0.413$, $p < 0.01$), Difficult Items ($r = -0.413$, $p < 0.05$), Total Score ($r = -0.555$, $p < 0.01$).
Conclusions: These encouraging results are a positive indicator for the NPSA as a potential measure of symptom validity, and further investigation seems promising. Once it is further honed and validated, the NPSA could prove to be an attractive test for clinicians to employ, as it is very quick to administer and score.
Correspondence: *Eliyas Jeffay, M.A., University Of Toronto, 1265 Military Trail, Scarborough, ON M3A1A8, Canada. E-mail: eliyas.jeffay@utoronto.ca*

S. MOHAMMED, K. AN, E. JEFFAY & K. ZAKZANIS. Effort Exerted in Mandatory vs Voluntary Participation in Undergraduate Experiments.
Objective: Obtaining valid neuropsychological test results is essential in research studies. Previous research has suggested that a high proportion of the undergraduate population, whom which much neuropsychological research is conducted on, exert suboptimal effort. The current research was a follow-up to An et al. (2012)'s preliminary findings. Specifically, the purpose was to compare undergraduate test-taking effort in mandatory versus non-mandatory enrollment in research studies.
Participants and Methods: Participants ($n = 55$) were administered four symptom validity tests (SVTs), the Test of Memory Malingering, Dot Counting Test, Word Memory Test, and Victoria Symptom Validity Test, along with various neuropsychological tests.
Results: Analysis revealed that 20% of participants exerted poor effort on at least one SVT. This is less than what we previously found where poor effort accounted for 55.6% of non-mandatory enrollment. MANOVA results revealed that those who exerted poor effort had significantly lower scores on the linear combination of neuropsychological tests than those who exerted optimal effort ($\lambda = .508$, $F = 2.77$, $p = 0.006$, $\eta 2 = .492$). Discriminant function analysis revealed that grades ($\beta = .665$) and major ($\beta = .513$) carried the highest weights in predicting effort groups, and together, they accurately classified 77% of cases.
Conclusions: These findings suggest that when enrollment is mandatory, students give more effort than when enrollment is non-mandatory. Nevertheless, a substantial portion of mandatory enrollment participants still exerted poor effort, which affects their performance on neuropsychological tests and may distort research findings using undergraduate participants.
Correspondence: *Eliyas Jeffay, M.A., University Of Toronto, 1265 Military Trail, Scarborough, ON M3A1A8, Canada. E-mail: eliyas.jeffay@utoronto.ca*

A.L. CLARK, S.F. SORG, M. BONDI, N. LUC, D.M. SCHIEHSER, K.L. HANSON, L.R. FRANK, A. JAK, J.B. LOHR & L. DELANO-WOOD. Relationships Between Effort, Psychiatric Symptom Reporting, and Structural Brain Changes in OEF/OIF Veterans with History of Mild TBI.
Objective: Poor effort in the context of mild TBI (mTBI) is associated with inflation on symptom rating scales and decreased cognitive performance. Whether there are neurobiological abnormalities that underlie the clinical presentation of those who fail effort measures has not been studied. We therefore sought to further explore the role of effort and structural MRI brain in Veterans with and without history of mTBI.
Participants and Methods: 97 Veterans who underwent cognitive and 3T MRI assessments were divided into those with mTBI who passed (mTBI-P: n=53) and failed (mTBI-F: n=15) effort measures, and military controls (NCs: n=28) with no history of mTBI. Poor effort was defined by Trial 2<45 on TOMM or <15 on CVLT-Forced Choice. Mean cortical thickness was extracted from 6 frontal and temporal cortical ROIs; fractional anisotropy (FA) was extracted from 6 white matter (WM) ROIs. For the imaging analyses, the mTBI-P group was divided into those with intact executive function (EF) (mTBI-P+; n=35) and reduced EF (mTBI-P-: n=18).
Results: The mTBI-F group endorsed greater psychiatric symptoms compared to mTBI-P (p's<.002) and NC (p's<.001) groups. MANOVA revealed significant DTI differences across the 4 groups (Wilk's Lambda, p=.01); post hoc analyses revealed significantly decreased FA in the mTBI-P- group compared to all others. Overall FA means showed no significant differences between the mTBI-P+ group and mTBI-F group ($p > .05$); however, FA of the mTBI-F group fell between those of mTBI-P+ and mTBI-P-. A second MANOVA revealed no significant differences between groups on cortical thickness (p=.34).
Conclusions: Findings show that mTBI patients with poor effort endorse significantly greater psychiatric symptoms compared to those with optimal effort, although DTI indices reveal that WM integrity in those with poor effort is intermediate to those mTBI with intact vs. reduced cognition. Findings suggest mTBI participants with poor effort may represent a heterogeneous group composed of those with and without WM abnormalities.
Correspondence: *Alexandra L. Clark, B.S., UCSD/SDSU Joint Doctoral Program, 3350 La Jolla Village Dr., San Diego, CA 92161. E-mail: alexandra.leigh.cl@gmail.com*

R.S. SCHEIBEL, M. TROYANSKAYA, N.J. PASTOREK, N.J. PETERSEN, H.K. HENSON & H.S. LEVIN. Deployment-Related Mild TBI, Effort Testing, and Perceived Limitations in Community Reintegration, Social Participation, and Resiliency Among OEF/OIF Veterans.
Objective: To investigate if suboptimal performance on effort testing and history of deployment-related traumatic brain injury (TBI) influence self-reported problems with community reintegration, participation, and resiliency.
Participants and Methods: Participants included 214 Operation Iraqi Freedom and Operation Enduring Freedom (OEF/OIF) service members and veterans; 159 participants who had been exposed to blast and reported symptoms consistent with mild TBI (mTBI) and 55 control participants who had no history of blast exposure or TBI. The Word Memory Test (WMT) was used to assess effort, the Community Integration Questionnaire (CIQ) was used to measure different aspects of reintegration, and the Connor-Davidson Resilience Scale was used to assess current and pre-deployment resilience. The Mayo-Portland Adaptability Inventory-4 Participation Index (M2PI) was used to measure social participation.
Results: Seventy-seven participants with mTBI performed above 82.5% on all three main WMT subtest (TBI_Passed group (TBI_P)), while 82 participants with mTBI performed below or at 82.5% on at least one of the easy WMT subtests (TBI_Failed (TBI_F) group). All control participants (Controls group) passed the WMT. The three groups did not differ significantly in age or time since deployment. There were significant differences in the CIQ Productivity and Job scores between the TBI_F and TBI_P ($p= 0.007$ and $p=0.020$) and between TBI_F and Controls ($p=0.002$ and $p=0.004$), but not between the TBI_P and Controls ($p=0.555$ and $p=0.538$). Similarly, the change in resiliency differed between two TBI groups and between TBI_F and Controls (both p=<.0001), but not between TBI_P and Controls (p=0.395). There were no significant between-group differences for the M2PI.
Conclusions: Suboptimal performance on effort testing has greater effect on perceived limitations than history of deployment-related TBI.
Correspondence: *Maya Troyanskaya, MD, PMR, Baylor College of Medicine, 6550 Fannin # NB 410, Houston, TX 77025. E-mail: mayat@bcm.edu*

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

K.J. DUNHAM, S.N. ROLIN, J.M. SIBSON, S.A. OGBEIDE & R.L. DENNEY. Specificity for Cognitively Impaired Individuals on the RBANS Effort Scale and Effort Index.

Objective: The Effort Index (EI) and Effort Scale (ES) have been developed as embedded measures of effort within the Repeatable Battery for the Assessment of Neuropsychological Status. The EI has shown high false positive rates in individuals with amnestic disorders, whereas the ES has shown early promise. The current study examines specificity comparisons of the EI and ES among elderly individuals.

Participants and Methods: Fifty-two archived cases that included diagnoses of Alzheimer's disease (AD) (n = 10), Vascular Dementia (VaD) (n = 16), Mixed-type Dementia (MD) (n = 7), Dementia NOS (D-NOS) (n = 9), and No Cognitive Impairment (NCI) (n =10) were used. EI and ES scores were calculated for each case.

Results: Specificity of the ES for the total sample was 63.5%, 100% in the AD group, 75% in the VaD group, 57.1% in the MD group, 55.6% in the D-NOS group, and 20% in the NCI group. EI specificity was 76.9% in the total sample, 70% in the AD group, 87.5% in the VaD group, 42.9% in the MD group, 66.7% in the D-NOS group, and 100% in the NCI group. Pearson product moment correlation coefficient indicated a moderate, negative correlation between the EI and RBANS Total Scale score, r = -.53, n =52, p <.001. There was also a moderate, negative correlation between the ES and RBANS Total Scale score, r = -.62, n = 52, p <.001, and between the ES and years of education, r = -.38, n = 52, p <.05.

Conclusions: The EI was found to have greatest specificity in groups with no cognitive impairment, but variable specificity in groups with amnestic disorders. The ES showed greatest specificity in groups with more severe amnestic disorders, but limited specificity in groups with no cognitive impairment. Education levels and level of cognitive functioning may affect EI and ES results and should be considered when using the scores for the detection of effort in samples with cognitive impairment.

Correspondence: *Kathryn J. Dunham, MA, Forest Institute, 185 Players Club Drive, Castle Rock, CO 80104. E-mail: kathrynjdunham@hotmail.com*

K.J. DUNHAM & R.L. DENNEY. Introduction to a New Profile Analysis on the Medical Symptom Validity Test.

Objective: The Medical Symptom Validity Test (MSVT) Severe Impairment Profile (SIP) research has focused on identification of impairment from poor effort. This approach has resulted in identification of impairment rather than identifying poor effort. This has resulted in more accurate identification of individuals with true cognitive impairment, but has led to a high number of simulators and criterion malingerers achieving the SIP. This study introduces and validates a new profile analysis with a focus on the MSVT identifying poor effort from genuine impairment.

Participants and Methods: Two phases were used in this study. The first phase included 50 older individuals with cognitive impairment and 44 simulators. Logistic regression was conducted and four new profiles were proposed. The second phase included 47 older individuals with cognitive impairment and 50 new simulators. The same four profiles were investigated with the second phase. Specificity and sensitivity were calculated for each of the profiles for both phases.

Results: Delayed recognition and free recall scores from the MSVT were identified as significant variables by the logistic regression. The logistic regression equation correctly identified 90.4% of the cases in phase I, but showed only 50% sensitivity in phase 2. Each of the four newly proposed profiles based on the logistic regression equation showed high specificity (94-96%) and acceptable sensitivity (70.5% to 88.6%) in phase I. Phase II indicated significant improvement with one of the proposed formulas, in which specificity was 95.7% and sensitivity of 84%.

Conclusions: The newly proposed profile that identified poor effort shows significant improvement at separating individuals simulating memory impairment from individuals with genuine cognitive impairment. The new profile includes a multistep decision process similar to the SIP, but focuses on identifying poor effort.

Correspondence: *Kathryn J. Dunham, MA, Forest Institute, 185 Players Club Drive, Castle Rock, CO 80104. E-mail: kathrynjdunham@hotmail.com*

E.N. ANDRESEN, A. DORFMAN, R.I. NAUGLE & R. BUSCH. Relationships Between Personality Assessment Inventory and Victoria Symptom Validity Test Scores Change Across the Lifespan in a Mixed Clinical Sample.

Objective: Symptom validity tests (SVTs) are being increasingly used in non-litigating patient populations, often in conjunction with measures of personality and psychopathology. Although a number of studies support a relationship between cognitive SVTs and scores on the MMPI-2 in litigating samples, little research has been conducted to determine if similar relationships are present in general clinical samples or when psychological symptomatology is assessed with different measures.

Participants and Methods: This retrospective study investigated the relationship between the Personality Assessment Inventory (PAI) and the Victoria Symptom Validity Test (VSVT) in a large mixed clinical sample (n = 695; mean age = 42.6; mean education = 13.7 years). All patients completed the PAI and VSVT as part of a comprehensive neuropsychological evaluation.

Results: In the sample as a whole, small but significant negative correlations (Spearman's rho) were observed between VSVT Total item performance and eight PAI scales, with the strongest correlations seen on scales of Negative Impression Management, Somatization, Depression, and Schizophrenia. A significant positive correlation was seen between VSVT Total item performance and the Dominance scale. When the data were analyzed separately by age groups (18-30, 31-59, 60-78), the pattern of correlations was different for each age range. In young adults, scales assessing interpersonal factors (Dominance and Warmth) were positively correlated with VSVT Total performance whereas in middle aged adults, Somatization was negatively correlated with Total VSVT performance. No significant correlations were seen in the older adult group.

Conclusions: These findings suggest that VSVT performance is significantly associated with a number of psychological factors that vary over the lifespan. Results will be discussed in the context of the current literature.

Correspondence: *Elizabeth N. Andresen, Ph.D., Psychiatry & Psychology, The Cleveland Clinic, 12479 Cedar Rd Apt 203, Cleveland Heights, OH 44106. E-mail: elizabeth.andresen@gmail.com*

M.A. SUGARMAN & B.N. AXELROD. Embedded Measures of Effort in the Controlled Oral Word Association Test in a Clinical Sample.

Objective: Clinical neuropsychologists are required to determine whether their evaluations represent valid assessments of their patient's true functioning. Performance validity tests (PVTs) take the form of freestanding measures or embedded indices within common neuropsychological tests. Embedded indices present several advantages, including that they do not add to total administration time and can allow for several PVTs to be administered during a single evaluation. The current study determined to what extent verbal fluency measures can be used as a PVT during neuropsychological evaluation.

Participants and Methods: Participants were clinically-referred for neuropsychological evaluation in an urban-based Veteran's Affairs hospital. Participants were placed into two groups based on their objectively evaluated effort on performance validity tests (PVTs) during their evaluations. Individuals who exhibited Credible Performance (n = 431) failed zero PVTs and those with Poor Effort (n = 192) failed two or more PVTs. All participants completed the Controlled Oral Word Association Test FAS and Animals verbal fluency measures. We evaluated how well scores on these measures could discriminate between the two groups.

Results: Raw scores and T-scores for Animal fluency successfully discriminated between Credible Performance and Poor Effort groups with 90% specificity and greater than 40% sensitivity. FAS scores had lower sensitivity for detecting poor effort. A combination of FAS and Animals

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

scores into logistic regression models yielded acceptable classification (AUC > .74) of groups, with 90% specificity and greater than 44% sensitivity.
Conclusions: Verbal fluency measures can yield adequate discrimination between individuals exhibiting poor effort and those with credible performance, and may have value as an embedded PVT during neuropsychological evaluation. We provide suggested cut points and logistic regression models for predicting the probability of poor effort in clinical settings.
Correspondence: *Michael A. Sugarman, Master of Arts, Psychology, Wayne State University, 5057 Woodward Ave, 7th Floor, Detroit, MI 48202. E-mail: mike.sugarman@wayne.edu*

E. ESTEVIS, M.R. BASSO, B. ROPER, D. WHITESIDE, H. PEDERSEN, L. SCHULTZ, D. COMBS & R. PURDIE. The Judgment of Line Orientation Test as an Embedded Measure of Symptom Performance Validity.
Objective: Initial research involving the Judgment of Line Orientation Test implied that it had acceptable specificity and sensitivity as a performance validity test (PVT). In a variation, summing the discrepancy between patient responses and correct choices may also serve as an embedded effort measure. The present study evaluated the JLO total and discrepancy scores as embedded PVTs and compared their accuracy to an established embedded PVT, WAIS-IV reliable digit span (RDS). Performance on a standalone measure, the Word Memory Test (WMT), was also assessed.
Participants and Methods: 59 depressed inpatients were administered the JLO, RDS, and WMT as part of a routine neuropsychological evaluation. Standard WMT cutoffs served as the criterion for invalid performance effort.
Results: Results: To arrive at an optimal cut-off score, Larrabee's (2003) criterion of 90% specificity was employed. Regarding the JLO adjusted total score, a cut-score of 17 yielded specificity of 90% and sensitivity of 28%. With respect to the JLO discrepancy score, a cut-score of 17 achieved specificity of 90% and sensitivity of 28%. A cut-off score of 6 for WAIS-IV RDS achieved specificity of (93%), but poor sensitivity (0%).
Conclusions: The JLO total score and discrepancy score are relatively specific embedded measures of performance validity, and their sensitivity was adequate (28%). In contrast, the WAIS-IV reliable digit span achieved limited utility as an embedded PVT; with a specificity of at least 90%, 0% sensitivity was achieved. Overall, the JLO total score and digit discrepancy value can alert clinicians of sub-optimal effort on neuropsychological evaluations in which malingering is suspected.
Correspondence: *Michael R. Basso, Ph.D., Psychology, University of Tulsa, 800 South Tucker Drive, Tulsa, OK 74104. E-mail: michael-basso@utulsa.edu*

L. LAU, M.R. BASSO, A. MILLER, E. ESTEVIS, B. ROPER, D. WHITESIDE & D. COMBS. Detection of Coached Neuropsychological Dysfunction: An Experiment Regarding Mild Closed Head Injury.
Objective: The Test of Memory Malingering (TOMM) and Word Memory Test (WMT) are used to detect symptom exaggeration. Some attorneys may coach clients to defeat such validity tests. Yet, the effects of coaching are largely undefined. In this experiment, normal subjects were presented with either superficial or sophisticated information concerning mild head injury symptoms, and attempted to simulate performance of genuine head injured patients.
Participants and Methods: College students served as research subjects. 13 received sophisticated information, and 12 received superficial details concerning mild head injury symptoms. 12 controls also participated. All were administered the TOMM, WMT, CVLT-2, WRAT-IV Reading test, and Judgment of Line Orientation (JLO).
Results: On ANOVAs and Tukey HSD post hoc contrasts, the simulated patients performed worse than controls on all tests. Moreover, the sophisticated simulators performed worse than the naive simulators on all tests, including the WMT and TOMM. Scores of simulators fell far below standard cutoffs for performance validity. All p's <.01.
Conclusions: These results suggest that simulated symptoms of head injury are readily detected by the TOMM and WMT. This is an important consideration in light of previous findings that at least 70% of patients are suspected of modifying their symptoms in forensic settings. Unexpectedly, simulators who received the most detailed information concerning head injury symptoms performed worse than those who received superficial details. These findings suggest that neuropsychological malingering measures are sensitive to symptom coaching and that a combination of information may be warranted to determine a patient's true clinical presentation.
Correspondence: *Michael R. Basso, Ph.D., Psychology, University of Tulsa, 800 South Tucker Drive, Tulsa, OK 74104. E-mail: michael-basso@utulsa.edu*

A. MILLER, M.R. BASSO, E. ESTEVIS, B. ROPER, D. WHITESIDE, D. COMBS & R. PURDIE. A Comparison of the WMS Rarely Missed Index to the WAIS Reliable Digit Span in Depressed Inpatients.
Objective: Much research concerns detection of poor effort in neuropsychological assessment. Embedded effort measures offer an advantage over freestanding tests of performance validity (PV), because they require no additional time or materials. One such measure is the Rarely Missed Index (RMI) from the Logical Memory Recognition subtest of the WMS-III. Initial validation revealed 97% sensitivity and 100% specificity in detecting simulated head-injury patients (Killgore & DellaPietra, 2000). The current study compared the effectiveness of the RMI to the Reliable Digit Span (RDS) from the WAIS, another embedded PV measure.
Participants and Methods: Participants included 121 depressed inpatients (73 females and 48 males; age: M=37.02, SD=12.55). They were administered WMS-III/IV Logical Memory and WAIS-IV Digit Span. Standard cutoffs for the Word Memory Test served as the criterion of PV. RMI operational characteristics were compared to those of the RDS.
Results: Consistent with Larrabee (2003), 90% specificity guided selection of optimal RMI and RDS cut scores. The ideal cut score for the RMI was 136, yielding a specificity of 92% and sensitivity of 20%. Optimal RDS cutoff was 6, and resulted in a specificity of 90% and 11% sensitivity.
Conclusions: These data revealed excellent specificity but substantially lower sensitivity than originally reported for the RMI. This is similar to what other validation studies have demonstrated (e.g., Bortnik et al., 2010), and likely reflects the use of an actual clinical sample. The RMI achieved comparable specificity but better sensitivity than the RDS, suggesting that the RMI is a conservative and effective measure of PV.
Correspondence: *Michael R. Basso, Ph.D., Psychology, University of Tulsa, 800 South Tucker Drive, Tulsa, OK 74104. E-mail: michael-basso@utulsa.edu*

M.R. BASSO, B. ROPER, D. WHITESIDE, D. COMBS, E. ESTEVIS & R. PURDIE. Symptom Validity and Performance Validity: One or Two Constructs? A Structural Equation Modeling Study.
Objective: A growing consensus recognizes that the validity of patient responses should be examined as part of a neuropsychological evaluation. Generally, efforts have focused upon measuring performance validity (PV) with tests such as the Test of Memory Malingering. However, others assert that self-reported symptom validity (SV) should also be measured, with scales such as the Fake Bad Scale from the MMPI-2. Some posit that SV corresponds with PV (e.g., Larrabee, 2003), implying that these constructs overlap. The present study investigated this hypothesis using structural equation modeling.
Participants and Methods: 95 depressed inpatients were administered a battery of tests that included a measure of PV (Word Memory Test) and the MMPI-2 which included indices that assessed SV (Fake Bad Scale, Response Bias Scale, Henry-Heilbronner Index).

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

Results: Using structural equation modeling, latent variables of SV and PV were estimated. One model freely estimated their shared variance, and another model fixed their covariance at 1.0. Covariance between SV and PV in the freely-estimated model was only .09. The CFI and TLI for the former exceeded .98 and .96, whereas the latter achieved values of .59 and .32. ANOVA showed that the former achieved better model fit than the latter. Thus, the former model fits the data well, whereas the latter model fits the data poorly.
Conclusions: As measured with the MMPI-2 and WMT, SV and PV are unique and distinct characteristics. They do not share meaningful variance, assumptions that they do were unsupported. Clinicians should measure both constructs, and recognize that they are assessing different pools of variance.
Correspondence: *Michael R. Basso, Ph.D., Psychology, University of Tulsa, 800 South Tucker Drive, Tulsa, OK 74104. E-mail: michael-basso@utulsa.edu*

N. WISDOM, N.J. PASTOREK, B.I. MILLER, J.E. BOOTH, J.M. ROMESSER, J.F. LINCK & A.H. SIM. PTSD and Cognitive Functioning: Importance of Including Performance Validity Testing.
Objective: Many studies have observed an association between Post-traumatic Stress Disorder (PTSD) and cognitive deficits across several domains including memory, attention, and executive functioning. The inclusion of response bias measures in these studies, however, remains largely unaddressed. The purpose of this study was to identify possible cognitive impairments correlated with PTSD in returning OEF/OIF/OND veterans after excluding individuals failing a well-validated performance validity test.
Participants and Methods: Participants included 126 men and 8 women referred for a comprehensive neuropsychological evaluation as part of a consortium of five Veterans Affairs hospitals. The PTSD CheckList (PCL) and Word Memory Test (WMT) were used to establish symptoms of PTSD and invalid performance, respectively. Groups were categorized as follows: Control (PCL < 50, pass WMT), PTSD-pass (PCL > 50, pass WMT), and PTSD-fail (PCL > 50, fail WMT).
Results: As hypothesized, failure on the WMT was associated with significantly poorer performance on almost all cognitive tests administered; however, no significant differences were detected between individuals with and without PTSD symptoms after separating out veterans failing the WMT.
Conclusions: These findings highlight the importance of assessing respondent validity in future research examining cognitive functioning in psychiatric illness and warrant further consideration of prior studies reporting PTSD-associated cognitive deficits.
Correspondence: *Nick Wisdom, Ph.D., Michael E. DeBakey Veterans Affairs Medical Center, 2002 Holcombe Blvd, Houston, TX 77030. E-mail: nickandjen@gmail.com*

Forensic Neuropsychology

A.E. LANSING, A. BECK, K.M. PICKWITH & J. COOK. Auditory Processing Deficits Among Incarcerated Youth: Contributors to Performance and Implications for Services.
Objective: Verbal deficits are reported among delinquents but few studies assess underlying auditory processing [AP] skills. We aim to elucidate AP skills among incarcerated youth, including demographic, attention and language acquisition factors. Service delivery implications are addressed.
Participants and Methods: Participants were 92 persistently delinquent [PD] youth, ages 16-18 years old. The SCAN-A Test for Auditory Processing Disorders in Adolescents and Adults and Digit Vigilance Test [DVT] were administered. The SCAN-A includes: Filtered Words [FW] and Figure-Ground [FG], tapping distorted speech perception or speech compromised by poor acoustic environments; and dichotic tasks Competing Words and Sentences, reflecting auditory system development/maturation and hemispheric specialization. Gender (51.1% female), racial/ethnic (29.4% African American, 33.7% Caucasian, 36.9% Latino) and bilingual status comparisons (30.4% bilingual; with 22.8% ESL) were made. The relationship between AP and attention (DVT speed and omission errors) was examined.
Results: FW and FG scores were impaired across all demographic and language categories, with PD girls (m=3.79, SD=.46) performing significantly worse than boys (m=6.44 SD=.51, p<.001). Dichotic listening scores were largely normal with no notable demographic or bilingual differences. Only ESL specifically had an impact on Competing Words (ESL m=6.14, SD=.62 vs. non-ESL m=8.37, SD=.37, p<.01). No significant relationships were observed among DVT and SCAN-A scores.
Conclusions: Given that delinquents have high rates of school dropout and learning disabilities, these data may inform better tailored services to address the AP deficits underlying language and learning problems. Our data suggest PD youth have notable deficits in the functional AP skills needed for everyday listening situations not disruption of hemispheric specialization or AP development. In particular, PD girls have significant service needs related to severe AP deficits when sound quality is compromised.
Correspondence: *Amy E. Lansing, PhD, Psychiatry, University of California, San Diego, CNS-Acts, 8950 Villa La Jolla Drive, Suite A109, La Jolla, CA 92037. E-mail: alansing@ucsd.edu*

A.E. LANSING, A.N. BECK, K.M. PICKWITH, A. ANDERSON & J. COOK. Non-Verbal Attention Skills Among Incarcerated Adolescents.
Objective: Attention deficits are reported among delinquents but little data are available on processing speed and errors among persistently delinquent [PD] youth. We aim to examine attention related processing speed and errors among PD youth, including the contribution of demographic and language-related (bilingualism, reading level, auditory processing) factors. Service implications and future directions are addressed.
Participants and Methods: Participants were 90 PD youth, ages of 16-18 years old. An Acculturation Scale, the Digit Vigilance Test [DVT], Wide Range Achievement Test, 4th Ed. and SCAN-A Test for Auditory Processing Disorders in Adolescents and Adults were administered. Gender (50% male), racial/ethnic (27.8% African American, 34.4% Caucasian, 37.8% Latino) and bilingual (31.1%) comparisons were made.
Results: PD boys made significantly more DVT error omissions (M=25, SD=3) and were slower (M=384.89, SD=5.59) than girls (M=15.09, SD=2.06, p<.01; M=364.68, SD=6.44, p<.05, respectively). Differences were driven largely by greater omission errors among Caucasian boys (M=30.95, SD=20.20) who also tended to be slower (p=.07), relative to Latino boys (M=18.13, SD=20.03, p=.03). There was a trend for bilinguals to have faster processing speed (M=362.78, SD=10.39) with a lower omission error rate (M=15.43, SD=3.33) than monolinguals (M=380.18, SD=4.24, p=.067; M=22.13, SD=2.25, respectively). No significant relationships were found between DVT and reading level or the SCAN-A.
Conclusions: Given that PD youth are known to have elevated rates of school dropout and learning disabilities, more nuanced data on specific PD subgroups are needed to inform appropriate allocation of resources. Our data suggest that Caucasian PD boys have an exceptionally high number of omission errors during sustained attention which do not reflect a speed-accuracy tradeoff. More data are needed to determine if other factors contribute to this specific performance deficit (e.g., higher rates of stimulant use or ADHD) among some PD boys.
Correspondence: *Amy E. Lansing, PhD, Psychiatry, University of California, San Diego, CNS-Acts, 8950 Villa La Jolla Drive, Suite A109, La Jolla, CA 92037. E-mail: alansing@ucsd.edu*

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

C. BIDDLE, R.L. FAZIO & R.L. DENNEY. The Effect Of Hand Restraints On Forensic Neuropsychological Evaluations.

Objective: Neuropsychologists have been increasingly involved in criminal forensic evaluations in recent years. In this arena, there are times the evaluee cannot be tested without hand restraints (i.e., handcuffs) due to correctional policies. No empirical data exist to reveal the effects of hand restraints on test performance.

Participants and Methods: We used a counter-balanced design and alternate forms of common neuropsychological tests (Grip Strength, Grooved Pegboard, Trail Making Test A & B, Coding, and Verbal Fluency) to assess effects of hand restraints. Participants included 52 undergraduate and graduate psychology students (M age = 26.7). Non-parametric statistics were used for all analyses due to violations of normality. All motor tasks were analyzed separately for dominant and non-dominant hands. Bonferroni correction was applied due to the number of analyses.

Results: Participants evidenced no significant differences on the control task (fluency) in either their raw scores or standardized scores (M = 21 words, both conditions). No significant differences were found for Grip Strength-dominant hand (39 kg unrestrained; 38 kg restrained). Significant differences were found for the raw scores of all remaining tests (Coding p = .001, Grip Strength-non dominant p = .01, Grooved Peg Board-dominant p = .02, Grooved Peg Board-non dominant p = .003, TMT A p < .001 and TMT B p = .04). Standardized scores of all remaining tests were also significant (Coding p = .001, Grip Strength-non dominant p < .03, Grooved Peg Board-non dominant p = .001, and TMT A p < .001 and TMT B p = .07) except for Grooved Pegboard-dominant hand.

Conclusions: These results demonstrate the presence of hand restraints are an influence that evaluators in the criminal setting cannot ignore. Results should be validated in a criminal forensic sample.

Correspondence: *Christine Biddle, M.A, Forest Institute, 101 Carlile, Pueblo, MO 81004. E-mail: cbiddle85@gmail.com*

H. LUU, D.M. WHITESIDE, L. GRANITE, L. WARDIN, V. KERCE, L. RICE, B. ROPER & M. BASSO. Motor functioning tests as embedded performance validity measure in males.

Objective: Although motor functioning tests have been studied as an embedded performance validity test (PVT) (Boone, 2007), no studies found examined them in combination or separated out gender effects, particularly on the Grooved Pegboard Test (GPT). Additionally, no research was found that looked at gender specific performance on motor tests. Arnold et al. (2013) and Larrabee (2010) both found that dominant-hand finger tapping test (DH FT) is sensitive to suboptimal effort. The current study expanded upon previous research by examining dominant and non-dominant side performance on several commonly used neuropsychological measures of motor functioning, including the FT, Grip Strength Test (GST), and GPT (Heaton et al, 2009) in male participants.

Participants and Methods: Participants were 255 consecutive referrals for comprehensive neuropsychological evaluation who were male (mean age= 46.3, mean education = 13.5) and completed the study measures. Based upon performance on several free-standing and embedded performance validity measures, two groups were created, an optimal effort (OE) group and a suboptimal effort (SE) group.

Results: Results indicated that all measures except non-dominant (ND) FT and ND GST were significantly different between the groups. ROC analysis indicated that DH GST reached acceptable classification accuracy (AUC=.7), as did a regression based combination of all the motor variables (AUC=.71).

Conclusions: Results tentatively supported the use of a combined motor functioning and DH GST as an embedded performance validity measure in males. Further research examining motor tests as PVT in females is warranted.

Correspondence: *Hien Luu, Adler School of Professional Psychology, 17 N. Dearborn, Chicago, IL 60602. E-mail: hluu@my.adler.edu*

L. WARDIN, D.M. WHITESIDE, J. KOGAN, G. WIDMANN, H. LUU, L. RICE, B. ROPER & M. BASSO. Digit span total raw score as an embedded performance validity test.

Objective: The current study examined the raw total digit span score (DS-Raw) on the Wechsler Adult Intelligence Scale-IV (WAIS-IV) as an embedded performance validity test (PVT). No studies found have explored DS-Raw as a PVT. However, the Reliable Digit Span (RDS) has been heavily researched as a PVT (Boone, 2007). With the WAIS-IV, digit span subtest added digit sequencing, and so far very few studies (Young et al., 2013; Spencer et al., 2010) have examined this version as an embedded PVT.

Participants and Methods: Participants were consecutive outpatients referred for comprehensive neuropsychological assessment who completed all study measures including DS and the Test of Memory Malingering (TOMM, Tombaugh, 1996). Mean age of participants was 43.92 (SD= 15.30) and a mean education was 13.02 (SD= 2.51), with 49.6% males and 50.1% females. The most common psychiatric diagnoses included: 20.6% Depression/anxiety, 7.5 % Cognitive Disorder NOS, 6.6%, 5.3% somatization disorder, and 5% PTSD. Participants were assigned to the Biased Responding group (BR, N= 73) based upon failure on any TOMM trial. Those participants who passed the TOMM were assigned to the Unbiased Responding group (UR, N= 564).

Results: T-tests indicated that raw score totals of digit span were significantly lower in the BR group compared to the UR group. In both groups, age was not a significant predictor. ROC analysis indicated that the DS-Raw had acceptable classification accuracy (AUC > .78). Sensitivity, specificity, and positive and negative predictive power were calculated, with sensitivity at .46% with specificity at 90%.

Conclusions: Results provide evidence that using the raw score from digit span may be useful as embedded measure of cognitive effort.

Correspondence: *Lydia Wardin, Adler School of Professional Psychology, 411 E Hillside Ave, Barrington, IL 60010. E-mail: lwardin@my.adler.edu*

E.H. MITCHELL, M. SEIDENBERG & D.S. GOLDSTEIN. The Relationship between Psychological Response Bias, Neurocognitive Symptom Validity, and Estimates of IQ in Criminal Defendants.

Objective: The purpose of this investigation is to examine the factor structure of neurocognitive symptom validity and psychological response bias measures in a sample of criminal defendants. A difference score between observed and predicted IQ was also examined.

Participants and Methods: 134 consecutively court-referred adult felony defendants completed a comprehensive neuropsychological battery including symptom validity testing. An exploratory factor analysis (EFA) including 9 MMPI-2 validity scales and 3 neurocognitive symptom validity tests (SVTs) was conducted in order to compare findings from our sample of criminal defendants to a compensation-seeking group reported in Nelson, Sweet, Berry, Bryant and Granacher (2007). We also examined a proxy measure of effort derived from the discrepancy between observed (WAIS-III FSIQ) and estimated IQ (WTAR demographics-only predicted WAIS-III score).

Results: The exploratory factor analysis revealed a 3-factor solution with factors representing 1) over-reporting of psychological symptoms; 2) insufficient cognitive effort; and 3) underreporting of psychological symptoms. In addition, the IQ discrepancy score loaded on the second factor representing insufficient cognitive effort.

Conclusions: Criminals show distinct psychological and cognitive response validity constructs. Unlike the findings of Nelson et al. (2007), criminals are as likely to over-report atypical/rarely endorsed symptoms as they are neurotic symptoms, showing a more global presentation of negative psychological bias. Results also contribute to literature suggesting low IQ may be more reflective of low effort than true low intellectual functioning in incentivized subjects.

Correspondence: *Elizabeth H. Mitchell, M.S., Clinical Psychology, Rosalind Franklin University of Medicine and Science, 137 S Connecticut Ave, Royal Oak, MI 48067. E-mail: elizabeth.h.mitchell@gmail.com*

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

C. REESE, E. BOLINGER & J. SUHR. Examining the MMPI-2-RF RBS, HHI-r, and FBS-r Validity Scales in Simulated Head Injury.

Objective: Several MMPI-2-RF scales have been developed to measure noncredible cognitive symptom reporting, including FBS-r, RBS, and the more recently developed and revised Henry-Heilbronner Index (HHI-r). We examined the utility of all of these indices in detecting simulated head injury in college students with a history of mild TBI.

Participants and Methods: All participants completed a neuropsychological battery including the MMPI-2-RF. Eighteen participants were randomly assigned to simulate head injury symptoms and were compared to 29 controls asked to participate with best effort.

Results: Simulators performed higher on all validity scales (RBS p<.001, d=1.32; HHI-r p=.007, d=0.87; FBS-r p=.010, d=0.82). Both RBS and HHI-r were able to distinguish the two groups when using clinical cutoffs (RBS [$\chi 2$ (1, 47) = 7.28, p = .01]; HHI-r [$\chi 2$ (1, 47) = 4.39, p = .04]). Using RBS T-scores ≥ 80 as the possible over-reporting cutoff resulted in a specificity of 86.2% and sensitivity of 50%, while using the HHI-r ≥ 7 as the noncredible symptom reporting cutoff resulted in a specificity of 79.3% and sensitivity of 50%. There was no difference in percentage of simulators and controls who scored clinically high on the FBS-r (using a ≥ 80 T-score cutoff), $\chi 2$ (1, 47) = .40, p = .53.

Conclusions: Thus, in this simulated head injury sample, RBS and HHI-r appeared to be equally sensitive indicators of noncredible responding, with RBS resulting in higher specificity.

Correspondence: *Caitlin Reese, M.A., M.S., Psychology, Ohio University, 200 Porter Hall, Ohio University, Athens, OH 45701. E-mail: caitlinreese46@gmail.com*

D.M. UKUEBERUWA & P.A. ARNETT. Simplifying Coping Measurement for the Clinic.

Objective: The description and classification of coping strategies may distinguish adaptive and maladaptive types of coping, explaining which strategies best allow individuals to overcome stress and return to a healthy or desired state. Carver, Scheier, & Weintraub (1989) developed 6 subscales of the COPE that relate to active and avoidant coping. This study sought to identify simplified coping factors in order to create an Adaptive Coping Scale. Methods: 51 healthy participants completed a set of psychosocial measures. 24 items from 6 COPE subscales were subjected to a principal components analysis. The study retained items loading onto a factor at 0.4 or greater. Factors were then combined into one scale and subject to correlation with other measures. Results: PCA reduced the total number of items and resulted in one active coping factor with 11 items and one avoidant coping factor with 8 items. Eight highest loading items were retained for the active factor to create homogenous scales. An Adaptive Coping Scale with high reliability (alpha = 0.8) was created by averaging across all 16 items. The scale was negatively correlated (r = -0.4) with fatigue. Conclusion: This study created an empirically valid Adaptive Coping Scale that was associated with fatigue, a common symptom of chronic neurological disorders. The scale can be used for easy administration of the COPE for evaluation of strategies that may affect distress and recovery in clinical settings.

Correspondence: *Dede M. Ukueberuwa, 142 Moore Building, University Park, PA 16802. E-mail: dedemu@psu.edu*

G. VARGAS & P. ARNETT. Prevalence, Correlates, and Changes in Elevated Anxiety Levels in Multiple Sclerosis.

Objective: While anxiety is prevalent in Multiple Sclerosis (MS), it is often overlooked clinically. However, anxiety has been shown to correlate with cognition, quality of life, suicidality, and other important factors. This study sought to determine a suitable cut-off score for anxiety in MS patients and to examine the prevalence of elevated anxiety, its correlates, and how it changes over time.

Methods: Fifty-one MS patients and 51 controls were given the State Trait Anxiety Inventory along with other self-report questionnaires. A cut-off score of one-and-a-half standard deviations above the control mean was used for patients. Additionally, a group of MS patients was followed for three time points over about a 13-year period. One-hundred-and-one MS patients were tested at time 1, 51 again at time two, and 13 at time three.

Results: Significantly more MS patients reported elevated scores on the STAI-State than controls (X2=4.3198, p<.05). Patients reporting elevated state anxiety also reported significantly more daily hassles and perfectionistic tendencies. Within the MS patient group, trait anxiety correlated with age, diagnosis duration, and EDSS and state anxiety correlated with the BDI-FS, CMDI mood and evaluative scores, and MS-related helplessness. Furthermore, prevalence of elevated STAI state scores in MS patients increased over time from 2% at time 1 to 20% at time 2 to 54% at time 3 while trait scores did not increase.

Conclusions: A suggested clinical cut-off score on the STAI is presented. Additionally, interesting correlates of elevated anxiety were found, including age, diagnosis duration, disability level, stress, attributional style, and depression. Prevalence of elevated state anxiety was also shown to increase over time. Possible interpretations for these findings and clinical implications will be presented.

Correspondence: *Gray Vargas, 372 Moore Bldg, Penn State University, University Park, PA PA. E-mail: gav111@psu.edu*

A.R. RABINOWITZ, V. MERRITT & P.A. ARNETT. The Effect of Motivation on Cognitive Test-Performance: Integrating Measures of Effort into Baseline Concussion Testing.

Objective: Baseline cognitive testing is commonly considered in return-to-play decisions following sports-related concussion. However, some have noted that an athlete's approach to testing can dramatically differ between baseline and post-concussion assessments. Studies from our lab (Bailey et al., 2006; Rabinowitz et al., submitted) and others' (Duckworth et al., 2012) have demonstrated the influence of motivation on test performance. Although there are many measures of malingering, there is no measure with demonstrated sensitivity to a sincere, but unmotivated, approach to testing.

Method: This study examines observational and performance-based measures of effort towards testing in 174 collegiate athletes participating in a concussion management program. Athletes were administered a battery of neuropsychological tests including ImPACT and the Vigil Continuous Performance Task at baseline. After testing, examiners completed a checklist of 26 motivation-related behaviors (MBCL). Vigil response Time Variability (RTV) was evaluated as a performance-based indicator of effort towards testing.

Results: Principal components analysis of the MBCL revealed 3 components accounting for 39% of the variance in responses (Impulsivity, Engagement, and Boredom). Each subscale exhibited good internal consistency (alpha>.70). Boredom was not correlated with any ImPACT Composite scores. Impulsivity was negatively correlated with ImPACT Verbal Memory, Visual Memory, and Visual Motor Speed (R=-.35, -.25, -.33 respectively, all p<0.005). Engagement was positively correlated with Verbal and Visual Memory (R=.27 and .25 respectively, all p<0.005). Vigil RTV was negatively correlated with Verbal Memory (R=-.16, p<0.05) and Visual Motor Speed (R=-.36, p<0.001).

Conclusion: These results further support the notion that poor motivation can cause underperformance on baseline cognitive testing. Guidelines for translating the MBCL and RTV into clinical practice will be discussed.

Correspondence: *Amanda R. Rabinowitz, 2944 Cambridge St., Philadelphia, PA PA. E-mail: rabinowitz.a@gmail.com*

J. MEYER, G. VARGAS, V. MERRITT, A. RABINOWITZ, D. RAMANATHAN & P. ARNETT. The Affective Word List: a Measure of Mood and Memory.

Objective: The Affective Word List (AWL), a new test designed to measure mood through bias in recall of affectively positive and negative words, has additionally been shown to be sensitive to changes in verbal learning and memory in collegiate athletes post-concussion (Meyer et al., 2013). The AWL thus has the capacity to detect changes in learning

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

and memory, as well as mood problems, in the context of one measure. The goal of the present study was to evaluate the ability of the AWL to predict cognitive and mood changes post-concussion compared with existing measures.
Participants and Method: 45 collegiate athletes were tested at baseline and post-concussion. Reliable change indices measured change in performance from baseline to post-concussion for the immediate and delayed recall indices of the AWL, as well as the HVLT-R. Change in performance from baseline to post-concussion was evaluated for the affective bias index of the AWL (affectively positive minus negative word recall) using one standard deviation as the metric for clinically significant increase, and compared with the BDI-Fast Screen in detecting mood changes.
Results: 21 out of 45 athletes (47%) showed a reliable decline from baseline to post-concussion on at least one memory recall index of the AWL. Additionally, 9 out of 45 (20%) athletes showed a clinically significant increase in negative affective bias. In comparison, 20 out of 45 athletes (44%) showed a reliable decline on at least one index of memory recall on the HVLT-R. An additional 11 out of 45 (24%) athletes showed a reliable increase on the BDI-FS.
Conclusion: The AWL produces results comparable to existing measures of emotional and cognitive effects of concussion, but does so more efficiently by using one measure instead of two. The AWL adds the value of providing a measure of mood that is performance-based, and thus resistant to the possibility of some athletes' tendency to underreport symptoms such as depression post-concussion.
Correspondence: *Jessica Meyer, 373 Moore building, Penn State, University Park, PA 16801. E-mail: jem308@psu.edu*

V.C. MERRITT & P.A. ARNETT. Baseline Predictors of Post-Concussion Symptoms in Collegiate Athletes.
Objective: The development of appropriate return to play guidelines following sports-related concussion has been challenging. Given that return to play decisions currently revolve around athletes' self-reported symptoms, having the ability to accurately predict the nature of post-concussion symptom reporting would greatly benefit the decision-making process. The purpose of the present study was to better characterize the symptoms athletes endorse at baseline, and determine what impact pre-morbid characteristics have on the development and severity of post-concussion symptoms in the acute injury period following concussion.
Participants and Methods: Two groups of participants were examined: athletes at baseline (N=702) and post-concussion (N=55). Athletes were administered a comprehensive battery of neuropsychological tests, consisting of neurobehavioral and neurocognitive measures. The main outcome measure was the Post-Concussion Symptoms Scale (PCSS). A factor analysis was conducted on the participants' baseline PCSS data to determine the factor structure of the PCSS. Additionally, logistic regression analyses were conducted that examined the PCSS symptom clusters, demographic variables, and neurocognitive variables as predictors of dichotomized post-concussion PCSS total scores (e.g., low versus high symptoms).
Results: Four distinct factors emerged from the factor analysis including cognitive, physical, affective, and sleep symptom clusters. Regression results indicated that the physical and affective symptom clusters at baseline reliably ($p<.05$ for all effects) predicted athletes' post-concussion symptom group, as did gender, concussion history, and a neurocognitive composite score.
Conclusions: These findings show that certain baseline characteristics of athletes confer risk for greater self-reported symptoms post-concussion. Knowledge of these risk factors can assist the management and treatment of concussion, and can inform return to play decisions.
Correspondence: *Victoria C. Merritt, 372 Moore Building, University Park, PA 16802. E-mail: vcabarnes@gmail.com*

Assessment/Psychometrics/Methods (Adult)

P. SCHATZ & G. IVERSON. Improving the Psychometric Interpretation of ImPACT using Base Rate Analyses.
Objective: Baseline testing is used in amateur and professional sports as a component of comprehensive concussion management programs. We provide information on the base rates of low scores on ImPACT that will facilitate the interpretation of baseline and post-injury neurocognitive testing.
Participants and Methods: Participants were 46,679 adolescents and young adults who completed baseline computerized neurocognitive evaluations with ImPACT. They had valid baseline scores, and subjects with self-reported ADHD or academic problems were not included. The breakdown of the sample by gender-stratified age cohorts was as follows: females aged 14-18=14,426 and 19-22=7,640, and males aged 14-18=14,487 and 19-22=10,126. ImPACT is a brief computer-administered test battery. The four primary composite scores used for the base rate analyses were Verbal Memory, Visual Memory, Processing Speed, and Reaction Time.
Results: The base rates of low scores in adolescents and young adults on the four composite scores vary by level of cutoff and do not conform to a standard normal distribution. Having one or more scores at or below the 2nd percentile occurs in 7-8% of the subjects in the four age cohorts, and having one or more scores at or below the 10th percentile occurs in 26-28% of the subjects in the four age cohorts. Obtaining two or more scores below the 16th percentile occurs in approximately 15% of adolescents and young adults. Age and gender stratified base rate results for the following cutoff scores are provided: 25th, 16th, 10th, 5th, and 2nd percentiles.
Conclusions: When multiple neurocognitive test scores are interpreted simultaneously, the metrics of the standard normal distribution cannot be relied upon. That is, approximately 15% of healthy subjects will obtain a score that is greater than one standard deviation below the mean, when a single score is considering in isolation, but 40% will obtain one score in this range if the four scores are considered simultaneously.
Correspondence: *Philip Schatz, Psychology, Saint Joseph's University, 222 Post Hall, 5600 City Ave, Philadelphia, PA 19131. E-mail: schatzsju@gmail.com*

J.C. PIERCY, H.A. KUBAS, M. PASTERNAK, H. JOHNSTON, A. KRAWITZ & J. HALE. Exploring Dorsal "Cool" and Ventral "Hot" Executive Functions Using the Emotional Continuous Performance Task (EMO-CPT).
Objective: Executive functions (EFs) are the cognitive control skills required to adapt to and function within one's environment, making their direct neuropsychological measurement elusive. Dorsolateral "cool" and orbital "hot" frontal-subcortical circuits (FSCs) mediate external task-related and self-regulatory functions respectively. The Emotional Continuous Performance task (EMO-CPT) was developed to be the first measure to assess both FSCs in the same measure.
Participants and Methods: The EMO-CPT uses neutral and emotionally-laden facial stimuli in a go-no go continuous performance test paradigm, with each subsequent version tested using undergraduate students (N = 78, 109, 44). The evolution of the EMO-CPT involved block changes, trial randomization, inter-stimulus interval variations, and paradigm changes to ensure facial expression examination.
Results: Initial results revealed no emotional and neutral face block trial differences, but EMO-CPT relationships with "cool" (Counting Stroop; incongruent-congruent accuracy r range -.14 to .30, reaction time r range .14 to .29) and "hot" (Balloon Analog Risk Task; r range -.25 to .04) neuropsychological tests, as well as with Behavior Rating Inventory of Executive Function "cool" (Metacognitive Index, r range -.14 to .16) and "hot" (Behavior Regulation Index; r range -.25 to .07) self-report suggested further EMO-CPT development was necessary. In the current iteration, the revised EMO-CPT revealed main effects for trial ($F(1,42) = 231.60$, $p < .001$), emotional valence ($F(3,125) = 4.42$, $p = .006$), and a trial by emotion ($F(3,125) = 2.73$, $p = .046$) interaction.

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms.
https://doi.org/10.1017/S1355617714000381

Conclusions: The latest EMO-CPT iteration is ready for fMRI validation and normative/clinical sample data collection, as it now appears to tap dorsal "cool" and ventral "hot" FSCs in the same task. Once validated, the EMO-CPT could reveal differences among clinical populations known to show dorsal and ventral FSC impairment, making it a useful tool for differential diagnosis and management of patients with EF dysfunction.

Correspondence: *Jamie C. Piercy, B.S., Psychology, Wayne State University, 5057 Woodward Avenue, Detroit, MI 48202. E-mail: jamiepiercy@live.ca*

J.C. PIERCY, D. LEITNER, H.B. MILLER & M.K. REYNOLDS. Convergent Validity of Clinical and Functional Measures of Memory.

Objective: The California Verbal Learning Test-II (CVLT-II) and the Selective Reminding Test (SRT) are established measures purported to assess verbal learning and memory in patients with acquired brain injury (ABI). A recent study found differences between these two measures (Leitner, Piercy, Docherty, & Miller, 2013). The current study measured self- and proxy-ratings of functional memory with the Prospective Retrospective Memory Questionnaire (PRMQ) to examine if the CVLT-II or the SRT accurately capture memory deficits in daily life. The clinical validity of the PRMQ based on these objective memory tests was also examined.

Participants and Methods: Fifty three ABI outpatients (mean age = 46, SD = 15; mean education = 13, SD= 3.5), consisting of 33 males and 20 females participated in the study. Each participant received the SRT, CVLT-II, and the PRMQ as part of the neuropsychological assessment. The PRMQ-proxy form was completed by a family member or caregiver.

Results: Analyses revealed PRMQ scores of self- and proxy-rating scales did not correlate with indices of learning, memory, or total list scores for the SRT or the CVLT-II. T-tests suggested significant differences between scores on the PRMQ with scores for SRT and CVLT-II, regardless of the severity of memory impairment. T-tests also suggested significant differences for indices of learning, long delay recall, and total list scores between the SRT and CVLT-II, with participants scoring lower on these measures on the SRT than on similar measures for CVLT-II, consistent with findings from a previous study (Leitner et al. 2013).

Conclusions: The results suggest that the PRMQ does not reflect failures of memory similar to the CVLT-II and SRT, two widely used measures in clinical assessment of memory. This finding may call into question the clinical validity of the PRMQ measure. Alternatively, concern is also raised regarding the translational aspects of the SRT or CVLT-II to daily function.

Correspondence: *Jamie C. Piercy, B.S., Psychology, Wayne State University, 5057 Woodward Avenue, Detroit, MI 48202. E-mail: jamiepiercy@live.ca*

M.T. BUELOW & J.A. SUHR. The Assessment of RIsky Decision Making.

Objective: "Hot" or risky decision making is frequently assessed in the clinical and research realms. Typical tasks utilized include the Iowa Gambling Task (IGT) and Balloon Analogue Risk Task (BART). However, little is known about the convergent and divergent properties of these tasks. Do measures of risky decision making measure the same thing? The present study sought to examine relationships between the IGT, BART, and delay discounting task.

Participants and Methods: Participants were 39 undergraduate student non-smokers (17 males; mean age 19.79 [SD = 3.44]). All participants completed the IGT, BART, and delay discounting task in a counterbalanced order. Scores on the IGT were calculated as the number of advantageous minus disadvantageous selections on each of the 20-card blocks of trials. Scores on the BART were calculated as the average adjusted number of pumps and total money earned. k values were calculated for the delay discounting task to indicate relative preference for smaller, more immediate rewards or larger but distant rewards.

Results: On the IGT, selections during the first 20 trials were not correlated with performance on the remainder of the task. Performance on Blocks 2, 3, 4, and 5 were correlated. No correlations were found between performance on the IGT and performance on the BART. Individuals who preferred smaller, more immediate rewards performed riskier on Block 5 of the IGT and earned less money on the BART.

Conclusions: The present results indicate that measures of risky decision making do not necessarily assess the same components of the construct.

Correspondence: *Melissa T. Buelow, Ph.D., Psychology, The Ohio State University Newark, 1179 University Drive, Newark, OH 43055. E-mail: buelow.11@osu.edu*

C. POSADA, K. BLACKSTONE, B. GOUAUX, R. DEUTSCH, I. GRANT & D.J. MOORE. Development of the Emotional Verbal Learning Test.

Objective: Emotions appear to bring salience to memory and help the brain to determine which information should and should not be remembered (Kimberly et al, 2009). In order to assess the impact of emotional words on verbal learning and memory, we developed a list-learning task (Emotional Verbal Learning Test; EVLT) to assess whether emotionally-laden words are better remembered than neutral words.

Participants and Methods: The EVLT contains 12 English words divided into three groups of four positive, four negative, and four neutral words. The test has the following components: five consecutive learning trials, interference list, short delay free recall, short delay cued recall, long delay free recall, long delay cued, and recognition. Words were randomly selected from the Affective Norms for English Words and were matched on affective valence and frequency. Twenty-eight middle age healthy participants with some college education (recruited from ongoing HNRP studies) were assessed using the EVLT. We compared the mean numbers of each word type (positive, negative, neutral) that participants recall on each trial.

Results: Participants learned (Trials 1-5) significantly fewer negative words ($F = 7.6$, $p < 0.01$) as compared to positive and neutral words. No significant differences were found between positive, negative or neutral words on the short delay free recall or short delay cued recall. Participants recalled significantly more neutral words as compared to positive and negative words on both long delay free recall, ($F = 7.9$, $p < 0.01$), and short delay cued recall ($F = 5.8$, $p < 0.01$).

Conclusions: : Healthy individuals were less likely to learn negatively laden words as compared to positively or neutrally laden words. After a delay, neutral words were more frequently remembered as compared to emotional words. Future work will use the EVLT among persons with mood disorders and will compare EVLT performance with traditional verbal list learning tests.

Correspondence: *Carolina Posada, UCSD, 9130-C Regents Rd, La Jolla, CA 92037. E-mail: cposada@ucsd.edu*

C.A. LOCKWOOD, K. MCCARRON, N. ALLEN, R. HANDEL & B. SCHWARTZ. Facial Affect Recognition in Veterans with PTSD.

Objective: Although many individuals with PTSD demonstrate difficulties in social and emotional functioning, there is limited research examining facial affect recognition (FAR) in this population. This is notable in that facial expressions are considered the most important nonverbal emotional cue and impaired FAR may have serious interpersonal, emotional, and health status implications. This study examined FAR performance in a sample of Veterans with PTSD.

Participants and Methods: Participants were recruited as part of a larger ongoing study at the War Related Illness and Injury Study Center at the Washington, DC VA. In the present analyses, the sample consisted of 23 Veterans (19 male, 4 female), mean age 48 (range ages 31-59), with a diagnosis of PTSD. Participants completed a structured interview and emotional and social perception measures. In the present study, measures analyzed include the FAR task and the Clinician Administered

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms.
https://doi.org/10.1017/S1355617714000381

PTSD Scale for DSM-IV (CAPS). Correlational analyses explored the relationship between FAR and PTSD.
Results: Results revealed a significant correlation between the FAR total score and CAPS total (r= 0.361, p= 0.045). Additional analyses revealed a significant correlation between the avoidance CAPS criterion and FAR (r = 0.413, p = 0.025).
Conclusions: Findings suggest that with heightened symptoms of PTSD, FAR performance improved. Research investigating anxiety and FAR is mixed. Some studies suggest there may be reduced ability to discriminate between emotional expressions in PTSD samples. Other studies have found that elevated symptoms of anxiety are associated with faster and more accurate FAR responses, particularly in social anxiety and borderline personality disorder samples. With many returning service members reporting emotional distress, and the established link between social support and PTSD recovery, it is important to better understand the association between emotional functioning, perception of emotions, and social cognition in PTSD.
Correspondence: *Courtney A. Lockwood, Ph.D., WRIISC, Washington DC VA Medical Center, 50 Irving St, NW, Washington, DC 20422. E-mail: courtneylockwood@gmail.com*

C.A. LOCKWOOD, H. AMANDA, C. EICKHOFF, P. SULLIVAN, B. SCHWARTZ & M. REINHARD. Cognitive Performance in a VA Sample with Chronic Pain.
Objective: Chronic pain is associated with neurocognitive difficulties in domains of attention, processing speed, memory, and executive functioning. This study examined neurocognitive performance and the association between pain and cognition in veterans with chronic pain.
Participants and Methods: Participants were veterans with chronic pain (>2 years) recruited from the Integrative Healthcare and Wellness (IHW) Program, a comprehensive complementary and alternative (CAM) clinic at the Washington DCVA War Related Illness and Injury Study Center. The present sample consisted of 20 veterans (12 male, 9 female), mean age 47 (range 29-69), mean educational level attained 15 years (range 9-22 years). Participants were administered measures of cognitive functioning (ACS ToPF and Affect Naming, WAIS-IV Digit Span and Arithmetic, DKEFS Color-Word and Verbal Fluency, Hopkins Verbal Learning Test- Revised, Brief Visuospatial Memory Test-Revised, Trails), a self-report measure of depression (BDI-II), and a self-report measure of pain (Pain Disability Questionnaire) as part of a comprehensive battery.
Results: Mean total score analyses revealed intact performance across all neurocognitive measures. Results of correlational analyses indicated pain is significantly correlated with the WAIS-IV Digit Span subtest (r= -0.624, p= 0.003) and trending with Trails B (r= 0.423, p= 0.063). Pain was also associated with depression (r= 0.584, p= 0.009). Depression was not significantly correlated to cognitive performance across measures.
Conclusions: In sum, although cognitive performance was generally intact as a whole, increased pain was associated with worsened cognitive performance. Research in pain samples has investigated factors that may contribute to cognition (e.g., emotional distress), however, in the present sample, depression was not significantly correlated to cognition. These findings highlight the need for further investigation as to factors which may impact cognition in pain samples.
Correspondence: *Courtney A. Lockwood, Ph.D., WRIISC, Washington DC VA Medical Center, 50 Irving St, NW, Washington, DC 20422. E-mail: courtneylockwood@gmail.com*

T. MCKENZIE, L. SCHMITT & D. KINSINGER. Normative Data for the Original Serial Sevens Test in a Legally Blind Veteran Population.
Objective: The Serial Sevens Test (SST), a conventional task of the mental status exam, is generally regarded as a measure of concentration. As it does not require motor or visual ability, it is ideal for inclusion within a cognitive screen when assessing those with disabilities. Although the SST may have some value among those with visual impairments, there are no available norms for such a population. This study aimed to develop reliable norms for the SST among a sample of legally blind (LB) veterans.
Participants and Methods: Data for this study were obtained from all LB veterans (n= 548) seen within a VA Blind Rehab Center from 1997-2012. Veterans were mostly male (94%), ranging from 22-93 years of age, whose etiology of LB included Macular Degeneration (40%), Diabetic Retinopathy (20%), Glaucoma (19%), Retinitis Pigmentosa (4%), and eye traumas (6%). Each veteran completed the original 14-iteration version of the SST as part of a brief psychological screen.
Results: Evaluation of the SST produced the following normative data for LB veterans: Errors, (M=1.26, SD=1.48), and Time (M=79.19", SD=44.53"). Differences for errors was found for MD (M=1.45, SD=1.68) and DR (M=.84, SD=1.04); there were no statistical differences for other etiological groups. Correlational analyses, consistent with prior research, showed a negative correlation between errors and level of education (r= -.164, p=.000). No correlation was found between education and time. Interestingly, those with MD had a higher number of errors (r= .087, p=.05), while those with DR had fewer errors (r= -.100, p=.024), even when controlling for age, education, and time to completion.
Conclusions: Data from this study will help to provide preliminary norms for a task that, while frequently used in LB populations, was limited by its lack of normative data. The contents of this abstract do not represent the views of the Dept. of Veterans Affairs or the US Government. This material is the result of work supported with resources and the use of facilities at Hines VA.
Correspondence: *Tamara McKenzie, PsyD, Neuropsychology, Hines VA, 5000 South 5th Avenue, Hines, IL 60141. E-mail: mckenzie744@gmail.com*

D. LEITNER, J.C. PIERCY, H. MILLER & M. REYNOLDS. A Comparison of the Buschke Selective Reminding Test and the California Verbal Learning Test - Second Edition in a Traumatic Brain Injured Population.
Objective: The Buschke Selective Reminding Test (SRT) and California Verbal Learning Test – Second Edition (CVLT-II) assess verbal learning and memory. A recent study with a heterogeneous acquired brain injury sample (Leitner, Piercy, Miller, and Docherty, 2012) suggested differences in degree of impairment and/or classification of patients as impaired or not impaired, depending on which test was used. The current study looked at patients with traumatic brain injury (TBI), and whether those differences were maintained in specific indices for each test.
Participants and Methods: Thirty-nine outpatients (mean age = 40.6, SD = 15.8) were included in the study. Participants were seen in a hospital setting or private office. Eligible participants had a history of TBI (i.e., fall, motor vehicle accident, or blow to the head) and at least one neurological marker of TBI (i.e., depressed GCS score, post traumatic amnesia, and/or positive CT/MRI findings). Each participant received the SRT and CVLT-II, separated by a minimum of two hours, within the context of a neuropsychological assessment.
Results: T-tests suggest differences between indices of long delay free recall, learning, and total list scores. Next, the sample was stratified into mild, moderate, and severe groups, based on neurological markers of severity of TBI. Significant t-test differences remained in the mild and moderate TBI groups and only for total list scores in the severe TBI group. Correlations were significant in the mild TBI group and total list scores in the severe TBI group.
Conclusions: The results indicate that in a TBI population, the SRT classifies patients as more impaired significantly more often than the CVLT-II. These findings suggest that the SRT and CVLT-II are not interchangeable tests of learning and memory in patients with TBI. Thus, recommendations regarding verbal learning and memory are likely to vary for patients with TBI based on the clinician's choice of using the SRT or the CVLT-II.

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

Correspondence: *Damian Leitner, BSc. (Hons) Psychology, Kelowna General Hospital, 2268 Pandosy Street, Kelowna, BC V1Y 1T2, Canada. E-mail: Canadian_02@hotmail.com*

R.P. KESSELS & A. OVERBEEK. Assessment of Working Memory in Patients with Early Alzheimer's Disease: Comparing Working Memory Tests from the WAIS/WMS-III/IV.

Objective: Typically, working memory (WM) function is often considered relatively spared in patients with Alzheimer's Disease (AD), especially in the early stages. However, widely-used clinical WM paradigms such as digit or block span tests may be relatively insensitive in detecting WM defiicts in older people. It can be hypothesized that the WAIS/WMS-IV verbal and spatial WM subtests may be more sensitive to detect WM deficits in older people. In this study, a direct comparison is made between the performance on verbal and spatial WAIS/WMS-III and WAIS/WMS-IV WM subtests in a group of early AD patients and older controls.

Participants and Methods: Twenty-five patients who fulfilled the criteria for early AD (age M=77.7, SD=7.1; MMSE M=22.1, SD=4.7) and 25 older controls (age M=74.8, SD=7.9; MMSE M=29.4, SD=0.8) participated. All participants completed the WAIS-III Digit Span (Forward and Backward), WMS-III Spatial Span (Forward and Backward), WAIS-IV Digit Span (Forward, Backward, and Sequencing) and the WMS-IV Spatial Addition subtest. All patients were recruited from a memory clinic.

Results: Results showed that AD patients performed worse than controls on all WM subtests (F-values>6.0, p<0.019), with large effect sizes (Cohen's d=0.7-1.6). The smallest effect was found on the WMS-III Spatial Span Forward (0.7), the largest effect on WAIS-IV Digit Span Sequencing (1.6). All but two variables were significantly correlated with MMSE (r>.41, p<.05).

Conclusions: Deficits were identified in the AD group on all WM subtests, with the largest effect on the subtest with the highest executive load (Digit Span Sequencing). However, we did not confirm our hypothesis that the newly developed Wechsler WM task were more sensitive to AD-related WM dysfunction than traditional forward and backward span tasks. Although not initially developed for use in older adults, we show that administration of the WMS-IV subtest Spatial Addition is feasible in both healthy older adults and patients with AD.

Correspondence: *Roy P. Kessels, PhD, Radboud University Nijmegen, PO Box 9104, Nijmegen 6500 HE, Netherlands. E-mail: r.kessels@donders.ru.nl*

C. ABEARE & A. SEGUIN. Predicting Estimated IQ with Verbal Fluency Response Characteristics.

Objective: With growing time pressure on clinical neuropsychologists, it is more important than ever to make assessments more efficient without sacrificing validity. One way in which this can be accomplished is to maximize the amount of information extracted from currently used neuropsychological measures. Verbal fluency tests are brief measures commonly used to assess aspects of language and executive functioning by counting the number of correct responses generated based on phonemic or semantic criteria. The goal of this study was to determine whether information about the quality of participant responses on a phonemic fluency test was related to estimated intelligence. If such a relationship exists, then there are potential clinical applications of this technique of analyzing verbal fluency performance.

Participants and Methods: Accordingly, FAS verbal fluency test responses and North American Adult Reading Test (NAART) scores of 85 participants (M age = 20.98, 76% Female) were collected. A number of age of acquisition (AoA) indices were generated, based on a normative database of AoA values, in order to determine if any of these measures are related to estimated IQ based on NAART performance.

Results: The average maximum AoA score of FAS words was the best predictor of estimated full scale IQ with a correlation coefficient of r = 0.393, p < 0.00. This relationship was stronger than the relationship between the number of NAART errors and the estimated premorbid IQ based upon the equation, which was r = -.257, p = .017. The total number of correct responses on FAS did not correlate with NAART performance and did not correlate with AoA indices.

Conclusions: This suggests that: people with a higher NAART estimated IQ are more likely to generate words on FAS that have a higher AoA value, that maximum AoA produced is a better predictor of estimated IQ than the NAART itself, and that this AoA index provides unique information about test-takers. Clinical implications are discussed.

Correspondence: *Christopher Abeare, Ph.D., University of Windsor, 401 Sunset Ave., Windsor, ON N9B 3P4, Canada. E-mail: cabeare@uwindsor.ca*

L. GLASS UMFLEET, J.J. RYAN & S. GONTKOVSKY. WAIS-IV GAI, CPI, and FSIQ Discrepancies in Four Clinical Samples.

Objective: The General Ability Index (GAI) and Cognitive Proficiency Index (CPI) are optional composites of the WAIS-IV. The GAI is derived from the six Verbal Comprehension and Perceptual Reasoning subtests and is relatively resilient to cognitive deficits associated with many neurological and medical disorders. The CPI is comprised of the four Working Memory and Processing Speed subtests. Compared to GAI, CPI is more susceptible to acquired cognitive impairment. This study explores pattern and level of performance differences among GAI, CPI, and FSIQ in four patient samples. The hypotheses are: GAI will be significantly above FSIQ, CPI will be significantly below FSIQ, and GAI will be significantly above CPI.

Participants and Methods: Ninety-eight patients from four diagnostic categories (Multiple Sclerosis, progressive neurodegenerative conditions, TBI, non-neurological medical disorders) were administered the WAIS-IV. Groups differed in age, but not in education or FSIQ. Three repeated measures ANOVAs were used to identify within group differences on the composites (FSIQ vs. GAI; FSIQ vs. CPI, and GAI vs. CPI) as well as any group by composite interactions.

Results: ANOVAs showed significant main effects of composites. No significant main effects emerged for groups or groups by composite interactions. Results supported our hypotheses. GAI > FSIQ, CPI < FSIQ, and GAI > FSIQ patterns emerged in each group. Percentages of patients with discrepancy scores in ≤10% of the WAIS-IV standardization sample were calculated.

Conclusions: As reported above the three hypotheses of the study were supported. Discrepancies among the three composites were sensitive to cognitive processing deficits regardless of a patient's specific diagnosis.

Correspondence: *Laura Glass Umfleet, Neuropsychology, Medical College of Wisconsin, 9200 W Wisconsin Ave, Milwaukee, WI 53226. E-mail: lglass@mail.roosevelt.edu*

J.J. RYAN, L. GLASS UMFLEET & S. GONTKOVSKY. Prorating WAIS-IV Summary Scores for Patients with Relapsing-Remitting Multiple Sclerosis.

Objective: The core WAIS-IV subtests took >60 minutes to administer during standardization. Patients with multiple sclerosis (MS) require more time to complete the Scale because of fatigability. When time is limited, Vocabulary is often omitted since information from the subtest is redundant with that of other measures (Lezak et al., 2004). With some patients, it may be practical to also omit Block Design. The WAIS-IV manual provides tables for prorating VCI, PRI, and FSIQs for two or eight subtests, respectively. We assessed the validity of composites when Vocabulary and Block Design were omitted among patients with MS.

Participants and Methods: Forty-eight patients with relapsing-remitting MS completed the WAIS-IV. Age, education, and duration of diagnosis averaged 42.35, 14.21, and 8.30 years. Prorated VCI = Similarities + Information, PRI = Matrix Reasoning + Visual Puzzles, and FSIQ = remaining eight subtests. Sums of scaled scores for abbreviated composites were converted using Tables A.8 and A.9 in the manual.

Results: Means for standard and prorated VCI, PRI, and FSIQ and corrected/uncorrected correlations are presented (Table 1). Paired t-tests

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

showed no significant differences between prorated and standard composite means. Correlations between full and prorated composites were high (>.90). Table 2 reports frequencies of absolute differences between prorated and standard composites.
Conclusions: Findings support the use of prorated VCIs, PRIs, and FSIQs among patients with MS. Prorated composites did not differ from standard composites and inter-composite correlations were high. Absolute differences between full and prorated scores were minimal.
Correspondence: *Laura Glass Umfleet, Neuropsychology, Medical College of Wisconsin, 9200 W Wisconsin Ave, Milwaukee, WI 53226. E-mail: lglass@mail.roosevelt.edu*

M. ROSSETTI, M. FORTE, R. GAVETT, I. PIRYATINSKY, F.S. AHMED, P.M. KLINGE, S. SALLOWAY, P.F. MALLOY, N.R. RELKIN, L.D. RAVDIN, B.E. LEVIN, M. BROGGI, J.S. MANISCALCO & H.L. KATZEN. Novel Upper Extremity Motor Tasks are Reliable and Sensitive to Deficits in Idiopathic Normal Pressure Hydrocephalus.
Objective: Idiopathic Normal Pressure Hydrocephalus (INPH) is a progressive neurological disorder in which gait, cognitive, and bladder symptoms emerge in the context of enlargement of the brain ventricles. Gait disturbance, typically the first and most pronounced symptom, is the primary indicator for treatment candidacy and response. Since some patients are wheelchair bound or have orthopedic issues interfering with gait evaluation, assessment of upper extremity motor (UEM) skills can be crucial, yet this has not been widely studied. Line Tracing (LTT) and Serial Dotting (SDT), two novel UEM measures, have potential as reliable and practical outcome tools in INPH. This study introduced new error scoring methods to determine if accuracy and completion time are both important aspects of performance. A second goal was to explore reliability of the scoring methods.
Participants and Methods: Eighty-four INPH subjects (Mage=75.29, SD=6.78) and 36 healthy controls (Mage= 72.37, SD=7.44) underwent neuropsychological testing including LTT and SDT. Novel error scoring procedures were developed for both measures in an effort to make scoring practical and efficient.
Results: Independent sample t-tests revealed slower performance and more errors in the INPH group on both LTT and SDT ($p<.01$). Difference in LTT completion time was not significant after controlling for age and education. Two raters scored each protocol and interclass correlation coefficient analysis revealed good reliability of error scoring procedures for both tasks (0.997, $p<.01$).
Conclusions: These findings indicate that assessment of UEM function is useful for evaluation of INPH patients. This is the first study to establish the importance of performance accuracy, in addition to completion time, and introduce practical/reliable error scoring. While completion time may reflect impaired processing speed, reduced accuracy scores may suggest planning and self-monitoring difficulties, aspects of executive functioning known to be compromised in INPH.
Correspondence: *M. Agustina Rossetti, M.S., Neurology, University of Miami, 1150 NW 14th Street, 1337, Miami, FL 33136. E-mail: mrossetti@med.miami.edu*

V. BALLDIN, J. MARCEAUX, K. MCCOY & R. HILSABECK. Validation of the Brief Cognitive Status Exam (BCSE) in a Mixed Clinical Sample.
Objective: The Brief Cognitive Status Exam (BCSE) is a new measure of global cognitive functioning. The BCSE covers seven cognitive abilities: Orientation, Time Estimation, Mental Control, Planning/ Visual- Perceptual Processing, Incidental Recall, Inhibitory Control, and Verbal Productivity. It yields performance classification levels based on impairment (Average, Low Average, Borderline, Low, Very Low), with classifications stratified by age and years of education. It was hypothesized that the BCSE would demonstrate good convergent, divergent, and criterion-related validity.
Participants and Methods: Veterans (n=245; 89% men) with a mean age of 58.04 years (SD=13.6) and mean education of 13.1 years (SD=2.9) were administered the BCSE as part of a neuropsychological evaluation. Correlations between the BCSE total score and scores on tests of memory, language, executive functioning, processing speed, and mood were computed, and univariate and multivariate analyses of variance (ANOVA) were conducted to determine if there were differences on cognitive measures among BCSE classification categories. Finally, an independent samples t-test was used to examine differences in BCSE total scores between patients without a cognitive disorder and those with dementia.
Results: The BCSE correlated significantly in the expected direction with all cognitive measures but not measures of mood. ANOVAs and MANOVAs were significant for all measures of cognition, but were not significant for measures of mood. A t-test revealed that the dementia group obtained significantly lower BCSE total scores than the no cognitive disorder group.
Conclusions: As hypothesized, the BCSE demonstrated convergent and divergent validity, as well as criterion-related validity. Results suggest the BCSE may have utility as a brief screening measure to aid clinicians in deciding whether an individual is appropriate for further assessment.
Correspondence: *Valerie Balldin, Psychology, South Texas VA, 7400 Merton Minter Blvd, 116B, San Antonio, TX 78229. E-mail: valerielhobson@yahoo.com*

A.L. WONG, K. BARRERA, C. MOORE & S.K. PATEL. Evaluating Alternate Versions of the Hopkins Verbal Learning Test and Complex Figures.
Objective: Serial neurocognitive assessments in longitudinal research have been associated with practice effects due to repeated exposure to test stimuli. Alternate forms of the same test were created to minimize these effects with the assumption that subjects will perform equally on them. We previously showed an effect of alternate forms across time points for DKEFS Verbal Fluency and the WRAT, and we now extend the focus to two additional measures: HVLT and Complex Figures. Using data from an ongoing, larger study we continue our evaluation of comparable performance on alternate test versions.
Participants and Methods: The current sample consists of 91 healthy female controls who were administered two similar forms of batteries (Forms A and B) across two time points (T1 and T2). Approximately 50% of the women were administered Form A at T1 and then Form B at T2. The other half was administered these forms in the reverse order. Form A consisted of the Rey-Osterrieth Complex Figure and HVLT (Form 1), whereas Form B consisted of the Taylor Complex Figure and HVLT (Form 2). The alternate versions of these subtests are widely believed to be comparable to each other.
Results: In these analyses, we controlled for age, education, and time between T1 and T2. Repeated measures ANCOVAs showed significant differences between the complex figures with better performance on the Taylor: Copy, $F(1,64)=12.03$, $p=.001$, and Immediate Recall, $F(1,64)=12.68$, $p=.001$. In regards to the HVLT, significant differences emerged with better performance on Form 1: Initial Learning Trial, $F(1,74)=8.83$, $p=.004$, and Recognition Discrimination, $F(1,74)=5.76$, $p=.01$. No significant differences were found on Delayed Recall.
Conclusions: Consistent with our previous results, we found significant effects associated with alternate versions of these measures and that patients perform differently on them. This variability in performance may adversely impact research results and should be considered in designing longitudinal studies. Further research may be warranted.
Correspondence: *Andrew L. Wong, M.A., Population Sciences, City of Hope National Medical Center, 1500 East Duarte Rd., Duarte, CA 91010. E-mail: alwong83@gmail.com*

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

R. GOLDSWORTHY, J. RAAK, N. FERGESTROM, R. O'NEIL & R. SKEEL. The Distinctions Between Self-Report and Behavioral Outcomes of Impulsivity Measures.

Objective: Previous research on the construct of impulsivity has indicated that self-report and behavioral measures of impulsivity tend to have small relationships (e.g., Cyders & Coskunpinar, 2011). It has been speculated that behavioral tasks tap into a range of underlying processes, and this may account for the lack of meaningful relationships with self-report measures. The current study measured a range of behavioral measures and one self-report measure of impulsivity in an effort to define which behavioral measures may show stronger relationships with self-report instruments.

Participants and Methods: Eighty-seven undergraduate participants completed behavioral measures of impulsivity: a weighted risk task (Stoplight Task), a time estimation task, a sequential risk task (Angling Risk Task), and a delay discounting task. In addition, participants completed a computerized delay discounting questionnaire, the Barratt Impulsiveness Scale (BIS), an IQ screening measure (AMNART), and a measure of numeracy.

Results: Exploratory factor analysis indicated that a two-factor solution best fit the data, and included: Factor 1, Cognitive/Intelligence Component (29.5% of the variance; stoplight task, AMNART, numeracy questionnaire, time estimation, and angling risk task), and Factor 2, Self-Report Component (19.2% of the variance; delay discounting and BIS).

Conclusions: These results suggest that self-report and behavioral measures are discrete facets of impulsivity. Behavioral measures appear to rely upon various cognitive components that are not related to self-report measures.

Correspondence: *Rachael Goldsworthy, Psychology, CMU, 600 S. Washington Street, APT 19, Mt. Pleasant, MI 48858. E-mail: rgoldswo@gmail.com*

L.A. SCHWENT SHULTZ, H.A. PEDERSEN, B.L. ROPER, S. MUSIL, E.M. CROUSE, G.P. CRUCIAN, D.M. WHITESIDE & M.R. BASSO. RBANS Story Recognition: A New Subtest with Promising Clinical Utility.

Objective: On the RBANS (Randolph, 1998), delayed memory is assessed with a word list, brief story, and complex figure. Only the word list includes a recognition trial. We explore the clinical utility of story recognition paradigm for RBANS Forms A and B, originally developed by Suzanne Musil (previously unpublished), which includes 11 items with two foils per item and is administered after Story Recall.

Participants and Methods: RBANS with Story Recognition was administered as part of a larger test battery to 144 participants (141 men, 3 women; age: M = 73.3, SD = 11.4; years of education: M = 11.3, SD = 2.7) referred for neuropsychological evaluation at a large VA medical center. Participants were free of psychosis and diagnosed with either dementia (n = 51), MCI (n = 59), or no cognitive diagnosis (NCD; n = 34).

Results: Correlations among Story Recognition and existing RBANS subtests ranged from small for Digit Span ($r = .22$, $p < .01$), moderate for List Recognition ($r = .41$, $p < .001$), and large for Story Recall ($r = .66$, $p < .001$). Across diagnostic groups, MANOVA employing Story Recognition and all immediate and delayed RBANS memory subtests was significant ($p < .001$). Story Recognition significantly differed across all three diagnostic groups. Participants with NCD (M = 9.8, SD = 1.2) performed better than those with MCI (M = 8.3, SD = 1.9; $p < .001$), who in turn performed better than those with dementia (M = 7.0, SD = 2.3, $p < .01$). In contrast, List Recognition distinguished dementia (M = 13.3, SD = 3.4) from MCI (M = 15.1, SD = 2.7, $p < .02$) and NCD (M = 16.3, SD = 2.6, $p < .001$), but did not distinguish MCI from NCD ($p = .13$).

Conclusions: Results support the diagnostic utility of Story Recognition, which may perform better in distinguishing MCI from NCD than the existing List Recognition subtest. Future studies may focus on the utility of Story Recognition in differentiating among specific dementia types as well as other diagnostic groups.

Correspondence: *Laura A. Schwent Shultz, PsyD, Mental Health, Memphis VA Medical Center, 1030 Jefferson Ave, Memphis, TN 38104. E-mail: laura.shultz@va.gov*

K. WYMAN-CHICK, M. DANIEL, K. BEENE & B. THIEME. What does Visual Puzzles measure? Factor analysis in a mixed clinical sample.

Objective: To date, little information has been published regarding the neuropsychological correlates of performance on the Visual Puzzles subtest of the Wechsler Adult Intelligence Scale – Fourth Edition (WAIS-IV). This study examines the factor structure of Visual Puzzles performance with tests of executive functioning, visual integration, working memory, and processing speed.

Participants and Methods: Participants were 75 subjects (48% male; mean/SD: age = 30.5/10.4; education = 13.8/2.9) referred to a university clinical psychology training clinic for neuropsychological evaluation. Principal axis factoring with a direct oblimin rotation was conducted with eleven neuropsychological tests; WAIS-IV: Block Design, Visual Puzzles, Matrix Reasoning, Symbol Search, Arithmetic, Digit Span, Coding; Judgment of Line Orientation (JLO); DKEFS Trails 4; Wisconsin Card Sorting Test Percent Conceptual Level Responses (WCST); Rey-O copy.

Results: The Kaiser-Meyer-Olkin measure was .79 and Bartlett's test of sphericity was significant ($\chi 2$ (153) = 242.1, $p < .05$). Using conventional criteria (e.g., eigenvalue >1), 3 factors emerged: 1.) Visual integration/working memory [JLO (.59); WAIS-IV: Block Design (.73), Visual Puzzles (.67), Matrix Reasoning (.73), Arithmetic (.71) and Digit Span (.57)]; 2.) Motor/processing speed [WAIS-IV: Coding (.84) and Symbol Search (.63)]; and 3.) Executive functioning [WCST (.57) and DKEFS Trails 4 (.50)]. None of the variables cross loaded and one (Rey-O Copy) did not load on any factor.

Conclusions: Visual Puzzles measures visual integration and working memory to a greater extent than processing speed or executive functioning.

Correspondence: *Kathryn Wyman-Chick, MA, Pacific University, 9334 N Lombard St #3, Portland, OR 97203. E-mail: kwyman@pacificu.edu*

H. GOGEL & W.D. KILLGORE. A Psychometric Validation of the Design Organization Test (DOT) in a Healthy Sample.

Objective: Abbreviated tests of cognitive functioning are becoming increasingly necessary in order to reduce patient testing burden and to collect relevant clinical information in a time efficient and cost effective manner. The Design Organization Test (DOT; Killgore et al., 2005) was developed as a brief, 2-minute, paper-and-pencil alternative to the Wechsler Block Design (BD) subtest for evaluating visuospatial ability. The DOT was initially validated in a sample of high functioning university students and subsequently in a sample of clinical neurologic patients. The DOT showed good reliability (r=.80) and excellent correlation with the WAIS BD subtest (r=.92). To further develop the DOT, we presently examined its psychometric properties in a well-characterized sample of healthy adults.

Participants and Methods: Two alternate versions of the DOT and the Wechsler Abbreviated Scale of Intelligence (WASI) were administered to 61 racially and educationally diverse (11 to 20 years of formal education) healthy adult participants (30 males) ranging in age from 18 to 45 years (M = 30.3, SD = 8.1). Participants were screened to exclude significant medical, neurological, substance abuse, or psychiatric problems.

Results: The DOT showed high alternate forms reliability (r = .90 to .92) and the two versions yielded equivalent levels of performance, suggesting that they are interchangeable. The DOT was highly correlated with raw BD (r = .76 to .79) and Full Scale IQ (r = .68 to .69), and yielded nearly identical outcomes when used in lieu of BD in the calculation of WASI IQ scores (i.e., total scores differed by less than 1/3 of an IQ point).

Conclusions: Findings provide further support for the reliability and validity of the DOT as a brief measure of visuospatial ability in a healthy

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

population, and add to prior findings in clinical neurological patients and university students. The DOT may serve as an efficient estimate of intellectual functioning when lengthier tests may be excessively fatiguing or impractical.

Correspondence: *William D. Killgore, Ph.D., McLean Hospital, 115 Mill Street, Belmont, MA 02478. E-mail: killgore@mclean.harvard.edu*

S.S. XIE, C.M. GOLDSTEIN, E.C. GATHRIGHT, J. GUNSTAD, M.A. DOLANSKY, J. REDLE & J.W. HUGHES. Performance of the Automated Neuropsychological Assessment Metrics (ANAM) in Detecting Cognitive Impairment in Heart Failure Patients.

Objective: Though cognitive impairment negatively affects outcomes in heart failure (HF), routine neuropsychological screening is rarely performed, and the insensitive Mini-Mental State Examination (MMSE) is commonly used. The Automated Neuropsychological Assessment Metrics (ANAM) is a promising test. The ANAM's capacity to distinguish cognitive impairment in HF patients was evaluated using the MMSE and a composite model of global cognitive function as comparisons.

Participants and Methods: Participants were 38 male and 19 female HF patients ranging from 48-89 years of age. Participants completed the MMSE, Rey Auditory Verbal Learning Test, Rey-Osterrieth Complex Figure Test, Trail Making Parts A and B, Letter Number Sequencing, Frontal Assessment Battery, the Stroop Color Word Test, and a 20-minute computerized ANAM battery. Using age and gender, raw neuropsychological test scores were converted to t-scores. The mean of the t-scores was the global cognitive function variable. Scores <35 indicated impairment.

Results: ANAM efficiency scores successfully differentiated cognitively impaired and non-impaired HF patients to a significant degree, Wilk's lambda = .92, $c^2(1) = 4.45$, $p < .05$, as did accuracy scores, Wilk's lambda = .80, $c^2(1) = 12.53$, $p < .001$. A discriminant function analysis conducted using the <35 cutoff of the composite CI variable for MMSE scores was non-significant, revealing that the MMSE correctly classified 0 HF patients as impaired and 1 patient as non-impaired. The ANAM classified approximately three-quarters of HF patients according to impaired and non-impaired categories.

Conclusions: The ANAM showed greater utility than the MMSE, but it may not be sufficiently sensitive for detecting cognitive impairment in HF. Further research is needed to develop a brief, standard screening method. This would be essential for tailoring HF management and self-care regimens to improve the lower quality of life and heavier healthcare costs associated with comorbid cognitive impairment and HF.

Correspondence: *Carly M. Goldstein, MA, Psychology, Kent State University, PO Box 5190, Kent, OH 44242. E-mail: cgoldst1@kent.edu*

D.M. O' SHEA, D. FIEO & D. HUEY. Validating a caregiver-based questionnaire to assess sexual behaviors in patients with brain injury, frontotemporal lobar degeneration and corticobasal syndrome.

Objective: Changes in sexual behavior following onset of dementia or acquired neurological injury has been minimally studied. We aimed to develop a validated caregiver-based measurement scale to assess the range and type of sexual behaviors in a sample of patients with brain injury, frontotemporal lobar degeneration and corticobasal syndrome in which these behaviors are most common.

Participants and Methods: Beginning with a 35-item questionnaire, nonparametric item response theory (IRT) methodology was used to construct a scale with appropriate dimensionality, monotonicity, item discrimination power, and scalability within a sample of 106 patients with brain injury frontotemporal lobar degeneration and corticobasal syndrome.

Results: A sexuality questionnaire with four primary domains or subscales was established. The scales presented with sufficient reliability (rho .70 to .80), while meeting the Mokken IRT criteria of medium scalability. The first scale was labeled "sexual aggressiveness" and obtained an H coefficient of .41. The second and third scales were defined as "sexual preoccupation" and "affection", with respective H coefficient of .50 and .42. A fourth dimension emerged but with very few items, "blunted affection" (H= .47).

Conclusions: Construct validity was established for groups of items pertaining to four unique aspects of sexuality. This is the first known caregiver-based measurement scale that has been validated to specifically assess sexual behaviors oriented towards patients with brain injury, frontotemporal lobar degeneration and corticobasal syndrome.

Correspondence: *Deirdre M. O'Shea, MS, The Taub Institute, Columbia University,Medical center, 630 West 168th street, P &S box 16, New york, NY 10032. E-mail: dmo2123@cumc.columbia.edu*

K. KRISHNAN, J. FALKOWSKI, K. CARTER, L. HYNAN, L. LACRITZ, M. WEINER, C. CULLUM & H. ROSSETTI. Change in Montreal Cognitive Assessment Over Time.

Objective: To assess the stability of Montreal Cognitive Assessment (MoCA) scores over time in a self-selected sample of multiethnic, urban-dwelling, elderly individuals.

Participants and Methods: The MoCA was administered to 152 participants at 2 time points ranging from 2 to 4 years apart (Mean=3, SD= 0.70) as part of a larger study unrelated to the present investigation. MoCA scores at both time points were compared using paired samples t-test and intraclass correlation coefficient (ICC). Diagnoses at time 2 consisted of 8 individuals with Alzheimer's disease, 75 individuals with Mild Cognitive Impairment, 5 with another form of dementia, and 64 healthy controls. At time 2, the mean age was 66.9 (SD = 5.2; range = 58 – 77) and mean education was 14.4 years (SD = 2.9; range = 7 - 22); with 56% women and 42% African Americans.

Results: There was a small, but significant overall decrease in MoCA Total scores (M=0.6 points; SD = 2.7; range =8 - 6) between the 2 time points (Time 1 M=24.2, SD=3.3; Time 2 M=23.64, SD=4.06), t=-2.72, p=0.007, Cohen's d=-0.22. ICC was 0.84 (p<.001).

When the groups were divided into higher (≥26) versus lower (<26) MoCA scores at Time 1, greater decline was observed in individuals with higher scores at baseline (M change=-1.1) compared to those with lower scores (M change=-0.28; t=-1.1, p<0.001, Cohen's d=0.52).

When the MoCA score was evaluated by diagnoses, a significant decrease in AD (M change= -4.4 points, SD= 3.5, p =0.01) and MCI groups (Mean change= -0.97, SD= 2.6, p=0.002) was observed. Healthy controls did not demonstrate significant change over time (Mean change = 0.33, SD= 2.2, p= 0.24).

Conclusions: MoCA Total scores in this sample showed significant decline in elders with cognitive impairment over a period of 2-4 years but not in healthy controls. Little is known about the stability of the MoCA; however, the pattern described above appears consistent with literature on other cognitive screening measures such as the Mini Mental State Examination.

Correspondence: *Kamini Krishnan, M.S, UT Southwestern Medical Center, 2801 Live Oak St, Apt #2305, Dallas, TX 75204. E-mail: kamini.krishnan@utsouthwestern.edu*

J.A. FALKOWSKI, L.S. HYNAN, K. KRISHNAN, K. CARTER, L. LACRITZ, H. ROSSETTI, M.F. WEINER & C. CULLUM. Converting Montreal Cognitive Assessment to Mini-Mental State Examination Scores.

Objective: An algorithm that converts Montreal Cognitive Assessment (MoCA) scores to Equivalent Mini-Mental State Examination (MMSE) scores was recently derived from an elderly, primarily Caucasian sample that included 321 persons with Alzheimer's disease, 126 individuals with mild cognitive impairment (MCI), and 140 healthy elderly controls (Roalf et al., 2012). This study aimed to validate this algorithm in a racially diverse sample.

Participants and Methods: A sample of 174 participants (43% African American, 51% Caucasian, 6% Hispanic, 57% female, ages 58-80, 7-20 years of education) from the UT Southwestern Alzheimer's Disease Center were administered the MoCA and MMSE as part of a larger

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

neuropsychological battery. This sample was composed of 73 healthy controls, 86 persons with MCI, 9 individuals with Alzheimer's disease, and 6 with another form of dementia. MoCA scores (unadjusted for education) were transformed into Equivalent MMSE scores based on the conversion table by Roalf et al., (2012) that was developed with the equipercentile equating method to produce comparable scores between instruments. The intra-class correlation, a measure for agreement, between Equivalent MMSE scores and MMSE scores was examined.
Results: As expected, participants scored lower on the MoCA (M=23.7, SD=4.2, range 9-30) than the MMSE. Equivalent MMSE scores (M=27.5, SD=2.7, range 15-30) derived from the MoCA were highly similar to actual MMSE scores (M=27.6, SD= 2.5, range 13-30), with an intra-class correlation coefficient of 0.857 ($p<.001$). The intra-class correlation coefficient remained high when data were examined by gender and ethnicity.
Conclusions: This study supports the use of Roalf's conversion method to transform MoCA scores to Equivalent MMSE scores in a racially diverse population-based sample.
Correspondence: *Jed A. Falkowski, M.A., Department of Psychiatry, Division of Psychology, Ut Southwestern Medical Center, 5323 Harry Hines Blvd., Dallas, TX 75390. E-mail: jed.falkowski@utsouthwestern.edu*

N. OJEDA, D. ROCIO, J. PEÑA, N. IBARRETXE, A. AZNAR, B. SANCHIS & L. LOPEZ. Validation and Normalized data for the M-WCST (NORMACOG Project) in Spanish Population.
Objective: Neuropsychological assessment in Spanish population is conditioned by the limited standardization processes, and restrictived in terms of age-ranges, and educational levels. The NORMACOG Project was designed to validate and normalize several neuropsychological tests in Spanish speaking population in Spain. The aim of this study is to provide age and education adjusted norms for the Modified Wisconsin Card Sorting Test (M-WCST) in Spanish population, as part of the NORMACOG Project.
Participants and Methods: Five hundred healthy participants (age range: 18–90) were recruited from 8 different geographical locations in Spain and were representative of the population distribution according to the Spanish Statistical Institute in gender, age and educational level. Participants were volunteer and not paid. They should have Spanish as mother tongue or been bilingual. The M-WCST was chosen for not having been validated into Spanish population. Compared to attention or memory, there are fewer neuropsychological instruments validated into Spanish population measuring executive functions. Therefore, it represented an opportunity to provide the neuropsychology community with a new instrument of cognitive assessment which adds significant value to the available tests materials.
Results: The results were standardized by 8 ranges of age and 4 educational levels. Means, standard deviation and percentiles for each sociodemographic range are presented. We obtained the percentiles, the scalar scores and the raw scores adjusted by age and education.
Conclusions: As expected, there were significant differences in the M-WCST performance obtained in the same age range depending on the educational level. Normative data obtained of the M-WCST varied by different ranges of age & education and therefore emphasize the need to consider both variables in the scoring and interpretation of the M-WCST.
Funding sources: Department of Health and Consumption of the Basque Government. Project N: 2011111102
Correspondence: *Natalia Ojeda, PhD, of Methods and Experimental Psychology, Universidad de Deusto, Avenida de las Universidades 27, Bilbao 48007, Spain. E-mail: nojeda@deusto.es*

M.C. NATELSON LOVE & D.S. GELDMACHER. Alabama Brief Cognitive Screener (ABCs): Design and Initial Clinical Experience.
Objective: The Alabama Brief Cognitive Screener (ABCs) was developed in response to the need to include a cognitive screening in a new electronic medical record at the University of Alabama-Birmingham (UAB). Internal legal review indicated that the MiniMental State Exam (MMSE) was not suitable for inclusion because of copyright. Other potential instruments available for non-proprietary use, including the Montreal Cognitive Assessment and the Saint Louis University Mental Status Examination, were considered but determined to be more tuned to milder deficits than the MMSE.
Participants and Methods: The ABCs was designed as a clinically useful substitute for the MMSE that would provide the same level of difficulty for the examinee and require similar time to complete. It includes a 30-point scoring system, using questions familiar to many physicians. It also incorporates systematic assessments of the cognitive domains required for a comprehensive "single system neurologic examination" per 1997 US coding guidelines, emphasizing cognitive functions not readily observable during history-taking. These systematic assessments include orientation, recent (3-word) memory, concentration, object naming, and repetition. ABCs were administered to 718 patients with dementia-related diagnoses in the UAB Memory Disorders Clinics from 5/1/12 to 4/30/13.
Results: Scoring distribution by diagnosis: Mild Cognitive Impairment (n= 90)- mean 26.06, median 27, SD 3.61; Alzheimer's Disease (n= 102)- mean 18.01, median 18, SD 6.49; Cerebral Degeneration (n= 138)- mean 21.09, median 22, SD 5.60; Memory Loss (n= 300)- mean 23.86, median 25, SD 5.60; Dementia (n= 88)- mean 12.41, median 12, SD 6.18.
Conclusions: ABCs scores vary appropriately by diagnosis and resemble MMSE scoring distributions. This instrument provides a non-proprietary cognitive screening evaluation to be used by physicians to detect cognitive deficits and to aid in defining the degree, quality, and progression of impairment.
Correspondence: *Marissa C. Natelson Love, M.D., Neurology, University of Alabama Birmingham, 620D Sparks Center, 1720 7th Avenue South, Birmingham, AL 35294. E-mail: marissa.natelson@gmail.com*

K.N. FIELDS, T.J. SLATTERY, K. RUSS & B.D. HILL. A psycholinguistic analysis of the Word Memory Test: Item level characteristics and variability.
Objective: Green's Word Memory Test (WMT) is a widely used measure of performance validity. While the WMT categorizes word pairs as "easy" or "hard", these attributes have not been formally evaluated and a random binomial probability is assumed for all word pairs. We explored item level characteristics (word frequency, strength of semantic relationship, etc.) influencing these probabilities. As people cognitively have the tendency to over mix, the randomness of WMT sequences of binomial events was also evaluated.
Participants and Methods: This study evaluated aspects of item level characteristics in 202 completed WMT clinical administrations. Only immediate and delayed recall trials were analyzed. Demographics: mean age 22.41 (SD 12.7), mean education 11.24 (SD 4.6), 51.7% female, 73.2% white, and 17.2% African American. The runs statistical analysis was used to assess the extent to which the string of responses indicated mixing or switching back and forth between alternatives more often than a true random binomial sequence.
Results: Our findings indicate that some items were easier to recognize than others (accuracy range 100%-77%). Additionally, there was a low level of concordance between the assumed difficulty of the items and the empirically derived probability that they were correctly recognized.
Conclusions: The WMT is assumed to resemble a series of binomial responses. However, this study indicated that the test items show a strong dependency between individual trials. Unfortunately, it was discovered that the presentation of word pairs within the WMT itself yielded statistically significant indications of over mixing related to the inability of people to create truly random binomial sequences. Other potential psycholinguistic issues related to the WMT as well as methods for improving the classification of subject effort based on item level responding will be discussed.

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

Correspondence: *Benjamin D. Hill, PhD, Psychology, University of South Alabama, UCOM 1032, Mobile, AL 36688. E-mail: bdhill@southalabama.edu*

K. RUSS, B.D. HILL, K. FIELDS, M. WOMBLE & M.L. ROHLING. The reliability of cognitive consistency: Cognitive intra-individual variability across two testing sessions.

Objective: Intra-individual variability (IIV) is an emerging concept as a marker of neuropathology. This study examined the reliability of IIV in healthy individuals who completed a baseline sports concussion computerized battery.

Participants and Methods: Data from 227 who were tested twice using the same battery and passed embedded effort measures both times were utilized. Sample was a mix of high school and college athletes (60%) and college non-athlete controls (40%). Mean demographics: age 18.1 years (SD 3.1) and education 11.7 years (SD 1.8). Sample was 60% male. Concussion Vital Signs (CVS) was administered twice to each participant; mean test interval was 262 days (SD 167, range 14-371). IIV was defined as the overall test battery mean standard deviation (OTBM SD) for each individual. OTBM was derived from the normed standard scores of the 7 CVS clinical domains.

Results: Paired samples t-test comparing OTBM SD time 1 (mean 12.38, SD 4.06) and OTBM SD time 2 (mean 11.59, SD 3.93) found significant differences [$t(221)=2.378$, $p=.02$]. A 2-way mixed model for intraclass correlation (ICC) revealed an ICC value absolute agreement value of .390 and consistency value of .395, both $p<.01$.

Conclusions: These results indicate moderate reliability for cognitive IIV in this sample of largely young adults and predominantly student-athletes. Cognitive IIV is potentially useful as a diagnostic tool for concussion in student-athletes.

Correspondence: *Benjamin D. Hill, PhD, Psychology, University of South Alabama, UCOM 1032, Mobile, AL 36688. E-mail: bdhill@southalabama.edu*

S.M. MCCLINTOCK, M.M. HUSAIN, R. DEWEY, I.H. BERNSTEIN, L. LACRITZ, E. ARSLANAGIC & C. CULLUM. Psychometric Properties of the NIH Toolbox Cognitive Battery in Patients with Parkinson Disease.

Objective: Parkinson disease (PD) is a common neurodegenerative disorder which is associated with decline in neurocognitive function. The National Institutes of Health (NIH) developed the Toolbox, which is comprised of measures that assess cognitive, sensory, motor, and emotional functions. The purpose of this study was to assess psychometric properties of the NIH Toolbox cognitive measures in patients with PD.

Participants and Methods: We enrolled 124 participants diagnosed with PD based on standard neurologic criteria from an academic movement disorders center. Participants completed the NIH Toolbox cognitive battery, which included six computerized neurocognitive measures of processing speed, attention, language, memory, and executive function. Pearson correlation coefficients were computed to examine associations among the NIH Toolbox cognitive measures.

Results: The sample had a mean age of 65.0 (SD=9.8) and estimated IQ of 106.6 (SD=9.4), 72% were male and 90% were Caucasian. The mean UPDRS motor score was 15.1 (SD=8.7). Most correlations among the NIH Toolbox cognitive measures were small, ranging from -.02 to .30, though some correlations were statistically significant ($p= .006$ to .93, mean=.32). There were two moderate correlations between the List Sorting Working Memory (LSWM) and Pattern Comparison tasks ($r=.45$, $p<0.0001$), and the LSWM and Picture Sequence Memory tasks ($r=.47$, $p<0.0001$).

Conclusions: Overall, the six NIH Toolbox cognitive measures were found to be unrelated, suggesting that each assesses unique aspects of neurocognitive function. The LSWM measure was related to another measure of memory, and one of psychomotor processing speed. Further exploration with a larger PD cohort is necessary to confirm the psychometric properties of the NIH Toolbox cognitive measures.

Correspondence: *Shawn M. McClintock, Phd, MSCS, Psychiatry and Behavioral Sciences, Duke University School of Medicine, 200 Trent Drive, DUMC 3620, Durham, NC 27710. E-mail: shawn.mcclintock@duke.edu*

L. VELLA, C.Z. BURTON, D. FOLSOM & E.W. TWAMLEY. Cognitive Impairment Rates in a Sheltered Homeless Population.

Objective: Cognitive impairment is associated with homelessness and may be a risk factor for homelessness. Much of the research in this area relies on dementia screening measures or IQ estimation measures. This study aimed to more comprehensively evaluate cognitive impairment in a shelter-dwelling homeless population.

Participants and Methods: 100 homeless individuals residing in a large homeless shelter in San Diego were recruited for cognitive assessment. Recently enrolled shelter residents were invited to participate and individuals were not recruited on the basis of cognitive complaints. On average, participants were 49 years old, had completed 11.7 years of education and reported an average of 3.4 episodes of homelessness in their lifetime. Participants were administered WRAT-4 Reading, the Wechsler Abbreviated Scale of Intelligence, WAIS-IV Coding, and the Montreal Cognitive Assessment (MoCA).

Results: The mean full scale IQ of the sample was 98, with average Vocabulary and Matrix Reasoning performance (Mean T=46 and 50, respectively). Word reading ability was in the average range (Mean standard score=92). Coding scores were in the low average range (Mean age scaled score=7.8), with 30% of the sample falling in the impaired range. The mean score on the MoCA was 23.9, with 45% of the sample falling below the cut-off for mild cognitive impairment (<24).

Conclusions: The homeless individuals in this sample performed in the average range on measures of IQ and premorbid IQ, but demonstrated low average to impaired performance on neurocognitive measures that are more sensitive to cerebral dysfunction. With almost half of the sample screening positive for mild cognitive impairment, incorporation of cognitive screening in a shelter's entry process may help to identify individuals needing extra support navigating disability applications, social services, medical and psychiatric treatment, and new medical insurance laws.

Correspondence: *Lea Vella, MPH, SDSU/UCSD, 209 Wawona St, San Francisco, CA 94127. E-mail: levella@ucsd.edu*

C.J. NOULLET, K.L. FARLEY & C.I. HIGGINSON. The Ecological Validity of Measures of Visual Attention in Community-Dwelling Older Adults.

Objective: Interest in predicting daily functioning using neuropsychological measures is increasing. Evidence suggests that measures more analogous to everyday tasks predict variance in daily functioning beyond traditional measures; however, few studies have included measures of visual attention.

Participants and Methods: Forty independent older adults (35 female) with mean (SD) age and education of 78.4 (7.5) and 11.9 (2.6) years, respectively, completed a battery of neuropsychological measures including a commonly used, traditional measure of visual attention, Digit Span, and a measure of visual attention with verisimilitude, NAB Driving Scenes. Participants also completed a performance based measure of daily functioning, the Revised Observed Tasks of Daily Living (OTDL-R). A hierarchical regression was used to determine whether Driving Scenes predicted significant variance in OTDL-R performance beyond Digit Span, demographic variables, and measures of depression and global cognitive functioning.

Results: Results indicated that Driving Scenes had the highest correlation with the OTDL-R ($r = .64$, $p < .0001$) and predicted a significant 9.3% of additional variance in OTDL-R performance beyond the other measures, $F(1,32) = 7.18$, $p = .012$. In addition, Driving Scenes had the highest Beta weight in the regression, predicting significant independent variance in OTDL-R performance, $t = 2.63$, $p = .013$.

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

Conclusions: Results support the conclusion that measures with verisimilitude predict variance in daily functioning that is not captured by traditional measures and support the inclusion of Driving Scenes and other measures with verisimilitude in neuropsychological batteries used to predict daily functioning in older adults.
Correspondence: *Christopher J. Noullet, M.S., Psychology, Loyola University Maryland, 7020 Holly Springs Lane, Elkridge, MD 21075. E-mail: chrisnoullet@gmail.com*

D.T. PULSIPHER, J.R. SADEK & K.Y. HAALAND. Influence of Sociodemographic Variables on a Performance-Based Measure of Everyday Functioning.

Objective: Everyday functioning varies as a function of the normal aging process and is impaired in a wide range of psychiatric and neurologic disorders. There are moderate to strong correlations between neuropsychological test performance and independent activities of daily living (IADLs). While it is well established that sociodemographic variables are related to neuropsychological test performance scores, their influence on IADLs is less well defined. Most previous research addressing sociodemographic influences and everyday functioning has relied on self or collateral report of IADLs rather than observed performance. The aim of this study was to determine the influence of sociodemographic factors on a performance-based measure of everyday functioning, the Functional Impact Assessment (FIA), a battery of tests assessing financial, shopping, communication, cooking, and medication management skills.
Participants and Methods: Using healthy controls (n=73) ages 42-88 years, we examined correlations between sociodemographic variables and FIA scores. We then derived sociodemographically-corrected normative data for accuracy and speed of performance on the FIA, and examined the influences of sociodemographics on effect sizes for corrected and uncorrected scores.
Results: Age and education were most strongly correlated with FIA number correct and speed. Race and sex influenced scores to a lesser extent. Increasing age and fewer years of education were associated with less accurate and slower FIA performance. Male sex and White race were associated with higher and faster FIA scores. Several interactions were also found, suggesting a complex relationship among sociodemographic factors and functional performance.
Conclusions: Age, sex, education, and race should be taken into consideration when developing and applying performance-based tests of everyday functioning. Sociodemographic corrections may improve accuracy in determining functional impairment where functional decline is not clinically obvious.
Correspondence: *Dalin T. Pulsipher, Ph.D., NeuroDevelopmental Science Center, Akron Children's Hospital, 215 W. Bowery St., Suite 4500, Akron, OH 44308. E-mail: dalin.pulsipher@my.rfums.org*

T. MARCOTTE, R. MEYER, T. HENDRIX, S. LETENDRE, I. GRANT & R. JOHNSON. EEG-based Workload Estimates During Driving Simulation Predict On-road Performance.

Objective: The use of neuropsychological (NP) measures to predict driving ability has met with modest success. Driving simulators may improve prediction, but can be limited by reliance on overt outcomes (e.g., crashes) that are typically infrequent in the real world. The aim of this study was to determine whether EEG metrics gathered during simulated driving would be sensitive to on-road impairments. We hypothesized that estimates of elevated workload (WL) and lower engagement (ENG) would predict worse on-road driving performance.
Participants and Methods: Thirteen healthy normal control drivers (age range 18 to 84; 65% male; mean of 7,495 (4,570) miles driven in the past year) completed NP testing, an interactive PC-based driving simulation, and a structured on-the-road (OTR) driving evaluation. The primary outcome was the OTR score (higher score indicates more errors). During the driving simulation participants wore a portable wireless EEG/ECG system, and we examined previously validated EEG algorithms estimating ENG and WL during a challenging portion of the simulation.
Results: OTR scores ranged from 0 to 13 (mean 6.1 [4.3]), and were not significantly associated with demographic characteristics, driving mileage or overall NP performance (mean T score). The OTR score was predicted by simulator speeding tickets ($r = .58$, $p = .02$), but not crashes or overall error score. EEG WL ($r = .65$, $p = .02$), but not ENG ($p = .29$), predicted OTR scores. In a multivariable model, WL ($p = .048$) and speeding tickets ($p = .11$) accounted for 56% (overall $p = .02$) of the variance in on-road performance.
Conclusions: This preliminary study suggests that EEG measures of brain function during semi-naturalistic, simulated driving may enhance detection of individuals who might be impaired in real-world driving. Future research should examine this approach in larger cohorts and across patient populations.
Correspondence: *Thomas Marcotte, PhD, University of California, San Diego, 220 Dickinson St., Suite B, San Diego, CA 92103. E-mail: tmarcotte@ucsd.edu*

M.T. SCHULTHEIS, T. GIOVANNETTI, C. MORSE, C. SCOTT, M.T. SCHULTHEIS, K. HAALAND & C. SANDERS. Neuropsychology and Functional Activities of Daily Living.

Symposium Description: There is increasing evidence and growing consensus that traditional neuropsychological measures are limited in their ability to predict everyday functionally-relevant activities of daily living. Evidence for the limited predictive validity of neuropsychological measures for everyday tasks (e.g., returning to work, driving) support the criticism that these measures are not ecologically valid. These findings have spurred the development of innovative and novel measures of cognition. These new measures may: 1) incorporate new technologies which can offer more increased objectivity and sensitivity to measuring cognitive performance, or 2) may employ structured performance tasks that allow detailed evaluation of components of these behaviors and 3) may focus on complex cognitive constructs (e.g., multitasking). Taken together, this represent a novel approach in neuropsychological assessment that may provide an integrated view of cognitive functioning and offer new methods for developing cognitive intervention and informing cognitive rehabilitation.
The current symposium will present cutting edge research that is expanding the definition of neuropsychological/cognitive assessment and targets the development of new neuropsychological tasks for real world functional activities. Specifically, this will include: research examining the relationship between cognition and the ability to drive an automobile among individuals with multiple sclerosis, evaluation of everyday tasks (e.g., preparing lunch) among individuals with mild cognitive impairment, assessment of planning abilities using an open-ended problem-solving task in a real-world environment and the evaluation of multi-tasking ability in a vocational setting and in a home setting. The symposium will conclude with a discussion about future direction and the necessary next steps to transitioning these laboratory based measures to clinical use.
Correspondence: *Maria T. Schultheis, PhD, Psychology, Drexel University, 3141 Chestnut Street, Stratton Building Suite 123, Philadelphia, PA 19104. E-mail: schultheis@drexel.edu*

S.T. MARIA, E. WHIPPLE & D. BRINCKMAN. Cognition and driving in multiple sclerosis.

Objective: The current study examined the use of a virtual reality driving simulator (VRDS) to examine driving performance among individuals with multiple sclerosis.
Participants: A total of 27 community dwelling individuals with multiple sclerosis (MS) and 8 age-, gender- and driver experience matched controls (HC).
Methods: All participants were administered a standardized route on the VRDS that included both straight and curved driving and a battery of neuropsychological measures of cognitive domains relevant to driving.

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms.
https://doi.org/10.1017/S1355617714000381

Correlational analyses were used to examine the relationship between specific cognitive domains and VRDS driving performance measures. As an exploratory analysis between group difference on VRDS of a subgroup of the MS sample (n= 17) and HC were conducted.
Results: Among the MS sample, significant relationships were found between cognitive measures and driving including: average speed was related to visual learning (r= .445) and memory (r=.485); total lane bust (driving outside lane) was related to working memory as measured by Trail Making B (r= .590) and Symbol Digit Modality (r= -.502). The Motor-Free Visual Perception test, which covers various aspects of visua-perception skills was significantly related to lane bust (r=-.490), variability in speed (r=-.463) and miles per hour over speed limit (r= .-452). No statistically significant between group difference were seen, but with MS drivers demonstrated greater variability in lane positioning and greater number of times driving outside of lane.
Conclusions: The VRDS offers new measures of driving performance that are related to cognitive domains relevant to driving. The advantage of the objective and specific new measures of driving performance offered by the VRDS may provide clinicians with novel methods for identifying specific areas of weakness (e.g., speed management, lane management) which may help to better inform clinical rehabilitation interventions and recommendations
Correspondence: *Elizabeth Whipple, Drexel University, 3141 Chestnut Street, Philadelphia, PA 19104. E-mail: whipple.elizabeth5@gmail.com*

C. MORSE, J. ANG, E. WHIPPLE, A. CARLITZ & M. SCHULTHEIS. Multitasking and Vocational Functioning in Multiple Sclerosis: A Performance Based Assessment.

The objective of this study was to develop a novel performance-based measure of multitasking ability in multiple sclerosis (MS) to inform vocational rehabilitation strategies. The construct of multitasking may represent a more ecologically-valid approach to examining vocational functioning in MS. Sixteen participants with MS and twenty healthy control (HC) participants completed cognitive tests, a vocational questionnaire, and the Vocational Multitasking Test (VMT), a novel performance-based measure of multitasking. The VMT requires participants to complete as much of four vocationally face valid tasks as possible within twelve minutes. Scoring variables are an overall completion score (Total), simultaneous task attempts (Simultaneous), total errors (Errors), and task switches (Switch). The VMT demonstrated adequate reliability and concurrent validity. Within the MS sample, Total score significantly correlated with an episodic memory test (r=.40), Simultaneous score significantly correlated with mental flexibility (r=.61), and Switch score significantly correlated with episodic memory (r=.38) and visuomotor processing speed (r=.36). Compared to HC, participants with MS had a significantly lower Total score ($t(32)=2.13$, $p=.04$), and significantly higher Error score ($t(32)=3.15$, $p=.02$). Within the MS sample, Error score was significantly higher for unemployed participants relative to employed participants ($t(14)=-2.17$, $p=.047$), and increased self-reported productivity at work significantly correlated with higher Simultaneous (r=.79) and Switch (r=.80) scores. The results provide preliminary support for the use of the VMT as a vocationally oriented measure of multitasking ability in MS. Participants with MS demonstrated greater multitasking impairment as measured by the VMT, and distinct patterns of performance were demonstrated based on employment status. The utility of the VMT as a novel tool to inform cognitively-based vocational rehabilitation will be discussed.
Correspondence: *Chelsea Morse, 295 Elmira Place, Apt A, Atlanta, GA 30307. E-mail: chelsealmorse@gmail.com*

T. GIOVANNETTI, S.C. SELIGMAN, I.O. LAWRENCE, D.J. LIBON, K. LEVY & T.J. ADAMS. Characterizing Everyday Functioning in Mild Cognitive Impairment with Performance-based Assessment and a Neurocognitive Model.

This study characterized subtle functional difficulties in MCI in reference to the Omission-Commission (OC) Model, a neurocognitive model developed to explain functional disability in dementia. Eighteen participants with MCI completed cognitive tests and the Naturalistic Action Test (NAT), a performance-based measure of IADL (e.g., make lunch). The NAT was scored for level of impairment (Global Score) and specific errors: Commission–step performed inaccurately; Omission–step not performed. On the OC Model, these errors dissociate and have distinct cognitive predictors (Commissions – executive function; Omissions – episodic memory). Microerrors (object touched/moved but not used) were coded to detect subtle performance difficulties. Informant-questionnaires of daily functioning also were obtained. All informants reported normal everyday functioning, but 28% obtained NAT Global Scores below the norm cut off. Consistent with the OC Model, Commissions and Omissions did not significantly correlate ($r = .21$). Microerrors significantly correlated with Commissions ($r = .66$, $p < .01$) but not Omissions ($r = .25$). Commissions/Microerrors and Omissions differentially correlated with cognitive tests. Contrary to the OC Model, Commissions/Microerrors significantly associated with episodic memory tests ($r > .47$, $p < .05$ for all). Omissions were not significantly associated with any cognitive test, but compared to Commissions (r=.08), they were more strongly associated with collateral ratings of everyday functioning (r=.31). In sum, despite normal informant reports of functioning, several MCI participants showed impaired performance of everyday tasks. Consistent with the OC Model, everyday impairment in MCI was multidimensional, with Omissions and Commissions reflecting dissociable processes. However, the cognitive underpinnings of these error processes are different in MCI than predicted by the OC Model and suggest model revisions that will be discussed.
Correspondence: *Tania Giovannetti, Temple University, Weiss Hall, Psychology, 1701 N 13th Street, Philadelphia, PA 19122. E-mail: tgio@temple.edu*

K. BLACKSTONE, J.C. SCOTT, P. FAZELI, S.P. WOODS & D.J. MOORE. Metacognition of Everyday Multitasking Among HIV+ Adults.

Objective: Everyday multitasking (MT) is an ecologically relevant ability that is impaired in HIV disease. Limited awareness of MT impairments (metacognition) in HIV secondary to frontal systems dysfunction may contribute to errors in complex everyday tasks. This study asssessed the effects of working memory (WM) and HIV infection on metacognition (MC) of everyday MT.
Participants and Methods: Eighty HIV+ and 36 HIV- older (≥50 yrs) participants completed a performance-based MT test (Scott et al., 2011), which simultaneously assesses four everyday skills (e.g., medication and financial management), alongside a comprehensive neuropsychological battery. Participants were also queried regarding their MC of their MT performance, which included 'MC knowledge' (self- and task-knowledge) and 'online awareness' (task appraisal, self-monitoring, and self-evaluation).
Results: Linear regression was used to examine the impact of HIV status, WM, and their interaction on each of the MC domains. Although no interactions emerged, HIV was independently associated with better task knowledge, lower self-knowledge and task appraisal, and more accurate self-evaluation of MT; conversely, better WM was associated with more accurate global MC, self- and task-knowledge, task appraisal, and self-evaluation abilities. Within the HIV+ group, more accurate global MC ($\rho=.40$), specifically MC knowledge ($\rho=.66$), was associated with better MT performance.
Conclusions: HIV infection and WM independently impact awareness of everyday multitasking abilities. Despite superior task familiarity (knowledge), HIV subjects had poorer MT planning and lower self-efficacy, which was predictive of impairment in actual everyday MT performance. Interventions targeting planning, self-efficacy, and WM abilities, may therefore be useful for improving MC among older HIV+ adults.
Correspondence: *Kaitlin Blackstone, 220 Dickinson Street, Suite B, San Diego, CA 92103. E-mail: kaitlin.blackstone@gmail.com*

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

C. SANDERS, M. SCHMITTER-EDGECOMBE & C. LOW. The map task: An Open-Ended Test of Planning Ability using Ecologically-Valid Stimuli in a Real-World Environment.
Studies examining planning ability, an important subset of executive functioning, have revealed patterns of decline with normal aging and mild cognitive impairment (MCI). However, the utility of these findings in predicting everyday planning ability may be overstated due to the limited ecological validity of many laboratory-based planning tasks. We developed the "map task" (Sanders & Schmitter-Edgecombe, 2012), an open-ended task of planning ability designed to separately evaluate formulation and execution subcomponents of planning ability using ecologically valid stimuli in a real-world environment. Participants are given a map layout of a university apartment and tasked with developing and writing out a strategy to successfully complete several tasks (e.g., retrieving/filling a water pitcher, placing a remote control in front of the T.V.). Subsequently, participants carry out the tasks in the actual apartment. Our initial study with 50 cognitively healthy older adults (OAs) and 50 younger adults (YAs) showed that OAs performed more poorly than YAs during both the formulation and execution stages on measures of accuracy and efficiency. We also found that both groups improved from formulation to execution. In a second study with 37 individuals with MCI and 37 OA controls, MCI participants performed more poorly than OA controls during both stages on measures of task accuracy and efficiency. In addition, MCI participants took significantly longer to complete the task and were less adherent to their formulated plans during task completion. Both groups again improved in task accuracy and efficiency from formulation to execution. These findings indicate that planning impairment accompanies normal aging, with more severe declines associated with MCI. Using an ecologically valid paradigm with everyday task stimuli may also tap planning abilities more reflective of those used in everyday functioning, where individuals might compensate with well-learned strategies.
Correspondence: *Chad Sanders, 1704b N. 103rd St., Seattle, WA 98133. E-mail: chaderly5550@yahoo.com*

Assessment/Psychometrics/Methods (Child)

S.K. POWELL & J. JAKIMCZYK. Analysis of a Novel Model for Neuropsychological Services in a Pediatric Training Hospital: Creation of a Targeted Neuropsychological Assessment Clinic.
Objective: In today's academic medical centers, neuropsychologists must develop novel approaches to meeting varied referral demands efficiently yet effectively. In our outpatient clinic, we identified several needs from the perspective of referring physicians, patients, and business managers that we felt could be addressed with a Targeted Neuropsychological Assessment Clinic (TNAC). Supported by St. Louis Children's Hospital's Sabbatical Program, we took a methodical approach to developing such a clinic and evaluating its feasibility.
Our goals were: 1) to create an avenue for rapid assessment, whether due to immediacy of need from the referring physician or specificity of the referral question; 2) to allow more patients to access our services by increasing both the number of available appointments and our flexibility for coordinated care with other services; 3) to decrease wait times; and 4) to reduce the impact of failed appointments.
Participants and Methods: TNAC days comprised two assessments led by a single neuropsychologist and psychometrist, including targeted testing and immediate results. Although the initial proposal included same-day abbreviated reports, this was determined to be insufficient for patient needs. Instead, a flexible report template was created allowing rapid turn-around while still providing individualized recommendations. Clinical, billing, and outcome data were collected.
Results: Seven referral categories were determined to be appropriate, with only 1 of 37 patients requiring testing beyond the initial session. The number of patients seen and rate of kept appointments were higher than that for standard outpatient visits, while wait times were lower. Clinic time was used more efficiently, characterized by a greater decrease in psychometrist than neuropsychologist billed time. Unfortunately, unbilled neuropsychologist time was higher than preferred.
Conclusions: Analyses largely supported the TNAC's clinical utility and fiscal viability. Current efforts are directed toward limiting unbilled time
Correspondence: *Stephanie K. Powell, Ph.D., Psychology / Neurology, St. Louis Children's Hospital / Washington University School of Medicine, One Children's Place, Suite 3 South 32, St. Louis, MO 63130. E-mail: skp6143@bjc.org*

M. ENNOK, M. MÄNNAMAA & M. KRUUS. Cognitive Processess Assessed by the Contingency Naming Test.
Objective: The Contingency Naming Test (CNT) was developed to assess different attentional processes in children. It allows to evaluate both simple concentration ability and more complex processing skills. Although CNT has proved to be a very useful measure it is a relatively new addition to neuropsychological assessment. The aim of this study is to examine different cognitive constructs that are associated with performance in CNT.
Participants and Methods: The sample includes 30 children between the ages of 7 to 10 years (15 boys and 15 girls). All children were healthy and were attending regular community schools. In addition to CNT a set of tests was administered to assess general intelligence (Raven's Progressive Matrices), attention (Trail Making Test), verbal comprehension and reasoning (Word Guessing Test, NEPSY Narrative Memory Immediate Recall), and verbal processing efficiency (NEPSY Speeded Naming).
Results: We observed statistically significant correlations between CNT efficiency scores in part 1 and 2 (r=.74), and in part 3 and 4 (r=.43). The efficiency scores in part 1 and 2 were also associated with Trail Making part B (r= -.51 and r= -.36 respectively) and NEPSY Speeded Naming (r=.45 for both). Performance in CNT parts 3 and 4 was associated with general intelligence (r=.03 for both) and in part 4 also with Trail Making part B (r= -.49) and NEPSY Speeded Naming (r=.55).
Conclusions: We observed strong correlations in CNT between simple concentration tasks (naming colors vs naming shapes) and complex attention tasks (selective comparison vs interference rules). CNT performance was also associated with verbal processing efficiency, attentional flexibility in simple concentration tasks and general intelligence in complex attention tasks.
Correspondence: *Margus Ennok, MSc, Department of Neurology and Neurosurgery, University of Tartu, L. Puusepa 8, Tartu 51014, Estonia. E-mail: margus.ennok@ut.ee*

K.J. MCKITTRICK, K.N. SKILLICORN & S.T. LI. An Indepth Investigation of the Beery-Buktenica Developmental Test of Visual-Motor Integration-Sixth Edition: Evidence of a Flynn Effect and Relations with Intelligence.
Objective: Rising test scores over time, also known as the Flynn Effect (Flynn, 1984), is an important consideration in cognitive assessment as it has implications for test validity. This study advanced beyond intelligence to investigate the presence of a Flynn Effect with a commonly used visual-motor integration test, the Beery-Buktenica Developmental Test of Visual-Motor Integration (VMI). The relationship between visual-motor integration and intelligence was also examined.
Participants and Methods: The sample included 111 predominantly Caucasian children between the ages of 6 and 16 who were recruited and assessed by graduate students in the Pacific Northwest. Participants were administered a battery of tests including the VMI and the Wechsler Intelligence Scale for Children-Fourth Edition (WISC-IV).
Results: Sample VMI scores across three editions of the test were examined for notable trends indicating change in test scores over time. A significant rise in test scores was found from the fourth edition to the sixth edition of 1.28 points per year. Thus, there was clear evidence that scores on the Beery VMI are rising over time. The results indicated a low to moderate relationship between visual-motor integration and intelligence as measured by the WISC-IV in this sample (FSIQ and VMI: $r(110) = .33$, $p<.001$; VCI and VMI: $r(112) = .26$, $p<.005$; PRI and

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

VMI: r(111) =.32, p<.001). Further, the relation between PRI and VMI scores in this sample was lower than the relation between WISC-III PIQ and VMI scores previously reported in the literature (z = 2.63, p = .009).
Conclusions: To date, we are aware of no studies that have investigated the Flynn Effect with the VMI nor published studies establishing the relation between the VMI and the WISC-IV. Our study suggests that the Flynn Effect does apply to the VMI and that there is a significant, low to moderate, relationship between visual-motor integration and intelligence despite decreased motor demand on the 4th version of the WISC.
Correspondence: *Kevin J. McKittrick, M.S., School of Professional Psychology, Pacific University, 2229 NW Everett st Apt 1, Portland, OR 97210. E-mail: mcki7796@pacificu.edu*

N.K. SANDEL, G. SOLOMON, M. LOVELL & P. SCHATZ. Normative data for the neuropsychological risk factors reported on the ImPACT neurocognitive test battery.
Objective: ImPACT (Immediate Post-Concussion Assessment and Cognitive Testing) is a brief computerized neurocognitive test battery consisting of a demographic section, symptom scale, and six neurocognitive test modules yielding four composite scores: Verbal Memory [VerbMem], Visual Memory [VisMem], Visual Motor Speed [VisMotSpd], and Reaction Time [RT]. Neuropsychological risk factors reported in the demographic section of ImPACT can be categorized into three clusters: headache/migraine [migraineurs], neurological insult (i.e. seizures, brain surgery, meningitis), and psychiatric conditions/substance abuse [psychological]. This study presents normative data for ImPACT for athletes with a history of these risk factors.
Participants and Methods: Athletes are U.S. males and females who completed baseline testing as part of standard preseason evaluation and reported at least one of the risk factors: migraineurs (N=2,423), neurological insult (N=216), and psychological (N=525). Athletes are separated into 13 to 15 and 16 to 18 year old age groups and gender stratified based on established norm classifications for ImPACT (2007).
Results: Independent t-tests (p<.05) were conducted to explore males' and females' neurocognitive performance within each of the risk factor groups. No significant differences for gender were found in the neurological insult or psychological groups. Migraineurs aged 13-15 years old demonstrated significant differences for gender on VisMem t(1511)=-2.002, p=.045, with males M=70.89(14.58) outperforming females M=69.30(15.42), and VisMotSpd t(1511)=3.808, p<.001, in which females M=37.22(8.12) outperformed males M=35.62(7.77). Significant differences were found in the 16-18 year old migraineurs group on VerbMem t(1091)=2.758, p=.006, with females M=85.56(12.32) outperforming males M=83.39(12.95), and on VisMotSpd t(1091)=2.715, p=.007, in which females M=40.19(7.83) outperformed males M=38.85(8.06).
Conclusions: These data may help manage sports-related concussions when individual baseline data is unavailable.
Correspondence: *Natalie K. Sandel, BS, Widener University, 757 S. 17th St. Apt. 2F, Philadelphia, PA 19146. E-mail: nksandel@mail.widener.edu*

J. IRWIN, M. JOSCHKO & K.A. KERNS. Comparison of the Reynolds Intellectual Assessment Scales (RIAS) to the Wechsler Intelligence Scale for Children – Fourth Edition in Canadian Children.
Objective: The Reynolds Intellectual Assessment Scales (RIAS) is an individually-administered intelligence test, developed based on the Cattell-Horn and Cattell-Horn-Carroll models of intelligence. It was designed to measure overall cognitive ability (g; CIX), verbal (crystallized; VIX) intelligence, nonverbal (fluid; NIX) intelligence, and memory. Examining the validity of the RIAS is critical since the RIAS is being increasingly used to make important clinical and educational decisions. However, previous studies have produced conflicting results with the RIAS's index scores tending to correlate highly with measures of crystallized intelligence and much lower with fluid intelligence measures. The RIAS also produces higher index scores than other intelligence tests. To our knowledge, no studies have examined its validity in a Canadian sample of children.
Participants and Methods: Participants were 47 Canadian children referred for neuropsychological assessment, aged 6-16 years (M = 12.1, SD = 2.82; 20 female). They were administered the four core subtests of the RIAS (Verbal Reasoning, Guess What, What's Missing, and Odd-Item-Out) and the 10 core subtests of the WISC-IV.
Results: Strong correlations were found between CIX and FSIQ, r = .763 and the VIX and VCI, r = .715. VIX and PRI were moderately correlated, r = .525. However, NIX and PRI were only moderately correlated, r = .565. All RIAS index scores were significantly higher than WISC-IV scores with mean differences of: CIX>FSIQ = 9.41; VIX>VCI = 5.32; and NIX>PRI=8.73.
Conclusions: There is evidence to support interpretation of the VIX as a measure of crystallized intelligence but there is less support for the validity of the NIX as a measure of fluid intelligence. The FSIQ and CIX's high correlation may be driven more by the verbal subtests of each test. The higher RIAS scores may lead to different decisions than if using other intelligence measures in clinical, research, and forensic settings.
Correspondence: *Julie Irwin, M.Sc., Psychology, University of Victoria, 3800 Finnerty Rd, Victoria, BC V8P 5C2, Canada. E-mail: jkirwin@uvic.ca*

D.M. DE JONG, C.A. CLARK, A. GILGENBACH, C.R. OLSON, K.M. POPPERT, L.S. WAKSCHLAG & K.A. ESPY. Prenatal Tobacco Exposure and Preschoolers' Observed Externalizing Behavior under Conditions of Frustration.
Objective: Prenatal tobacco exposure (PTE) is linked to externalizing behavior and inattention, with animal studies suggesting this may reflect neurobiological alterations to systems dependent on dopamine, norepinephrine and serotonin. Mechanisms behind such outcomes are unclear because PTE also is related to sociodemographic risk and maternal antisocial behavior. In this prospective, longitudinal study, we aim to elucidate the features of early externalizing behavior associated with PTE via a developmentally-sensitive direct assessment method.
Participants and Methods: Repeated measures of maternal smoking including cotinine assays and self-report were obtained during pregnancy and at birth. Self-report data was used to create a propensity score to allow for precise statistical control of 42 confounding variables linked to maternal smoking in pregnancy. As part of a comprehensive neurocognitive assessment at age 5, 217 children completed a novel computerized task assessing sustained attention under varied conditions including a rigged block designed to induce frustration via negative feedback following some correct responses. Intensity of frustration, negative emotion and activity level was subsequently coded.
Results: PTE was related to reduced attentional accuracy and more intense frustration during the rigged block. Dose-response patterns were observed, i.e. accuracy decreased and frustration increased as a function of the number of cigarettes smoked during pregnancy. These relations persisted after adjusting for age, sex and propensity score. Further, PTE boys were twice as likely as PTE girls to display more intense frustration. PTE was unrelated to negative emotion or activity.
Conclusions: Using direct assessments, we detected a distinct pattern of PTE and specific components of young children's externalizing behavior, i.e. reductions in sustained attention and heightened intensity of frustration, under conditions of mild frustration. A more nuanced approach may elucidate mechanisms and inform targeted prevention.
Correspondence: *Desiree M. de Jong, PhD, University of Nebraska-Lincoln, Developmental Cognitive Neuroscience Laboratory, 501 Building, Room 102, Lincoln, NE 68588-0206. E-mail: ddejong2@unl.edu*

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

J. WELSH, P. SCHATZ & J. REESMAN. Utility of the ImPACT with Deaf Adolescents.

Objective: The present study examined the utility of the Immediate and Post-Concussion Assessment and Cognitive Testing (ImPACT test) for use with deaf student athletes at baseline. There has been no research to date on whether or not the ImPACT test may be an appropriate and accessible tool for use with this population.

Participants and Methods: We conducted a retrospective review of 116 de-identified student-athlete baseline ImPACT data files from a residential school for the deaf (N=80 male). Eight data files were excluded for analysis due to being flagged as potentially invalid. Composite scores, symptom report and raw scores were examined for the group as a whole and compared to a hearing normative baseline dataset.

Results: Total Symptom ratings in the deaf males were significantly higher than a comparison group of high school males from the ImPACT normative dataset (p=0.19), though no significant differences were noted in the female ratings. Total symptom ratings for males and females respectively (M=8.11; 11.31). Mean composite scores for males and females, respectively; Verbal Memory Composite (81.95, 80.28), Visual Memory Composite (70.48, 69.69), Visual Motor Composite (30.31, 33.92), Reaction Time Composite (.98, .89) and Impulse Control Composite (6.64, 7.08). On the Three Letter task, we noted a possible marker of task misunderstanding, indicated by 0-3 average items clicked correctly by 12.1% of the deaf sample. In a comparison baseline sample of 17,359 hearing peers this occurrence was noted in 54 individuals (0.31%).

Conclusions: Symptom report may be higher in deaf males compared to hearing peers. Overall, scores as a group may fall lower than hearing peers, even when compared to those in special education. Present data indicate that deaf adolescents may be at increased risk for misunderstanding instructions, though this pattern of performance may not result in the baseline being flagged as invalid, though the individual clinician is encouraged to examine the raw scores for signs of task misunderstanding.

Correspondence: *Jill Welsh, KKI, 1109 Battery Ave, Baltimore, MD 21231. E-mail: welshj@kennedykrieger.org*

K. PATRICK, J. ZAMZOW, A. TART-ZELVIN, K. OSIPOWICZ & J. WILLIAMS. The Relationship Between Early and Later Language Skills in a Longitudinal Sample of Very Young Children.

Objective: The Preschool Language Scales (PLS) measure preverbal behaviors and early linguistic skills in very young children. We examined the predictive value of the PLS-3 for later expressive and receptive language skills in a sample of typically developing children.

Participants and Methods: Longitudinal data on 31 children were collected as part of the NIH MRI Study of Normal Development. Participants were administered the auditory comprehension and expressive communication measures from the PLS-3 multiple times between the ages of 3 and 30 months. These children were then administered Naming Vocabulary and Verbal Comprehension subtests from the Differential Abilities Scale (DAS) and semantic Word Generation from the NEPSY between the ages of 36 and 54 months. Multiple linear regressions analyzed the predictive value of the PLS-3 scores from 3 to 30 months on later language skills.

Results: PLS expressive communication scores at 30 months (n = 31) and 24 months (n = 24) significantly predicted DAS naming vocabulary scores at 36-54 months (b = .42, p = .001; b = .36, p = .04) while there was no significant association between PLS-3 auditory comprehension and DAS naming vocabulary at any age. PLS-3 expressive communication scores before 24 months were not associated with later performance. PLS-3 auditory comprehension scores at 30 months (n = 31) predicted later DAS verbal comprehension scores (b = .30, p = .01) while expressive communication scores were not predictive. PLS-3 auditory comprehension scores before 30 months were not associated with later performance. PLS-3 scores at any age did not predict performance on semantic word generation.

Conclusions: Early expressive communication skills measured by the PLS-3 may predict later expressive vocabulary skills while early auditory comprehension skills may predict later receptive vocabulary. However, early language skills before 24 months as tested by the PLS-3 may not be a strong indicator of later language development.

Correspondence: *Kristina Patrick, M.S., Drexel, 506 S 41st St 2M, Philadelphia, PA 19104. E-mail: kristina.e.patrick@gmail.com*

S.E. RAIFORD, D.L. COALSON, K. ROLLINS, E. GALLEMORE & S. TONG. Validity of New WISC-V Visual Spatial, Fluid Reasoning, Visual Working Memory, Rapid Naming, and Visual-Verbal Associative Memory Subtests.

Objective: The Wechsler Intelligence Scale for Children–Fifth Edition (WISC-V) represents a significant revision of its predecessor, the WISC-IV (Wechsler, 2003). Clinicians are likely to view the revised test structure as the most significant change, based on its obvious impact on neurological assessment, interpretation, and clinical diagnosis. The revised scale includes new measures of visual spatial ability, fluid reasoning, and visual working memory, and optional measures of rapid automatized naming, and visual-verbal associative memory. These changes are intended to broaden the scale's construct coverage; align it to modern cognitive, neuroscientific, and intelligence theories; and provide measures of neuropsychological constructs critical to assess in neurodevelopmental disorders. Sample items from each new subtest will be displayed, and preliminary factor-analytic data will be provided as validity evidence for the new measures and the revised test structure.

Participants and Methods: Analyses are based on preliminary data from the normative sample (N=2,200), which is stratified to meet current census targets on age, parent education, sex, and race/ethnicity. Results from confirmatory factor analysis of multiple models are presented.

Results: Similar to more recent revisions of other Wechsler intelligence scales (Wechsler, 2003, 2008, 2012), results indicate support for the WISC-V expanded factor structure, including visual spatial and fluid reasoning abilities.

Conclusions: Results will be discussed within a neuropsychological framework: Parallels will be drawn between these data and cognitive neuroscience data supporting the importance of these constructs in children.

Correspondence: *Susan E. Raiford, PhD, Pearson, 19500 Bulverde Road, San Antonio, TX 78259. E-mail: susan.raiford@pearson.com*

K.K. HARDY, R.D. ANNETT, S.A. HOSTETTER, N. WINICK, K.S. WALSH, B. HAREL, L. EMBRY & R.B. NOLL. Promoting Participation in Large, Multi-site Clinical Trials of Neurocognitive Functioning: Use of a Brief, Computerized Neurocognitive Battery for Pediatric Patients with Cancer.

Objective: Survivors of childhood acute lymphoblastic leukemia (ALL) are at risk for neurocognitive deficits. Historically, use of lengthy neurocognitive batteries that require trained professionals to administer has been associated with low rates of participation and high attrition. To address gaps in our knowledge while increasing participation and compliance, we selected a brief computerized battery (CogState) to prospectively examine neurocognitive functioning in children with high-risk ALL in the context of a Children's Oncology Group (COG) clinical trial. The current aim was to test interim methodological objectives including: 1) 100 sites participating, 2) recruiting 55% of eligible patients, and 3) achieving a data collection rate of 90%.

Participants and Methods: The sample includes English, French, or Spanish-speaking children, aged 6-11 years, enrolled on a COG phase III ALL trial. Serial assessments are conducted every 6 months from 3 months post-diagnosis to 1-year post-treatment. Children complete a 25-minute computerized battery that can be administered by any professional in the oncology clinic. Data are automatically scored and uploaded for centralized data management.

Results: 115 sites are participating in the neurocognitive study and 99 of 144 eligible participants (69%) have been enrolled. For the first

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

timepoint, 93% of participants have complete data, and all data have been collected for those reaching the second timepoint. Only two children have been unable to complete testing within the data window. Data integrity checks, designed to detect poor effort or misunderstanding of the tasks, indicate that the majority of participants (>94%) provided valid data.

Conclusions: Data indicate that CogState can be used to reliably conduct research assessments in large trials. Use of a computerized battery may boost rates of accrual and adherence in multi-site clinical trials. Although the scope and depth of data is limited by this approach, it may be advantageous when large, diverse samples are desired.

Correspondence: *Kristina K. Hardy, PhD, Neuropsychology, Children's National Medical Center, 111 Michigan Ave, NW, Washington, DC 20010. E-mail: kkhardy@childrensnational.org*

Birch Lecture: A Social Neuroscience Perspective on Adolescent Risk-Taking (CE Session F)

Presenter: Laurence Steinberg

4:45–5:45 p.m.

L. STEINBERG. A Social Neuroscience Perspective on Adolescent Risk-Taking.

Adolescence is a period of heightened engagement in risky and reckless behavior, including unprotected sex, substance use, reckless driving, and criminal activity. This lecture presents the results of a program of research on the underpinnings of risk-taking adolescence that is informed by recent advances in developmental neuroscience. According to recent research on adolescent brain development, reward-seeking and impulsivity develop along different timetables and have different neural underpinnings, and the difference in their timetables helps account for heightened risk-taking during adolescence. Consistent with predictions, research on a sample of nearly 1,000 Americans between the ages of 10 and 30, demonstrates that there is a substantial increase in reward-seeking during early adolescence, with sensitivity to rewards and preference for immediate rewards especially pronounced. In contrast, age differences in impulsivity follow a linear pattern, with impulsivity declining steadily from age 10 on. Heightened vulnerability to risk-taking in middle adolescence (as well as a range of mental health problems) may be due to the combination of relatively higher inclinations to seek rewards and still maturing capacities for self-control. Findings from a replication of this study in a sample of 5,000 individuals in 10 diverse nations support the conclusions drawn from the study of American individuals. The lecture will also present findings showing that adolescents' sensitivity to rewards is heightened by the presence of peers, as well as evidence that this effect is mediated by hyper-activation of the brain's reward circuitry. The talk concludes by discussing the implications of this work for parents, policymakers, and practitioners.

Correspondence: *Laurence Steinberg, Temple University, Department of Psychology, Temple University, 1701 N. 13th Street, Philadelphia, PA 19122. E-mail: lds@temple.edu*

FRIDAY MORNING, FEBRUARY 14, 2014

CE Workshop 9: This is Your Brain on Weed: The Neuropsychological Impact of Marijuana and Alcohol Use in Adolescence

Presenter: Susan Tapert

7:20–8:50 a.m.

S. TAPERT. This is Your Brain on Weed: The Neuropsychological Impact of Marijuana and Alcohol Use in Adolescence.

Adolescent alcohol and marijuana use are common, with 69% of U.S. 12th graders having at least tried alcohol, and 45% having experimented with cannabis. In adults, chronic use of these compounds has been associated with neuropsychological decrements. Recently, more is known about the neural sequelae in adolescents who use these substances. This course will first review findings from basic research that have led to the appreciation that adolescent exposure to these commonly used intoxicants can produce deleterious alterations in brain development and functioning. Second, current research will be discussed that is aimed at understanding functional differences among adolescent humans who use alcohol, marijuana, both, or neither, in terms of cognitive performance and brain integrity. Third, the course will cover new research that investigates recovery of diminished functions with abstinence.

At the conclusion of this presentation, attendees will be able to: (1) Summarize foundational neuroscience research on cannabis and adolescent alcohol use; (2) Recognize the neuropsychological profiles of youth with histories of heavy use of marijuana, alcohol, both, and neither.

Correspondence: *Susan Tapert, Ph.D., Psychiatry, University of California San Diego, 9500 Gilman Drive, 0603V, San Diego, CA 92093-0603. E-mail: stapert@ucsd.edu*

CE Workshop 10: Neuropsychology and Real World Functional Assessment: Success, Barriers and What the Future may Bring

Presenter: Maria Schultheis

7:20–8:50 a.m.

M. SCHULTHEIS. Neuropsychology and Real World Functional Assessment: Success, Barriers and What the Future may Bring.

While traditional neuropsychological measures have demonstrated their relevance to the understanding and assessment of specific cognitive abilities; however, one area that continues to have limited success is the ability to predict everyday functionally-relevant activities of daily living using neuropsychological measures. For example predicting vocational functioning, driving ability and managing everyday tasks such as food preparation or medication management. While, some gains have been made, criticism that these measures are not ecologically valid or that our methods do not approximate the real world that is being examined, remain. Part of the challenge may be in revisiting how we define individual versus more complex constructs of cognition. So therefore, since the real world often demands complex and dynamic cognitive processing, it is arguable that new methods and measurements for evaluating the relationship between cognition and everyday functioning are necessary. Researchers in this area have begun to develop innovative and novel measures of cognition to address this need. These new measures may: 1) incorporate new technologies which can offer more increased objectivity and sensitivity to measuring cognitive performance, or 2) may employ structured performance tasks that allow detailed evaluation of components of these behaviors and 3) may focus on complex cognitive constructs (e.g., multitasking). The current workshop aims to provide an overview of this growing area of research by providing a brief review

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

of both theory and practical aspects of evaluating everyday functioning and present findings from current research that has examined the development of ecologically valid measures of cognition. The workshop will also discuss the practical challenges that remain to be addressed in this area of research. This novel approach in neuropsychological assessment may provide an integrated view of cognitive functioning and offer new methods for developing cognitive intervention and informing cognitive rehabilitation.

Correspondence: *Maria Schultheis,, PA. E-mail: sg94g745@drexel.edu*

Invited Address: Why is Autism More Common in Males? (CE Session G)

Presenter: Simon Baron-Cohen

9:00–10:00 a.m.

S. BARON-COHEN. Why is Autism More Common in Males?

Autism affects males much more often than females. In classic autism it is about 4:1 (male: female) whilst in Asperger Syndrome (AS) it is about 9:1. Under-diagnosis of females with AS due to better imitation and language skills, and greater social motivation to 'camouflage', may mean the true sex ratio in AS is closer to 4:1, but the male-bias needs an explanation. Hormones (e.g., the steroid hormones that brain development) and/or genetics (e.g., X-linked genes, or genes regulating and regulated by the steroid hormones) are strong candidate factors. Here I summarize work from our lab suggesting one steroid hormone, testosterone, measured in the womb is associated with individual differences in typical children's language and social skills, attention to detail and narrow interests, autistic traits, and later brain structure and function. A new large-scale study in collaboration with Denmark is testing if elevated prenatal steroids are associated with autism itself. Finally, evidence of steroid hormone dysregulation in autism and their family relatives is reviewed. A baby's sex steroid hormones are a key part of the puzzle of autism.

At the conclusion of this presentation, attendees will be able to: (1) Identify factors that contribute to sex differences in the prevalence of autism; (2) Describe the role of testosterone in neurodevelopment; (3) Describe current research studies examining how prenatal steroids may contribute to autism

Correspondence: *Simon Baron-Cohen,, United Kingdom. E-mail: sb205@cam.ac.uk*

Symposium 4: Global Neuropsychology

Chair: David Schretlen

10:00–11:30 a.m.

D.J. SCHRETLEN. Global Neuropsychology.

Symposium Description: Over the last half century, it has become clear that many neurological, psychiatric, and other medical conditions have neuropsychological effects that contribute to functional outcomes. In a related development, cognitive testing is an increasingly common component of the assessment of patients and research participants throughout the world. These conditions have increased the availability of international neuropsychological data worldwide, inspiring efforts to harmonize clinical and research assessments conducted in different countries. This symposium will explore the use of "big data" to characterize the effects of age, sex, education, country of origin, and language on cognitive performance. Two presentations will be based on the International Neuropsychological Normative Database Initiative (INNDI) that is pooling normative data collected in any country and language for selected cognitive tests. Scientists around the world have contributed data for over a quarter million people (5 – 111 years old) from 51 countries, who were tested in one 76 languages. These two speakers will (1) provide an overview of INNDI, (2) describe the effects of education and literacy on animal naming in over 130,000 adults, and (3) compare age-specific cognitive performance across countries with widely varied life expectancies. Two other presentations will be based on multiple longitudinal cognitive data sets that have been aggregated for analyses. These presenters will (4) describe approaches to the harmonization of cognitive test results obtained from multiple samples, and (5) show results of cross-sectional and longitudinal age effects on cognition using large data sets.

Correspondence: *David J. Schretlen, Ph.D., Department of Psychiatry, Johns Hopkins University School of Medicine, 600 N. Wolfe Street, Meyer 218, Baltimore, MD 21287-7218. E-mail: dschret@jhmi.edu*

S.M. HOFER, A.M. PICCININ, G. MUNIZ & S. CLOUSTON. Integrative Analysis of Longitudinal Studies on Aging (IALSA): Challenges and Requirements for Quantitative Harmonization.

Cross-validation of research findings across independent longitudinal studies is essential for a cumulative science. In many cases, cross-study differences in measurements and sample composition (e.g., ability level, education, language) impede the utility of pooled data analysis, particularly in the case of longitudinal studies. Harmonization can occur at the levels of research question, statistical models, and measurements, permitting synthesis of results for understanding ways in which birth cohort, country, culture, and issues of mortality and selection relate to outcomes and differences across studies. The goal of the Integrative Analysis of Longitudinal Studies of Aging (IALSA) research network (NIH/NIA P01AG043362) is to maximize opportunities for reproducible research and cross-validation across heterogeneous sources of evidence by evaluating comparable statistical models, with comparison of the pattern and magnitudes of effects at the construct level. In terms of measurement harmonization, co-calibration and the development of an item library (i.e., relational map of existing measures) requires overlapping multivariate item sets and a well-defined theoretical framework. While cross-study comparison can proceed without quantitative harmonization, the isolation of measurement as a source of between-study differences is important and can lead to refined measurements for future studies. We will discuss some of the challenges and approaches for quantitative harmonization of neurocognitive assessments and mental health outcomes, using examples from longitudinal studies of aging.

Correspondence: *Scott M. Hofer, Department of Psychology, PO Box 1700 STN CSC, University of Victoria, Victoria, BC V8W 2Y2, Canada. E-mail: smhofer@uvic.ca*

A.L. GROSS. Big Questions in Cognitive Aging: An Integrative Analysis Approach.

The timing and magnitude of age-related cognitive decline, some of the oldest questions in cognitive aging research, remain open questions of major importance. However, comparison of results across published studies is challenging because different cognitive tests have different measurement properties and are not easily comparable. The goal of this presentation is to describe a procedure for calibrating cognitive factors representing general cognitive performance, memory, and executive function across several large epidemiologic studies with longitudinal data that administered different neuropsychological test batteries, in order to conduct an integrative data analysis of cognitive aging. The cognitive factors are scaled across study to a nationally representative sample of older adults. We used neuropsychological performance data from 10 epidemiologic and clinical studies of older adults, for a combined sample size of 39,832 adults between the ages of 50 and 110 who have been followed over time for up to 20 years (median 4 years). We used item response theory to estimate cognitive ability for each participant and visit based on item-level cognitive data, scaled

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

to national norms. The global factor has interval-level properties, was internally consistent (Cronbach's alpha=0.96), had minimal floor or ceiling effects, and demonstrated reliable measurement precision over a broad range of cognitive performance. Domain-specific factors had similar properties. In conclusion, this approach can be used to calibrate neuropsychological test results across diverse settings and studies into a summary measure of global cognitive performance. The measure holds substantial promise for advancing work to evaluate cognitive decline over time. Substantial further work is needed to evaluate bias in the composites and generalizability of the method.
Correspondence: *Alden L. Gross, The Johns Hopkins University School of Public Health, 2024 E Monument St, Baltimore, MD 21287. E-mail: aldgross@jhsph.edu*

C. SULLIVAN, A.M. KUEIDER, B. GORDON & D.J. SCHRETLEN. Cognitive Aging on Four Continents.
All people experience some degree of cognitive decline over the course of their adult years. However, both the rate and extent of age-related cognitive decline vary from person to person, and the reasons for this remain unclear. Nor is it clear whether some aspects of cognitive aging but not others vary across countries throughout the world. One factor that might account for some cross-cultural variability concerns how "age" is conceptualized. We typically define age as the number of years a person has lived. However, life expectancy varies throughout the world. Thus, it might also be useful to consider a person's age in relation to his or her life expectancy. And, of course, even chronological age can have nonlinear effects on cognitive performance over the adult life span. Using data from the International Neuropsychological Normative Database Initiative (INNDI) for more than 80,000 healthy adults from Brazil, China, South Korea, the United Kingdom and the United States aged of 51 to 100 years, this presentation will examine effects of age on cognitive test performance. Each participant completed a 30-item version of the widely-used Mini-Mental State Exam (MMSE) dementia screening test. Effects of chronological age, proximity to one's life expectancy, country of origin, and interactions among these predictors will be used to explore the complex contributions of age to MMSE performance by healthy adults from four continents.
Correspondence: *Campbell Sullivan, The Johns Hopkins Hospital, 600 N Wolfe St, Meyer 218, Baltimore, MD 21287-7218. E-mail: asulli15@jhmi.edu*

D.J. SCHRETLEN, A.M. KUEIDER, C. SULLIVAN & B. GORDON. Cultural Differences in the Effects of Education and Illiteracy on Animal Naming.
Individual differences in age, sex, race, and years of education all account for variability in the cognitive test performance of healthy adults. However, even in countries where access to school is nearly universal, differences in school quality complicate using "years of schooling" to assess the impact of education on cognitive performance. Further, in developed countries, individual differences in intelligence influence educational attainment. Thus, the relationship between education and cognitive performance likely is bi-directional. Yet these complexities pale in comparison to the challenges inherent in modeling the effects of education and illiteracy on cognitive performance by healthy adults from both developed and developing countries. This is precisely what the International Neuropsychological Normative Database Initiative (INNDI) aims to do. While the challenge is daunting, combining cognitive test data from highly diverse samples provides a unique opportunity to address such questions as (1) whether illiteracy has the same impact on cognitive performance around the world, and (2) whether differences between countries in mean educational level moderate the effects of educational attainment on cognitive performance. This presentation will explore the effects of education and illiteracy on category word fluency (animal naming) in more than 130,000 healthy adults between 40 and 90 years of age, including over 20,000 with 0 to 4 years of schooling. Finally, this presentation will compare "top-down" classifications of educational attainment with a "bottom-up," empirically driven analysis of the relationship between educational attainment and animal naming.
Correspondence: *David J. Schretlen, The Johns Hopkins Hospital, 600 N Wolfe St, Meyer 218, Baltimore, MD 21287-7218. E-mail: dschret@jhmi.edu*

Paper Session 4: Child and Adolescent TBI

Moderator: Kelly McNally

10:00–11:30 a.m.

A. ARENIVAS, T.Z. KING, B. SUN, S.M. MCMANUS, R. BREWSTER, L. HAYES & T.G. BURNS. Neural activation on a working memory functional MRI task in pediatric sports-related concussion.
Objective: The pathophysiology of pediatric sports-related concussion (SRC) is not fully understood. Compared to healthy controls, fMRI studies have shown disrupted frontal activation patterns during working memory (WM) tasks with mixed results of less or greater activation associated with impaired WM. This study examined brain activation in high school SRC and controls during a 3-back WM fMRI paradigm (Siemens 3T scanner).
Participants and Methods: FMRI sequences were acquired 2-7 days post-injury. Participants included 10 SRC (M=16.4years,SD=1.3) and 10 demographically matched controls, (M=15.8years,SD=1.1). All participants were right-handed males who were similar in race/ethnicity (70% Caucasian), education (M=9.7years,SD=1.2), and WASI IQ (M=104,SD=11) with no history of concussion. FMRI analyses were completed in FSL v.5.0.2(FEATv6.0.0 & FLAME) to examine performance on a letter WM (3+2back) versus vigilance (1+0back) task; threshold set at Z>2.3, cluster corrected p<.05. One-way analyses of variance were carried out to determine group differences in percent change in BOLD responses.
Results: Groups did not differ in accuracy or reaction-time across n-back conditions. The SRC group demonstrated significantly greater activation in the left prefrontal, superior, and middle frontal regions relative to controls on WM versus vigilance tasks.
Conclusions: Differences in brain activation can be observed in individuals who have sustained a single injury 2-7 days post-injury compared to controls. Despite similar neurocognitive performance, differences in neural activation were observed, and in regions consistent with existing WM literature. Ongoing research is needed to identify the timeframe of recovery and clinical correlates of these differing activation patterns.
Correspondence: *Ana Arenivas, PhD, MPH, Neuropsychology, Children's Healthcare of Atlanta & Emory University School of Medicine, 5455 Meridian Mark Road, Atlanta, GA 30342. E-mail: ana.arenivas.827@gmail.com*

M. AMAYA-HODGES, C. VAUGHAN, L. PRATSON & G. GIOIA. Retrospective Reports of Pre-Injury Symptoms: Psychometric Properties and Clinical Utility for Pediatric Concussions.
Objective: To examine the psychometric properties and potential clinical utility of retrospective reports of pre-morbid symptoms for youth who have sustained a concussion.
Participants and Methods: Children (N=770; 61% male; 51% white) and their parents completed the Post-Concussion Symptom Inventory (PCSI) as part of a standard post-injury clinical assessment. Current symptom reports, as well as retrospective reports of pre-injury symptoms, were collected. Participants included youth ages 5-7 (n=39), 8-12 (n=204), and 13-17 (n=527) years first treated within 30 days of injury (M=14.3±6.9).
Results: There was no effect of age, gender, or race on RBL total scores. Parents' reports of pre-injury symptoms were moderately correlated with older children's (r=.30, p<.001) and adolescents' (r=.48, p<.001),

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

but not with younger children's. Adequate internal consistency was found for parent (α=.78) and older child (α=.80)/adolescent (α=.82) reports of pre-injury symptoms but lower for young children's self-reports (α=.64). Test-retest reliability was high (ICC>.72) on parent and self-report in a subsample of youth evaluated a second time within 30 days of their first visits (n=402). Profile analysis of the PCSI subscales revealed significant differences between pre- and post-injury symptom patterns. All symptom subscales increased post-concussion, with the greatest increases in Sleep and Cognitive, followed by Physical and Emotional symptoms.

Conclusions: Retrospective reports of pre-injury symptoms on the PCSI exhibit adequate psychometric properties and are a useful alternative to prospective baseline symptom reports obtained prior to injury. For youth, the pre-injury pattern of Cognitive, Physical, Sleep, and Emotional problems changes following a concussion, and it will be important to consider pre-morbid functioning when assessing return to baseline.

Correspondence: *Meredith Amaya-Hodges, Ph.D., Children's National Medical Center, 15245 Shady Grove Rd., Suite 350, Rockville, MD 20850. E-mail: mamaya@cnmc.org*

S. JIVANI, D. BROWN, R. SAVJANI, E.A. WILDE & S. GALE. Effects of Injury Severity on White Matter Tract Fractional Anisotropy in Chronic Pediatric Traumatic Brain Injury and the Relationship to Memory.

Objective: Traumatic brain injury (TBI) is the most common cause of disability in children and adolescents, yet relatively few studies have examined the long-term structural consequences of these injuries using diffusion tensor imaging (DTI) and how these relate to memory in pediatric populations. We examined the relation between DTI-derived fractional anisotropy (FA), injury severity as measured by Glasgow Coma Scale (GCS) score, and memory.

Participants and Methods: Seventeen children (8F, 9M; mean age=12.3±2.4 years) with chronic TBI (mean years post-injury=3.2±1.4) underwent DTI and memory testing using the California Verbal Learning Test – Children's Version (CVLT-C). Tract-based spatial statistics (TBSS) were used to investigate the relationship between FA and GCS (M=9.1±4.6) and FA and memory.

Results: TBSS analyses demonstrated lower GCS was associated with significantly lower FA (p=0.05, threshold-free cluster enhancement, multiple comparisons corrected) in multiple brain regions including the corpus callosum, inferior longitudinal fasciculi, and inferior frontal occipital fasciculi. Additionally, decreased FA in the corpus callosum was associated with lower delayed recall on the CVLT-C (p=0.05, threshold-free cluster enhancement, multiple comparisons corrected).

Conclusions: Our results indicate that children with chronic (3 years post-injury) TBI may continue to demonstrate lower FA in the corpus callosum and other regions, that these lower FA values are associated with initial injury severity, and that lower FA in the corpus callosum is also associated with lower performance on measures of memory function. Thus, results support prior studies suggesting decreases in FA are associated with TBI, that the corpus callosum is among those structures demonstrating this relation, and that memory function is also related to decreased FA in these regions.

Correspondence: *Sanam Jivani, Clinical Psychology, Brigham Young University, 14925 Ox Cart Lane, Draper, UT 84020. E-mail: sanam47@gmail.com*

S. HEVERLY-FITT, K. RUBIN, E. BIGLER, M. DENNIS, H. TAYLOR, K. VANNATTA, C. GERHARDT, T. STANCIN & K.O. YEATES. Investigating a Proposed Model of Social Competence in Children with Traumatic Brain Injuries (TBI).

Objective: The goal of the current study was to test a proposed model of social competence for children with TBI (Yeates et al., 2007), suggesting intra-individual characteristics predict the display of social behavior, which predicts peer acceptance. We hypothesized social behavior would mediate the relation between executive function (EF) and peer acceptance.

Participants and Methods: Participants were 8-13 years (n=53) involved in a larger study of social outcomes following childhood TBI. TBI severity ranged from complicated mild to severe. A composite EF score was derived from performance on: the WISC processing speed subscale, TEA-Ch Walk/Don't Walk, Code Transmission, and Creature Counting. Classroom measures of social behavior included: The Extended Class Play and the Teacher-Child Rating Scale. Peer acceptance was gathered from classmate reports. Hierarchical linear regressions tested if social behavior mediated the relation between EF and peer acceptance. Peer acceptance was the outcome variable. Steps of the regression analyses included: 1) Age, 2) EF composite, 3) Social behavior.

Results: All conditions of mediation were met: EF was a significant predictor of peer acceptance and of social behavior; and social behavior was a significant predictor of peer acceptance while controlling for EF. Regression coefficients between EF and peer acceptance decreased substantially when controlling for teacher-rated social behavior. Similar results were found for peer-rated social behavior, primarily leadership/prosociality, popularity, and rejection/victimization.

Conclusions: Social behavior fully mediated the relation between EF and peer acceptance in children with TBI. This supports the model of social competence proposed by Yeates et al. (2007), and adds to the growing literature aimed at better understanding the social-cognitive processes and social outcomes of children with TBI. This study also adds to the current literature by providing perspectives on the social behaviors of children with TBI from teachers and peers.

Correspondence: *Sara Heverly-Fitt, M.S.Ed, University of Maryland, 3304 Benjamin Building, College Park, MD 20742. E-mail: sphf15@gmail.com*

C.L. HENDRIX, T.Z. KING, J. WISE & J. HAARBAUER-KRUPA. Pragmatic language mediates the relationship between early childhood TBI and adaptive functioning.

Objective: Traumatic brain injuries (TBI) sustained in early childhood can adversely affect adaptive functioning. However, the mechanisms by which adaptive functioning is disrupted is not well understood in children injured at a young age. This project examined pragmatic language as a potential mechanism for adaptive outcome disruption in children with early TBI.

Participants and Methods: The sample consisted of 50 children between the ages of 6 and 10 years old (M=8.46 years, SD=1.33, 52% female, 72% white) who sustained a TBI (n=24) or orthopedic injury (OI; n=26) before 6 years of age (M=3.63 years, SD=1.69) and at least one year prior to testing (M=4.71 years, SD=1.48). The pragmatic language subtest of the Comprehensive Assessment of Spoken Language (CASL) was administered to the child. Parents completed the Adaptive Behavior Assessment System (ABAS, composite score).

Results: A mediation model was tested using the simple mediation with bootstrapping script for SPSS (Preacher & Hayes, 2004). Injury type (OI vs. TBI) significantly predicted parental report of child's adaptive functioning. TBI had worse adaptive outcomes compared to OI (β=-9.9, t(48)=-2.51, p<.05). Further, the indirect effect through pragmatic language was significant (β=-5.57, 95CI: -11.45, -1.04) while the relationship between injury type and adaptive functioning was not significant when pragmatic language was added to the model (β=-4.33, t(48)=-1.06, p=.30).

Conclusions: Results indicate that pragmatic language mediated the relationship between injury group and adaptive functioning. The ability to use language in social situations is rapidly developing in early childhood. A TBI during this time leaves children vulnerable to disruption of more complex language skills, including social language use, and is significantly related to adaptive outcomes. Future research examining the relationship of complex language skills to pragmatic language and adaptive outcomes is warranted.

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

Correspondence: *Cassandra L. Hendrix, Psychology, Georgia State University, 319 Brookhaven Way, Atlanta, GA 30319. E-mail: hendrix.cassandra@gmail.com*

Symposium 5: Item Response Theory and Rasch Analysis in Neuropsychology: Modern Methods for Refining, Calibrating, and Interpreting Measures

Chair: Callie Tyner

Discussant: Michael Thomas

10:15–11:15 a.m.

C.E. TYNER, S.R. MILLIS, L. GIBBONS, C.E. TYNER, M. THOMAS & M. THOMAS. Item Response Theory and Rasch Analysis in Neuropsychology: Modern Methods for Refining, Calibrating, and Interpreting Measures.

Symposium Description: Neuropsychologists are tasked with using empirically validated measurement tools and keeping up with psychometric innovations. Item response theory (IRT) provides modern psychometric approaches for measuring cognition, emotion, and behavior. Unfortunately, literacy of these psychometric techniques within neuropsychology is not widespread. In contrast to traditional techniques based on classical test theory (CTT), IRT separates item characteristics from examinee characteristics in the underlying psychometric models. This approach has benefits over CTT including improved ability to study test precision, link and equate different test forms, identify test bias, and improve test efficiency. IRT methods, including Rasch analysis, allow for development of better instruments, including computerized adaptive tests. This symposium highlights current research within neuropsychology using IRT and Rasch analysis. The speakers will present on clinically relevant applications of these psychometric methods, including refining a post-concussion symptom inventory (S. Millis), calibrating multiple tests of the same domain (L. Gibbons), detecting psychometric limitations in a performance based test of sustained attention (C. Tyner), and using multidimensional IRT to understand the component processes of working memory (M. Thomas). Our discussant (M. Thomas) will review the relevant theoretical frameworks of these measurement theories, so that those in attendance may gain a better appreciation of the importance of these modern psychometric approaches.

Correspondence: *Callie E. Tyner, M.S., Clinical and Health Psychology, University of Florida, P.O. Box 100165, Gainesville, FL 32610. E-mail: callietyner@phhp.ufl.edu*

S.R. MILLIS. Introduction to the Rasch model.

The Postconcussive Symptom Questionnaire (PCSQ; Lees-Haley, 1992) is purported to measure four constructs. These include psychological, cognitive, somatic, and infrequency (i.e., items intended to reflect negative impression management) symptoms. The utility and validity of Postconcussive Syndrome (PCS) as a diagnostic condition continues to be debated. To this end, examining the instruments used to measure postconcussive symptoms can increase our understanding with respect to this issue. The aim of this study was to derive a revised PCSQ to target the core construct of subjective symptoms reported by persons with traumatic brain injury (TBI). A total of 133 people with mild to severe TBI completed the 45-item PCSQ. Items were scored dichotomously, as symptom present or absent. Rasch analysis, based on the mathematical model formulated by Rasch (1960), was used to derive the revised PCSQ. Misfitting and redundant items were removed and a second model containing 19 items was fitted. The revised PCSQ-19 had superior psychometric qualities; reliability was 0.81. The PCSQ-19 provides a more targeted, unidimensional assessment of subjective symptoms following brain injury. The findings also revealed information related to symptom hierarchy which can further our understanding of PCS.

Correspondence: *Scott R. Millis, RIM - Research Dept, 261 Mack Blvd, Detroit, MI 48201. E-mail: srmillis@yahoo.com*

L.E. GIBBONS & P.K. CRANE. Item Response Theory Methods for Calibrating Multiple Tests of the Same Domain.

Objective: To explain Item Response Theory (IRT) Methods for calibrating multiple tests of the same domain.

Motivation: Calibrating two or more tests of the same domain so that they are on the same scale can be useful. Researchers may want to combine data from studies using different tests to measure the same domain, adopt a new test but continue to use data collected with the legacy test, or calibrate a test with one that has been normed to a reference population. Clinical practitioners may want to understand a new test by linking it to scores on the scale of another test.

Methods: Calibration is fairly straight-forward using IRT, if there is either a sample of people who took both tests on the same occasion ("common people") or the tests have some items in common ("common items"). This talk illustrates how to obtain parameters for the test items, and how to assess how closely the tests measure the same domain. If the assumption of a single domain is tenable, IRT methods to link the tests are straight-forward. In the case of "common people", we demonstrate how to fix item parameters from one test to get item parameters from the other test on the same scale, illustrated using previously published research on migrating from a legacy depression measure to a measure suitable for computerized adaptive testing. Graphical methods presented may help clinicians adapt to the scale of a new test. In the case of "common items", we demonstrate how the common items can be used to link the tests, illustrated using multiple measures of global cognitive function from several studies of dementia.

Conclusion: IRT can be used to calibrate multiple tests of the same domain. This calibration can be useful in research and in clinical practice.

Correspondence: *Laura E. Gibbons, Box 359780, Harborview Medical Center, 325 Ninth Avenue, Seattle, WA 98104. E-mail: gibbonsl@uw.edu*

C.E. TYNER, S.C. HEATON, L.L. JORDAN & C.A. VELOZO. Pay no attention to that man behind the curtain: Psychometric considerations uncovered by Rasch analysis of a pediatric test of sustained attention.

Rasch analysis and other techniques collectively known as Item Response Theories (IRT) have recently been increasing in popularity among neuropsychological researchers. Yet most research has centered on questionnaires and rating scales. The present study was designed to explore what can be learned from Rasch analysis of performance-based tests. Item level data were gathered from a retrospective chart review from the Test of Everyday Attention for Children (TEA-Ch), a test appropriate for children ages 6 to 16. In particular, the 10 items from the sustained attention subtest known as "Score!" were examined. Performance data on this subtest were gathered from 642 neuropsychological assessments (from 612 unique children). Analyses included dichotomous model Rasch analysis as well as reliability and separation analyses. Results demonstrated that the 10 items poorly measured all but the very middle of the range of abilities reflected in this heterogeneous sample; floor and ceiling effects were significant. Reliability analysis suggested that this subtest could not discriminate children into statistically distinct groups of attentional functioning. Results were considered in light of published normative data provided in the TEA-Ch technical manual, which provide scaled scores ranging from 1 to 18 based on age and gender corrections. This study suggested that the clinical utility of this subtest might be limited. Implications for clinical practice are discussed, along with suggested directions for future research and test development.

Correspondence: *Callie E. Tyner, 1645 W. Jackson Blvd, Suite 400, Chicago, IL 60612. E-mail: callietyner@phhp.ufl.edu*

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

M.L. THOMAS, G.G. BROWN, R.C. GUR, T.M. MOORE, M.K. NOCK, J.A. NAIFEH, R.C. KESSLER, S. HEERINGA, R.J. URSANO & M.B. STEIN. A Component Process Analysis of Working Memory Deficits Associated with Head Injury Using Multidimensional Item Response Theory.

Working memory (WM) – a multi-faceted construct involving cognitive processes necessary for short-term maintenance, access, updating, and manipulation of information – is often impaired due to head injury. Unfortunately, the multidimensional aspects of WM tests complicate our understanding of these deficits; poor total scores can reflect deficient performance in any number of component processes. Multidimensional item response theory (MIRT) can counter opaque test validity by identifying unique abilities measured by a single task. In this study, we disentangle component processes on the Penn Letter-N-Back Test in order to improve our understanding of the measure's discriminative associations with head injury variables. Modeling was conducted using self-report and computerized assessment data from 43,140 U.S. Army Soldiers participating in the Army Study to Assess Risk and Resilience in Servicemembers (Army STARRS). The median age of participants was 20, 84% were male, and most were white (70%) and had 12 years of education (57%). MIRT parameters were estimated for a General Component Latent Trait Model. Three response components were identified: liberal (yes) bias, sustained attention, and working memory. Component difficulties were related to task characteristics such as the base rate of targets (liberal bias), administration length (sustained attention), and n-back condition (working memory). Although standard error functions revealed that WM ability was measured with high precision, individual differences in liberal bias and sustained attention were not reliably quantified. Nonetheless, self-reported history of post-traumatic amnesia was significantly associated with increased liberal bias, decreased sustained attention, and decreased working memory. Limitations and future directions of MIRT modeling in neuropsychological research, including potential for improving the predictive and discriminative validity of measures will be discussed.

Correspondence: *Michael L. Thomas, 9500 Gilman Drive MC: 0738, La Jolla, CA 92093-0738. E-mail: mlthomas@ucsd.edu*

Poster Session 6: Alzheimer's Disease, Medical/Neurological Disorders in Adults, Epilepsy/Seizures

10:15–11:30 a.m.

Dementia (Alzheimers)

D.L. KERR, T.A. BARTEL, D.G. MCLAREN & D.C. MARSON. Relationships between Brain Atrophy and Financial Capacity in Patients with aMCI and AD.

Objective: The key IADL of financial capacity (FC) clinically shows early impairment in amnestic MCI and mild AD. We used structural imaging to investigate relationships between brain atrophy and FC in cognitively normal elderly (CN), patients with amnestic MCI (secondary to AD) (aMCI-AD) and patients with mild AD (AD).

Participants and Methods: Study participants consisted of 37 CN, 20 aMCI-AD, and 20 AD (total n=77) as diagnosed by study consensus conference using Petersen and NINCDS-ADRDA criteria. Participants completed the Financial Capacity Instrument (FCI) and structural MRI. We used voxel based morphometry (VBM) and DARTEL in SPM8 to estimate participants' local grey matter volume (GMV). Voxel-wise analyses investigated group differences in GMV and GMV relationships with FC and controlled for age, gender and total brain volume (TBV). We used a cluster extent threshold of $p<0.001$ in at least 10 contiguous voxels.

Results: T-tests/chi-square revealed no group differences for age, education, or TBV; however, the CN group had more females. Regarding GMV, aMCI-AD had less GMV than CN in the STG bilaterally, right MTG, left ITG, left STG, left IPG, left FFA, left LG and left amygdala. AD had less GMV than aMCI-AD in the MTG, ITG, and precuneus bilaterally, right FFA and right MCC. Comparable but more extensive GMV differences were found between the AD and CN groups. With respect to financial skill performance, we observed a significant positive relationship between FCI score and GMV in the left ACC and right ITG in the aMCI-AD group. For the mild AD group, significant positive relationships between FCI score and GMV were observed in the left HIP, right PHG, right ITG and right MFG.

Conclusions: Diminished cortical volumes in patients with prodromal and clinical AD were strongly associated with declining financial skill performance. The findings offer an initial neuroanatomical model for understanding loss of financial capacity in AD.

Correspondence: *Deborah L. Kerr, Ph.D., Neurology, University of Alabama at Birmingham, Sparks Center 650, 1720 7th Avenue South, Birmingham, AL 35294-0017. E-mail: kerr.deborah@gmail.com*

L. EMBREE, L. ERCOLI, J. MARTINEZ, N. DONOGHUE, P. SIDDARTH, V. KEPE, M. REINLIEB, K. MILLER, J. BARRIO, L. APOSTOLOVA, J. RINGMAN & G. SMALL. FDDNP-PET Imaging Identifies Alzheimer's disease-like Binding Patterns in Subjects with Non-Amnestic Mild Cognitive Impairment.

Objective: FDDNP-PET imaging identifies senile plaques and neurofibrillary tangles in the brains of people with Alzheimer's disease (AD) and in people with amnestic Mild Cognitive Impairment (MCI-A), who have high AD risk. People with non-amnestic MCI (MCI-N) have non-memory cognitive impairment, but some develop AD, although they may not be identified as at-risk because they do not demonstrate memory impairment. We used 2-(1-{6-[(2-[fluorine-18]fluoroethyl)(methyl)amino]-2-naphthyl}-ethylidene)malononitrile (FDDNP) PET imaging to identify MCI-N subjects at high risk for AD.

Participants and Methods: Subjects with normal cognition (N=45) Mild Cognitive Impairment (non-amnestic, MCI-N, N=27); amnestic, single and multi-domain; MCI-A, N=43) and Alzheimer's disease (AD, N=23) (age range = 44 – 90 years) underwent FDDNP-PET and neuropsychological testing. A disjoint cluster analysis was performed on FDDNP binding levels in frontal, parietal, medial and lateral temporal, and posterior cingulate brain regions of interest (ROI).

Results: Four FDDNP binding clusters were identified among subjects. One cluster demonstrated high global FDDNP binding suggestive of an AD-like pattern (HG; N=51); another showed relatively elevated binding in parietal/posterior cingulate ROIs but not in the other ROI (High-PAR/PCG; N=30); the third demonstrated relatively high binding only in the medial temporal region (Hi-MTL; N=31); and the final cluster demonstrated low global binding (LG; N=26). All but 2 AD subjects were in the HG cluster, as were ten MCI-N subjects (37%) and 15 (35%) MCI-A subjects.

Conclusions: FDDNP identified a subset of MCI-N subjects that appear to have elevated risk for AD. FDDNP imaging may identify high AD risk subjects who would otherwise go undetected and who may benefit from early intervention.

Correspondence: *Lindsay Embree, Ph.D., UCLA, 760 Westwood Plaza, 37-360B, Los Angeles, CA 90095. E-mail: lindsay.muir.embree@gmail.com*

C.E. WIERENGA, S.I. DEV, C. HAYS & D. SHIN. Altered Brain Response to Object Naming in Alzheimer's Disease Risk: A Simultaneous BOLD fMRI and Pseudocontinuous Arterial Spin Labeling Study at 3T.

Objective: We examined the impact of genetic (APOE ε4 isoform) and cognitive (mild cognitive impairment; MCI) risk for Alzheimer's disease (AD) on change in cerebral blood flow (CBF) and blood oxygen level dependent (BOLD) response to object naming in the fusiform gyrus (FG), a region implicated in visual semantic knowledge and AD pathology.

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

Participants and Methods: Functional BOLD and CBF data were simultaneously acquired using an optimized pseudocontinuous arterial spin labeling (ASL) sequence with a dual-echo readout during picture naming in 28 cognitively normal (CN; 18 ε3, 10 ε4) and 12 MCI (6 ε3, 6 ε4) participants. Cognitive and genetic risk groups were equivalent in terms of education and stroke risk, but MCI adults were significantly older than CN adults (p=.02). Percent change (%Δ) in BOLD and CBF within the left and right FG were compared using 2 group (MCI, CN) x 2 genotype (ε3, ε4) ANOVAs with age as a covariate.
Results: In the left FG, MCI adults had elevated %ΔBOLD (2.2%+1.0) compared to CN adults (1.5%+0.6) [$F(1,35)=8.5$, p=.004] and there was an interaction between cognitive group and genotype [$F(1,35)=4.4$, p=.04] driven by elevated %ΔBOLD in the ε3MCI group (2.6%+1.0). For %ΔCBF there was a main effect of genotype in the left FG. APOE ε4 carriers had reduced %ΔCBF (80.8%+46.7) compared to ε3 carriers (65.1%+42.4) [$F(1,35)=4.7$, p=.04]. %ΔCBF predicted left FG %ΔBOLD in ε3 carriers [$F(1,22)=7.4$, R=.5, R2=0.3, p=.01] and in MCI adults [$F(1,10)=15.2$, R=.8, R2=0.6, p=.003] but not in CN adults or ε4 carriers. No differences in %ΔBOLD or %ΔCBF were found in the right FG.
Conclusions: Findings suggest %ΔCBF in the FG during picture naming is altered in genetic risk for AD, and the relationship between %ΔCBF and %ΔBOLD varies with genetic and cognitive risk. Results support ASL as a sensitive technique for identifying individuals at risk for AD and implicate %ΔCBF when assessing changes in neural activity due to developing AD neuropathology.
Correspondence: *Christina E. Wierenga, Ph.D., Psychiatry, UCSD, 3350 La Jolla Village Drive, 151B, San Diego, CA 92161. E-mail: cwierenga@ucsd.edu*

E.R. HARTMAN, S.S. NELSON SCHMITT, S. CORREIA, A. LEE, J. RAO, P. MALLOY, S. SALLOWAY & S. DEONI. Myelin Integrity and Trails B Performance in Normal Elderly, Mild Cognitive Impairment, and Alzheimer's Disease.
Objective: To determine if cognitive set switching is associated with cerebral myelin integrity across cognitively normal aging (NC), mild cognitive impairment (MCI), and Alzheimer's disease (AD).
Myelin declines in healthy aging and AD; these declines are associated with reduced cognitive function. We hypothesized that reduced myelin integrity would be associated with poorer performance on Trail Making Test Part B (TMT-B) in NC, MCI, and AD; and that this association would be greater for a TMT efficiency score (TMT-Be; INS Montreal 2012) than for original completion times (TMT-Bo; 300s max). TMT-Be incorporates completion time and errors of omission and commission; it captures performance variability for individuals who fail to complete within 300s. Higher TMT-Be = poorer performance.
Participants and Methods: Based on Clinical Dementia Rating score, participants were NC=14; MCI=21; mild AD=16; moderate-severe AD=7. TMT-Bo and TMT-Be scores were recorded from standard administration of TMT-B. Myelin water fraction (MWF) and radial diffusivity (RD) maps were computed from mcDESPOT (Deoni, 2008) and DTI data, respectively; higher MWF, lower RD = better integrity. We registered the JHU white-matter tractography atlas to MWF maps after rigid alignment to MNI space and measured MWF in 11 callosal and bilateral association and projection fiber bundles. We analyzed the entire sample to maximize power.
Results: MWF was significantly negatively correlated with TMT-Be in 4 of 11 pathways. No significant positive correlations were found. In contrast, MWF was significantly negatively correlated with TMT-Bo in 2 of 11 pathways. RD was significantly negatively correlated with TMT-Be in 1 of 11 pathways.
Conclusions: Reduced myelin integrity is associated with poorer cognitive set switching ability. Results provide further support for the use of TMT-Be in research with cognitively impaired individuals, and suggest that MWF may have greater relevance for cognition than RD.
Correspondence: *Elizabeth R. Hartman, M.A., Brown University, 670 Mill Creek Dr., North Kingstown, RI 02852. E-mail: e.tuminello.hartman@gmail.com*

Z. MCDONNELL, Y.H. TSUI, C. FINUF, A. HALL, M. GILMARTIN, J. CUMMOCK, D. SKILES, D. OLESON, C. HUGHES, D. BJORNN, M. FAULKNER, S. RICHARDSON, M. KILLPACK, E.D. BIGLER, J.T. TSCHANZ, M.C. NORTON & A. ALL OTHER CACHE COUNTY INVESTIGATORS. Basal Ganglia Hyperintensities in Relation to the Modified Mini-Mental State (3MS) in the Cache County Study on Memory Health and Aging.
Objective: Although traditional clinical ratings of white matter (WM) hyperintensities (WMHs) have focused on subcortical WM, MRI signal abnormalities may occur in predominantly gray matter (GM) regions which may influence cognitive functioning. In the current study, we used the Scheltens et al. (1993) method for proton density and T2-weighted MRI scans to identify signal abnormalities in both WM and GM. The Scheltens et al. rating method includes a separate rating for the basal ganglia, thalamus and internal capsule, classified as "Basal Ganglia Hyperintensities (BGH)." The current investigation examined BGH findings in individuals 65 and older from the Cache County Study on Memory Health and Aging. Cognitive assessment was based on the Modified Mini-Mental State (3MS; Teng & Chui, 1987; Tschanz et al., 2002). Quantitative MRI analyses were also performed to assess the relation between volumetric changes (i.e., atrophy) and BGH. Quantitative MRI used hippocampal volume as a marker of atrophy, since hippocampal volume loss in this sample is known to be present and associated with 3MS performance.
Participants and Methods: One hundred fifty individuals with suspect dementia as well as controls were included in the present study. Trained raters performed the Scheltens et al. clinical ratings. Total BGHs were computed for all subjects and examined in relation to cognitive performance on the 3MS. Hippocampal volume was based on ANALYZE operator-controlled tracings.
Results: BGHs significantly related to 3MS scores ($r = -0.33$, $p < 0.05$). BGHs also positively related to regional as well as overall WMH burden but not with hippocampal volume.
Conclusions: Hyperintense signal abnormalities at the level of the basal ganglia including regions of the internal capsule and thalamus were associated with worse cognitive performance on the 3MS. In that BGHs were positively related to overall WMH burden and not hippocampal atrophy suggest regionally specific effects of these lesions on cognition.
Correspondence: *Yoko H. Tsui, Clinical Psychology, Brigham Young University, 659 N 700 E, Apt 7, Provo, UT 84606. E-mail: stsuiyoko@gmail.com*

Y.H. TSUI, Z. MCDONNELL, C. FINUF, A. HALL, M. GILMARTIN, J. CUMMOCK, D. SKILES, D. OLESON, C. HUGHES, D. BJORNN, M. FAULKNER, S. RICHARDSON, M. KILLPACK, E.D. BIGLER, J.T. TSCHANZ, M.C. NORTON & A. ALL OTHER CACHE COUNTY INVESTIGATORS. Scheltens et al. Ratings For White Matter Hyperintensities in the Cache County Study on Memory Health and Aging.
Objective: MRI studies have shown that generalized brain atrophy and white matter (WM) hyperintensities (WMH) increase with age and dementing illnesses. A well-established internationally used WMH clinical rating method by Scheltens et al. (1993) categorizes WMH findings in 4 areas: periventricular, subcortical WM, basal ganglia and infra-tentorial regions of interest (ROIs). The Cache County Study on Memory Health and Aging, hereafter referred to as the Cache County Memory Study (CCMS), is an ongoing population based longitudinal investigation that began in the mid-1990s. The purpose of the current study is to provide descriptive ROI WMH findings from the first two waves of clinical assessment in relation to performance on the Modified Mini-Mental State (3MS; Teng & Chui, 1987; Tschanz et al., 2002) exam and with brain atrophy.

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

Participants and Methods: 150 individuals 65 and older with possible dementing illnesses as well as controls were included in this study. Individual ROIs as well as total WMHs were examined in relation to 3MS. Quantitative MRI findings were ANALYZE-based using operator-assisted tracing to establish brain volume, a ventricle-to-brain ratio (VBR) and hippocampal volume. Associations between 3MS and quantitative MRI also were undertaken.
Results: Increased total WMHs were significantly negatively correlated with 3MS ($r = -.33$, $p < .05$). 3MS was also related to total brain volume ($r = .28$, $p < .05$), VBR ($r = -.29$, $p < .05$), but not hippocampal volume ($r = .10$, $p > .05$). WMH ratings were not significantly correlated with brain volume, VBR or hippocampal volume.
Conclusions: Based on 3MS findings both WMHs and general measures of brain atrophy (brain volume or VBR) but not hippocampal volume were related to cognitive functioning. However, degree of WMHs and brain or hippocampal atrophy were not related. The relative and unique contributions of WM pathology as well as global degeneration in cognitive functioning in the elderly will be discussed.
Correspondence: *Yoko H. Tsui, Clinical Psychology, Brigham Young University, 659 N 700 E, Apt 7, Provo, UT 84606. E-mail: stsuiyoko@gmail.com*

B. LUST, J. COHEN SHERMAN, S. FLYNN, C. HENDERSON, J. GAIR, C. CORDELLA, J. BEHRENDT, S. GUTZ & S. WHITMORE. Three-Word Bricolage: A New Task Distinguishes Mild Cognitive Impairment From Healthy Aging.
Objective: Research into biomarkers of Alzheimer's Disease (AD) during its long prodromal period is advancing quickly now, but behavioral diagnostics of cognitive changes during this period still remain underdeveloped; e.g., while it is known that changes in language characterize the development of AD, our understanding of the nature of potential language changes during prodromal AD and our ability to test for them with behavioral tasks remain limited. In this paper, we introduce a new linguistic task and report first results from its application that significantly differentiated a population of 13 subjects (68-80 years) diagnosed with Mild Cognitive Impairment (MCI) (potential precursor to AD) from populations of 14 Healthy Aging (HA) (65-80) and 10 Healthy Young (HY) (20-29).
Participants and Methods: In a 'Three Word Bricolage Task', subjects were asked to listen to three words and "tell a story with one or two sentences using all of those words," e.g., "paper, pen, ink" or "rag, ocean, chair", which varied semantically by the Edinburgh Associative Thesaurus and USF Free Association Norms.
Results: A logistic-linear mixed model revealed that MCI subjects were significantly less successful than HA and HY in using all three words in their responses to 6 such 3-word lists, regardless of semantic variation.Test of 3-word memory in Addenbrooke's Cognitive Examination (ACE-R) where subjects are asked to repeat "lemon, key, ball" also differentiated the MCI group from the others, but performance on this memory task was significantly weaker and did not significantly predict performance on the linguistic task, which also revealed particular changes in language in the MCI group when responses were analyzed.
Conclusions: This research reflects a collaborative pilot study between three US institutions, including Massachusetts General Hospital. We discuss implications of our results for a simple clinical test to assess language changes which may indicate potential pathological deterioration in prodromal AD .
Correspondence: *Barbara Lust, Ph.d., Human Development, Cornell University, MVR G57, Ithaca, NY 14886. E-mail: bcl4@cornell.edu*

A. TANIGUCHI, D.P. SALMON, J. BREWER & D. GALASKO. California Verbal Learning Test (CVLT) Indices of Memory and Pattern Separation Correlate with Hippocampal Volume in Normal Aging, Mild Cognitive Impairment (MCI), and Alzheimer Disease (AD).
Objective: Various measures of episodic memory, including visual pattern separation, are impaired in AD and MCI and correlated with hippocampal volume (HV). Pattern separation is an encoding process in which targets are stored as discrete representations that can be distinguished from very similar distractors at retrieval. We developed verbal pattern separation indices based upon the similarity between various types of distractors and targets on the CVLT recognition task, and examined their relationship to HV in AD, MCI and normal controls (NC).
Participants and Methods: We compared 67 NC, 23 MCI, and 77 AD subjects on standard CVLT measures (total learning, long delay free recall (LDFR), discriminability) and derived measures of pattern separation (d′ for unrelated distractors minus d′s for each of four distractor types: temporal/semantic, temporal, semantic and phonemic). A subset of 49 NC, 14 MCI, and 57 AD also had an MRI processed using NeuroQuant to obtain HV and a derived hippocampal occupancy (HOC) measure (hippocampal volume/ hippocampal plus inferior lateral ventricle volumes).
Results: AD patients performed worse than MCI, and MCI worse than NC, on standard CVLT measures and d′s for each distractor type (all p's<.001). HOC was correlated with LDFR and discriminability in NC, and with learning and LDFR in AD (all p's<.03). Right and left HV was correlated with learning and LDFR in AD (all p's<.02), and right HV with LDFR in MCI (all p's<.03). Pattern separation measures did not differ among groups. However, HOC was correlated with temporal/semantic pattern separation in AD and MCI (p's< .04), and with semantic pattern separation in NC (p=.04).
Conclusions: Standard CVLT measures, but not verbal pattern separation measures, vary significantly between NC, MCI, and AD. However, pattern separation measures do correlate with the severity of hippocampal atrophy within each group. Thus, verbal pattern separation may be a useful adjunct to standard CVLT measures.
Correspondence: *David P. Salmon, Ph.D., Neurosciences, UCSD, 9500 Gilman Drive, La Jolla, CA 92093-0948. E-mail: dsalmon@ucsd.edu*

A. BONNER-JACKSON, S. DURGERIAN, J.L. WOODARD, K.A. NIELSON, M. SEIDENBERG, J. SMITH, A. BUTTS, M. LANCASTER, M. MATTHEWS, M.A. SUGARMAN, C. KAY, C. KANDAH, N. HANTKE, A.L. NORMAN, K. HAZLETT, C. FIGUEROA & S.M. RAO. Longitudinal Changes in Semantic Memory Activation in Healthy Elders at Genetic Risk for Alzheimer's Disease: Results of a 5 Year fMRI Study.
Objective: Healthy aging is associated with cognitive declines typically accompanied by increased task-related brain activity in comparison to younger counterparts. The Scaffolding Theory of Aging and Cognition (STAC; Park & Reuter-Lorenz, 2009) posits that compensatory brain processes are responsible for maintaining cognitive performance in older adults, despite accumulation of neural damage. Individuals at risk for Alzheimer's disease (AD) often show aberrant patterns of brain activity in cross-sectional studies, suggesting that they may be showing the earliest brain changes associated with AD pathology, although few longitudinal studies exist. We examined longitudinal changes in fMRI response to a semantic memory paradigm in three groups of older adults varying in risk for AD over a five-year period.
Participants and Methods: Participants included 60 older adults (21 low risk, 15 family history of AD, 24 APOE-e4 positive) scanned at baseline, 18 months, and 57 months. Famous Name Recognition Task (FNRT) was performed during fMRI scans, and neuropsychological assessments were conducted at each follow-up. Neuroimaging data were analyzed using a functional region of interest (fROI) approach.
Results: The trajectory of change varied as a function of genetic risk, primarily in hippocampal and posterior cortical regions. The low risk group demonstrated a gradual increase in activation over the 5-year

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

period, while the high risk groups showed hyperactivation at baseline and gradual decline in activation over the follow-up period.
Conclusions: Older adults showed divergent patterns of brain activity over a 5-year period as a function of AD genetic risk. In accordance with the STAC model, those at higher risk for AD showed greater baseline activation, followed by eventual decline in activation, presumably through accumulation of AD-related neuropathology in compensatory circuits. Our results could not be attributed to changes in task performance, which remained high throughout the study.
Correspondence: *Aaron Bonner-Jackson, Ph.D., Center for Brain Health, Cleveland Clinic, 9500 Euclid Avenue, Cleveland, OH 44195. E-mail: aaronbonnerjackson@gmail.com*

E.C. EDMONDS, L.R. CLARK, L. DELANO-WOOD, C.R. MCDONALD, A.J. JAK, D.J. LIBON, D.P. SALMON, R. AU & M.W. BONDI. Susceptibility of the Conventional Criteria for Mild Cognitive Impairment to False Positive Diagnostic Errors: Evidence from the Alzheimer's Disease Neuroimaging Initiative.
Objective: Our prior work has demonstrated 1) that Mild Cognitive Impairment (MCI) can be empirically differentiated into specific cognitive subtypes (e.g., memory, language, executive function) based on cognitive test profiles, and 2) that conventional classification of MCI is vulnerable to false positive diagnostic errors (Clark et al 2013). We therefore aimed to assess whether distinct MCI subtypes could be empirically derived within the Alzheimer's Disease Neuroimaging Initiative (ADNI) MCI cohort.
Participants and Methods: Cluster and discriminant function analyses were performed on baseline neuropsychological test data from 846 ADNI participants (mean age=73.2; mean MMSE=27.6) who had been classified as MCI based on conventional criteria (Petersen et al 2005, 2010). Prior to analysis, scores were converted to z-scores based on the performance of a large group of cognitively normal ADNI participants who had remained normal over 1-7 years of follow-up.
Results: Four MCI subtypes emerged: 1) Amnestic with isolated memory impairment (n=170), 2) Language/Memory impairment (n=133), 3) Dysexecutive with a mixture of other deficits (n=99), and 4) Cognitively Normal (n=444). The cluster-derived Cognitively Normal group had significantly higher MMSE scores, less difficulty with activities of daily living, fewer APOE-ε4 carriers, and fewer who progressed to dementia up to 7 years later compared to the other three MCI subtypes.
Conclusions: Identification of distinct, empirically-derived MCI subtypes from the ADNI cohort validates previous findings by demonstrating a high degree of heterogeneity in MCI cognitive profiles that is not captured by the conventional criteria. Results further show that these subtypes are associated with different APOE frequencies and rates of progression to dementia. Identification of a large cluster of participants who performed within normal limits on cognitive tests suggests that traditional diagnostic criteria for MCI are susceptible to false positive errors.
Correspondence: *Emily C. Edmonds, Ph.D., University of California, San Diego, 4635 Torrey Circle Apt. N104, San Diego, CA 92130. E-mail: ecedmonds@ucsd.edu*

D. SHAKED, J. KARLAWISH, S. CINES, E. SULLO, D. DEVANAND & S. COSENTINO. Memory Awareness Influences Modification of Everyday Activities in Cognitively Impaired Elders.
Objective: Decision making capacity (DCM), a crucial element in an individual's independence, deteriorates in dementia patients. Preserved self-awareness has been shown to be particularly important in maintaining DCM related to providing informed consent and managing medications. The current study examined the extent to which reduced memory awareness in individuals with Alzheimer's disease (AD) and Mild Cognitive Impairment (MCI) affects decisions about managing cognitively demanding everyday activities. We hypothesize that individuals with greater memory awareness will be more likely to effectively monitor their daily activities, modifying or discontinuing those that they feel they are unable to manage independently.
Participants and Methods: 32 individuals (12 MCI, 7 AD, and 13 healthy controls) underwent a novel Everyday Decision Making Questionnaire (EDMQ), clinical ratings of awareness, and cognitive assessment. The EDMQ examined whether individuals modified their approach to 12 activities (e.g., driving, cooking, managing finances). Bivariate correlations were used to assess the relationships between decision making and memory awareness, as well as demographic (age, education, and gender) and cognitive variables.
Results: The likelihood of modifying or discontinuing cognitively demanding activities was not associated with demographic or cognitive variables. However, individuals with greater awareness of memory loss were more likely to modify or discontinue activities ($r = .59$, $p = .03$).
Conclusions: The presence of MCI or dementia necessitates that individuals modify their approach to cognitively demanding activities such as driving and managing finances. The current findings in individuals with MCI and AD suggest that the likelihood of modifying one's approach is related to degree of memory awareness. Thus, evaluation of decisions regarding everyday activities is highly important in the context of reduced memory awareness, as the failure to modify these activities may result in negative functional outcomes.
Correspondence: *Danielle Shaked, BA, Taub Institute, Columbia University, 136 W. 87th St., Apt. #2, New York, NY 10024. E-mail: ds3203@columbia.edu*

S. COSENTINO, A. BRICKMAN, E. GRIFFITH, C. HABECK, S. CINES, T. BRINER, M. FARRELL, D. SHAKED, T. HUEY & Y. STERN. Metamemory is Associated with Right Insular Volume in Healthy Aging and Alzheimer's Disease.
Objective: The neuroanatomic basis of disordered memory awareness in Alzheimer's disease (AD) has long been investigated yet remains elusive. Traditional assessments of memory awareness such as clinician and informant ratings are limited in their ability to inform this issue due to their subjectivity. Identifying the neural correlates of disordered memory awareness will clarify the nature of this clinical syndrome and guide its management. This is the first study to our knowledge to examine the structural correlates of objectively measured metamemory in cognitively diverse elders.
Participants and Methods: 34 individuals (14 AD, 20 healthy elders) completed an episodic Feeling of Knowing (metamemory) task and underwent structural MRI. Metamemory was measured using the gamma statistic representing the degree of association between predictions for memory performance and actual performance. Freesurfer software was used to derive volumetric data for 66 regions of interest (ROIs). Partial correlations and linear regression were used to examine the association between metamemory and individual ROIs, as well as hemispheric lobar ROIs.
Results: Partial correlations adjusting for diagnostic group, memory performance, and total intracranial volume revealed a single significant association between metamemory and right insula volume ($r=.37$, $p=.04$). This relationship persisted when controlling for left insula volume ($\beta=1.17$, $p=.04$) and the above covariates in a linear regression predicting metamemory ($R2=.64$, $F(4, 28)=4.91$, $p=.004$).
Conclusions: The current study offers preliminary evidence for the right insula in supporting memory awareness in cognitively diverse elders. This is consistent with previous imaging work implicating the insula in aspects of self-awareness in healthy adults including recognizing one's own face and detecting performance errors, as well as a long standing literature pointing to a preferential role for the right hemisphere in subserving accurate self-assessment across diverse clinical populations.
Correspondence: *Stephanie Cosentino, Columbia University Medical Center, 630 West 168th Street, New York, NY 10032. E-mail: sc2460@cumc.columbia.edu*

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

S. CINES, M. FARRELL, J. KARLAWISH, E. SULLO, E. HUEY, D. JIMENEZ & S. COSENTINO. Disentangling The Link Between Awareness and Depression in Alzheimer's Disease.

Objective: The nature of the relationship between depression, memory loss, and awareness of memory loss in Alzheimer's disease (AD), traditionally measured by subjective cognitive complaint, is unclear. The current study used memory, depression, and objective and subjective indices of awareness to disentangle this relationship. Three hypotheses (H) were assessed: 1) depressed mood underlies increased complaints (cognitive or otherwise), independent of actual awareness; 2) depression reduces memory function, which increases memory complaints; and 3) depression reflects a psychological reaction to awareness of memory loss.

Participants and Methods: 90 individuals with mild AD were scored for degree of memory complaints (MC). Participants completed objective metamemory and memory testing, and the Geriatric Depression Scale (GDS). Informants rated participant distress related to specific cognitive difficulties. Bivariate correlations were used to examine all hypotheses.

Results: GDS correlated with MC (r=.34, p<.01) but not objective metamemory, lending initial support to H1. However, non-cognitive complaints were unrelated to MC. Memory positively correlated with MC (r=.22, p=.03) and was unrelated to depression, rejecting H2. The association between MC and informant reported participant distress tied to specific cognitive deficits supported H3 (r=.38, p<.01).

Conclusions: The selective relationship between depression and MC but not objective metamemory supports the idea that MC may reflect heightened complaints rather than true awareness. However, MC was not related to non-cognitive complaints, arguing against this possibility. Depression was not related to memory and MC was actually associated with less severe memory deficits. External observation of participant distress following specific cognitive difficulties suggests that depression may represent the psychological reaction to awareness of memory loss. Awareness may need to occur at a global (MC) rather than local (objective metamemory) level to influence mood.

Correspondence: *Sarah Cines, Sergievsky Center, Columbia University Medical Center, 622 W. 168 Street, New York, NY 10032. E-mail: sc3311@cumc.columbia.edu*

A. WARD & D. TRANEL. Olfaction: A key to understanding neural degeneration in Alzheimer's disease?

Objective: Deficits in olfaction occur early in Alzheimer's disease (AD). The piriform cortex is an important structure for olfaction. This region is connected to areas subserving decision-making and emotional memory (anterior medial temporal lobe (AMTL) and orbitofrontal cortex, respectively). In AD, pathological changes occur in the piriform cortex and nearby regions, and could result in impairments in olfaction, emotional memory and decision-making. We aimed to study this in patients with AD and healthy elderly (HE), and predicted that olfaction would correlate with emotional memory and decision-making.

Participants and Methods: 8 patients with mild to moderate AD and 8 HE participants were recruited through the Department of Neurology at the University of Iowa. Participants completed tests measuring smell (odor identification and odor memory), emotional memory (recall and recognition of pictures), and decision-making (Iowa Gambling Task and Balloon Analogue Risk Task). The Wechsler Test of Adult Reading was administered as a "control" task. A Spearman correlation was conducted between each olfaction variable and decision making, emotional memory, and reading variables for AD and HE (combined) to examine these associations along a range of cognitive abilities.

Results: We found a significant association between odor identification and emotional memory (recall rho=.75, p<.05; recognition rho=.73, p< .05). No significant association was found between olfaction and decision-making or reading (p's >.05).

Conclusions: We found a significant relationship between smell and emotional memory. However, we did not find a significant relationship between smell and decision-making. These different outcomes may reflect greater decline in the AMTL in mild to moderate AD. These results support olfaction assessment to provide information about the anterior-medial temporal lobe and memory. These findings could help generate a better understanding of neural dysfunction in AD.

Correspondence: *Amanda Ward, Bachelor of Arts, University of Iowa, 1146 Hotz Avenue, Iowa City, IA 52245. E-mail: amanda-m-ward@uiowa.edu*

A.M. WEAKLEY & M. SCHMITTER-EDGECOMBE. Analysis of Verbal Fluency Ability in Alzheimer's Disease The Role of Clustering, Switching, and Semantic Proximities.

Objective: While it is established that individuals with Alzheimer's disease (AD) experience impairment in language ability, the underlying nature of this deficit remains unclear. This study investigated the temporal production pattern, word organization, and retrieval strategy of individuals with AD using word fluency tasks.

Participants and Methods: Participants were 48 individuals with AD and 48 cognitively healthy older adults. Fluency performance on letter and category tasks was analyzed across two 30-second intervals for total words produced, mean cluster size (i.e., groups of related words) and total switches (i.e., shift from one cluster to another).

Results: Analyses revealed that the AD group produced fewer words and switches on both fluency subtests, yet only their category mean cluster size was significantly smaller than control's. Each group generated more words and switches during the first 30-seconds on both fluency tasks, while cluster sizes where similar at each measured interval. The AD group was differentially impaired on category compared to letter fluency and produced more repetitive responses than controls on the category fluency task only. A multidimensional scaling (MDS) approach, used to investigate the organization of retrieved semantic words on the category fluency task, revealed that the organization of AD participants' semantic maps were very similar to controls. However, while the AD group produced a greater proportion of frequently produced category members to total words, the control group produced a greater number of frequent category members overall. Correlations between language and executive functioning tasks suggested that the AD group's poorer word retrieval was related to decrements in both of these abilities.

Conclusions: Overall the data suggests that executive abilities involving search and retrieval processes and a reduced availability of or access to semantically related words is contributing to the AD group's poorer performance despite similar temporal and organizational patterns.

Correspondence: *Alyssa M. Weakley, M.S., Psychology, Washington State University, 415 NW Maryland st, Pullman, WA 99163. E-mail: alyweakley@gmail.com*

M. EDWARDS & S. O'BRYANT. Molecular Markers of Neuropsychological Functioning and Alzheimer's Disease.

Objective: The current project sought to examine molecular markers of neuropsychological functioning among elders with and without Alzheimer's disease (AD) and determine the predictive ability of combined molecular markers and select neuropsychological tests in detecting disease presence.

Participants and Methods: Data was analyzed from 300 participants (n=150 AD and n= 150 controls) enrolled in the Texas Alzheimer's Research and Care Consortium. Non-fasting serum samples were collected from each participant and assayed via using electrochemiluminescence. Linear regression models were created to examine the link between the top 5 molecular markers from our AD blood profile (IL5, IL6, IL7, TNFα, CRP) and neuropsychological test scores. Next, logistical regressions were utilized to predict AD presence using the serum biomarkers in combination with select neuropsychological measures.

Results: The molecular markers, independent of age, gender and education, accounted for significant amounts of variance in neuropsychological test scores: COWAT (5%), Logical Memory I (19%), Logical Memory II (20%), Visual Reproduction I (19%), Visual Reproduction II (22%), TMTA (8%), TMTB (13%), and BNT (14%). Using the neuropsychological test with the least amount of variance overlap with the molecular

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

markers (COWAT), the combined neuropsychological test + molecular markers was highly accurate in detecting AD presence (SN and SP of 90.2% and 92%, respectively, with an overall accuracy of 91.1%).
Conclusions: A biomarker profile containing only five molecular markers previously linked to AD status was strongly related to neuropsychological test scores, in particular memory measures. Combining these markers with a single neuropsychological test (verbal fluency) yielded an excellent overall accuracy of 91%. This work provides the foundation for the generation of a point-of-care device that can be utilized to screen for AD with screen positives referred for a comprehensive neuropsychological examination.
Correspondence: *Melissa Edwards, M.A., Psychology, University of North Texas, 1155 Union Circle, Denton, TX 76203. E-mail: ml.edwards@yahoo.com*

S. MOELTER, M. GLENN, L.M. SHAW, S.E. ARNOLD, J.Q. TROJANOWSKI & D.A. WOLK. Temporal Associative Memory Differences in Healthy Older Adults with Pathological or Normal Cerebrospinal Fluid Markers of Alzheimer's Disease.
Objective: To test the hypothesis that healthy adults at risk for Alzheimer's disease (AD) show reduced forward temporal associations and initiation of recall with the first list item during a verbal learning test.
Participants and Methods: Age-, gender-, and education-matched healthy adults (N=34) who were part of the normal control cohort evaluated at the University of Pennsylvania Alzheimer's Disease Center participated. Half of the subjects demonstrated at least one cerebrospinal fluid (CSF) biomarker seen in patients with AD.
CSF total tau, phospho-tau, and Aβ42 were determined using x-MAP technology. Participants were administered the 10-item CERAD list learning (CWL) test as part of the ADC cognitive assessment. CWL record forms closest in time to CSF measurement were recoded to capture temporal retrieval information. Temporal association measures included conditional response probability as a function of lag (Lag CRP) and probability of first recall (PFR).
Results: There were no group differences in total CWL recall for trials 1-3 ($p > .10$). For lag CRP, both groups showed an expected tendency to make 1-step forward temporal associations (Lag +1) between retrieved items. In contrast to our prediction, however, Lag+1 associations were not different between subjects with normal CSF Aβ42 and tau (M=0.18±.09) and AD-like CSF profiles (M=.17±.08), $F(1,32)=0.19$, $p=.67$. PFR showed predicted group differences; the tendency that the first recalled item was the first list item was greater in the normal (M=.42±.34) than the abnormal CSF group (M=.18±.24), $F(1,32)=5.35$, $p=.03$.
Conclusions: Temporal associations in memory, especially PFR, may be sensitive to subtle biological dysfunction. CSF normal subjects may effectively retrieve temporal context information from the first item to initiate recall, as is typical of shorter lists. Aβ42 and tau AD-like participants may be less able to maintain this context and thus switch to retrieval of the last list item to initiate recall, as is typical when list-length increases.
Correspondence: *Stephen Moelter, University of the Sciences, 600 S. 43rd Street, Philadelphia, PA 19104. E-mail: s.moelte@usciences.edu*

J.N. TRAVIS SEIDL & P.J. MASSMAN. Baseline Neuropsychological Test Performances Differ Between Rapidly and Slowly Progressing Alzheimer's Disease Patients.
Objective: Rate of progression of cognitive deficits is variable among Alzheimer's disease (AD) patients. Previous research has identified differences in demographics and performance on neuropsychological testing between those who progress rapidly and those who progress slowly; however, there is not currently a method of predicting rate of cognitive decline in a clinical setting. The purpose of the current study was to compare demographic characteristics and performance on neuropsychological measures at baseline evaluation between rapidly and slowly progressing patients.
Participants and Methods: Participants were 55 rapidly progressing and 55 slowly progressing patients with probable AD who had a follow-up evaluation 21-27 months after the baseline evaluation. Those who had a decline in ADAS-Cog score of 6 points or more from baseline to follow-up were classified as rapidly progressing, and those whose score improved or did not change were classified as slowly progressing.
Results: Independent samples t-tests revealed that the groups differed in age, with younger patients more likely to be rapidly progressing. Chi-square results indicated that those patients with an initial CDR score of 0.5 were more likely to be slowly progressing. Despite not differing significantly on baseline ADAS-Cog or MMSE scores, the rapidly progressing patients performed significantly worse on Verbal Series Attention Test (VSAT) time, Logical Memory I, Visual Reproduction I, Block Design, and Controlled Oral Word Association Test. Furthermore, discriminant function analysis revealed that performance on these neuropsychological measures at baseline predicted membership in either the slowly progressing (71.7% correctly predicted) or rapidly progressing (71.2% correctly predicted) group.
Conclusions: Rapidly progressing and slowly progressing patients differ on baseline neuropsychological performance. Identifying those patients at risk for rapid progression would provide useful information for caregivers and healthcare providers.
Correspondence: *Jennifer N. Travis Seidl, M.A., Psychology, University of Houston, 126 Heyne Building, Houston, TX 77204. E-mail: jennifer.t.seidl@gmail.com*

P.M. MCLAUGHLIN, D. MAR, B. IZAGUIRRE, M. RAJAGOPAL, M.J. WRIGHT, L.G. APOSTOLOVA, J.M. RINGMAN & E. WOO. Metacognition in Mild Cognitive Impairment and Alzheimer's disease.
Objective: It is known that individuals with Alzheimer's disease (AD) have poor metacognition. However, it is unclear whether such abilities are impacted in mild cognitive impairment (MCI), a risk state for dementia. In the present study, a performance-prediction and postdiction paradigm was used to evaluate metacognition in MCI and AD.
Participants and Methods: Healthy older adults (n = 114) and individuals with amnestic MCI (n = 67), non-amnestic MCI (n = 59), and AD (n = 26) were administered the California Verbal Learning Test – II (CVLT-II), Visual Reproduction I and II (VR I and II), and the Rey-Osterrieth Complex Figure Test. Prior to each task, participants were given a description of the measure and asked to make a prediction about how well they believed they would perform the task. After receiving task experience, they made a postdiction regarding how well they believed they had performed the task. Difference scores were computed for the predictions and postdictions.
Results: A mixed-model analysis of variance was conducted to determine whether metacognition varied as a function of group, task type, trial type (immediate versus delay), and task experience (predictions versus postdictions). The controls and the non-amnestic MCI group showed improved metacognitive accuracy with task experience across measures, with the exception of Rey-O recall. In contrast, the AD group displayed reduced metacognitive accuracy with task experience on the CVLT-II delayed recall and VR immediate recall trials. The amnestic MCI group had reduced metacognitive accuracy only on the CVLT-II delayed recall trial.
Conclusions: These findings indicate that healthy controls and individuals with nonamnestic MCI are able to increase their self-knowledge about their performances when given task experience. In contrast, metacognitive abilities are affected in both amnestic MCI and AD, with task experience being deleterious to their judgments about their cognitive performances.
Correspondence: *Paula M. McLaughlin, UCLA, 3767 Clarington Avenue, Unit 434, Los Angeles, CA 90034. E-mail: pmclaughlin@mednet.ucla.edu*

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

P.M. MCLAUGHLIN, B. IZAGUIRRE, A. HE, L.G. APOSTOLOVA, J.M. RINGMAN, M.J. WRIGHT, K.D. TINGUS & E. WOO. Variability in Verbal Fluency Performance and Everyday Functioning in Mild Cognitive Impairment and Alzheimer's disease.

Objective: Amnestic mild cognitive impairment (aMCI) and Alzheimer's disease (AD) is associated with decreased verbal fluency, particularly with semantic fluency. To date, there is limited research exploring within-trial fluctuations in verbal fluency performance and whether this variability is associated with everyday functioning in MCI and AD. In the present study, we investigated variability in verbal fluency in MCI and AD and whether it was related to activities of daily living (ADLs).

Participants and Methods: Participants with aMCI (n = 26), non-amnestic MCI (n = 22), AD (n = 14), and healthy older adults (n = 40) were administered phonemic and semantic fluency tests, for which measures of dispersion (individual variability within a trial) were calculated. In addition, participants' significant others completed the Functional Activities Questionnaire (FAQ), an informant-based index of ADLs.

Results: Variability was compared across groups using a mixed-model analysis of variance, and dispersion on each test was correlated with mean FAQ scores. Individuals with aMCI and AD were more variable than healthy controls on semantic fluency, but not phonemic fluency. The non-amnestic MCI group showed similar variability as controls on both semantic and phonemic fluency tests. For only the aMCI group, increased variability on phonemic fluency trials was associated with deficiencies in everyday functioning.

Conclusions: The finding of greater semantic fluency variability in aMCI and AD suggests that disruptions in semantic networks affect word generation in both groups. In contrast to semantic fluency, phonemic fluency has an executive component and typically requires increased switching between subcategories of words. This may explain the observed relationship between variability in phonemic fluency and increased functional difficulties in aMCI.

Correspondence: *Paula M. McLaughlin, UCLA, 3767 Clarington Avenue, Unit 434, Los Angeles, CA 90034. E-mail: pmclaughlin@mednet.ucla.edu*

K. CARTER, L. HYNAN, J. FALKOWSKI, K. KRISHNAN, M. WEINER, L. LACRITZ, M. CULLUM, A. KHERA & H. ROSSETTI. The Relationship Between Atherosclerosis Progression and Cognitive Function.

Objective: To explore the relationship between change in subclinical atherosclerosis and cognitive performance in an ethnically diverse, community-based sample.

Participants and Methods: Coronary artery calcium (CAC) levels were collected as part of the Dallas Heart Study (DHS), a multiethnic investigation of cardiovascular risk factors, using electron beam computed tomography at baseline (DHS-1) and 7-year follow-up (DHS-2). The Montreal Cognitive Assessment (MoCA) was administered at DHS-2 (N=1279, age 35-74 (M=52), 57% female, 46% Black, 16% Hispanic). The relationship between CAC progression, measured as an increase from baseline calcium levels, and MoCA Total Score was examined using independent T test, multiple linear regression, and ANCOVA (to account for sociodemographic variables). Participants were divided into two groups, progressors and nonprogressors, according to DHS methodology for CAC accumulation.

Results: At DHS-2, 36% of the sample demonstrated CAC progression (median= 2377 Agatston units, SD=317). Progressors were more likely to be male (51%), and >=age 65 (82%). MoCA Total Score was significantly higher for nonprogressors (M=23.63,SD=3.89) than progressors (M=22.87,SD=4.31), although the effect size was small [t(1278)=3.14, p=.002, d= .19]. Furthermore, CAC group membership was not a significant predictor of MoCA Total Score [F(1, 1271)= 1.584, p= 0.208]. There was a small but statistically significant relationship between MoCA Total Score and continuous CAC progression (β= −0.13, p< 0.001), which was attenuated by gender, age, ethnicity, income and education (β= -0.039, p=0.108).

Conclusions: Progression of subclinical atherosclerosis as measured by CAC showed little relationship with global cognitive performance in this multi-ethnic, relatively young sample. Replication in a sample demonstrating more advanced atherosclerosis is needed to better understand the relation of atherosclerosis and cognition.

Correspondence: *Kirstine Carter, B.A., University of Texas Southwestern Medical Center, 316 Westway St., Denton, TX 76201. E-mail: Kirstine.Carter@utsouthwestern.edu*

M. PARIKH, M. WEINER, L. HYNAN, L. LACRITZ, W. RINGE & C. CULLUM. Predicting the Rate of Decline in Alzheimer Disease: The Role of Neurocognitive Performance Features.

Objective: Alzheimer disease (AD) characteristically begins with episodic memory impairment, although the course of illness is variable, with significant differences in the rate of cognitive decline. For research and clinical purposes, it would be useful to identify persons a priori who will progress slowly vs. more rapidly. The purpose of this investigation was to use neurocognitive performance features and disease-specific and health information to determine the best predictive model for the rate of cognitive decline in subjects in the early stages of AD.

Participants and Methods: Ninety-six subjects with mild AD were administered a battery of neurocognitive tests (including measures of learning, memory, attention, processing speed, executive functioning, language, and visuospatial skills) and clinical measures. Based on Clinical Dementia Rating Scale Sum of Boxes scores over two years, subjects were classified as Faster (n = 45) or Slower (n = 51) Progressors. Stepwise logistic regressions using neurocognitive performance features, disease-specific, health, and demographic variables were performed.

Results: Neurocognitive measures that distinguished Faster from Slower Progressors included Trail Making Test-A (TMT-A; OR = .944, p < .01), WAIS-R Digit Symbol (OR = .797; p < .01), California Verbal Learning Test (CVLT) Total Learned (OR = .950, p = .02), and CVLT Primacy Recall (OR = 0.825, p = 0.04). No disease-specific, health, or demographic variables predicted rate of progression; however, history of heart disease showed a trend. TMT-A distinguished Faster from Slower Progressors with 68% accuracy. In an omnibus model including neurocognitive, disease-specific, health, and demographic variables, only TMT-A distinguished groups.

Conclusions: Several neuropsychological performance features at baseline were associated with rate of cognitive decline in mild AD, with TMT-A showing the best predictive ability. Results suggest that some simple neuropsychological tests may be useful in predicting progression in AD.

Correspondence: *Mili Parikh, Ph.D., VA Northern California Healthcare System, 14959 Marquette Street, Moorpark, CA 93021. E-mail: miliparikh.phd@gmail.com*

W.A. ALVERSON, P.J. MASSMAN, J.M. GRABYAN & R.S. DOODY. Progression and Stability of Cognitive Asymmetry in a Large Sample of Alzheimer's Disease Patients.

Objective: Some discrepancies exist in the current literature regarding the prevalence and significance of hemispheric cognitive asymmetry observed in Alzheimer's Disease. Many studies which have demonstrated the presence of such asymmetry do not address the stability of asymmetry over time. Studies that do have been limited by small sample sizes, making generalizations about asymmetry difficult. It was hypothesized that a large clinical sample would show directionally stable measures of asymmetry over time.

Participants and Methods: Archival data was obtained from the Baylor College of Medicine Alzheimer's Disease and Memory Disorders Center in Houston, Texas. This study used neuropsychological test results to calculate asymmetry indices for a large number (N = 372) of probable AD patients. Apolipoprotein E genotype, a risk factor for AD, is coded for each patient. Patients were assessed at baseline and annual followups, during which they were administered a number of neuropsychological tests. Rey-Osterrieth Complex Figure copy, WAIS-R

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

or WAIS-3 Block Design, Boston Naming Test, and Letter Fluency were used to calculate an Asymmetry Index for each patient.
Results: The current sample showed a larger proportion of asymmetric profiles than had been previously reported. A regression analysis yielded no strong demographic predictors of asymmetry, although a significant but small correlation did emerge between APOE genotype and Asymmetry Index. Repeated measures ANOVA was performed to test for within-subjects change over time, and did not yield significant results.
Conclusions: Asymmetry Indices remained relatively stable from baseline to followup assessments, which was expected based on previously published literature. This combined with the greater than expected prevalence of asymmetry implies that asymmetric profiles are indeed a prevalent, stable phenomenon that warrant consideration as unique subtypes of Alzheimer's Disease.
Correspondence: *William A. Alverson, B.S., Psychology, University of Houston, 2496 Bering Dr, Houston, TX 77057. E-mail: waalverson@gmail.com*

C. KANDAH, M. SEIDENBERG, M. MATTHEWS, K. SRNKA, D. ROSADO, J. WOODARD, K. NIELSON, J. SMITH, S. DURGERIAN & S. RAO. Longitudinal Performance on the Mini-Mental State Exam (MMSE) and the Mattis Dementia Rating Scale-2 (DRS).
Objective: Screening measures suitable for identifying elderly individuals at increased risk for cognitive decline are important in both clinical assessment and research. The presence of both the APOE e4 and positive family history for dementia increases the risk for cognitive decline. Therefore, a longitudinal study design that tracks cognitive change for low and high risk asymptomatic older individuals can provide useful information about the sensitivity of different screening measures. We describe the results of a five year longitudinal study of individuals at low or high for Alzheimer's Disease (AD) on their performance on the Mini-Mental State Exam (MMSE) and the Mattis Dementia Rating Scale-2 (DRS).
Participants and Methods: Participants were divided into low risk (APOE e4 non-carrier and family history of dementia) (n=21,Mage=73) and high risk (APOE e4 carriers with a family history for dementia) (n=17,Mage=71) groups. Performance was examined on the MMSE and DRS at 3 time points: baseline, 1.5 year, and 5 year follow-ups. Alternate versions were used for the DRS at follow up. Scores on both measures were converted to z-scores.
Results: A mixed design RM ANOVA resulted in significant time x group ($F(2,72)=4.9$,$p=.011$) and interaction for the DRS memory subscale. There are no significant differences found between groups on the MMSE, and all other DRS subscales across all time periods. Unlike the MMSE, the high risk group performed significantly worse on the DRS memory subscale starting at time 2 ($p=.003$) and continuing to time 3 ($p=.010$). Overall, the high risk group was not as proficient on the mDRS-2 compared to the MMSE at time 2 ($p=.002$).
Conclusions: Our findings suggest that the DRS memory subscale may prove more useful than the MMSE in cognitive screening of the elderly. The DRS may be a more sensitive outcome measure for research and clinical intervention trials. Additional investigation of the reliability and validity of cognitive screeners for cognitive status and AD risk in the elderly is warranted.
Correspondence: *Cassandra Kandah, Psychology, Rosalind Franklin University of Medicine and Science, 1919 N. Drake, Unit J, Chicago, IL 60647. E-mail: Cassandra.Kandah@my.RFUMS.org*

E.M. LANE, D. LIU, M. XU, S.P. BELL, K.D. NISWENDER & A.L. JEFFERSON. The Impact of Diabetes Medications on Alzheimer's Disease and Vascular Neuropathology.
Objective: Diabetes increases the risk for Alzheimer's disease (AD) and vascular neuropathology. However, the use of diabetes medications may offer modest protection against the pathogenesis of AD or development of cerebrovascular changes in diabetic elders across the cognitive aging spectrum (i.e., normal cognition (NC), mild cognitive impairment (MCI), and AD).
Participants and Methods: National Alzheimer's Coordinating Center data was accessed on 80 diabetic NC (87±8, 36% female), MCI (87±5, 25% female), and AD elders (84±7, 64% female) who reported no medication use (n=36, referent) or reported taking only one diabetes medication type at the final study visit prior to death, including metformin (n=19) and secretagogues (n=25). Neuropathological outcomes included neuritic and diffuse plaques, neurofibrillary tangles, and vascular injury.
Results: Adjusting for age, sex, race, time to death, and statin use, chi-squared tests revealed that individuals taking metformin or secretagogues had significantly fewer diffuse plaques than the referent ($x2=16.1$; $p=0.01$). A main effect by medication group was noted for the presence of microinfarcts ($x2=7.78$; $p=0.02$) with a trend towards increased microinfarcts in the referent compared to individuals taking metformin or a secretagogue.
Conclusions: Diabetes medications may impact the pathogenesis of AD and cerebrovascular disease, as metformin and secretagogue use relate to less diffuse plaque burden than no medication. Diffuse plaques may represent an immature form of the more toxic neuritic plaques, and our findings imply that diabetes medications may reduce the frequency of these immature plaques.
Funding: K23-AG030962, IIRG-08-88733, R01-AG034962, R01-HL11516, U01-AG016976
Correspondence: *Elizabeth M. Lane, PhD Psychology, Vanderbilt Memory & Alzheimer's Center, Vanderbilt University Medical Center, 2525 West End Avenue Suite 1200, Nashville, TN 37203. E-mail: elizabeth.m.lane@vanderbilt.edu*

K. MULHAUSER, M.M. BURK, J. PETERSON & B.A. PYYKKONEN. Group Differences Between Mild Cognitive Impairment, Vascular Dementia, and Alzheimer's Disease on the Geriatric Depression Scale.
Objective: The present study seeks to establish the relationship between depressed mood and clinical diagnosis of patients referred for neuropsychological evaluation. The authors hypothesized that depressed mood would be elevated among patients diagnosed with Mild Cognitive Impairment (MCI) and Vascular Dementia (VD) when compared to those diagnosed with Alzheimer's Disease (AD), due to diminished insight in the latter group and the potential for post-stroke depression in the Vascular group.
Participants and Methods: Participants included 67 older adults with a Mean age of 82 (7.6) who were referred for assessment of cognitive deficits and differential diagnosis. A One-way ANOVA was used to assess overall group differences (MCI, VD, and AD) on depressive symptomatology as measured by the Geriatric Depression Scale (GDS-15). Exploratory follow up t-test analysis assessed differences between group pairs (MCI and AD; MCI and VD; VD and AD).
Results: The ANOVA was not significant. However, a means plot was consistent with expectations. Exploratory follow up comparison between groups revealed significant differences between MCI and AD on the GDS-15 ($p = .021$). No other significant group differences were evident.
Conclusions: Though not statistically significant, a means plot of the ANOVA revealed a pattern consistent with expectations that individuals diagnosed with MCI and VD would endorse higher levels of depression than those with AD. The MCI group endorsed significantly higher levels of depression than the AD group, despite significant functional and cognitive deficits evident in the AD group. Notably, the AD group endorsed depressive symptoms only slightly above that of healthy controls. This comparatively low depression score in the AD group may reflect diminished insight into their functional changes, but may also facilitate adjustment to changes in daily living. Though limited due to the small sample and related power concerns, these finding may have implications for future research and intervention.

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

Correspondence: *Kyler Mulhauser, MA, Psychology, Wheaton College, 326 Duane St, Glen Ellyn, IL 60137. E-mail: kyler.mulhauser@gmail.com*

R.G. JOLLIE, K.A. SIGVARDT & C.I. HIGGINSON. The Relation Between Premorbid Occupation Level and Overall Cognitive Function in Parkinson's Disease.

Objective: Few studies have addressed cognitive reserve (CR) in Parkinson's disease (PD). The purpose of the current study was to determine the relationship between premorbid level of occupation, an indicator of CR, and overall level of cognitive function in a PD sample.

Participants and Methods: Participants consisted of 140 individuals with PD undergoing baseline evaluation for functional neurosurgery. As part of their evaluation, participants completed the Wechsler Adult Intelligence Scale (Third Edition) and their most prestigious occupation was rated using the Hollingshead index. Following a thorough neuropsychological evaluation, 20 participants met DSM-IV criteria for dementia.

Results: As hypothesized, individuals with higher Hollingshead scores were less likely to be diagnosed with dementia, $\chi 2(4)=17.02$, p=.002, and had higher current Full Scale IQ scores, $F(4, 124)=5.93$, p<.0001.

Conclusions: These results support the CR hypothesis, suggesting that CR may protect individuals with PD from cognitive decline.

Correspondence: *Ryan G. Jollie, Loyola University Maryland, 4401 Old Hanover Road, Westminster, MD 21158. E-mail: rgjollie@loyola.edu*

J.J. LY, L.R. KAPLAN, O.M. NIKELSHPUR, G. DAMJANAC, Y. NOMURA, Y. CARO, J.T. BERGER, L.O. MACINA & N.S. FOLDI. Deficits in Top-down Processing and Processing Speed in Alzheimer's Disease and Aging, Using the Attentional Blink Paradigm.

Objective: Patients with Alzheimer's disease (AD) show attentional deficits, but the reasons remain unclear. This study was designed to dissociate top-down processing from temporal demands-processing speed using the attentional blink (AB) paradigm (adapted from Duncan et al., 1994). We hypothesized that while aging would affect ability to keep pace with rapid presentations, AD would cause additional deficits using top-down directives.

Participants and Methods: Three groups participated (AD: N=27; mean age=79.4±7.0 SD), age-matched old controls (OC: N=35; 78.2±7.4), and healthy young controls (YC: N=24; 41.4±11.7). Measure: Two alphanumeric characters (displayed at individualized durations) were presented in rapid succession. Temporal load was varied by increasing presentation intervals (stimulus onset asynchronies, SOA: 133, 266, 399, 532, 665msec). Top-down processing was judged using two instruction types: 1) Top-down: report only one alphanumeric category and 2) Bottom-up: report both stimuli. Accuracy was measured.

Results: All groups showed AB effect [$F(3.4,281.4)=110.3$, p< .01] and AD were less accurate [$F(2,83)=4.8$, p=.01] than OC (p=.050) and YC (p<.01). Importantly, the 3-way interaction [$F(7.5,309.3)=2.0$,p=.050] revealed that YC could improve using top-down instruction at the fastest SOA (p<.01) and OC at 266 and 399 ms (p<.01). However, AD did not improve with instruction regardless of time allotted; rather, they were less accurate if given top-down instructions at the fastest SOA.

Conclusions: We showed a speed-related age effect: YC used top-down instructions at highest temporal loads but OC did so only with sufficient time. The AD group failed to use any top-down, instructions, regardless of the time allotted, supporting our hypothesis that patients with AD are unable to use a-priori directives to improve attentional allocation. Prior instructions even hindered patients at the fastest presentation interval, suggesting instructions may, in some instances, be too confusing.

Correspondence: *Jenny J. Ly, Psychology, The Graduate Center, City University of New York, 65-30 Kissena Blvd., New York, NY 11367. E-mail: jenny.ly@qc.cuny.edu*

K. GIFFORD, T. HOHMAN, D. LIU & A. JEFFERSON. APOE modifies the relation of cognitive complaints and episodic memory in older adults with mild cognitive impairment.

Objective: Apolipoprotein E4 (APOE4) and cognitive complaint are both related to poor episodic memory and an increased risk of incident dementia. However, the interaction of these risk factors on episodic memory performance is not well understood. We tested the interaction of APOE4 on the relation between subjective memory complaint and verbal episodic memory indices in mild cognitive impairment (MCI), a prodromal phase of dementia.

Participants and Methods: MCI participants were drawn from the Alzheimer's Disease Neuroimaging Initiative and included 141 non-complainers (75±7 years, 38% female) and 181 complainers (74±8 years, 39% female) defined by the participant's response to "Do you feel you have more memory problems than most?" Verbal episodic memory was measured by the Rey Auditory Verbal Learning Test. Participants were classified as APOE4 positive (APOE4+, one or more copies of the ε4 allele) or APOE4 negative (APOE4-, no copies of the ε4 allele).

Results: Age, race, sex, education, and MMSE-adjusted linear regression with APOE4 status as an interaction term revealed complaint was unrelated to all episodic memory performances among APOE4+ participants, including Total Trials 1-5 (β=-0.42, p=0.72), Learning Slope (β=-0.10, p=0.21), Immediate Recall (β=-0.57, p=0.18), Delayed Recall (β=-0.47, p=0.29) and Delayed Recognition (β=-0.89, p=0.07). Among APOE4- participants, a complaint was related to worse performance on Total Trials 1-5 (β=-4.48, p<.001), Immediate Recall (β=-1.58, p<.001), and Delayed Recall (β=-1.63, p<.001).

Conclusions: Our cross-sectional findings suggest that among MCI individuals, a memory complaint is related to poorer learning, encoding, and retrieval performances in APOE4- MCI individuals. However, in APOE4+, a memory complaint confers no increased "risk" of poorer memory performance. More research is needed to understand how these risk factors interact in the clinical manifestation of brain aging over time in MCI and pre-MCI.

Correspondence: *Katherine Gifford, PsyD, Vanderbilt University, 2525 West End Ave, 12th Floor, Suite 1200, Nashville, TN 37203. E-mail: katie.gifford@vanderbilt.edu*

K. LAU, S.T. FARIAS, C. HUANG & D. HARVEY. Early functional limitations increase risk of disability and dementia.

Objective: Loss of autonomy and independence is a major concern to older adults; it is associated with poorer quality of life and increased economic burden. Functional decline occurs along a continuum. Using the Disablement Process Model (Verbrugge & Jette, 1994), functional limitations are early manifestations of functional decline, reflecting subtle losses that predate disability (i.e., complete loss of independence in major domains of activities of daily living (ADLs)). Functional limitations likely characterize MCI, while disability is a core feature of dementia. We examined whether early functional limitations increases future risk for incipient disability and a diagnosis of dementia.

Participants and Methods: Participants were part of the longitudinal research cohort at the University of California, Davis Alzheimer's Disease Center. Functional limitations were measured using the Everyday Cognition scales (ECog; Farias et al., 2008), which provided global and domain-specific scores (i.e. memory, language, visual perception, planning, organization, and divided attention). Incident disability was defined as dependence in two or more domains of the instrumental ADL (IADL; Lawton & Brody, 1969) scale.

Results: Greater functional limitations on the ECog (global score) at baseline was associated with increased risk of incident disability at follow-up (hazard ratio (HR)=4.0, 95%CI=(3.2,5.0);p<.001). When examining individual ECog domains in a joint model, both Everyday Memory (HR=2.9; 95%CI=(2.3,3.7); p<0.001) and Everyday Language (HR=1.5; 95%CI=(1.1-2.0); p=.006) were independent predictors of incident disability. Among individuals with MCI, greater functional limitations (ECog global) at baseline increased risk of dementia conversion at follow-up (HR=4.1 [2.8-6.0], p<.001).

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

Conclusions: Consistent with the Disablement Process Model, degree of functional impairment in early disease has important prognostic value regarding future disability. Greater functional impairment leads to faster disease progression.
Correspondence: *Karen Lau, Ph.D., Neurology/Alzheimer's Disease Center, University of California, Davis, 4860 Y Street, Suite 3900, Sacramento, CA 95817. E-mail: karen.lau@ucdmc.ucdavis.edu*

L.Q. PARK, R. MELROSE, A. GROSS, S. FARIAS, J. PA, J. JOHNSON & J. MANLY. Memory and Executive Functioning Are Important Longitudinal Predictors of IADLs Across the Spectrum of Alzheimer's Disease.

Objective: Memory and executive functioning are important predictors of instrumental activities of daily living (IADL) in Mild Cognitive Impairment (MCI) and Alzheimer's Disease (AD), however few studies examine these relationships over time. We studied the longitudinal associations among change in memory and executive functioning and change in IADLs across the spectrum of cognitive aging, including early MCI, late MCI, and early AD.
Participants and Methods: We used data from ADNI. The sample included older adults with early MCI (N= 299), late MCI (N= 533), and early AD (N=291). Cognitive factors were derived using a published factor analysis of the ADNI neuropsychological battery. The IADL factor was derived from the Functional Activities Questionnaire and Clinical Dementia Rating scale. Baseline data were analyzed using regression of IADL on cognitive factors. Changes in cognition and IADL were analyzed with multilevel random effects modeling of factor scores.
Results: Results of the longitudinal analyses show that change in memory (early MCI: Partial R2=.77; CI=.50, .75; late MCI: Partial R2=.65; CI=.50, .75; AD: Partial R2=.65; CI=.37, .80) and change in executive functioning (early MCI: Partial R2=.81; CI=.46, .91; late MCI: Partial R2=.73; CI=.57, .82; AD: Partial R2=.64; CI=.29, .81) predicted change in IADLs across all groups. Baseline memory (early MCI: Partial R2=.12; CI=.02, .28; late MCI: Partial R2=.23; CI=.10, .36; AD: Partial R2=.28; CI=.10, .45) and baseline executive functioning (early MCI: Partial R2=.05; CI=.00,.18; late MCI: Partial R2=.17; CI=.05, .31; AD: Partial R2=.20; CI=.06, .36) predicted baseline IADLs, across all 3 groups.
Conclusions: Declines in memory and in executive functioning are associated with IADL decline across the spectrum of cognitive aging from early MCI to early AD. The correlations are stronger between change in cognition and change in IADLs than among the cross-sectional/baseline variables. These relationships were observed across the spectrum, from early MCI to early AD.
Correspondence: *Lovingly Q. Park, Ph.D., Alzheimer's Disease Center, UC Davis Medical Center, 4860 Y Street Suite 3900, Sacramento, CA 95814. E-mail: lovinglyq@gmail.com*

M. FARRELL, S. COSENTINO, L. ZAHODNE & Y. STERN. Subjective word-finding difficulty predicts engagement in social leisure activities in Alzheimer's disease.

Objective: Word-finding difficulty (WFD) is among the most common and distressing symptoms associated with Alzheimer's disease (AD). Despite its pervasiveness, the consequences of subjective (self-reported) WFD on AD patients' quality of life has not been formally examined. In the current study, we investigated the effect of subjective WFD on AD patients' participation in and enjoyment of social and nonsocial leisure activities.
Participants and Methods: 244 individuals with mild-moderate AD completed questionnaires where they were asked to 1) report whether they experienced difficulty with word finding, 2) estimate the frequency with which they participated in social and nonsocial leisure activities, and 3) rate their enjoyment of activities. Patient ratings were largely corroborated by their caregivers. Relevant covariate measures included dependence, depression, cognitive status, age, sex, and education. Covariates were included in regression models if they were correlated with either subjective WFD or outcome measures in preliminary analyses.
Results: Regression analyses revealed that subjective WFD predicted lower frequency and enjoyment of social leisure activities, controlling for age, depression, cognitive status, and dependence. In contrast, engagement in nonsocial activities was associated with higher age and depression scores, but was not related to subjective WFD.
Conclusions: These data are the first to demonstrate an independent effect of perceived WFD on social leisure activity engagement in AD. Because subjective WFD predicted social but not nonsocial measures, it suggests that the relationship between subjective WFD and social activity engagement is related to specific cognitive demands (i.e., interacting with others) as opposed to a general mood construct shared by both variables. These findings have important clinical and health implications, in that social withdrawal may threaten patient quality of life, increase caregiver burden, and ultimately exacerbate language symptoms over time.
Correspondence: *Meagan Farrell, Columbia University Medical Center, 630 W 168th Street, New York, FL 10032. E-mail: mtf2127@columbia.edu*

S.C. YOU, R. KETELLE, T. SUBAS, B.L. MILLER & J.H. KRAMER. Neuropsychiatric Symptoms Predict Functional Status in Alzheimer's Disease.

Objective: Improving daily living skills is the ultimate target of clinical trials. Although cognitive deficits are presumed to be the primary driver of functional impairment in AD, this has not been confirmed empirically, and functional status is likely multifactorially determined. Our objective was to determine the relative contribution of neuropsychiatric symptoms in predicting functional status.
Participants and Methods: A total of 223 patients at UCSF Memory and Aging Center met inclusion criteria based on probable AD diagnosis, Mini Mental Status Exam score (MMSE)≥12, and completion of the Neuropsychiatric Inventory (NPI) and Functional Activities Questionnaire (FAQ) between 2000 and 2011. The NPI assesses hallucinations, delusions, agitation, dysphoria, anxiety, irritability, disinhibition, euphoria, apathy, aberrant motor behavior, sleep and night-time behavior change, and eating change. Standard neuropsychological evaluation yielded memory and executive function factor scores.
Results: NPI anxiety, apathy, motor, and sleep scores were sufficiently correlated with FAQ for inclusion in subsequent multiple regression analysis. These NPI variables were entered as predictors for FAQ, controlling for MMSE, gender, age, memory, and executive function. The total model explained 32.4% of the variance ($p<.001$) in FAQ. Importantly, the unique variance explained by the NPI was 10.3% ($p<.001$), with apathy ($\beta=.35$, $p=.019$) and sleep ($\beta=.68$, $p=.002$) remaining in the model.
Conclusions: We identified two variables, apathy and changes in sleep, that predict functional status in AD patients. This relationship between neuropsychiatric symptoms and functional status was independent of cognitive dysfunction, as defined by memory and executive function factor scores, and can negatively impact the patients' and caregivers' quality of life. The importance of apathy and sleep for functional status suggests that neuropsychiatric symptoms could be targets for clinical trials, and are relevant for tracking longitudinal change.
Correspondence: *Shou-Chin C. You, MS, Langone Medical Center, New York University, 240 East 38th Street, New York, NY 10016. E-mail: cyou@paloaltou.edu*

T. SOLOMON, G. DEBROIS, A. BUDSON, N. MIRKOVIC, C. MURPHY & P. SOLOMON. Correlational Analysis of Five Commonly Used Measures of Cognitive Functioning and Mental Status: An Update.

Objective: Alzheimer's disease (AD) continues to be the most prevalent form of dementia. Currently, there are numerous measures for detecting the presence of dementia and quantifying its severity and progression. We analyzed the relations between scores on 5 commonly used scales and tests (Mini Mental State Exam, Montreal Cognitive Assessment,

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

Alzheimer's Disease Assessment Scale-cognitive sub-scale, Activities of Daily Living Scale and Global Deterioration Scale) in order to provide a reference to quickly estimate scores between them.
Participants and Methods: Scores from 101 successive evaluations to a memory clinic were utilized in the analysis. Patients were only included in the analysis if they received a diagnosis of Mild Cognitive Impairment due to Alzheimer's disease pathophysiological process or Alzheimer's disease and if all five measures were administered during the same evaluation.
Results: All five measures were highly correlated ($p > .001$), with correlation coefficients ranging between r = 0 .67-0.86. Scores on individual tests were interrelated using linear regression and regression formulas as well as their correlation coefficients are presented. Participants were also grouped by MMSE scores with regard to level of disease severity, allowing for the creation of a quick reference table for estimating an approximate score range for any of the other four measures.
Conclusions: Results from this study provide a clinically useful tool for estimating test scores on five commonly used dementia screening/rating instruments. With the exception of the ADL, r = 0.67, intercorrelations were high among measures, r = 0.78-0.86, suggesting that each instrument is measuring similar cognitive functions. These estimations provide a useful tool for clinicians when comparing between multiple different instruments that measure the mental status and functional ability of individuals with Alzheimer's disease and MCI due to AD pathology.
Correspondence: *Todd Solomon, PhD, Solomon, Todd, 822 Boylston Street, Suite 201, Chestnut Hill, MA 02467. E-mail: Todd@bostonmemory.com*

G.B. DEBROS & T.M. SOLOMON. The Montreal Cognitive Assessment (MoCA) Is Superior to the Mini-Mental State Examination (MMSE) in Differentiating MCI from Normal Healthy Aging in Patients With Subjective Memory Complaints.
Objective: The amnestic subtype of Mild Cognitive Impairment likely represents prodromal Alzheimer's disease (AD) and can be differentiated from Age-Associated Memory Impairment (AAMI). The Montreal Cognitive Assessment (MoCA) has shown excellent sensitivity in detecting MCI. We sought to build upon the existing evidence demonstrating the MoCA's clinical utility in differentiating patients with MCI and AD from those with AAMI by comparing it to the Mini-Mental State Examination (MMSE).
Participants and Methods: Data were obtained from new patient evaluations at a United States memory clinic over a one-year period. All participants had subjective memory complaints. Participants were grouped according to consensus diagnosis following National Institute on Aging–Alzheimer's Association (NIA-AA) guidelines. The final sample was comprised of three groups: AD (n=52), MCI (n=50), and AAMI (n=18). Receiver-operator characteristic (ROC) curve analyses were conducted to compare groups on both measures using various cut scores.
Results: The MoCA showed increased sensitivity in differentiating between AAMI and MCI using cut scores between 22 and 29. Notably, using a cut score of ≤26, the MoCA differentiated MCI from AAMI with 92% sensitivity and 72% specificity. At the same cut score of ≤26, the MMSE differentiated MCI from AAMI with 52% sensitivity and 100% specificity. Using a cut score of ≤25, the MOCA differentiated MCI from AAMI with 90% sensitivity and 83% specificity. At the same cut score of ≤25, the MMSE differentiated MCI from AAMI with 34% sensitivity and 100% specificity.
Conclusions: Our findings are consistent with those of previous studies, which have demonstrated the MoCA's sensitivity to subtle cognitive changes associated with the development of MCI and AD. Using the same cut score on both measures, the MoCA outperforms the MMSE in differentiating MCI and AD from AAMI.
Correspondence: *Guy B. deBros, M.A., The Memory Clinic, 357 Shields Drive, Bennington, VT 05201. E-mail: guy@memorydoc.org*

A. GURNANI & B.E. GAVETT. A Meta-Analysis Examining the Utility of Neuropsychological Tests in Diagnosing Neuropathologically Confirmed Alzheimer's Disease.
Objective: A diagnosis of definite Alzheimer's disease (AD) can only be made via autopsy, yet most research into the diagnostic utility of neuropsychological tests has employed clinically diagnosed AD as the criterion standard. Because a clinical diagnosis of AD is not always accurate, it is important to understand the relationship between neuropsychological test results and autopsy confirmed AD. The present study undertook a meta-analytic review of the literature that has examined cognitive test performance in autopsy verified cases of AD and normal aging to identify tests that are the most sensitive to cognitive changes caused by AD pathology.
Participants and Methods: A comprehensive literature search yielded 5 studies that met the inclusion criteria for the present meta-analysis, comprising 235 AD cases and 450 autopsy-confirmed healthy controls. The magnitude of the difference between groups on six neuropsychological test variables was determined by calculating weighted Cohen's d effect size estimates and confidence intervals for each test that was used in more than one study. WLS multiple regression was used to examine the moderating effects of age at autopsy, interval between assessment and autopsy, and years of education on effect size estimates.
Results: Results revealed that the effect of definite AD was to significantly reduce scores on category fluency (d = -0.40, 95% CI [-0.67, -0.14]); CERAD immediate recall, (d = -0.48, 95% CI [-0.74, -0.22]), and CERAD delayed recall (d = -0.61, 95% CI [-0.87, -0.35]). Age, education, and interval from assessment to autopsy were significant moderators of performance on Logical Memory ($p < .05$) and age was a significant moderator of MMSE ($p < .01$).
Conclusions: Consistent with previous evidence, immediate and delayed list learning abilities appear to be good clinical markers for the presence of AD pathology. The limited number of studies reporting neuropsychological data warrants the need for the formulation established guidelines in clinico-pathological correlation studies.
Correspondence: *Ashita Gurnani, University of Colorado at Colorado Springs, 1510 Dublin Blvd, Apt 160, Colorado Springs, CO 80918. E-mail: agurnani@uccs.edu*

M. ENNOK, E. TAMME, ÜLLA. LINNAMÄGI, P. TABA & L. VAHTER. Assessment of Constructional Skills in Patients with Alzheimer's Disease and Parkinson's Disease with Dementia.
Objective: Deficits in constructional skills are described in various dementia diagnoses. This study compares constructional skills in Alzheimer's disease (AD) and Parkinson's disease with dementia (PDD) patients in two simple drawing tasks.
Participants and Methods: We assessed 15 patients with AD (9 women, 6 men; mean age 75.0 years, mean education 10.2 years, mean MMSE = 21.3) and 15 patients with PDD (11 women, 4 men; mean age 80.9 years, mean education 10.0 years, mean MMSE = 23.1). Their results were compared with 30 demographically matched healthy control subjects (20 women, 10 men; mean age 76.3 years, mean education 11.5 years, mean MMSE = 27.6). Constructional skills were assessed with two simple tasks. (1) In Rupp figure task, the subject is asked to continue drawing a structure of integrated hexagonal cells similar to a honeycomb. (2) In Alternating sequences task, the subject is asked to copy a pattern of alternating square and triangle components. Performance in both tasks was assessed by individual elements and these were combined for a full score.
Results: Control group obtained significantly better results in both tasks (Rupp figure: $H(2,60)=6.45$, $p<.03$; Alternating sequences: $H(2,59)=12.66$, $p<.002$). There were no significant differences in full score or individual element scores when patient groups were compared with each other. When comparing with control group AD patients had poorer results in Alternating sequences task in full score and individual element characteristics (line heights, lenghts, connections and drawing in continuous line). PDD patients had poorer results in full scores of

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

both tests but individual element comparison suggests more difficulties with Rupp figure task in symmetry and element lengths.
Conclusions: We observed constructional deficits in both AD and PDD patients in simple drawing tests. Element comparison suggests that AD patients have more difficulties in sequential processing and form representation but PDD patients show element representation and integration difficulties.
Correspondence: *Margus Ennok, MSc, Department of Neurology and Neurosurgery, University of Tartu, L. Puusepa 8, Tartu 51014, Estonia. E-mail: margus.ennok@ut.ee*

D.L. PENNEY, R. AU, D.J. LIBON, C. PRICE, M. LAMAR, R. SWENSON, C. MACAULAY, K. GARRETT, S. SESHADRI, S. DEVINE, L. DELANO-WOOD, S. SCALA, A. FLANAGAN & R. DAVIS. What The Digital Clock Drawing Test (dCDT) Tells Us About The MoCA Clock Scoring Criteria.
Objective: Determine the accuracy of the Montreal Cognitive Assessment clock (M-clock) scoring criteria using the digital Clock Drawing Test (dCDT).
Participants and Methods: 413 Framingham stroke/dementia free offspring subjects were given the dCDT. dCDT software was used to objectively quantify the M-clock 3-point scoring criteria of clock circle (ellipse, circle closure), numbers (all present, no repeats, no sequence error, in correct quadrant) and hands (distance from center, pointing to numbers, hand ratios). To establish the M-Clock hour hand "clearly shorter" criteria, exemplars of clocks with hand length ratios from .7 to .9 were judged by 2 raters. Hand ratios of .85 were reliably judged "clearly shorter"; higher ratios were unreliable, establishing .85 as the MoCA hand length ratio cut score (M-hand). We compared classification accuracy for M-hand, equal length (EQ) and any length (Any) hand ratios. Normative cut scores for the M-Clock were derived on a middle age referent group, FHS-M (n=297; age <60). Based on the skewed distribution, thresholds of 1.64SD were applied to account for 95% of the normal sample. An older-age cohort (FHS-O; n=116; age≥60 years) assessed classification accuracy.
Results: Clock circle and number scoring criteria correctly classified FHS-O as normal (5.50% and 1.83% failed, respectively). Mean hand ratios were high for both groups (FHS-M: 0.69 ±0.27; FHS-O: 0.78 ±0.31) resulting in hour hands longer than minute hands at the 1.64SD threshold. M-hand misclassified 44.95% FHS-O as not normal. Using EQ hand ratios improved classification accuracy, but failure rate was still high (33.94%). Any hand ratios provided best classification of the normal sample (22.02% failure).
Conclusions: Hand ratio errors are common in middle and older aged healthy adults. The M-clock hand length scoring criteria has high classification error rates of impairment. Eliminating the hand ratio component reduces potential misdiagnosis.
Correspondence: *Dana L. Penney, PhD, Neurology, Lahey Clinic, 41 Mall Road, Burlington, MA 01805. E-mail: Dana.L.Penney@Lahey.org*

D.L. PENNEY, D.J. LIBON, R. AU, M. LAMAR, C. PRICE, R. SWENSON, C. MACAULAY, K. GARRETT, S. DEVINE, L. DELANO-WOOD, S. SCALA, A. FLANAGAN & R. DAVIS. Working Harder But Producing Less: The Digital Clock Drawing Test (dCDT) Differentiates Amnestic Mild Cognitive Impairment And Alzheimer's Disease.
Objective: Traditional Clock Drawing test scoring measures drawing accuracy. We assess the ability of measures of "work effort" – drawing time and clock size – to differentiate between older population normals, amnestic Mild Cognitive Impairment (aMCI) and Alzheimer's disease (AD), regardless of drawing accuracy.
Participants and Methods: The digital Clock Drawing Test (dCDT) was administered to 106 Framingham Heart Study older healthy control participants (FHS-HC), 60 aMCI and 79 AD. Groups differed in MMSE (FHS-HC=29.5±0.69; aMCI=27.2±1.2; AD,=21.4±2.9; p=.001). FHS participants were better educated compared to the other two groups. Groups were compared on total clock drawing time (TCDT), time spent thinking (T-Think, i.e., not drawing), total time inking (T-Ink), total drawing prodiction (measured by total ink length, I-Length), and clock size (Size).
Results: TCDT differentiated AD (62.8±41.5 sec, p=.001) from FHS-HC (37.1±13.4 sec) and aMCI (41.7±23.9 sec). AD spent more time thinking (longer T-Think p=.001, 43.9±34.6 sec.; 66.5±10.9%) than FHS-HC (22.2±9.8 sec.; 59.0±8.4%) and aMCI (26.5±20.9 sec.; 6.02±10.24%). Although AD T-Ink was also longer (p=.001, 18.9±10.1 sec) than FHS-HC (4.9±5.4 sec) and aMCI (15.2±5.8 sec), AD total I-Length was less than both groups (p=.001). Clock size differentiated all groups (p=.001, FHS-HC=80.6±18.3mm.> aMCI=71.2±19.6mm>AD=54.7±22.9mm).
Conclusions: Patients with AD appear to work longer and harder, but produce less output (i.e., less ink and smaller clocks) when compared to cognitively intact participants. In addition to drawing accuracy, the effort necessary and ink amount produced are useful for detecting and monitoring cognitive impairment.
Correspondence: *Dana L. Penney, PhD, Neurology, Lahey Clinic, 41 Mall Road, Burlington, MA 01805. E-mail: Dana.L.Penney@Lahey.org*

D.L. PENNEY, R. AU, D.J. LIBON, C. PRICE, M. LAMAR, R. SWENSON, C. MACAULAY, K. GARRETT, S. DEVINE, L. DELANO-WOOD, S. SCALA, A. FLANAGAN & R. DAVIS. Rare Errors In The Clock Drawing test: What Missing Hands And Numbers Tell Us.
Objective: We assess the ability of low frequency errors — missing numbers and hands — in clock drawing to command to differentiate older population normals from amnestic Mild Cognitive Impairment (aMCI) and Alzheimer's disease (AD).
Participants and Methods: The digital Clock Drawing Test (dCDT) was administered to Framingham Heart Study (FHS) younger (FHS-Y, n=280) and older (FHS-O, n=106) cognitively intact participants, 60 aMCI and 79 mild AD. FHS-Y and FHS-O differed by age only. FHS participants were better educated than the other two groups. Groups differed by MMSE scores (FHS-O=29.5±0.69; aMCI=27.2±1.2; AD=21.4±2.9; p=.001). Groups were assessed for missing hands (none, one, both; M-Hands) and missing numbers (none, one, multiple; M-Num).
Results: M-Hands: aMCI (N=1, 1.7%) and AD (N=3, 3.8%) were similar in single hand omission errors. AD (N=12; 15.2%) made more both-hand-missing errors than aMCI (N=1, 1.7%). FHS-Y & FHS-O made no hand omission errors (0%).
M-Num: M-Num differentiated AD (1.3±3.32,) from other groups (p=.001). FHS-Y (N=5, 1.8%) made single number omission errors. aMCI & AD made both single (aMCI N=2, 3.3%; AD N=6, 7.6%) and multiple number omission (aMCI N=2, 3.3%; AD N=11, 13.9%) errors. FHS-O made no number omission errors (0%).
Conclusions: Hand and number omission errors are rare in clocks drawn by healthy individuals. The presence of omission errors, particularly multiple omissions (both hands, more than one number) may be pathognomonic of AD, warranting further diagnostic work-up even in individuals who otherwise appear normal.
Correspondence: *Dana L. Penney, PhD, Neurology, Lahey Clinic, 41 Mall Road, Burlington, MA 01805. E-mail: Dana.L.Penney@Lahey.org*

D.L. PENNEY, D.J. LIBON, R. AU, C. PRICE, M. LAMAR, R. SWENSON, C. MACAULAY, K. GARRETT, S. DEVINE, L. DELANO-WOOD, S. SCALA, A. FLANAGAN & R. DAVIS. Detecting Mild Cognitive Impairment Using The MoCA Clock Drawing Subtest.
Objective: Assess the ability of the Montreal Cognitive Assessment clock drawing subtest (M-Clock) to differentiate between cognitively intact, amnestic Mild Cognitive Impairment (aMCI), and Alzheimer's disease (AD) using three hand ratio thresholds.

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

Participants and Methods: Three variants of M-Clock scores were calculated using digital Clock Drawing Test (dCDT) measurements of clock circle (ellipse, circle closure), numbers (all present, no repeats, no sequence error, in correct quadrant) and hands (distance from center, pointing to numbers, hand ratios), using 3 hand ratio thresholds: clearly shorter (CS; HH/MH <=0.85), equal (EQ, HH/MH<=1.0) and any (ratio not considered). 413 Framingham stroke/dementia free offspring subjects (297 age<60 years, FHS-Y; 116 FHS age ≥60 years, FHS-O), 79 aMCI and 88 AD were given the digital Clock Drawing test (dCDT) and compared using M-Clock scores incorporating the three different hand ratio thresholds. Groups differed by MMSE (FHS-O=29.5±0.69; aMCI=27.2±1.2; AD=21.4±2.9). education (FHS-Y=15.8±2.9; FHS-O=15.3±3.2, aMCI=14.6±2.8, AD=13.9±2.7) and age (FHS-Y=47.6±7.9 < FHS-O=70.7±7.3 < aMCI=74.9±7.6 < AD=79.3±5.9).
Results: FHS-Y & FHS-O were not differentiated by any of the 3 M-Clock score variations, but
all three variations differentiated healthy from clinical groups, and aMCI from AD (p=.001):
CS: FHS-Y (2.6±0.59)= FHS-O (2.5±0.61) > aMCI (2.1±0.75) > AD (1.4±0.91);
EQ: FHS-Y (2.7±0.57) = FHS-O (2.6±0.57) > aMCI (2.27±0.79) > AD (1.5±0.93);
ANY: FHS-Y (2.7±0.54) = FHS-O (2.8±0.51) > aMCI (2.42±0.76) > AD (1.6±0.99). MoCA scores based on circle and numbers criteria alone differentiated AD from other groups (p=.001), and did not further differentiate groups.
Conclusions: The clock drawing test is useful for detecting cognitive impairment. Measurement of cognitive processes underlying placement of the clock hands can differentiate aMCI from AD. Hand ratios of Any length differentiate between groups and reduce potential variability secondary to hand length judgments.
Correspondence: *Dana L. Penney, PhD, Neurology, Lahey Clinic, 41 Mall Road, Burlington, MA 01805. E-mail: Dana.L.Penney@Lahey.org*

Medical/Neurological Disorders/Other (Adult)

D.R. SEICHEPINE, M. YEE, A. FINEMAN, P. JANULEWICZ-LLOYD, K. SULLIVAN & M. KRENGEL. Gulf War Illness: Chronicity of Health Symptoms in the Ft. Devens Cohort.
Objective: Upon returning from the Gulf War (GW) in 1991, approximately 175,000 veterans began reporting a variety of non-specific health symptoms, subsequently termed Gulf War Illness. Hallmark symptoms included fatigue, joint pain and cognitive problems. While the exact cause remains unknown, leading theories include the environmental exposures encountered by veterans during the war (pesticides, PB, sarin). The aim of this study was to describe the symptoms still experienced by GW veterans exposed to these neurotoxicants nearly 22 years ago.
Participants and Methods: Participants included the first 94 GW veterans from the well-described Ft. Devens Cohort Study (8 females) who completed follow-up questionnaires documenting deployment-related exposures to toxicants and current health symptoms. Participants were divided into two groups based on GW-toxicant exposures (yes / no). The exposed (n=52) and non-exposed (n=42) groups were similar with regard to age (t=.69, p=.50), and education (t=.23, p=.83).
A comprehensive survey of health symptoms has been sent to the Ft. Devens cohort four times since returning from deployment. Data from the ongoing 2013 survey was used for the present analyses. Participants reported the presence or absence of 34 health symptoms in the past 30 days.
Results: Chi-square tests were used to examine the rate of each symptom between the exposed and non-exposed groups and alpha was conservatively adjusted using the Bonferroni method to p<.001(.05/34=.001). Rates of current symptoms were significantly higher in the exposed group when compared to the unexposed group for forgetfulness, weakness, faint/dizziness, and diarrhea.
Conclusions: Consistent with prior reports from the last Ft. Devens cohort study (1997-1998), exposed veterans were significantly more likely than non-exposed veterans to endorse chronic health symptoms. These findings will be discussed as they relate to other exposure variables and changes in symptom patterns over time.
Correspondence: *Daniel R. Seichepine, Boston VA Research Institute, 150 S Huntington Ave, Building #9, Room 330, Boston, MA 02130. E-mail: daniel13@bu.edu*

D. WALD, R. HEINRICHS, K. NETSON, V. KLEMAN & R. SCHROEDER. A Case Study of an Adult with Fahr's Disease.
Objective: To outline the neurocognitive profile associated with Fahr's disease, a rare neurologic condition.
Participants and Methods: We present a case of a 42-year-old Vietnamese male diagnosed with Fahr's disease. He had an abrupt onset of altered mental status which initially appeared episodic but quickly became persistent. Two months prior to our evaluation, the patient reported to his wife that he did not know what to do with their children (patient was primary caregiver) and that he was seeing things. His symptoms rapidly progressed and, by the time of our evaluation, the patient was experiencing problems with memory, disorientation, confusion, hallucinations, and an inability to perform instrumental activities of daily living (IADL). MRI and CT imaging both showed bilateral calcifications of the basal ganglia and significant atrophy inconsistent with his age. EEG monitoring showed diffuse slowing. A neurobehavioral examination with a simplified battery of neuropsychological tests was administered.
Results: Results indicated significant impairment on measures of attention, language fluency, repetition, visuospatial processing, executive functioning, and memory. The patient also demonstrated perseverative thought processes throughout the entire evaluation.
Conclusions: As a result of his cognitive impairments and difficulties with IADL, it was recommended that he receive 24-hour assistance. He was ultimately moved into a nursing home where his functioning continued to decline.
Correspondence: *Danielle Wald, Psy.D., University of Florida, 1316 NW 102th Way, Gainesville, FL 32606. E-mail: d_wald593@hotmail.com*

M. SHIELDS, K. FULCHER, E. KARANOUH-SCHULER, C. MYERSCOUGH, J. GUNSTAD & M. SPITZNAGEL. Physical Activity Level Predicts Reaction Time in Lean, not Obese, Individuals.
Objective: Greater physical activity (PA) levels are linked to better cognitive performance, particularly reaction time. In contrast, obesity is associated with slower performance on speeded tests. Whether PA attenuates the effects of obesity on cognitive function remains poorly understood. The current study compared reaction time between obese and lean individuals with high and low PA levels. We predicted that individuals with higher PA would show quicker reaction time, but that obese individuals would show less benefit of PA than lean.
Participants and Methods: 45 healthy young adults (M=20.7 years, SD=1.9; 54% female) were included in this 2 (23 obese, 22 lean) x 2 (22 high PA, 23 low PA) between subjects design. PA was assessed using the International Physical Activity Questionnaire and the ANAM4 Go/No-Go (GNG), Standard Continuous Performance Task (SCPT), and Running Memory Continuous Performance Task (RMCPT). Mean reaction time for ANAM4 tasks was the dependent variable.
Results: Multivariate analyses of variance (MANOVA) revealed no main effect for weight category or PA level, however there was an interaction between weight and PA, [F(3,29)=4.92, p=.005]. Follow-up MANOVA revealed overall differences between groups of obese/low-PA, lean/low-PA, obese/high-PA, and lean/high-PA, [F(9,95)=2.23, p=.03]. Pairwise comparisons revealed the lean/high-PA group exhibited faster reaction time than lean/low-PA on both RMCPT (p=.02) and GNG

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

(p=.04). No differences emerged between obese low versus high PA groups.
Conclusions: Results suggest the association between PA and reaction time may be more meaningful for lean compared to obese individuals. The mechanisms underlying this finding are not entirely clear, but it is possible that the selective improvement associated with PA is limited by reduced efficiency of the cardiovascular, respiratory, or metabolic systems in obesity. Future research is needed to clarify the mechanisms underlying this phenomenon.
Correspondence: *Morgan Shields, Kent State University, 6600 Alpha Dr. Apt #148, Kent, OH 44240. E-mail: mshield2@kent.edu*

M. FEIGON, A. POPA, M. VERNALE, L. PIPER, R. MOLOKIE, M. GOWHARI, J. HASSAN, N. PLISKIN & D. NYNEHUIS. Cognitive Variables Predicting Performance on the Competency Rating Scale in African-Americans with Sickle Cell Disease.
Objective: The Competency Rating Scale (CRS: Prigatano et al., 1986) is a frequently used self and collateral report measure of insight in individuals with traumatic brain injury. Clinically, it is often used to assess insight in individuals with cognitive impairment and dementia related to vascular risk factors and stroke. However, there is a paucity of research regarding the association between cognitive variables and insight as measured by the CRS. We examined cognitive variables predicting insight on the Patient and Clinician Competency Rating Scale in a sample of participants with Sickle Cell Disease (SCD).
Participants and Methods: All subjects (N = 63; ages 18 to 65) with a diagnosis of SCD completed the Competency Rating Scale, the 60 Minute Vascular Cognitive Impairment Neuropsychological Protocol (Hachinski et al., 2006), as well as a measure of depressive symptoms (CES-D: Radloff & Teri, 1977). A collateral (treating physician) completed the Clinician Competency Rating Form.
Results: Findings revealed that memory impairment predicted responses on both patient and collateral forms of the CRS in individuals with SCD ($p < .05$, $R2 = 0.23$; $p < .05$, $R2 = .26$) even after controlling for key demographics. Executive functioning did not significantly contribute to the overall model.
Conclusions: Memory appears to be an important factor in predicting level of insight in individuals with vascular risk factors or stroke and resultant cognitive impairment. Future studies will investigate specific subdomains of memory that contribute to insight in individuals with SCD.
Correspondence: *Maia Feigon, M.A., Illinois Institute of Technology, 1922 W. Bradley Pl., Chicago, IL 60613. E-mail: mfeigon@iit.edu*

L.H. MASON, A.J. ANDERSON & D.Y. HAN. Residual Verbal Fluency Deficits in Anti-NMDA-receptor Encephalitis Status Post-plasmapheresis.
Objective: With its name coined in 2007, Anti-NMDA-receptor encephalitis is characterized by acute neuropsychiatric symptoms, attributable to ovarian teratomas and subsequent autoimmune processes in about half of its cases (Dalmau et al., 2007 & 2011). Imaging correlates are often unremarkable and patients recover well after appropriate treatment. However, post-treatment cognitive status varies and limited data exist in this domain. The largest known case series of 9 patients noted executive deficits (Finke et al., 2012).
Participants and Methods: A 33-year-old woman underwent 2 probable bouts of autoimmune encephalitic episodes. The first occurred at age 24, with headaches, hallucinations, violent outbursts, seizures, then coma. Following high dose prednisone, she recovered with mild to moderate residual deficits. Nine years later, a more severe episode occurred involving recurrent status epilepticus and coma. Treatment included IVIG transfusion, plasmapheresis, and bilateral salpingo-oophorectomy. She was later switched to rituximab infusion and also received medications for psychosis and seizures. Laboratory findings revealed anti-NMDA-receptor encephalitis sans teratoma. Neuropsychological evaluation occurred 4 months post treatment.
Results: Cognitive deficits included decreased intelligence, visual memory, mental flexibility, expressive language, visuospatial skills, and motor dexterity. Most notable deficits were in verbal fluency (Animal= 22T, FAS= 22T) and on Trails B (22T). Depression and anxiety levels were mildly elevated (PAI: 67T, 66T respectively).
Conclusions: Although the literature established higher prevalence of anti-NMDA-receptor encephalitis than initially thought, data on post-treatment cognitive status remain limited. This case revealed residual executive and verbal fluency deficits with mood change post- plasmapheresis. This is the first known case to describe post-treatment cognition in anti-NMDA-receptor encephalitis after 2 autoimmune episodes.
Correspondence: *Lisa H. Mason, M.S., Psychology, University of Kentucky, 2648 Coronado Rdg, Lexington, KY 40511. E-mail: lisa.mason13@gmail.com*

C. SONGY & D.G. NEMETH. Challenging the Odds: Recovering from West Nile Encephalitis.
Objective: West Nile Virus (WNV) is becoming a major problem in the United States; however, for individuals age 55 and over, it often evolves into West Nile Encephalitis (WNE). Due to age and history, senior citizens often do not survive WNE. Therefore, the long-term outcome profiles of such individuals have not been well studied. The purpose of this single case study is to describe a 74 year old married Caucasian male who has not only survived WNE, but who is also in the process of recovering.
Participants and Methods: This individual, who experienced a coma and was hospitalized secondary to WNV, developed WNE and was transferred to a rehabilitation hospital where he received in patient services for 7 months. After intense intervention of lower level functions, this individual was able to be transferred to an outpatient rehabilitation setting. He has recently received a full spectrum neuropsychological evaluation and is currently being seen for medication management. He continues to benefit from Occupational Therapy, Speech Therapy, and Physical Therapy while living at home.
Results: Gross intellectual and memory functions are now within normal limits; however, specific neurocognitive measures of memory continue to suggest difficulties. Perceptual Motor and Executive Functions continue to suggest severe impairment. Anxiety and Depression remain clinically significant. Personality functioning is within normal limits.
Conclusions: Patients with WNE often require longer inpatient stays and have more complicated pre-medical histories and post-medical complications. This requires a longer post-acute rehabilitation period. As this patient is quite resilient and has made considerable recovery of lower level functions, emphasis is now being focused on higher level executive functions and memory. Fatigue, anxiety, and depression are being addressed by restructuring this patient's medication regimen.
Correspondence: *Chelsie Songy, B.A., The Neuropsychology Center of Louisiana, LLC, 4611 Bluebonnet Blvd, Baton Rouge, LA 70809. E-mail: chelsie1990@cox.net*

J. JONES, C. HASS, J. LAFO, P. MANGAL, M.S. OKUN & D. BOWERS. The Cognition Index of the Parkinson's Disease Questionnaire-39: What does it really measure?
Objective: The PDQ-39 is a common measure of quality of life that is widely used with Parkinson patients. Previous evidence suggests that the PDQ-39 reflects at least 8 dimensions (i.e., Emotion, Cognitions, Mobility, etc). To date, little research has examined the external/ convergent validity of the "cognition" dimension of the PDQ-39. This is particularly relevant since two of the four items comprising the cognition scale do not directly refer to cognition (i.e., daytime sleepiness, dreams/ hallucinations). Overall this raises the question as to what the PDQ cognition index is actually measuring.
Participants and Methods: A convenience sample of 303 PD patients underwent a comprehensive multi-domain neuropsychological (NP) evaluation, including completion of the PDQ-39. To examine convergent validity, we conducted correlational analyses between scores on the

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

PDQ cognition scale and composite indices of execution function, recent memory, processing speed, language, as well as a dementia screening measure (DRS-2).
Results: Although the PDQ Cognition scale was significantly correlated with verbal memory, language and processing speed composite scores, the strength of the relationships was low, ranging from Pearson's r=-.104 (language) to r=-.132 (verbal memory). Inspection of individual PDQ Cognition items revealed small, but significant relationships; the PDQ "memory" item correlated with the verbal memory composite, the PDQ "concentration" item was related to NP indices of processing speed, and the "hallucination/dream" item correlated with measures of processing speed and DRS-2 total score.
Conclusions: The PDQ Cognition index shows a very small relationship with measures of cognitive functioning and should not be considered a "proxy" for cognitive functioning. Future studies are needed to better explain the construct of this index.
Correspondence: *Jacob Jones, MS, CHP, University of Florida, 3901 SW 20th ave apt 206, Gainesville, FL 32607. E-mail: jacob.jones126@ufl.edu*

J. JONES, P. MANGAL, J. LAFO, M.S. OKUN & D. BOWERS. Mood and Amotivation Symptoms in Parkinson patients with and without Mild Cognitive Impairment (MCI): Comparison of 3 MCI classification approaches.
Objective: Apathy, depression and anxiety are common neuropsychiatric symptoms in Parkinson disease (PD). Studies with non-PD samples suggest the presence of apathy and anxiety are associated with faster transition from mild cognitive impairment (MCI) to dementia. Attempts to address this same question in PD patients are hampered by variability in how MCI is defined in PD. In this study, we compared 3 classification systems for categorizing PD into MCI subgroups in order to discern how they differed in mood/motivational characteristics.
Participants and Methods: Participants were 214 nondemented idiopathic PD who underwent multi-domain neurocognitive evaluation including assessment of apathy (AS), depression (BDI-II) and anxiety (STAI). Mild cognitive impairment was defined using 3 previously published classifications: a) the Movement Disorder Society consensus (MDS; Litvan et al., 2012), b) "Composite" scores (Troster, 2011), and c) "Comprehensive" approach based on studies of MCI stability and validity in non-PD samples (Jak et al., 2009).
Results: Percentage of PD classified as MCI ranged from 32% to 47%, depending on approach. In both the Comprehensive and Composite approaches, the PD-MCI group endorsed significantly more apathy and anxiety than the cognitively intact group. Using MDS criteria, the PD-MCI group endorsed greater depression and anxiety than intact group. Differences in MCI subtypes (amnestic vs non-amnestic) revealed the non-amnestic subgroup reported more depression symptoms than amnestic group for the Comprehensive classification.
Conclusions: Parkinson patients with MCI report greater mood symptoms compared to those who were cognitively intact. Discrepancies were found between different MCI classification systems but results suggest that the Comprehensive criteria may be the most sensitive for detecting mood/motivational differences across all three constructs (apathy, depression and anxiety). Future studies are needed to examine, validate and perhaps redefine MCI criteria within PD.
Correspondence: *Jacob Jones, MS, CHP, University of Florida, 3901 SW 20th ave apt 206, Gainesville, FL 32607. E-mail: jacob.jones126@ufl.edu*

B.C. LEMONDA, K.J. GILES, C.E. PRICE, M. MARSISKE, M.S. OKUN, R.M. BAUER & D. BOWERS. A Data-Driven Approach to the Classification of Neurocognitive Subtypes of Parkinson's Disease: Clinical Correlations and Relationship to MDS Criteria.
Objective: The past 5 years has seen a wealth of studies on 'mild cognitive impairment (MCI) in Parkinson Disease (PD), including proposed diagnostic criteria for PD-MCI (Litvan). Few studies have used empirically-based techniques for identifying distinct cognitive profiles. Those which have generally find "clusters" that differ in "level" of cognitive severity (Dujardin et al., 2013), rather than domain-specific subtypes. In the present study, we classified individuals with PD into distinct cognitive phenotypes based on neurocognitive functioning, using a data-driven approach, and examined clinical correlates and correspondence to the Movement Disorder Society (MDS) recommended criteria for MCI.
Participants and Methods: A convenience sample of 263 non-demented PD patients (mean age= 64.1 ± 9.6yr) underwent comprehensive multi-domain neurocognitive assessment including memory, executive function (EF), and other domains. Participants were well-educated, predominantly male, and in mid-stage of disease severity (UPDRS motor 25.34). Two cluster analytic approaches (hierarchical, K-means) were independently conducted on neurocognitive data, with number of clusters based on clinical relevance and statistical criteria.
Results: Both approaches resulted in similar 4 cluster models: a) cognitively normal (N=55); b) mild EF deficits (N=78); c) memory deficits (N=52); and d) mixed EF-memory (N=78). The groups did not differ in age; the mixed EF-memory group had worse motor symptoms (UPDRS), worse ADL's and communication, and longer disease duration. Use of MDS criteria resulted in excellent classification of WNL and Mixed EF-Mem groups.
Conclusions: These results support distinct cognitive presentations in PD that appear to differentiate patients based on domain-specific performance, rather than overall level. Finding will be discussed in terms neuroimaging correlates of these cognitive phenotypes and potential utility for gauging different disease trajectories.
Correspondence: *Brittany C. LeMonda, Master's, Department of Clinical and Health Psychology, University of Florida, 1225 Center Drive, Gainesville, FL 32611. E-mail: blemonda@phhp.ufl.edu*

B.C. LEMONDA, K.J. GILES, C.P. PECK & D. BOWERS. A Case Study of a Patient Following a Diagnosis of Susac's Syndrome: Interindividual Variability.
Objective: Susac's syndrome is a rare autoimmune disease characterized by a triad of symptoms including encephalopathy, retinal artery occlusions, and hearing loss following microvascular lesions that often involve the corpus callosum. To date, only three papers have described the neuropsychological correlates of this syndrome. We present the neurocognitive profile of a woman with a recent diagnosis of Susac's syndrome to add to the literature of this syndrome.
Participants and Methods: WD is a 42-year-old right-handed administrative assistant (13 yrs education), with bilateral hearing loss, tinnitus, and migraines. She was diagnosed with Susac's syndrome 2 years prior and seen for neurocognitive testing due to complaints of difficulties in memory, complex problem solving, and word finding. She remains independent in all IADLs. A comprehensive neuropsychological battery was administered covering all domains. Neuroimaging from 2012 revealed "T2 white matter hyperintensities throughout the deep white matter, including corpus callosum images."
Results: Results revealed WD to be a woman with high average premorbid intelligence, whose performance across cognitive domains was generally consistent with this estimate. She evidenced slowed bilateral fine motor speed, mild fluctuations in attention, and poor visual-spatial organization. Otherwise, there was no evidence of focal deficits in memory, problem-solving, and/or language skills, nor was there evidence suggesting disruption to cortical systems.
Conclusions: Although there is no typical neurocognitive profile associated with Susac's syndrome, WD's data differs from the limited literature on neuropsychological sequelae of the condition. Extant case studies of Susac's syndrome document diffuse cerebral dysfunction and moderate impairments in attention, nonverbal learning, and executive functioning. This is the first report of a normal neurocognitive profile in an individual with Susac's syndrome. Our findings suggest inter-individual variability in cognitive presentation.

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

Correspondence: *Brittany C. LeMonda, Master's, Department of Clinical and Health Psychology, University of Florida, 1225 Center Drive, Gainesville, FL 32611. E-mail: blemonda@phhp.ufl.edu*

A.A. HAZAMY, L. ALTMANN, J.P. WILSON, E. STEGEMÖLLER, M.S. OKUN & C. HASS. The Effects of a Cycling Dual Task on Cognition in Parkinson's Disease.

Objective: Dual task research consistently documents decrements in performance across one or both tasks under dual task compared to single task conditions. Further, persons with Parkinson's disease (PD) are more susceptible to dual task interference than controls. However, the acute exercise literature reports occasional dual task facilitation effects on cognitive performance during concurrent stationary cycling in healthy adults. The current study examined the effects of concurrent cycling on cognition in persons with PD.

Participants and Methods: Fifty-six cognitively-intact individuals ages 35-80 participated (37 persons with PD, 19 healthy adults). Participants completed a series of 12 cognitive tasks while sitting quietly and while stationary cycling. Tasks assessed visual and verbal processing in cognitive domains of varying difficulty including processing speed, controlled processing, working memory, and executive function.

Results: Compared to healthy adults, persons with PD exhibited deficits in three visual tasks (0-Back, visual-working memory, and 2-Back tasks) and a verbal Operation-Span. Both groups exhibited dual task facilitation effects in speed of processing for visual tasks across cognitive domains (digit symbol substitution, 0-Back, visual-working memory and 2-Back tasks). Verbal tasks showed no dual task effects on performance. There were no interaction effects for any cognitive task.

Conclusions: Both groups experienced improved response times on four tasks tapping visual (but not verbal) processing, although the PD group were impaired on three of these tasks. We hypothesize that cycling and visual processing may share neural resources. Our findings are not compatible with the dual task literature but are somewhat consistent with the acute exercise research. However, methodological and outcome differences suggest that a different mechanism may underlie our findings.

Correspondence: *Audrey A. Hazamy, University of Florida, 336 Dauer Hall, PO Box 117420, Gainesville, FL 32611. E-mail: ahazamy1@ufl.edu*

E.E. SLONENA, N. SCHWAB, N. CORONADO, P. NGUYEN & C.C. PRICE. The Role of Levodopa, Pulse Pressure, and Motor Asymmetry in Parkinson's Disease.

Objective: Patterns between Levodopa (L-dopa) medications, pulse pressure (PP), and side of onset in PD warrant examination. L-dopa is known to result in a decrease in BP and may modulate PP. In PD, the side of tremor onset is associated with different motor and cognitive deficits. For left-side onset patients, the associated right hemisphere deficit may result in abnormal sympathetic functioning. Aims: 1) To examine the hypothesis that PP in PD is reduced relative to age-education matched controls, 2) assess the association between L-dopa dosage and PP in PD patients, hypothesizing that higher L-dopa will associate with decreased PP, and 3) whether PP is lower in left-onset relative to right-onset PD.

Participants and Methods: ANOVAs and partial correlations were conducted on 42 non-demented, idiopathic PD-peers (Left-onset: n=16; Right-onset: n=26) and 43 age-education matched controls. PP was calculated as: systolic BP - diastolic BP. L-dopa was converted to a common metric (Levodopa Equivalency Dose) as detailed in Tomlinson et al. (2010).

Results: Examining PP by group was significant [$F(1,85)=6.20$, $p=.015$] with controls having significantly higher PP (56.93±15.34 mmHg) relative to the PD (50.23±9.13 mmHg). There was no association between L-dopa dosage and PP in PD ($r= .08$, $p=.63$). Side of onset and PP was significant ([$F(2, 81)=3.70$, $p=.03$]). Right-onset PD-peers were similar to controls in PP ($p>.10$) and controls showed significantly higher PP than left-onset PD ($p=.01$). Right-onset PD were significantly higher in PP relative to left-onset [$F(1,39)=4.35$, $p=.04$].

Conclusions: Data suggests that L-dopa does not significantly alter PP in PD-peers, and regardless of L-dopa dosage, PD subjects have reduced PP relative to controls. The results imply that reduced PP in PD is a disease related phenomenon, motor asymmetry is associated with PP, and those PD-peers with right-side onset may have sparring cardiovascular functioning.

This observational study is an IRB approved (427-2007) study funded by NINDS grant K23NS060660.

Correspondence: *Elizabeth E. Slonena, Bachelor of Science, Clinical and Health Psychology, University of Florida, 225 Rollins Avenue, Rockville, MD 20852. E-mail: elizabethslonena@gmail.com*

D.A. KAUFMAN, W.M. PERLSTEIN, M.S. OKUN, R. VAN PATTEN & D. BOWERS. Apathy, Novelty Processing, and the P3 Potential in Parkinson's Disease.

Objective: Parkinson's disease (PD) is characterized by deficits in executive function as well as a variety of emotional symptoms, including apathy, depression, and anxiety. Efficient processing of novelty is critical for goal-directed behavior, as it drives flexible allocation of attention and facilitates adaptation to changing environmental demands. The present study investigated novelty processing in PD, using event-related potentials (ERPs) to characterize electrophysiological reflections of distracter novelty.

Participants and Methods: Non-demented patients with Parkinson's disease (n=16) and healthy control participants (n=16) completed a three-stimulus visual oddball task while EEG was recorded from a 64-channel geodesic sensor net. Emotional symptoms were assessed using the BDI-II, STAI, and Apathy Scale, while executive functioning was examined using a range of neuropsychological measures.

Results: PD patients exhibited reductions in centrofrontally distributed P2 and P3 potentials when viewing novel distracters. Emotional symptoms collectively explained 84% of the variance in novel distracter-related P3 amplitudes. Affective and cognitive aspects of apathy were uniquely associated with these novelty P3 potentials, even after controlling for the effects of depression and anxiety.

Conclusions: These findings support a growing body of evidence pointing to the unique relationship between apathy and neurological deficit in PD. Apathy in Parkinson's disease was strongly associated with deficits in attentional orienting toward novelty, which has far-reaching implications for the executive control of goal-directed behavior. These findings help to clarify the psychophysiological correlates of apathy, and may facilitate a more biological understanding of this core symptom of PD.

Correspondence: *David A. Kaufman, Ph.D., Psychology, Saint Louis University, 221 N Grand Blvd, Shannon Hall, Room 216, St. Louis, MO 63103. E-mail: dkaufma3@slu.edu*

S. MOELTER, L.C. MACE, S. MCHUGH-GRANT, D. WEINTRAUB, M. CARY & J. KARLAWASH. Associations Between Capacity Judgments and Cognitive Performance on the Montreal Cognitive Assessment in Parkinson's Disease.

Objective: We examined the relationship between Montreal Cognitive Assessment (MoCA) performance and research consent capacity (RCC) judgments for a clinical trial in Parkinson's disease (PD). We hypothesized that difficulties in executive function would be most associated with capacity.

Participants and Methods: Participants were age-, gender-, and education-matched healthy adults (N=30) and people with PD (N=90). PD participants were classified by the Dementia Rating Scale-2 as cognitively normal (n=30), borderline (n=30), or impaired (n=30). Participants were administered a clinical interview that involved obtaining informed consent for two clinical trials and a neuropsychological battery that included the MoCA. Capacity to consent was evaluated by the judgment of three expert clinicians and the MacArthur Competence Assessment Tool–Clinical Research (MacCAT-CR).

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

Results: Spearman correlations were calculated between MoCA performances and MacCAT-CR scores. The strongest associations were found between the MoCA Visuospatial/Executive subtests and the MacCAT-CR Understanding and Appreciation Scales ($p<.01$). MacCAT-CR Reasoning scores were most associated with MoCA Delayed Recall ($p<.01$). The classification value of these associations was tested with receiver operator characteristic (ROC) curves and area under the curve (AUC). The Visuospatial/Executive subtests showed the strongest association with expert capacity judgments. The AUC for predicting the absence of capacity for consent was 0.83 (95% CI 0.75 to 0.92) and 0.86 (95% CI 0.78 to 0.94) for each clinical trial, respectively.
Conclusions: The results highlight the potential of the MoCA for screening individuals with PD for cognitive difficulties that may affect consent capacity. The MoCA subtests that tap Visuospatial/Executive abilities appear associated with capacity judgments. We contend that there is overlap between the cognitive functions measured by these tests and cognitive performances attended to by capacity evaluators.
Correspondence: *Lauren C. Mace, B.S, University of the Sciences, 1440 north 2nd street, Philadelphia, PA 19122. E-mail: laurenmace@gmail.com*

Y. BOGDANOVA, M. DIAZ-SANTOS, M. VALMAS, S. NEARGARDER & A. CRONIN-GOLOMB. Effects of Parkinson's Disease on Numerical and Spatial Cognition.
Objective: Recent evidence suggests that deficits in number processing and visuospatial function arise from neural circuitry alterations in the dorsolateral prefrontal cortex and the posterior parietal lobes, which are subject to pathology in Parkinson's disease (PD). Little is known about number processing in PD. We examined several aspects of number processing, including numerical reasoning and number line orientation, and explored the concept of mental number line and its relation to spatial processing in PD. We hypothesized that (a) parietal-based numerical processing and visuospatial function would be impaired in PD, and (b) specific aspects of numerical processing would be differentially affected by PD.
Participants and Methods: Twenty-four non-demented individuals with PD and 24 healthy control adults (NC) were administered a series of neuropsychological and number processing tests. We examined number line orientation in several modalities: mental number line bisection, physical number line orientation, as well as physical line bisection.
Results: The PD participants were significantly more impaired than NC on number processing, executive and visuospatial functioning. In NC, the direct exploration of physical and mental number lines activated the same attentional bias, indicating that the internal mental number line maintained its numerical and spatial integrity in both the vertical and horizontal physical dimensions, which provided further evidence for the spatial organization of the mental number line. In PD, by contrast, we found a dissociation between numerical and spatial processing components of numerical distance and physical space, indicating distinct neural networks underlying mental navigation along the number line in vertical and horizontal orientations.
Conclusions: The results indicate that PD-related damage to the brain can differentially affect numerical and spatial processing, suggesting disruption of frontal and parietal pathways underlying specific components of numerical cognition in this disorder.
Correspondence: *Yelena Bogdanova, PhD/PhD, Boston University, Psychology Research (151-A), 150 South Huntington Avenue, Boston, MA 02130. E-mail: bogdanov@bu.edu*

A. AMIDI, P.L. LARSEN, L. LARSEN, P. BORGHAMMER, K. ØSTERGAARD & M.F. DAMHOLDT. A Graph Analytical Approach to Animal Category Fluency in Parkinson Patients and Healthy Controls.
Objective: The Animal Category Fluency Test relies on efficient search initiation, retrieval, and executive functions. However, it may be difficult to infer subjects' use of strategies and association patterns. The present study employed a graph theoretical approach to study the topological properties of group-level association networks (AN). Results from patients with Parkinson's disease (PDP) and healthy controls (HC) were used.
Participants and Methods: Twenty-nine PDPs (Unified Parkinson's Disease Rating, M= 27.5, SD=8.5) and 29 HCs, matched on age (M=69.2 yrs., SD=5.8) and score on the Danish Adult Reading Test, completed the Animal Fluency Test. For each group identified animals were listed in the exact order and for each successive animal pair a link was registered in the AN. Graph analytical measures, i.e. clustering coefficient (CC) and average path length (PL), were then calculated for each groups and an index, SΔ, of network "small-worldness" (indicating high clustering and short PL) was obtained by comparing each network to 20 corresponding random networks with matching size and connectivity.
Results: HCs identified more animals (M=24.8, SD= 5.5) than PDPs (M=21.4, SD=7.0) ($t(56)=-2.052$, $p<0.05$) with 195 vs. 177 unique animals. CC for HCs was 0.053 against 0.057 for PDPs with PLs of 3.9 and 3.5. Compared with their respective random networks CCs of both groups were higher (HC: M=0.0086, SD=0.0014, $t(19)=-142.5$; PDP: M=0.0099, SD=0.0026, $t(19)=-80.7$; both $p<0.0001$), and the average PLs were only marginally longer (PLrandom=3.4, both $p>0.0001$). Both networks had a "small-world" topology (SΔ>1), SΔHC= 5.34, and SΔPDP= 5.59.
Conclusions: Our results indicate that the AN of HCs and PDP have a similar "small-world" topology with animals being clustered together, and yet all animals are reachable within few hops. This may indicate that both groups employ effective categorical search and set shifting. Future studies may include other graph measures (i.e. modularity) to analyze potential differences between HCs and PDPs.
Correspondence: *Ali Amidi, MSc Psychology, Aarhus University, Bartholins Alle 9, Aarhus C 8200, Denmark. E-mail: ali@psy.au.dk*

M.K. YEE, D.R. SEICHEPINE, C. PATTEN & M.H. KRENGEL. Pre-surgical Neuropsychological Tests Predict Post-deep Brain Stimulation Surgery Functional Status in Parkinson's Disease.
Objective: Deep brain stimulation (DBS) surgery is used to improve motor symptoms in patients with Parkinson's disease (PD). Though much is known about the effects of DBS on motor functioning, less is known about its impact on activities of daily living (ADL). Neuropsychological assessments are helpful in determining appropriateness for surgery, however it is unknown which cognitive tests best predict ADL outcome. The aim of this study was to determine which neuropsychological tests predict successful functional outcomes after surgery.
Participants and Methods: Participants included 29 patients with PD (8 female) with an average age of 59.4 years (SD=9.0) and a mean symptom duration of 15.0 years (SD=6.8). Post-surgery, 20 participants were deemed to be independent in performance of ADLs, as indicated by case consensus. Symptom duration was similar between participants with independent (M = 14.9; SD = 7.4) and dependent ADL scores (M=15.1; SD=5.5 7.4; t=.15, p=.94).
Participants completed a thorough clinical neuropsychological evaluation prior to surgery. Scores from all common tests were used for analysis including data from the Boston Naming Test, California Verbal Learning Test (CVLT), category fluency (animal naming), Complex Ideational Material, Hooper Visual Organization Test (HVOT), letter fluency (FAS), and Trail Making Tests (parts A and B).
Results: Independent logistic regressions indicated the following scores significantly predicted functional outcome status (all p-values less than .05): Trails A (β=1.04), FAS (β=1.16), animal naming (β=1.44), HVOT (β=1.33), and two scores from the CVLT (short delayed free recall β=1.44 and long-delayed cued recall β=1.32).
Conclusions: Scores on measures of simple attention, visuo-integration, executive function, and memory retention predicted functional outcome. Using these measures in pre-surgical evaluations will help identify successful surgical candidates.

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

Correspondence: *Megan K. Yee, M.A., Environmental Health, Boston University, 715 Albany Street, T4W, Boston, MA 02118. E-mail: meganyee@bu.edu*

N. MAHENDRA, E. KIM, N. CUNY, V. BISEN & J. TSAI. Effects of Huntington Disease on Cognition and Linguistic Communication.

Objective: The purpose of this study is to document the effects of Huntington disease on functional cognition and linguistic communication by comparing the performance of persons diagnosed with this disease to age-matched, healthy adults.

Participants and Methods: Fourteen adults diagnosed with HD and age-matched healthy peers were administered the Mini Mental State Exam (MMSE), the Arizona Battery for Communication Disorders of Dementia (ABCD), the modified Wisconsin Card Sort Test (mWCST), digit span tests, the Global Deterioration Scale (GDS), the Hamilton Depression Rating Scale (HDRS). Additionally, the Shoulson-Fahn Scale functional capacity rating scale was only completed for participants with HD. Finally, all HD participants completed an open-ended interview about the onset, nature, severity, and everyday impact of cognitive and communicative difficulties subsequent to diagnosis.

Results: Results revealed that after controlling for education, adults with Huntington disease performed significantly worse than age-matched healthy peers on the Mini Mental State Exam, the total score on the Arizona Battery for Communication Disorders of Dementia, digit span, and the Hamilton Depression Rating Scale. The two groups did not differ significantly in the number of errors made on the Modified Wisconsin Card Sort test. A finer analysis of episodic memory performance and comparison to performance of persons with AD (reported in the norms of the Arizona Battery of Communication Disorders of Dementia) revealed that adults with HD performed significantly better than persons with Alzheimer's disease on measures of immediate and delayed story recall and of word learning. Interview data will be presented qualitatively as part of this presentation.

Conclusions: Adults with Huntington disease differed significantly from age-matched controls on measures of global cognitive function (MMSE, GDS), linguistic communication (ABCD subtests and total score), and working memory (reflected in digit span).

Correspondence: *Nidhi Mahendra, Ph.D., California State University East Bay, 47307 Rancho Higuera Rd, Fremont, CA 94539. E-mail: mahendranidhi@gmail.com*

S. MCHUGH-GRANT, S.T. MOELTER, L. MACE & B. RIEGEL. Biomarkers of Heart Failure and the Identification of Cognitive Impairment.

Objective: In heart failure (HF), cardiac function decline may be associated with reductions in cerebral perfusion and cognitive function. Biological markers of HF may also be linked to cognition. Our objective was to compare the ability of biological markers and a cognitive screening instrument to identify cognitive impairment (CI) in people with heart failure (HF).

Participants and Methods: Adults with a confirmed diagnosis of stage C HF were enrolled into a prospective cohort study. Those with severe depression, dementia, a prior significant neurologic event, terminal illness, and recent drug or alcohol abuse were excluded. Baseline data were obtained from 279 subjects enrolled from 3 mid-Atlantic sites.

We identified a cohort with (n=140) and without (n=139) CI. CI was defined as two or more of the following measures below normative expectations: Psychomotor Vigilance Test Lapses, Probed Memory Recall, Digit Symbol Substitution, Letter Number Sequencing, and Trail Making Part B. Biomarkers of HF included systolic and diastolic blood pressure, left ventricular ejection fraction, B-type natriuretic peptide, and serum creatinine levels. The cognitive screening measure was the Telephone Interview for Cognitive Status (TICS).

Results: Biological markers were normalized using a log10 transformation and the classification value was tested with receiver operator characteristic curves and area under the curve (AUC). Among the biomarkers of HF, only creatinine level was predictive of CI, AUC=0.63±.03 (95% CI 0.56 to 0.70). TICS total score also predicted CI, AUC=0.69±.03 (95% CI 0.63 to 0.75).

Conclusions: Our results add to the growing body of research attempting to link cognitive measures to biological characteristics of HF and finds associations with kidney function. Our work also highlights the potential efficacy of a brief telephone screening instrument for predicting which HF patients may be at risk for CI.

Correspondence: *Sara McHugh-Grant, Bachelors of Psychological and Social Sciences, Behavioral and Social Sciences, University of the Sciences, 2121 Market St. Apt. 513, Philadelphia, PA 19103. E-mail: sara.mchughgrant@gmail.com*

C.M. GOLDSTEIN, E.C. GATHRIGHT, A. STERNS, J. GUNSTAD, J. REDLE, M.A. DOLANSKY, R. JOSEPHSON & J.W. HUGHES. Cognitive Dysfunction is Associated with Increased Physical Limitations But Not Greater Symptom Burden in Heart Failure Patients.

Objective: Cognitive dysfunction is common in heart failure (HF) patients and many patients report poor quality of life (QoL) marked by physical limitations, symptom instability, and high symptom burden. Previous work has not examined QoL subtypes. It was expected that cognitive dysfunction would be associated with poorer QoL related to physical impairment and symptom burden in HF patients.

Participants and Methods: Participants were 60 adults (65% male) predominantly Caucasian (83%) HF patients (69 ± 11 years of age) recruited from an outpatient cardiology practice. Cognition was assessed with a battery of neuropsychological tests including the Rey Auditory Verbal Learning Test, Rey-Osterrieth Complex Figure Test, Trail Making Parts A and B, Letter Number Sequencing, Frontal Assessment Battery, and the Stroop Color Word Test. Test t-scores controlling for age and gender comprised a composite score. QoL was assessed using the Kansas City Cardiomyopathy Questionnaire, and the Physical Limitations, Symptom Stability, and Symptom Burden subscale scores were entered into correlations controlling for NYHA classification.

Results: Of the sample, 27% displayed cognitive dysfunction with a mean t-score of 35 or less, and most reported impaired QoL. Greater cognitive dysfunction was associated with increased Physical Limitations on the KCCQ, $r = .31$, $p < .02$. However, cognitive function was not associated with symptom instability, $r = .11$, $p = .41$ or greater symptom burden, $r = .21$, $p = .12$.

Conclusions: Though previous research documents cognition is not related to general measures of QoL, the present study shows cognitive function is related to a specific aspect of QoL (physical limitations). Cognitive dysfunction may impair self-management behavior, leading to functional decline. Future research examining interventions for HF patients that improve both cognition and QoL, particularly physical limitations, is needed.

Correspondence: *Carly M. Goldstein, MA, Psychology, Kent State University, PO Box 5190, Kent, OH 44242. E-mail: cgoldst1@kent.edu*

M. ALOSCO, M. SPITZNAGEL, R. COHEN, N. RAZ, L.H. SWEET, R. JOSEPHSON, J. HUGHES, J. ROSNECK & J. GUNSTAD. Reduced Physical Activity Predicts Decreased Cerebral Blood Flow and Cognitive Dysfunction at a One Year Follow Up in Heart Failure.

Objective: Cognitive impairment is common in heart failure (HF) and is believed to result from brain hypoperfusion subsequent to cardiac dysfunction. Physical inactivity is prevalent in HF and is a known contributor to reduced cardiac and cognitive function. However, no study has examined whether low physical activity increases risk for brain hypoperfusion and cognitive impairment over time in HF.

Participants and Methods: HF patients (N= 65) completed common measures of attention/executive function and memory. Participants underwent transcranial Doppler ultrasonography to quantify cerebral blood flow velocity of the middle cerebral artery (CBF-V) and wore an accelerometer for seven days. All procedures were repeated 12-months

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

later. Linear regression models adjusting for medical and demographic variables as well as baseline cognitive test performance and CBF-V examined whether baseline physical activity predicted cognition and CBF-V at 12-month follow-up.
Results: HF patients exhibited 594.17 (SD = 74.80) minutes of sedentary behaviors per day. Reduced step count (trend; β = .17, p = .057) and less time spent in moderate activity (β = .19, p = .048) at baseline predicted poorer attention/executive function and decreased CBF-V at the 12-month follow-up (β = .18, p = .05; β = .19, p = .05, respectively). Sedentary HF participants, as classified by daily step counts, exhibited declines in CBF-V over the one-year period (p < .05).
Conclusions: In older adults with HF, lower physical activity predicted worse cognitive function and cerebral perfusion 12-months later. Physical inactivity may contribute to cognitive impairment in HF via negative effects on cerebral perfusion. Prospective studies should examine whether exercise programs in HF promote better neurocognitive outcomes in this high risk population.
Correspondence: *Michael Alosco, MA, Kent State University, 4710 Waterford Circle, Stow, OH 44224. E-mail: malosco@kent.edu*

M. ALOSCO, M. PENN, A.M. BRICKMAN, M. SPITZNAGEL, M. CLEVELAND, E.Y. GRIFFITH, A. NARKHEDE & J. GUNSTAD. Preliminary Observations on MRI Correlates of Driving Independence and Performance in Older Adults with Heart Failure.
Objective: Heart failure (HF) patients often require assistance with activities of daily living, including driving. Recent work shows HF patients commit more errors on a driving simulation task relative to controls and cognitive dysfunction contributed to these errors. We sought to extend these findings by examining whether structural MRI indices were also associated with driving independence and performance in persons with HF.
Participants and Methods: HF patients (N= 49) underwent MRI and completed a neuropsychological battery assessing attention/executive function and memory. The Lawton Brody assessed independence in transportation. A subset of HF participants (N = 8) also completed a validated, 20-minute simulated driving scenario.
Results: Among the full sample (N = 49), decreased gray matter was associated with greater reported dependence in transportation (r = .40, p < .01) as well as worse attention/executive function (r = .36, p < .05); in turn, worse attention/executive function predicted greater assistance with transportation (r = .30, p < .04). Among the subset of HF participants that completed the driving simulation task (N = 8), decreased gray matter was correlated with more stop signs missed (r = -.76, p < .05) and increased white matter hyperintensities were associated with greater collisions (r = .79; p < .05), centerline crossings (r = .81; p < .05), and time out of lane (r = .78; p < .05). Reduced attention/executive function was also linked with more time over the speed limit on driving simulation (r = -.70, p < .05). Follow-up analyses showed the above effects were largely independent from age.
Conclusions: Structural brain MRI indices are associated with poorer reported and simulated driving in older adults with HF. Larger prospective studies that employ on-road testing are needed to clarify brain changes in HF and corresponding risk for unsafe driving.
Correspondence: *Michael Alosco, MA, Kent State University, 4710 Waterford Circle, Stow, OH 44224. E-mail: malosco@kent.edu*

S. GARCIA, K. FULCHER, M. SPITZNAGEL, A. BRICKMAN, R. COHEN, N. RAZ, L. SWEET, R. JOSEPHSON, J. HUGHES, J. ROSNECK & J. GUNSTAD. The Relationship between Physical Activity and Neuroimaging Indices in Heart Failure.
Objective: Past studies suggest physical activity may have neuroprotective effects in healthy and neurological populations. Less is known about its possible benefits in persons with chronic medical conditions. The current study examined the relationship between physical activity and indices of white matter hyperintensities (WMH) and medial temporal atrophy (MTA) in heart failure (HF) patients.
Participants and Methods: Eight-five HF patients (67.20±10.41 years, 41.2% female) completed MRI and physical activity monitoring using actigraphs. Partial correlations adjusting for age, education, and intracranial volume were used to determine the relationship between physical activity indices and neuroimaging indices.
Results: Heart failure patients engaged in low amounts of activity, averaging 569.15+81.04 minutes of sedentary time per day outside of sleep. Analyses showed that greater average moderate to vigorous physical activity per day was associated with more WMH (r(79) = 0.26, p = 0.02) and unrelated to MTA (r(79) = 0.07, p = 0.56). HF severity was not associated with physical activity (r(79) = 0.05, p = 0.67).
Conclusions: Unexpectedly, greater physical activity was associated with greater WMH volume in this sample of HF patients. These findings are most likely attributable to the low levels of physical activity in the current sample (i.e. even the most "active" patients were largely inactive) and that more severe HF patients receive the most frequent instruction to increase physical activity. Prospective studies are needed to better clarify the possible benefits of physical activity in HF patients through structured exercise interventions, particularly on neurocognitive outcomes.
Correspondence: *Sarah Garcia, M.A., Kent State University, 144 Kent Hall, Kent, OH 44240. E-mail: SGarcia6@kent.edu*

K.K. FULCHER, S. GARCIA, M. SPITZNAGEL, R. COHEN, L. SWEET, R. JOSEPHSON, J. HUGHES, J. ROSNECK & J. GUNSTAD. Executive Function Predicts Depressive Symptoms in Older Adults with Heart Failure over 12 Months.
Objective: Both cognitive impairment and depression are common in persons with heart failure (HF) and known to worsen over time. Despite their shared etiology, no study has examined whether these outcomes progress at similar rates. The current study examined the contribution of cognitive decline to depressive symptoms over time in HF.
Participants and Methods: HF patients (N = 97, 69.68± 9.58 years, 36.1% female) completed a battery of cognitive tests measuring attention (TMT-A, Digits, LNS), executive function (TMT-B, FAB, SCWT), and memory (CVLT-SD, CVLT-LD, CVLT-Rec, CVLT-fps, CFT-Copy, CFT-D), as well as a measure of depression (BDI-II) at baseline and 12-month time points. Regression analyses examined the relationship between cognitive function and depressive symptoms while controlling for age, HF severity (both at baseline and 12 month follow-up), and baseline levels within each cognitive domain.
Results: Baseline cognitive impairment was common in this sample (48% with baseline MMSE scores ≤ 27) as were self-reported depressive symptoms (BDI-II 7.18 ± 7.03). Dependent t-tests revealed depression scores did not change over the 12 month interval (t(96) = -.479, p -.633). Memory scores increased during this time period, though no such pattern emerged for attention or executive function. Regression models show 12 month executive function scores predict depression levels independent of possible confounds, F(1,90) = 8.17, p = 0.005. No such association emerged for attention or memory.
Conclusions: Executive function at 12 month follow-up predicted greater depressive symptoms among HF patients, independent of demographic/medical characteristics and baseline cognition. Such findings suggest that decline in executive function is associated with onset of greater depressive symptomatology in HF, though future work is needed to clarify the directionality of this relationship and underlying mechanisms.
Correspondence: *Krysten K. Fulcher, B.S., Kent State University, Kent Hall, 600 Hilltop Drive, Kent, OH 44224. E-mail: kknecht1@kent.edu*

G.A. SEIDEL, D.A. DRABICK, M. FANNING, H. BATTAPADY, M. BILELLO, M.A. ACKER, T.F. FLOYD & T. GIOVANNETTI. Heterogeneity of Neuropsychological Profiles in Older Adults with Cardiovascular Disease: A Latent Class Analysis Approach.
Objective: In a large sample of older adults with cardiac disease, we used latent class analysis (LCA) to identify groups of participants based

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

on cognitive test performance. Groups were compared on vascular risk and neuroimaging variables.
Participants and Methods: Older adults (N=359, M_{age}=74.7) with aortic stenosis and/or coronary artery disease were administered tests of executive functions and episodic memory. Vascular risk was quantified in 187 participants by the Framingham Stroke Score. 129 participants underwent 1.5T MRI to obtain white matter lesion (WML) and hippocampal volumes. LCA on the cognitive variables was performed; a one-class model was tested followed by models with more classes until the best fitting model was identified. Vascular risk and neuroimaging variables (adjusted for intracranial volume) were compared across the resultant classes of the best-fitting model.
Results: Statistical indicators from the LCA indicated that a three-class model provided the best fit to the cognitive data, with Class 3 (intact; n=178) showing relatively intact cognitive test scores compared to the other classes. Classes 1 (mildly impaired; n=136) and 2 (dysexecutive; n=42) demonstrated uniformly low scores, with Class 2 showing the lowest and most impaired scores on two executive measures (Trails B and Mental Control). Follow-up analyses revealed significant differences between the classes on vascular risk score ($F(2,184)=3.13$, $p<.05$) and WML volume ($F(2,126)=3.16$, $p<.05$) with Class 2 (dysexecutive) showing significantly higher vascular risk scores ($p=.04$) and trending towards greater WML volumes than Class 3 (intact; $p=.056$).
Conclusions: Three cognitive classes identified in an older adult cardiac sample were interpretable as intact, mildly impaired, and dysexecutive and differed in vascular risk and WML volume. Results suggest meaningful heterogeneity in the cognitive presentation of older patients, with deficits in executive functions associated with potentially modifiable vascular risk factors/cerebrovascular disease.
Correspondence: *Gregory A. Seidel, M.A., Psychology, Temple University, 1701 N. 13th St., Weiss Hall, Philadelphia, PA 19122-6085. E-mail: gregory.seidel@temple.edu*

M. GONZALES, S. KAUR, D.E. EAGAN & A.P. HALEY. Central Adiposity Predicts Diminished BOLD Response in the Frontal Lobes.
Objective: Excessive adipose tissue, particularly with a centralized distribution, propagates hormonal and metabolic disturbance. The detrimental effects of adiposity may extend beyond the periphery and target the central nervous system, increasing vulnerability to cognitive decline. The aim of current study was to determine how central adiposity impacts the brain at midlife by examining the blood oxygen level-dependent (BOLD) response to a challenging cognitive task.
Participants and Methods: Seventy-three adults, aged 40-60 years, completed a 2-Back verbal working memory task during functional magnetic resonance imaging (fMRI). Central adiposity was assessed with waist circumference. The association between waist circumference and task-related activation in a priori regions of interest was modeled using bootstrapping regression models corrected for multiple-comparisons.
Results: Larger waist circumference was associated with diminished working-memory-related BOLD response in the right superior frontal gyrus (beta=-0.008, p=0.002, 95% CI: -0.012 - -0.003) and left middle frontal gyrus (beta=-0.009, p=0.005, 95% CI: -0.014 - -0.003), statistically adjusting for age, sex, systolic blood pressure, and total cholesterol. Reduced task-related activation in the right superior frontal gyrus (r=-0.369, p=0.002, 95% CI: -0.566 - -0.166) and left middle frontal gyrus (r=-0.266, p=0.025, 95% CI: -0.462 - -0.023) were related to slower reaction time on the task, controlling for age and education.
Conclusions: Larger waist circumference predicted alterations in the BOLD response that coupled with decrements in task performance. While future studies are necessary, the results suggest that similar to its role in the periphery, central adiposity may be a robust predictor of metabolic and hormonal alterations that impinge central nervous system functioning.
Correspondence: *Mitzi Gonzales, Psychology, University of Texas Austin, 2908 Pearl St Unit D, Austin, TX 78705. E-mail: mitzi.m.gonzales@gmail.com*

D. CALVO, R. GALIOTO, K. KNECHT FULCHER, M. SHIELDS, J. GUNSTAD & M. SPITZNAGEL. Is Uncontrolled Eating Related to Poorer Inhibitory Control?
Objective: Accumulating evidence demonstrates obesity is associated with reduced cognitive functioning, particularly in executive function. Research also suggests that obesity is related to disinhibited eating behavior, including uncontrolled eating. The current study examined the relationship between obesity, inhibitory control, and uncontrolled eating.
Participants and Methods: Sixty-two (32 lean, 30 obese) college students (21.13+2.31 years; 56.5% female) completed the abbreviated Three Factor Eating Questionnaire (TFEQ-R18) to assess uncontrolled eating. Go/No-Go from the ANAM4 was administered as a measure of inhibitory control; hits, omissions, commissions, and reaction time were examined.
Results: An independent samples t-test revealed higher levels of uncontrolled eating in obese (M=23.93; SD=4.17) than lean (M=21.53; SD=4.50) participants. Multivariate analysis of variance revealed differences between lean and obese groups on the Go/No-Go [$F(4, 57)=4.56$, $p<.005$; $\lambda=.24$; $\eta p2 =.24$)]; specifically, a statistically significant difference in reaction time, [$F(1, 60)=7.94$, $p<.01$]. Other Go/No-Go measures did not significantly differ. A Pearson bivariate correlation revealed a positive correlation between Go/No-Go reaction time and uncontrolled eating among all participants ($r=.343$, $p < .05$).
Conclusions: Relative to lean participants, obese participants demonstrated higher levels of uncontrolled eating and poorer Go/No-Go reaction time. In the full sample, greater self-reported dyscontrol in eating behavior was related to slower inhibitory control on cognitive testing. Results suggest that greater difficulty in executive functioning is linked to eating behavior. Further, obese individuals demonstrate greater vulnerability to difficulties in these domains relative to those who are lean.
Correspondence: *Dayana Calvo, Kent State Psychology, 3877 Lake Run Blvd, Stow, OH 33777. E-mail: dcalvo1@kent.edu*

M. SPITZNAGEL, M.A. ALOSCO, J. UPDEGRAFF, D. CALVO, J. MEISTER & J. GUNSTAD. Neurocognitive Response to Glycemic Regulation of Common Beverages.
Objective: Growing evidence suggests cognitive deficits associated with obesity are at least partly attributable to problems with glycemic control. While chronic glucose dysregulation is well known to produce cognitive impairment, the impact of acute blood glucose changes in response to beverage ingestion could also suppress cognitive test performance.
Participants and Methods: A total of 50 healthy young adults were included in this 2 (25 obese, 25 lean) x 2 (13 female, 12 male within lean and obese groups) x 3 (8 oz water, apple juice, 1% milk) mixed factorial design. Beverages were counterbalanced across trials. Glucose was taken via fingerstick at baseline, and 30, 60, 90, and 120 minutes after beverage ingestion. Go/No-Go from the ANAM4 was administered at 30, 90, and 120 minutes.
Results: Repeated measures analyses showed the beverages produced different patterns of blood glucose levels in water [slow decline over time; ($F(4,44) = 4.28$, $p < 0.01$)], juice [highest initial peak, steepest crash; ($F(4,46) = 37.80$, $p < 0.01$)] and milk [lower initial peak, slower decline over time ($F(4, 44) = 27.73$, $p < 0.01$)] conditions. Follow-up analyses revealed this pattern was driven by the obese group relative to lean in the milk condition (group by time: $F(1,48) = 5.88$, $p =.02$). Repeated measures examining Go/No-Go test performance within the full 2 x 2 x 3 design revealed a 3-way interaction [$\lambda = .77$, $F(4,39) = 2.92$, $p = 0.03$] such that lean females demonstrated fewer Go/No-Go hits and slower reaction time after consuming juice.
Conclusions: These findings suggest a complex relationship between cognitive function and acute glycemic response in lean versus obese

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

individuals, with women appearing especially susceptible to effects. The distinct profiles noted in this healthy young adult sample suggests that the adverse cognitive impact of rapid glucose changes is not limited to conditions like type 2 diabetes. Further work in larger samples is needed to clarify the nature of this relationship and underlying mechanisms.
Correspondence: *Mary Beth Spitznagel, PhD, Kent State University, 329 Kent Hall, Kent, OH OH. E-mail: mspitzna@kent.edu*

P. TOURADJI, S. PAZIENZA & F. HILL-BRIGGS. Associations of TICS with Education, Literacy, and Glycemic Control in a Low-Income African-American Sample with Type 2 Diabetes.
Objective: Type 2 diabetes is associated with increased risk of cognitive dysfunction and dementia. Although African Americans suffer higher rates of type 2 diabetes and its complications, few studies of cognitive performance or test sensitivity in the setting of diabetes have included African Americans. The purpose of this study was to examine associations of demographic factors and glycemic control with performance on a commonly used cognitive screening instrument in a sample of urban African Americans with type 2 diabetes.
Participants and Methods: One hundred and seventy nine adults with type 2 diabetes, recruited for a diabetes intervention study, were administered the Telephone Interview for Cognitive Status (TICS) and Wide Range Achievement Test 4th Edition (WRAT 4) at baseline. Blood samples were obtained for hemoglobin A1c (A1C).
Results: The sample was 70% female, 57.2 + 10.6 years of age, with mean A1C of 9.0% + 1.7%. The sample reported 13.3 + 2.3 years of education; WRAT-4 revealed a grade equivalent reading score of 8.8 + 3.5. The majority, 119 (67%), had reading levels below years of education, with a mean discrepancy of -5.2 + 2.6 years. TICS total score was 31.1 + 3.8, with 63(36%) scoring in the Nonimpaired range, 98(57%) Ambiguous, 11(6%) Mildly Impaired, and 1(1%) Moderately to Severely Impaired. Regression analysis showed WRAT-4 reading ($B = 0.55$, $p < 0.01$) and years of education ($B = 0.13$, $p < 0.05$) significantly accounted for the variance in TICS performance, A1C approached significance ($B = -0.12$, $p = 0.058$), while gender and age did not. Those with literacy below education obtained significantly lower TICS scores (30.0 + 3.5) than those with equivalent literacy and education (33.2 + 3.8).
Conclusions: Contrary to findings in studies using neuropsychological batteries, TICS performance was minimally sensitive to glycemic control. Consistent with previous studies, educational factors, particularly literacy levels, were significantly associated with cognitive performance in urban African Americans.
Correspondence: *Pegah Touradji, Ph.D., Johns Hopkins University, 600 N. Wolfe Street, Phipps 174, Baltimore, MD 21287. E-mail: ptourad1@jhmi.edu*

V. DE SANCTIS. Glutamic Acid Decarboxylase Autoantibody Syndrome Presenting as Depression with Cognitive Deficits: A Case Study.
Objective: Glutamic acid decarboxylase (GAD) is the rate-limiting enzyme converting glutamate into g-aminobutyric acid. Impaired GAD function can alter motor, cognitive, and behavioral function. Anti-GAD antibodies can cause several neurological disorders. However, the association between anti-GAD antibodies and depression, without seizures or focal neurological deficits, is not well defined. The purpose of this case presentation is to expand the spectrum of the clinical presentation of anti–GAD antibody related disorders.
Participants and Methods: A 19 year-old, right-handed, Caucasian male with a history of medically refractory depression since age 16 years with several suicide attempts and four psychiatric hospitalizations presented at a University Hospital for neurologic work-up with persistent depressed mood, suicidal ideation, memory problems, and difficulties with concentration. Prior treatment included pharmacotherapy and 19 unilateral (right side) ECT treatments. Blood and cerebrospinal fluid analysis including autoantibodies, electroencephalography, brain magnetic resonance imaging, and neuropsychological assessment were performed.
Results: Blood work was positive for Anti-GAD antibody, VEEG monitoring conducted was negative, an MRI of the brain without contrast was normal. Results of neuropsychological testing showed deficits in learning and memory (verbal > non-verbal) and executive functioning (concentration, speed of processing, mental tracking). Treatment with intravenous immunoglobulins (IVIG) was initiated. After treatment with IVIG the patient and his parents reported improved mood and memory functioning.
Conclusions: Anti–GAD antibody syndromes can present with only behavioral or neuropsychological symptoms without seizures or focal neurologic signs. In this case, improvements in symptoms of depression, previously resistant to pharmacotherapy and ECT, and cognitive functioning were observed after treatment with IVIG.
Correspondence: *Virginia De Sanctis, PhD, NYU Comprehensive Epilepsy Center, 223 east 34th street, New york, NY 10016. E-mail: virginia.desanctis@gmail.com*

J.C. YOUNG. Amnesia following thyroid cancer: A case report.
Objective: Memory impairment due thiamine deficiency is well established; however, it is increasingly recognized that a wide range of conditions can produce this nutritional deficiency.
Participants and Methods: This case report describes a 46-year-old female (Ms. T) who developed severe thiamine deficiency with Wernicke-Korsakoff encephalopathy (WKE) following thyroidectomy and radiation for thyroid cancer. She was referred for neuropsychological evaluation and cognitive remediation approximately 6 months post episode of WKE due to persistent memory impairment.
Results: At time of initial evaluation, nearly all specific neurocognitive abilities had returned to a level commensurate with premorbid estimates (average range) and there was no evidence of persistent motor dysfunction. Memory was the dramatic exception as the Ms. T displayed severe impairments in encoding and retrieval of verbal and visual stimuli. Cognitive remediation was initiated using an adapted version of the CogSMART program. While Ms. T displayed proficiency in the implementation of many compensatory strategies (e.g. calendar, alarms) and as well as application of elaborative encoding strategies, she has remained quite amnestic and evidenced minimal improvement during follow-up assessment. Given time since WKE and initiation of thiamine replacement (~8 months), current findings strongly suggests memory dysfunction will persist and remain severe.
Conclusions: Despite the absence of findings on neuroimaging, the persistent nature of Ms. T's memory impairments strongly suggests persistent mammillothalamic tract dysfunction associated structures are particularly vulnerable to thiamine deficiency. Additionally, this case highlights the importance of including assays of nutritional deficiency when encountering patients with severe amnesia yet no history of alcohol abuse or other common causes of poor nutritional status (e.g., eating disorder, bariatric surgery).
Correspondence: *John C. Young, Ph.D.,, Siskin Hospital, 1 Siskin Hospital, Chattanooga, TN 37403. E-mail: jcyoung@siskinrehab.org*

C.M. CONSIDINE, K. ROBERTS, A. GARANT, C. ABEARE, A. DHAR & W. RAJKUMAR. Phonemic, Semantic, and Emotional Word Generation Performance in Treated versus Untreated Obstructive Sleep Apnea Patients.
Objective: Word generation performance, associated with executive functioning, is worse in patients with obstructive sleep apnea (OSA) when compared to healthy controls. Sleep deprivation moderates cognitive processing of emotional material depending on valence; whether this is true in sleep disorder populations is not clear. While CPAP treatment of OSA concretely improves sleep quality, and has support for ameliorating cognitive performance deficits in some domains, the impact on cognitive-emotional processing is not known. This study predicted better reported sleep quality and cognitive performance on neutral and

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms.
https://doi.org/10.1017/S1355617714000381

emotionally-valenced word generation tasks for treated OSA patients compared to those not yet treated.
Participants and Methods: A subset of data from a large, ongoing sleep-cognition study was aggregated for analysis. Self-reported sleep quality and neurocognitive measures of phonemic, semantic, and emotional word generation were analyzed for 25 patients diagnosed with OSA in the last 6 months. Sleep quality and neurocognitive performance were compared between Untreated (n=13) and CPAP Treated (n=12) groups.
Results: Compared to the Treated group, Untreated patients reported significantly worse sleep quality (t(22)=-2.12, p=0.047, d=0.85) and performed worse on the phonemic word generation task (t(23)=-2.23, p=0.043, d=0.89). No significant differences were found between groups for semantic (t(23)=-.196, p=0.846) or emotional (F(1, 23)=.40, p=0.53) word generation tasks.
Conclusions: Subjective sleep quality was better in OSA patients who are successfully using CPAP. Treated OSA patients performed more strongly on a verbal fluency measure related to frontal functioning than their untreated colleagues. This performance difference was not found for a neutral category fluency measure related to temporal functioning, nor for a more novel emotional category fluency measure. These initial results suggest that CPAP treatment for OSA may differentially benefit subcomponent processes within traditional cognitive domains.
Correspondence: *Ciaran M. Considine, M.A., Psychology, University of Windsor, 49 E. Willis #15, Detroit, MI 48201. E-mail: considic@uwindsor.ca*

M. DEMIAN, R.J. SHAPIRO & W.L. THORNTON. Health Literacy, Neurocognitive Ability, and Medication Adherence in Adult Kidney Transplant Recipients.
Objective: There is a high rate of medication non-adherence in kidney transplant recipients. Research has demonstrated that lower health literacy (HL), defined as patients' ability to access, understand, and use information in order to make health decisions is linked to adverse disease outcomes. We examined the relationship between HL, neurocognition, and medication adherence in kidney transplant recipients.
Participants and Methods: 67 adult kidney transplant recipients (M=53.24 years) were recruited from Vancouver General Hospital. HL was assessed by the Health Literacy Questionnaire (HLQ), which is a new measure that comprehensively captures the construct of HL through nine distinct scales. Neurocognition was measured by the KBIT, CVLT, and subtests of the WAIS and DKEFS. Adherence was measured by the TEQ-Adherence subscale.
Results: Better intellectual ability was associated with adherence (KBIT Verbal, Adherence r=.26, p<.05) and with specific factors of the HLQ. Specifically, the "having sufficient information" factor was associated with nonverbal intelligence (r=.29, p<.05) and the "reading and understanding health information" factor was associated with both verbal (r=.36, p<.05) and nonverbal intelligence (r=.26, p<.05). Neither age nor intellectual ability predicted adherence. However, HL was predictive of adherence beyond the effect of female gender (β=.25, p<.05). Further investigation revealed that factors of the HLQ, specifically higher "healthcare provider support" (r=.32, p<.05), "having sufficient information" (r=.28, p<.05), and higher "social support" (r=.30, p<.05) were associated with adherence.
Conclusions: These results suggest that HL is predictive of adherence post-renal transplant. Specifically, having an established relationship with at least one healthcare provider, feeling confident that they have all the information needed to manage their condition, and having strong social support for their health emerged as important factors in how well kidney transplant recipients adhere to their medications.
Correspondence: *Maryam Demian, HBSc, Psychology, Simon Fraser University, 8888 University Drive, Department of Psychology, Burnaby, BC V5A1S6, Canada. E-mail: demian@sfu.ca*

K.F. HOTH, K. MESCHEDE, K.E. HOLM, B.J. MAKE, J.D. CRAPO, K.L. MOREAU, E. KOZORA, D.J. MOSER, H.D. WEINBERGER, R. BOWLER & F.S. WAMBOLDT. Daily Activities: The Impact of COPD and Cognition.
Objective: Chronic obstructive pulmonary disease (COPD), the 3rd leading cause of death in the US, is characterized by airflow limitation that is not fully reversible. Treatments focus on reducing symptoms and maximizing functioning. The aims of this study were to: 1) compare performance of daily activities between former smokers with and without COPD, and 2) determine whether cognitive functioning is associated with daily activities among those with COPD.
Participants and Methods: Ninety-one former smokers (60 with and 31 without COPD) completed neuropsychological tests, measures of pulmonary function, and questionnaires regarding daily activities. Activities were assessed using the Lawton and Brody IADL questionnaire and the St. George's Respiratory Questionnaire (SGRQ) Activity Subscale. Patients with COPD were compared to those without on activity measures. Regression modeling was used to examine the association between cognition and activity in those with COPD after adjusting for clinical and demographic measures.
Results: Aim1: The groups did not differ on age, education, or gender distribution. Patients with COPD reported reduced activity on the SGRQ compared to those without COPD (t=5.90, p<.001) and a significantly greater proportion of patients with COPD reported difficulty with one or more IADLs (Lawton and Brody; $\chi 2$=4.88, p=.027; 53% vs. 29% respectively). Aim 2: Among patients with COPD, poorer delayed recall was associated with a worse score on the SGRQ Activity subscale (β = -0.568, p=.049) after adjusting for clinical and demographic covariates. Poorer language performance was the only statistically significant correlate of IADL difficulty (Lawton and Brody; β = -0.095, p=.028).
Conclusions: Among individuals with COPD, reduced delayed memory and language skills were associated with self-reported difficulty with daily activities. Interventions to maintain cognitive skills in COPD may help to maximize patients' engagement in activities of daily living.
Correspondence: *Karin F. Hoth, Ph.D., University of Iowa, University of Iowa- Psychiatry, 200 Hawkins Drive, W278GH, Iowa City, IA 52242. E-mail: karin-hoth@uiowa.edu*

C.P. PECK & C.C. PRICE. Further Support for Geschwind's Theory of a Disconnection Syndrome in an Atypical Case of Gerstmann's Syndrome.
Objective: Gerstmann's syndrome (GS) is a neurologic condition that clinically presents with a tetrad of symptoms that include finger agnosia, agraphia, acalculia, and right-left confusion. GS is traditionally considered the result of damage to the left angular gyrus. The first report of GS from damage to the right angular gyrus was in 1991. Several subsequent studies report similar findings. However, as aptly noted by Moro et al. (2011), these cases are "rare" and typically associated with left-handed or ambidextrous individuals. The goal of this study was to (a) present a case of GS that resulted from right-hemisphere damage, and (b) provide a possible explanation for this using Geschwind's theory of disconnection syndromes.
Participants and Methods: "Mr. H." is a 71 year old right-handed male who is status-post resection of a right posterior parietal glioblastoma. Complaints at the time of the interview included left hemianopia in his left eye, trouble with directions, benign forgetfulness, confusion with numbers, dates, and times, and inertia. Comprehensive neuropsychological exam was administered and neuroimaging was reviewed.
Results: Findings from the neuropsychological exam reveal a right-lateralized pattern of deficits, with relatively spared verbal skills and compromised nonverbal skills. Atypical GS signs including visual and sensory finger agnosia for his non-dominant hand, dysgraphia, select symbolic acalculia, and right-left confusion for others, were also present. Symptoms of depression, apathy, and anxiety levels were clinically significant.
Conclusions: This study describes a right-handed individual with focal right posterior parietal damage who presents with GS signs theorized

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

to be the result of disrupted communication between the right and left angular gyri. This case challenges traditional conceptualizations of GS as a left localized syndrome and provides additional support for a model of disrupted neurocircuitries.

Correspondence: *Caleb P. Peck, Psy.D., Department of Clinical and Health Psychology, University of Florida, 1600 SW Archer Rd, Gainesville, FL 32608. E-mail: calebppeck@yahoo.com*

Epilepsy/Seizures

A. TREBLE-BARNA, S. CHAPMAN, D. SCHWARTZ & M. AXELRAD. Brief Behavioral Intervention for Disruptive Behavior in a Child Following Frontal and Temporal Resection for Medically Intractable Epilepsy: A Case Report.

Objective: Children with epilepsy are at an increased risk for psychopathology, especially disruptive behavior disorders (DBD). Rates of DBD are especially high in children with frontal seizure foci who undergo frontal lobe surgery. Despite evidence that family and parenting factors have been shown to predict psychopathology in childhood epilepsy, there have been no studies of parenting interventions targeting disruptive behavior in these children. In the present case report, we adapted a validated parent management training intervention, the Brief Behavioral Intervention (BBI), to treat DBD in a 7-year-old boy who had undergone frontotemporal resection for medically-intractable epilepsy.

Participants and Methods: The family participated in 12 BBI sessions over a period of 19 weeks.

Results: Both parent and teacher report indicated reduction of significant disruptive behaviors to the normal range, with treatment gains generally maintained two months following treatment.

Conclusions: The present case report demonstrates that parent management training in general and BBI specifically can be effective for treating problem behaviors in children with severe neurologically-based behavioral presentations.

Correspondence: *Amery Treble-Barna, M.A., Psychology, University of Houston, 454 E Sycamore St, Columbus, OH 43206. E-mail: amerytreblebarna@gmail.com*

N.K. SANDEL, M.R. LOVELL, G.S. SOLOMON & P. SCHATZ. Adolescent athletes with a history of seizures report a greater number of symptoms at baseline compared to matched controls.

Objective: The current study aimed to examine symptom reporting at baseline in a group of adolescent athletes with a reported history of seizures and/or epilepsy.

Participants and Methods: A total of 128 athletes (71 males and 51 females) aged 13 to 18 years old (M = 15.20, SD = 1.50) with a reported history of seizures/epilepsy were compared to control athletes carefully matched based on age, gender, handedness, education level, and sport played. All demographic and symptom data were collected retrospectively through embedded questions in the ImPACT (Immediate Post-Concussion Assessment and Cognitive Testing) test battery, which contains the Post-Concussion Symptom Scale (PCSS), a 7-point Likert scale detailing 22 common post-concussive symptoms that yields a total symptom score. Generally, a greater symptom score reflects greater severity and/or number of symptoms experienced.

Results: An independent-samples t-test revealed that on average, athletes with a history of seizures report a significantly greater symptom total (M = 4.83, SD = 7.67) compared to matched controls (M= 2.82, SD= 4.06) at baseline testing $t(192.943) = 2.618$, $p = .010$. Descriptive statistics revealed that the most common symptoms reported by athletes with a history of seizures are fatigue (23%), trouble falling asleep (23%), and sleeping less than usual (21%).

Conclusions: Athletes with a reported history of seizures/epilepsy may report a greater severity of symptoms than matched controls at baseline testing.

Correspondence: *Natalie K. Sandel, BS, Widener University, 757 S. 17th St. Apt. 2F, Philadelphia, PA 19146. E-mail: nksandel@mail.widener.edu*

R. BAEK, M. BALDASSARRE, L. ERDODI, B. TYSON, B. JOBST, K. BUJARSKI & R. ROTH. Performance validity testing in patients with epilepsy, non-epileptic seizures, and psychiatric disorders.

Objective: Non-epileptic seizures (NES) are difficult to diagnose in the absence of video-EEG monitoring. The relatively high prevalence of the condition, the associated health care costs, and the limited availability of gold standard assessment procedures make a compelling reason for identifying psychometric methods of dissociating NES from epilepsy (EPI). Given the high comorbidity between NES and psychiatric disorders (PSY), investigating the relative contribution of emotional distress to this complex presentation has the potential to improve current understanding and assessment of NES. This study evaluated whether patients with NES, EPI, and PSY show differential performance on neuropsychological performance validity testing (PVT).

Participants and Methods: Participants included patients with EPI (n = 31), NES (n = 15) and PSY (n = 29) referred for neuropsychological testing. They were assessed with commonly used free-standing and embedded PVTs (TOMM; Digit Span Scaled Scores, Reliable Digit Span, CVLT-II Forced Choice Recognition, WMS-III Logical Memory Recognition, WCST Unique and Set-Loss Errors, Finger Tapping Test – dominant hand and combined raw scores).

Results: Patients with PSY consistently demonstrated the lowest level of cognitive effort across various measures and cutoffs (15-70% failure rate), while the EPI and NES groups showed comparable effort, both outperforming the PSY group.

Conclusions: The present findings indicate that performance on PVTs cannot differentiate patients with NES from those with EPI. Furthermore, the poorer performance in the PSY than the NES group suggests that co-occurring psychiatric problems do not readily account for cognitive test performance in those with NES. The implications of these findings to the clinical conceptualization and assessment of NES are discussed.

Correspondence: *Rachel Baek, M.S., M.A., Geisel School of Medicine, 1 Medical Center Dr, Lebanon, NH 03766. E-mail: rachel.n.baek@gmail.com*

A.K. STEFANATOS & N.L. NUSSBAUM. Executive and Psychosocial Functioning in Children with Intractable Epilepsy Following Surgical Resection.

Objective: The relationship between executive and psychosocial functioning in children with intractable epilepsy following a surgical resection was examined.

Participants and Methods: Retrospective records from a cohort of children and adolescents referred for a comprehensive neuropsychological evaluation by a pediatric epilepsy neurosurgery team were reviewed. During the pre-surgical evaluation, parents completed measures of executive (Behavior Rating Inventory of Executive Function; BRIEF) and psychosocial (Achenbach Child Behavior Checklist; CBCL) functioning. Approximately 1 year post-surgery, parents completed follow-up questionnaires. Index scores on each measure were derived (Behavior Regulation Index [Beh Reg] from the BRIEF and Internalizing [Int] and Externalizing [Ext] Behavior Problems from the CBCL).

Results: Correlations between the various subscales of each measure pre- and post-operatively revealed a low correlation between Beh Reg and Int (r=.387 and .331, respectively) and a high correlation between Beh Reg and Ext (r=.701 and .645, respectively). However, when pre- and post-operative change scores were examined, a high correlation was observed between both Beh Reg and Int (r=.755) and Beh Reg and Ext (r=.768). Additionally, a regression analysis revealed that change scores in Beh Reg significantly predicted change scores in Int and Ext (p=.002 and 001, respectively) and accounted for a significant amount of variance (57% and 59%, respectively).

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

Conclusions: These findings suggest that aspects of executive function such as behavioral regulation are important factors in predicting psychosocial functioning in both internalizing and externalizing domains following surgical resection. This area of research has important implications for understanding the impact of executive functioning and epilepsy surgery on psychosocial functioning.

Correspondence: *Arianna K. Stefanatos, MA, Psychology, The University of Texas at Austin, 108 East Dean Keenton St., Austin, TX 78712. E-mail: akstefanatos@utexas.edu*

L. BRENNER, D. WABER, F. CRIGLER, J. MADSEN, B. BOURGEOIS, K. BOYER & C. VEGA. Word Retrieval Before and After Temporal Lobe Epilepsy Surgery in a Pediatric Sample.

Objective: A decline in word retrieval following temporal lobectomy for intractable epilepsy has been described in the adult literature; however, less is known about pediatric surgical outcomes. The purpose of this study was to test the hypothesis that children who undergo left temporal resection (LTR) are more likely to show post-surgical decline in word retrieval than children who undergo right temporal resection (RTR).

Participants and Methods: Patients were identified through archival record review. The final sample consisted of 21 patients (52% female) who underwent LTR and 15 patients (40% female) who underwent RTR. Mean age at surgery was 14.86 (SD=3.80; range=8-21 years) for the LTR group and 15.52 (SD=3.45; range=9-21 years) for the RTR group. Language was left-lateralized in all but one of the patients in the LTR group. Three patients in the RTR group had bilateral or indeterminate language representation; all others were left-dominant for language. Word retrieval was assessed using the Boston Naming Test (BNT) and Verbal Fluency measures from the Delis-Kaplan Executive Function System.

Results: There were no group differences on the BNT, Category Fluency (CF), or Letter Fluency (LF) at baseline. Repeated measures analysis of variance was used to assess pre- and post-surgical change in the two groups. There was a significant interaction between group and time for the BNT, $F(1,25)=4.23$, $p < .05$; post-surgical decline was seen with LTR but not RTR. The effects of group and time were not significant for either of the verbal fluency measures, but CF scores were lower following LTR than RTR.

Conclusions: Decline in word retrieval occurs after dominant, left temporal resections but not right temporal resections. Semantic fluency is also sensitive to left temporal resection. This study has implications for pre-surgical decision-making in pediatric populations.

Correspondence: *Laurie Brenner, Ph.D., Boston Children's Hospital/Harvard Medical School, FEGAN 8, 300 Longwood Ave, Boston, MA 02215. E-mail: laurie.brenner@childrens.harvard.edu*

E. LONG, E.Q. MONTAGUE, D.T. PULSIPHER & L.D. STANFORD. Psychiatric Comorbidity and Cognitive Flexibility in Pediatric Epilepsy.

Objective: Previous research has demonstrated higher rates of psychiatric comorbidity and executive dysfunction in pediatric epilepsy. Additionally, our group previously showed that parents who identify as having mood or anxiety symptoms rate poorer cognitive flexibility in their children compared to healthy caregivers. However, there have been few reports of the relationship between parental or child psychiatric comorbidity and cognitive flexibility, an area that is highly vulnerable to impairment in these children. This study sought to clarify the relationship between parent and child psychiatric comorbidity and performance-based cognitive flexibility.

Participants and Methods: Retrospective chart review of 117 consecutive epilepsy referrals was conducted. After exclusion criteria were applied, 24 children with two healthy parents and 17 children with a parent with self-reported mood or anxiety symptoms were compared on demographic variables, intelligence, cognitive flexibility, and parent reported emotional and behavioral functioning. 31 children did not have any psychiatric comorbidity while 10 did. Cognitive flexibility was conceptualized as performance on tests of set shifting and divided attention. The relationship between behavioral ratings and cognitive flexibility was examined.

Results: Parents with mood or anxiety symptoms reported increased executive dysfunction ($p=.05$) in their children compared to healthy parents. Worse cognitive flexibility was associated with increased reports of executive dysfunction by parents (p's $\leq .03$). Children with co-occurring mood or anxiety disorders had weaker cognitive flexibility compared to those without any accompanying disorder ($p=.04$).

Conclusions: Although parents with mood and anxiety symptoms were more likely to view their children as having executive dysfunction, children with psychiatric comorbidity showed greater impairment in cognitive flexibility. Findings highlight the added burden of a child's comorbid psychiatric diagnosis on cognitive functions in pediatric epilepsy.

Correspondence: *Elizabeth Long, Ph.D., Akron Children's Hospital, 215 W. Bowery Street, Akron, OH 44308. E-mail: beth.a.long@gmail.com*

E. VERCHE, M. CAIRÓS, R. MARRERO-ABRANTE & S. HERNÁNDEZ. Reading problems in children and adolescents with Frontal Lobe Epilepsy.

Objective: Children with epilepsy show academic difficulties, especially in arithmetic and reading. Antiepileptic drugs side effects could explain these deficits. However, we suggest a reading deficit directly related with the epilepsy, where the frontal focus could interfere in this basic instrumental skill.

The main goal of this study is to study reading performance (speed, accuracy and comprehension) in children with frontal lobe epilepsy (FLE).

Participants and Methods: 13 children with FLE and 13 healthy controls (aged 10-18) participated. They all completed 3 subtests from "Batería de Evaluación de Procesos Lectores": word reading task, pseudoword reading task and texts comprehension task. Trail Making Test-A was used as a covariable. In the reading tasks, the number of words read correctly and the reading time was measured as well as an accuracy index was calculated. In the comprehension task, the number of correct answers to some questions about the text was registered.

Results: We found significant differences in all the variables, except in number of pseudowords correct read, with a worse performance in FLE group and with no effect of the processing speed.

Conclusions: Results suggest reading problems in children with FLE in both lexical and semantic level, independently of the processing speed. This highlights the need for early intervention in reading skills to prevent these deficits and school failure.

Correspondence: *Emilio Verche, Msc Clinical Neuropsychology, Psychobiology and Methodology, University of La Laguna, School of Psychology, University of La Laguna, Campus de Guajara s/n, La Laguna 38071, Spain. E-mail: evercheb@ull.es*

C.I. BERMUDEZ, G. REY, B. KORMAN & A.P. ANDREWS. Behavioral Changes in Children with Refractory Epilepsy Following Hemispherectomy.

Objective: To examine behavioral outcomes of children following hemispheric surgery to relieve intractable epilepsy. A post-hemispherectomy group (HG) was compared with a control group (CG) with lateralized multilobar or hemispheric pathology undergoing surgical consideration.

Participants and Methods: 16 HG and 20 CG subjects ages 5 to 18. Eligibility criteria for the HG group included post-hemispherectomy status and parental completion of the Behavioral Assessment System for Children (BASC-2). CG criteria included intractable seizures, EEG evidence of lateralized epilepsy, and BASC-2 protocol.

Demographic and clinical information was obtained for all subjects including gender, age at time of study, age at seizure onset, seizure type, seizure frequency. For HG we also examined age at surgery, lateralization, post-surgical seizure frequency, and years since surgery.

Results: HG mean age was 12.63 and CG 12.15. Gender distribution was 44% female and 56% male for HG, and 65% female and 35% male

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

for CG. Both groups were similar in regards to age of seizure onset (p=. 048) and seizure frequency (p=. 001).
For HG the average age at the time of surgery was M=6.08, SD= 5.10. Time since surgery averaged at 7.06 months, SD=3.88. Etiology of seizures included, Rasmussen's syndrome N=7, Cortical Dysplasia N=3, Hemimegalecephaly N=5, and Prenatal Stroke N=1. Efficacy of surgery in intractable cases was demonstrated by a 100% reduction of seizures. T-test comparisons for BASC-2 scales showed significantly lower scores the HG on Anxiety (p= .026), Depression (p= .026), and Internalizing Index (p= .033). HG also demonstrated better adaptive and daily living skills (Adaptability p= .034).
Conclusions: Support for positive behavioral outcomes of children who undergo hemispherectomy surgery. Overall, reduction of internalizing behavior concerns and no evidence of increased externalizing behaviors is likely associated with seizure freedom.
Correspondence: *Christina I. Bermudez, M.Ed., M.A., M.S., Psychology, Nova Southeastern University, 6510 Main St Apt 312, Miami Lakes, FL 33014. E-mail: christina.bermudez1@gmail.com*

J.M. GIRARD, C. VEGA, M. TAKEOKA, D.P. WABER & K. BOYER. Neuropsychological Profiles of Children with Benign Rolandic Epilepsy.
Objective: Benign Rolandic Epilepsy (BRE) is a common pediatric epilepsy syndrome. Some, though, do not have a "benign" course, demonstrating cognitive/learning disabilities in the context of preserved intelligence. We evaluated neurocognitive functioning in children with BRE to determine rates at which functioning fell within the at-risk/clinical range ("Problem Range," PR). We predicted that children with BRE would have greater neurocognitive dysfunction than expected relative to peers.
Participants and Methods: Thirty-seven children ages 6-11 (mean=8.97; 62% male) with neurological history of BRE were recruited from clinical databases. Fourteen (38%) took antiepileptic drugs (AEDs); 16 (43%) had ≥1 parent with a graduate degree; and 10 (37%) had an Individualized Education Plan (IEP). Participants with seizures (34) had ~ 1 per month. Neurocognitive assessment included parent questionnaires and child testing.
Results: Mean IQ (108.03; SD=15.57) was higher than the population mean, perhaps reflecting demographic factors. Though group means on all tests/questionnaires were within the average range, there was an elevated frequency of PR scores (>1.5 SD below normative mean) in specific domains. More than 15% of the sample—over twice the expected prevalence of 6.7%—scored within the PR for 28% of items, highlighting executive function, processing speed, academic achievement, and memory concerns. Problems tended to be clustered in a subset of 10 individuals. AED treatment was not associated significantly with performance.
Conclusions: Although neurocognitive functioning was on average within normal limits, a subset of this sample displayed elevated cognitive vulnerability, manifest in testing and in provision of an IEP. These cognitive problems are not related to medication effects alone, but are potentially related to epileptiform abnormalities. Further investigation will establish the extent to which these outcomes may be related to epileptiform abnormalities that alter brain function.
Correspondence: *Katrina Boyer, PhD, Boston Children's Hospital, 300 Longwood Ave, Fegan 9, Boston, MA 02465. E-mail: katrina.boyer@childrens.harvard.edu*

A. DORFMAN, E. ANDRESEN, L. FERGUSON, J. HAUT, P. KLAAS & R. BUSCH. Cognitive Outcome Following Temporal or Frontal Lobectomy in Children with Pharmacoresistant Epilepsy.
Objective: Neuropsychological outcome following epilepsy surgery in children has not been thoroughly explored. The current study examined cognitive outcome following temporal or frontal lobectomy in children with pharmacoresistant epilepsy.
Participants and Methods: Ninety-four children with epilepsy completed the WISC-III or WISC-IV and the Children's Memory Scale (CMS) prior to and following temporal or frontal lobectomy. Repeated measures ANOVAs examined postsurgical changes in intelligence and memory as a function of surgical site separately in patients who underwent left and right-sided resections. Effect sizes ($\eta p2>0.05$) were used to interpret meaningful findings rather than reliance on traditional p values. The magnitude of cognitive change at the individual patient level was also examined.
Results: There were no pre-existing differences between groups in FSIQ or on other relevant variables. Following left-sided surgeries, significant two-way interactions were observed on the Verbal Immediate and Delayed, Verbal Delayed Recognition and Learning Indices of the CMS, with the frontal group showing postoperative improvements on these measures. Following right-sided surgeries, significant two-way interactions were observed on the Attention/Concentration and Verbal Delayed Recognition CMS indices, with postoperative improvements among temporal patients. Clinically meaningful postoperative declines (≥1 SD) occurred in a subset of patients, most frequently in verbal memory following left temporal or right frontal resections and in working memory and processing speed following frontal lobe resections, irrespective of surgical side.
Conclusions: Results suggest favorable cognitive outcome following epilepsy surgery in most children, though cognitive declines occur in a subset of patients. Memory declines in individual children were most frequently observed following left temporal or right frontal resections. Individual declines in working memory and processing speed most commonly occurred following frontal resections.
Correspondence: *Ava Dorfman, Cleveland Clinic, 12550 Lake Avenue, Apt. 1008, Lakewood, OH 44107. E-mail: ava.dorfman@gmail.com*

L. SEPETA, B. XU, V. ROOPCHANSINGH, L. BARRETT, B. ANDREWS, S. SHIH, W.H. THEODORE, W.D. GAILLARD & M.M. BERL. Hippocampal Functioning in Typically Developing Adults.
Objective: We sought to develop a paired association learning fMRI task to directly probe verbal and visual memory and elicit hippocampal activation (HA) on an individual basis for use in presurgical mapping. We aimed to establish effectiveness of the paradigm on an individual basis in typically developing (TD) adults and examine material specificity (left-verbal; right-visual), using lateralization index (LI) as the primary outcome measure.
Participants and Methods: 10 TD (age range: 21-24) completed an EPI BOLD 3T block design task of paired association learning with word stimuli (verbal memory) and abstract designs (visual memory). For each condition, six blocks were presented with each block consisting of three trial types [learning, distraction (baseline), and recall]. Image preprocessing was done in SPM8 including normalization and segmentation with the VBM8 Toolbox. A field map was acquired and used to correct distortion. LI was calculated using a hippocampal mask with the LI Toolbox.
Results: On an individual basis, for the verbal memory task 70% of TD controls demonstrated HA during learning; 60% showed activation during recall. During the visual memory task, 90% showed HA for learning and recall (p=0.05, uncorrected). Categorical LI distribution was mixed during learning and recall for the verbal memory task (Learning: 5 R, 2 L, 2 B; Recall 2 R, 4 L, 4 B) and for visual memory (Learning: 3 R, 4 L, 3 B; Recall: 4 R, 3 L, 3 B).
Conclusions: Results demonstrate that the verbal and visual learning paradigms reliably activate the hippocampus on an individual basis at lenient thresholds. Hippocampal lateralization by task is not material specific with this small sample of subjects, but we plan to add additional subjects and to examine how this activation relates to cognitive functioning/memory performance.
Correspondence: *Leigh Sepeta, Children's National Medical Center, 111 Michigan Ave, NW, Washington D.C, DC 20001. E-mail: lsepeta@cnmc.org*

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

L. MILLER, G. TREMONT, J. DAVIS, K. BRYANT & A. BLUM. Risk Factors for Cognitive Impairment in Older Adults with Epilepsy.

Objective: Cognitive deficits are common in epilepsy, though the impact of epilepsy on cognition in older adults is understudied. The current study aimed to characterize cognition in older adults with epilepsy relative to healthy older adults and identify potential risk factors for impairment.

Participants and Methods: 24 older adults with epilepsy (age 64.0±7.3) and 16 healthy controls (age 60.9±4.5) were included. Participants completed a comprehensive neuropsychological battery and composite domain scores were computed for memory,attention/speed,executive function,language,and visuospatial; the MMSE and DRS were also administered.Chart review for current medications, neuroimaging,and seizure history was also completed.

Results: Epilepsy patients performed worse across nearly all cognitive domains,with the exception of visuospatial and the MMSE,and were clinically impaired (i.e.,≥1.5 SD below mean) on more individual tests (M=3.13±3.22) when compared to controls (M=0.56±0.89).For epilepsy patients,MRI abnormalities (excluding age related changes) were associated with poorer attention/speed (p=.04).The use of two or more medications with known cognitive side effects was associated with poorer language skills (p=.03).Those who were considered treatment resistant demonstrated poorer performance in executive function (p=.01),language (p<.01),and on the DRS (p<.05),and were clinically impaired on more individual tests (M=6.60±4.39) than those with no seizures (M=2.23±2.42) in the past year.

Conclusions: Older adults with epilepsy demonstrated greater cognitive deficits than matched controls.Medications,neuroimaging abnormalities,and poor seizure control heightened the risk for cognitive impairment.Understanding the nature of cognitive decline in this population,as well as associated risk factors toward its evolution,may assist in the differential diagnosis of cognitive complaints and improve design of treatment for older patients with epilepsy.Replication in larger,longitudinal studies is warranted to generalize these findings.

Correspondence: *Lindsay Miller, M.A., Neuropsychology, Brown Medical Scool, 593 Eddy Street, POB 430, Providence, RI 02903. E-mail: lindsay_miller@brown.edu*

D.D. HARGRAVE, D.C. JACKSON, K. DABBS, B.D. BELL, J.E. JONES, P. RUTECKI, M. SEIDENBERG & B.P. HERMANN. Predictors of Longitudinal Change in Executive Function in Chronic Temporal Lobe Epilepsy.

Objective: To determine the presence and predictors of change in executive function over a 4-year course in patients with chronic temporal lobe epilepsy (TLE). Predictors of cognitive change included demographic, neuroimaging, and clinical epilepsy characteristics.

Participants and Methods: 39 patients with TLE (M age =33.00 yrs., SD = 10.60; M age of onset =10.25 yrs., SD =6.70]) and 47 healthy controls (M age = 31.02, SD = 10.89]) underwent baseline and 4 year reassessment of executive function (EF) including Trail Making Test-B (TMT-B), Stroop Test, WMS-III Working Memory Index (WMI), WCST, and COWAT. Demographically corrected regression-based z-scores for change were derived for patients based on cognitive change in the control group. Volumetric MRI data, processed via the FreeSurfer imaging analysis suite, were acquired at baseline for all participants. Group differences in change scores across measures of EF were examined. Potential predictors of identified cognitive change in the TLE group included demographic (e.g., age, education, height), imaging (e.g., thalamus and basal nuclei), and clinical epilepsy characteristics (e.g., number of AEDs, years of active epilepsy).

Results: Groups differed on two of five EF measures. Relative to controls, TLE patients exhibited adverse change on the TMT-B ($p < 0.01$) and WMS-III WMI ($p < 0.05$). In the TLE group, change in TMT-B was correlated with adjusted (ICV) baseline thalamus volume ($p < 0.01$) and years of active epilepsy ($p < 0.05$). Regression analysis showed adverse change in TMT-B performance to be associated with longer duration of active epilepsy. No predictors of WMS-III WMI change were identified.

Conclusions: Some aspects of EF in patients with chronic childhood/adolescent onset TLE show an adverse 4-year course compared to controls. Failure to achieve predicted performance is best predicted by cumulative years of active epilepsy. This work was supported by NINDS RO1-37738.

Correspondence: *David D. Hargrave, Psy.D., Neurology, University of Wisconsin-Madison, 1685 Highland Ave, Madison, WI 53705. E-mail: david.hargrave@gmail.com*

J.B. WILLIAMSON, M. HARCIAREK, L. ACOSTA & K.M. HEILMAN. Closure in temporal lobe epilepsy: Laterality and open endings.

Objective: Patients with left temporal lobe epilepsy (TLE) often have symptoms such as hypergraphia and hyper-religiosity. Both of these symptoms may be related to an increased desire for closure. For example, this search for closure may be at the heart of metaphysical explanations for unexplainable phenomena. The purpose of this study is to learn if patients with left TLE versus right TLE have different estimates of closure.

Participants and Methods: Twelve patients with unilateral left (8) or right TLE (4) were assessed with the Closure Scale, a 50 item, Likert-based scale assessing the degree of closure that subjects perceive in a series of closed and open-ended statements.

Results: Patients with left-TLE rated the statements as having significantly more closure than patients with right TLE, $F(1,11) = 11.456$, $p = 0.007$. These participants did not differ on premorbid ratings of intelligence.

Conclusions: The finding that patients with left TLE rated open and closed statements as telling a more complete story than patients with right TLE epilepsy may be related to several possible mechanisms. For example, finding closure is rewarding and left LTE may have altered the frontal-ventral basal ganglia reward networks. Also, patients with left anterior temporal lobe degeneration often have a semantic deficit and since the determination of closure may be related to semantic processing, patients with left TLE may have a mild semantic deficit.

Correspondence: *John B. Williamson, PhD, Neurology, University of Florida, 8114 SW 53rd Place, Gainesville, FL 32608. E-mail: john.williamson@neurology.ufl.edu*

N.T. BOTT, N.S. KORT, D. CAHN-WEINER, C. CONSTANTINE, L. HINKLEY, A.M. FINDLAY, D. MIZUIRI, S.S. NAGARAJAN & H.E. KIRSCH. Right Hemisphere Functional Connectivity Correlates with Verbal Memory Performance in Left Temporal Lobe Epilepsy.

Objective: One mechanism by which temporal lobe epilepsy (TLE) may disrupt verbal memory is through alteration in functional connectivity (FC) between brain regions. Magnetoencephalography (MEG) provides a method to evaluate global connectivity of individual brain regions. This study examined FC using resting state MEG on a verbal memory task in left TLE patients to examine the neural networks underlying impairments typically observed in these patients.

Participants and Methods: Subjects included 13 patients (8F, mean age=33) with TLE, who were candidates for surgical resection. MEG was recorded for 60 seconds in a task-free environment. MEG maps of FC in the alpha-band for subjects were compared with those of 13 age and sex-matched controls. Subjects were administered the California Verbal Learning Test – II (CVLT-II). Individual FC maps were correlated with CVLT-II short delay free recall (SDFR) and long delay free recall (LDFR) Z scores. Results were cluster corrected at a 20-voxel threshold, $p<0.05$.

Results: Left TLE patients showed a network of decreased FC, including bilateral temporal, bilateral parietal, and right frontal regions compared with age and gender-matched controls. SDFR and LDFR scores ranged from -4.5 to 1.5 (SDFR mean=-1.04; LDFR mean=-.92). Better performance on SDFR and LDFR was positively correlated with right hemisphere FC in specific regions: right insula (SDFR r=.70; LDFR r=.69), superior temporal gyrus (SDFR r=.66; LDFR r=.63); parietal

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

(SDFR r=.67; LDFR r=.65), and superior frontal regions (SDFR r=.70; LDFR r=.74).
Conclusions: The nociferous cortex hypothesis posits that TLE causes abnormally decreased FC in extratemporal regions. In this group of TLE patients, increased FC in the contralateral hemisphere correlates with verbal memory performance. Subjects who show increased right hemisphere FC may be compensating for loss of function associated with left TLE. These findings may have implications for predicting post-surgical outcome; further study of the clinical applications of FC is warranted.
Correspondence: *Nicholas T. Bott, Psychiatry and Behavioral Sciences, Stanford University School of Medicine, 401 Quarry Rd., MC 5719, Palo Alto, CA 94305. E-mail: nbott@stanford.edu*

L. GLASS UMFLEET, S.J. SWANSON, D. SABSEVITZ, W.M. MUELLER & M. RAGHAVAN. Verbal Memory and Visual Naming Outcome Following Left Anterior Temporal Lobectomy: A Comparison between Electrical Stimulation Mapping Paradigms.
Objective: Electrical stimulation mapping (ESM) during awake craniotomies, or using implanted subdural grid electrodes is often used to identify language cortex and tailor dominant anterior temporal lobectomies (ATL). There is, however, a paucity of outcome data on the extent to which different mapping strategies affect cognitive outcomes. The purpose of this study is to investigate differences in naming and verbal memory outcomes between patients who underwent intraoperative ESM using a visual naming task (I-ESM) and extraoperative ESM using both visual and auditory naming (E-ESM). We hypothesized that patients whose resections were tailored using a paradigm that included both visual and auditory naming (E-ESM group) would have smaller post-operative cognitive declines.
Participants and Methods: Participants were 66 patients with IQ¬>70 who underwent I-ESM (n = 53) or E-ESM (n = 13) prior to dominant L-ATL. Groups were matched on age, education, age at onset of recurrent seizures, and preoperative intellectual and cognitive variables. All patients completed pre- and post-operative neuropsychological testing. Independent and dependent sample t-tests were used to determine group differences on the post-operative and change scores for the Boston Naming Test (BNT) and Selective Reminding Test (SRT).
Results: Independent t-tests showed no significant differences between the I-ESM and E-ESM groups on post-operative SRT and BNT variables. Also, the groups did not differ on Engel outcome class. Examination of changes scores indicates that the E-ESM group did not decline significantly on SRT delayed recall and BNT. In contrast, the I-ESM group declined significantly on these variables.
Conclusions: While preliminary, these results suggest that tailoring resections based on a stimulation mapping paradigm that includes auditory definition naming in addition to visual naming reduces cognitive morbidity but does not affect likelihood of seizure freedom after dominant ATL.
Correspondence: *Laura Glass Umfleet, Neuropsychology, Medical College of Wisconsin, 9200 W Wisconsin Ave, Milwaukee, WI 53226. E-mail: lglass@mail.roosevelt.edu*

F. WINSTANLEY, J. ARORA, D. SCHEINOST, G. YANG, X. PAPADEMETRIS, D.D. SPENCER & R. CONSTABLE. Prediction of Post-Operative Memory Outcome in Temporal Lobectomy Patients Using Resting State Intrinsic Connectivity Distribution.
Objective: Anterior temporal lobectomy (ATL) is an effective treatment for patients with refractory temporal lobe epilepsy (TLE); however, there is associated risk of postoperative verbal memory decline with left language dominant temporal lobe resections. Predicting cognitive outcome is an essential task for epilepsy surgery centers to ensure the best quality of life for the patient. This study aimed to predict risk of postoperative memory decline in left, language dominant ATL patients using resting state intrinsic connectivity distribution (rs-ICD).
Participants and Methods: We studied 20 patients with TLE who underwent ATL for refractory epilepsy. All subjects underwent preoperative rs-ICD, preoperative neuropsychological testing (including verbal selective reminding test-SRT) and postoperative neuropsychological testing approximately 12-18 months following the surgery. Resting state analysis was conducted using a whole-brain normalized intrinsic connectivity distribution (rs-ICD).
Results: Results of a whole-brain study using normalized rs-ICD in left ATL patients showed a strong correlation between connectivity in the surgical temporal lobe and preoperative performance on the SRT. Resting state ICD also correlated with post-surgical changes in SRT performance. Areas of the greatest connectivity that correlated with SRT change scores was observed primarily in the area of the left anterior temporal lobe.
Conclusions: Resting state ICD correlates with preoperative memory performance and predicts postoperative memory outcome in left ATL patients. These findings further understanding of neural correlates of memory functioning in TLE patients and provides a new, non-invasive technique that can predict memory decline following left ATL.
Correspondence: *Francis S. Winstanley, PhD, Neurology, Yale Comprehensive Epilepsy Center, 60 Temple Street Suite 1-A, New Haven, CT 06510. E-mail: scott.winstanley@yale.edu*

S. BONNER, S.R. HOWE, A. REEDY, M. PRIVITERA & P.K. SHEAR. Social Cognition in Post-Surgical Temporal Lobe Epilepsy Patients.
Objective: The goal of this study was to investigate social cognitive ability in patients who had undergone anterior temporal lobectomy (ATL) for temporal lobe epilepsy. We hypothesized that patients with right ATL would perform more poorly than those with left ATL on social cognitive measures. In addition, poorer social cognitive ability was expected to predict poorer psychosocial functioning outcomes.
Participants and Methods: Participants were 16 individuals (mean age = 43.1; mean education = 13.6 years; 75% female) who had undergone ATL (8 left ATL; 8 right ATL) for TLE. Exclusionary criteria included self-reported history of neurological disorder other than epilepsy or other serious psychiatric, medical, or substance use history that could affect cognition. Participants completed a fixed battery of neuropsychological (memory, attention, executive functioning, confrontation naming), social cognitive (PennCNP Emotions Battery, MSCEIT), and self-report (quality of life, psychosocial functioning, depression) measures.
Results: The right ATL group performed significantly more slowly than, but was comparable in accuracy performance to the lefts in comparing the relative intensities of emotions depicted in two faces and in rating the intensity of the emotional valance of facial expressions, $p < .05$. In the full sample, poorer ability to correctly judge the relative intensity of emotions displayed across two faces and to incorporate one's own emotions into decision making were significantly related to poorer self-reported quality of life and psychosocial functioning, $p < .05$.
Conclusions: Despite comparable accuracy performance, patients with right ATL performed more slowly than patients with left ATL on social cognitive tasks, suggesting a speed accuracy trade-off that may have implications for the efficacy of affective processing in daily social interactions. This is the first known study to demonstrate a relationship between reduced social cognitive functioning and poorer functional outcomes in this population.
Correspondence: *Shawna Bonner, BA, Psychology, University of Cincinnati, 2160 Trailwood Drive, Cincinnati, OH 45230. E-mail: shawbo888@gmail.com*

K.E. EICHSTAEDT, W.E. CLIFTON, F.L. VALE, S.R. BENBADIS, A.M. BOZORG, N. RODGERS-NEAME, M. MATTINGLY & M.R. SCHOENBERG. Predicting Material Specific Memory Deficits Among Patients with Temporal Lobe Epilepsy with Performance Validity Tests and Rey Auditory Verbal Learning Test: Do Green's Word Memory Test Scores Share Variance with RAVLT?
Objective: The study compared Green's Word Memory Test (WMT) scores of patients with left temporal lobe epilepsy (LTLE) exhibiting impaired verbal memory with right TLE controls in order to assess

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

whether verbal memory deficits specifically associated with LTLE increase type I error risk on WMT primary effort subtests.
Participants and Methods: Participants were 32 patients undergoing neuropsychological evaluation as part of a pre-surgical assessment for localization-related pharmacoresistant epilepsy treatment. Seizure localization and lateralization were confirmed with video-EEG. Patients were demographically matched by seizure lateralization. In each group, five patients had unilateral mesial temporal sclerosis. Rey Auditory Verbal Learning Test (RAVLT) raw scores were compared using ANOVAs to assess verbal memory functioning between groups. WMT raw scores were also compared using ANOVAs. Logistic regression was used to evaluate variance of seizure lateralization accounted for by WMT and RAVLT scores.
Results: RTLE outperformed LTLE on RAVLT immediate ($p<.05$, $\eta_p^2=.13$) and long ($p<.01$, $\eta_p^2=.22$) delay. Groups performed similarly on WMT primary effort subtests, with $p\geq.76$ for both tests. Consistency scale ($p=.89$) was also similar between groups. RTLE showed insignificant trends toward better performance on the relatively easy memory subtests, with $p=.10$ for multiple choice, and $p=.18$ for paired associates. RTLE outperformed LTLE on free recall ($p<.05$, $\eta_p^2=.16$), one of the most difficult WMT subtests. Logistic regression found no WMT test scores contributed to predicting side of seizure onset after RAVLT delayed recall score was entered into the algorithm [Exp(B)=1.57, $p<.05$].
Conclusions: Data suggest WMT primary effort subtests can be used with verbal memory impaired LTLE patients without significant risk of type I error when RAVLT scores indicate clear memory impairment. However, WMT free recall score accounted for nearly as much variance in seizure lateralization when RAVLT scores were not entered.
Correspondence: *Katie E. Eichstaedt, MA, Florida School of Professional Psychology at Argosy University, Tampa, 5452 Baywater Drive, Tampa, FL 33615. E-mail: keichstaedt@stu.argosy.edu*

R. COLLINS, J. ROBINSON, M. PLASENCIA, R. FRANKS & D. CHEN. Perceived Competency and Quality of Life Deficits in Individuals Experiencing Psychogenic Non-epileptic Events.
Objective: Psychogenic non-epileptic events (PNEE), also called psychogenic non-epileptic seizures, are episodes in which an individual exhibits seizure like symptoms for which there is no accompanying physical or electrographic cause (Bodde et al., 2009; Loring, 2010). A better understanding of perceived subjective deficits and functioning in day to day life in individuals with PNEE may help in both early identification of these events and in later treatment. We hypothesized that individuals with PNEE would endorse lower levels of competence in completing activities of daily living as well as lower quality of life than individuals with conformed epilepsy.
Participants and Methods: As part of a larger assessment battery, patients on a week-long epilepsy monitoring unit were given the Patient Competency Rating Scale (PCRS; Prigatano et al., 1998) and the Quality of Life in Epilepsy Scale (Cramer et al., 1998). Independent samples t-tests were conducted on these scales to test for group differences between individuals with PNEE (N=52) and individuals with confirmed epilepsy (N=44).
Results: In this sample, individuals with PNEE (N=52) endorsed significantly greater impairment in overall competency on the PCRS as well as the subscales of overall quality of life, cognitive functioning, energy/fatigue, and medication effects (ps<.05). Effect sizes for these differences were medium to large (Cohen's d's = .49 - .64).
Conclusions: These results indicate that when compared to individuals with EEG and video=monitored confirmed seizures, those individuals with PNEE perceive their competency to carry our activities of daily living as well as their quality of life as it relates to issues commonly impacted by epilepsy as more impaired. Identification of these perceived deficits may be used to refine current psychotherapeutic treatments for individuals experiencing these events (Bodde et al., 2009).
Correspondence: *Jordan Robinson, Michael E. DeBakey VAMC, 3023 Broadmead Dr, Houston, TX 77025. E-mail: Jayking.robinson@gmail.com*

M. BALDASSARRE, R. BAEK, L. ERDODI, B. TYSON, B. JOBST, K. BUJARKSI & R. ROTH. Neuropsychological profiles associated with epilepsy, non-epileptic seizures and Psychiatric Disorders.
Objective: Objective: Neuropsychological studies have thus far provided inconsistent findings with respect to discrimination between patients with non-epileptic seizures (NES) and epilepsy (EPI). One reason for this may be the high comorbidity between NES and psychiatric disorders (PSY). In the present investigation we evaluated the extent to which mood contributed to neuropsychological performance in patients with NES. In addition, we compared those with NES to patients with EPI and those with psychiatric disorders (PSY) but no history of EPI or NES in order to determine whether the NES group's profile is more similar to the EPI versus PSY group.
Participants and Methods: Participants and Methods: Participants included patients with EPI (n = 31), NES (n = 15) and PSY (n = 29) referred for neuropsychological testing. Participants completed a battery of measures assessing intellectual and executive functioning, attention, memory, language, motor skills and mood
Results: Results: The three groups were remarkably similar on most measures. Isolated exceptions included the WAIS-III Letter-number sequencing and the WMS-III visual reproduction subtests, finger tapping test, the CVLT-II total recall discriminability raw score, BDI-II and STAI with medium-large effects. As a general pattern, the difference between EPI and PSY drove the main effects, while the EPI-NES contrast was typically non-significant.
Conclusions: Conclusions: Results suggest that standard cognitive tests have limited ability to differentiate between patients with EPI and PNES. Interestingly, simple motor measures (both hands, raw and standard scores) show the most potential to facilitate this clinically relevant differential diagnosis. The implications of these findings to the clinical assessment of PNES are discussed.
Correspondence: *Megan Baldassarre, MA, Psychiatry, Geisel School of Medicine at Dartmouth, 23 Parkhurst Street, Lebanon, NH 03766. E-mail: megan.baldassarre@gmail.com*

Dementia (Subcortical, Specific Disorders, MCI, etc.)

G. WEISSBERGER, L. DELANO-WOOD, D.A. NATION, K.L. BANGEN, L. SAKATA, N. EVANGELISTA, T.H. GOLLAN, D.P. SALMON, D. GALASKO & M.W. BONDI. Elevated Pulse Pressure is Associated with Executive Dysfunction in Hispanic Older Adults.
Objective: Recent studies suggest that elevated pulse pressure (PP) increases the risk of cognitive impairment in older adults. High rates of cardiovascular risk burden in Hispanic populations may make them particularly vulnerable to the deleterious effects of pulse pressure on cognition. Therefore, we examined the relationship between PP and cognition in Hispanics and non-Hispanics with and without Mild Cognitive Impairment (MCI).
Participants and Methods: Neuropsychological tests were administered to 76 non-demented Hispanic (MCI = 13, NC = 24) and Non-Hispanic (MCI = 13, NC = 26) older adults. Groups were age and education matched. Test scores were z transformed (based on the NCs) and averaged to create 6 composite scores: memory, executive function, language, visuospatial function, processing speed and attention. Blood pressure was measured on the day of testing and PP was determined by subtracting diastolic from systolic pressure
Results: Multiple regression analyses revealed a significant PP X Cultural Group interaction effect for executive function (p=.03), and a trend for language function (p=.09). There were no significant interaction

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

effects for other cognitive domains (all p-values>.13). Post-hoc analyses showed that higher PP predicted poorer executive function in Hispanics (p=.03) but not in Non-Hispanics (p=.35). This pattern was particularly evident in Hispanics with MCI (p=.03) compared to Hispanic NCs (p=.06).
Conclusions: These results suggest that higher PP is associated with poorer cognition, particularly in the executive function domain. Furthermore, higher PP may be more deleterious in Hispanic versus non-Hispanic non-demented older adults. This could be due to differences between the cultural groups in underlying neurovascular integrity, or in access to health care, medication adherence, poorer control of vascular disease risk, and barriers to treatment.
Correspondence: *Gali Weissberger, M.S., Clinical Psychology, San Diego State University/University of California, San Diego Joint Doctoral Program, 811 West Nutmeg St. Apt 401, San Diego, CA 92103. E-mail: gweissbe@gmail.com*

Invited Address: Age-related Memory Decline: New Insights from Imaging, Genetics, and Biomarkers (CE Session H)

Presenter: Andrew Saykin

11:30 a.m.–12:30 p.m.

A.J. SAYKIN. Age-related Memory Decline: New Insights from Imaging, Genetics, and Biomarkers.
Recent evidence indicates that Alzheimer's disease (AD) develops over 1-2 decades prior to diagnosis. Although there is clearly heterogeneity, in the canonical case there is likely to be an asymptomatic phase, followed by subjective cognitive decline, mild cognitive impairment and ultimately dementia. Advances in neuroimaging, biomarkers and genetics are rapidly contributing to progress in understanding the neural basis of prodromal cognitive changes in those at risk for AD. The combination of multi-modality imaging (MRI and PET) with genetics, fluid biomarkers (blood, CSF) and cognitive assessment, especially in a longitudinal framework, has proven to be a powerful research paradigm. The Alzheimer's Disease Neuroimaging Initiative (ADNI) and related large scale studies provide extraordinary opportunities to longitudinally examine the relationship between memory and other cognitive domains with MRI, PET, fluid and genetic biomarkers. Selected examples using structural, functional and molecular biomarker data as quantitative phenotypes to probe the role of genetic variation in age-related memory changes will be presented including candidate gene, genome-wide association studies (GWAS) and exome sequencing. ADNI just completed whole-genome sequencing (WGS) on over 800 participants and there are major conceptual and computational challenges related to extracting the most important information from such "big data" sets. There are also controversies regarding return of research results to individuals (what, when & how). In the future personalized medicine of aging and cognitive health, feedback on cognitive function will likely be accompanied by analysis of imaging, biomarkers, genetic risk and tailored therapeutic options. Multidisciplinary expertise will be required and we all need to be ready.
Correspondence: *Andrew J. Saykin, PsyD, Radiology and Imaging Sciences, Indiana University School of Medicine, Center for Neuroimaging, 355 West 16th Street, Indianapolis, IN 46202. E-mail: asaykin@iupui.edu*

FRIDAY AFTERNOON, FEBRUARY 14, 2014

Poster Session 7: Memory, Functional Imaging, Emotional Processes, Psychopathology/Neuropsychiatry, Autism Spectrum Disorders

12:30–1:45 p.m.

Memory Functions

S. OKAHASHI, S. YAMADA, M. TOICHI, T. HAYASHI & T. FUTAKI. Activation of the Prefrontal Cortex during Free-recall Task using Unrelated/Related Word List: a fNIRS Study.
Objective: The strategy like semantic organization is an important factor in memory process. The purpose of this study was to investigate how the activation of the prefrontal cortex (PFC) changes due to the two free-recall tasks: under unrelated /related word conditions by using functional near-infrared spectroscopy (fNIRS), which is a method for measuring concentration changes of local hemoglobin in human cerebral cortex noninvasively.
Participants and Methods: Six healthy righted-handed adults were instructed to remember 15 nouns presented orally (2s/word). Immediately following word presentation, they were asked to say aloud all the words recalled. Each encode/recall period was for 30 sec, and this process was repeated 5 times. The tasks were conducted under two conditions. In the unrelated condition, words were semantically unrelated to one another. On the other hand, in the related condition, the words were grouped into 2 semantic categories. Hemodynamic changes in the PFC were measured by multi-channel fNIRS. The changes in the consumption of oxygenated hemoglobin ([oxy-Hb]) for encode period was analyzed. We asked them about the strategy during the tasks after the measurement.
Results: There was no significant difference in the performance score between two conditions. Each task activated the dorsolateral PFC. The increase of [oxy-Hb] was larger in left PFC than right PFC under both conditions. The increase of [oxy-Hb] was larger under the unrelated condition than the related condition. The main strategy included the following: 1) imaging a scenes or making a sentence under the unrelated condition, 2) grouping words into semantic categories under the related condition.
Conclusions: Results suggest that left PFC activation is related to language process of encoding words. It is possible that subjects made more efforts to memorize the words using own strategies under the unrelated condition.
Correspondence: *Sayaka Okahashi, Graduate School of Medicine, Kyoto University, 53 Kawahara-cho, Shogoin, Sakyo-ku, Kyoto 606-8507, Japan. E-mail: okahashi.sayaka.7c@kyoto-u.ac.jp*

R. READY & A. BINDER. Recognition Memory for Negative Stimuli: Complex Associations with Emotion Regulation.
Objective: Memory for emotion stimuli is related to emotion experience but data on this topic are mixed and come mostly from patient populations. In amnestics, poor memory for negative emotion stimuli may interfere with emotion recovery. In persons with PTSD, intrusive memories are associated with emotional distress. The current study tested memory for emotion stimuli and emotion regulation in healthy younger (n = 23), midlife (n = 10), and older adults (n = 14).
Participants and Methods: Participants were shown film clips depicting interpersonal loss. Self-reported emotions were assessed with the PANAS-X (Negative Affect, Fear, Sadness, Guilt, Hostility, Positive Affect, Joviality, Attentiveness, Assurance) prior to the videos, immediately after the videos, and after 10-minutes of recovery. Recall and

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms.
https://doi.org/10.1017/S1355617714000381

recognition memory for the negative film stimuli were assessed after recovery. Verbal memory was assessed prior to the mood induction with WMS-IV Logical Memory.
Results: Emotion reactions were strongest to the films for increased Negative Affect, Sadness, and Hostility; decreases were greatest for Positive Affect and Joviality. After 10 minutes, negative emotions recovered to baseline but Positive Affect, Joviality, and Attentiveness were significantly below baseline (ps < 0.001). Better recognition memory for the film stimuli was associated with less recovery in negative emotions but with better recovery in Joviality and PA. Age was controlled in analyses. WMS-IV LM scores were not associated with emotion recovery.
Conclusions: Data partially support ideas that lesser attention to and processing of negative stimuli might facilitate emotional well-being in so far as negative emotion reactions might recover faster. Results have implications for older adults who tend to exhibit relatively reduced memory for negative stimuli when compared to younger adults. Novel findings with regard to memory for emotion stimuli and recovery from positive emotions deserves further study.
Correspondence: *Rebecca Ready, Ph.D., Psychology and Neuroscience, Univ of MA, 135 Hicks Way, Tobin Hall, Amherst, MA 01003. E-mail: ready@psych.umass.edu*

T. KUHN, A.E. BOUTZOUKAS, J.M. GULLETT, A. FORD, D.B. FITZGERALD & R.M. BAUER. Temporal Lobe Memory Circuits: White Matter Integrity and Memory Performance in Temporal Lobe Epilepsy.
Objective: To further understanding of white matter integrity as it relates to memory performance. White matter integrity refers to the degree of myelination and structural patency of axons and the density of axon clusters. We studied temporal lobe white matter integrity in temporal lobe epilepsy (TLE). Relationships between TLE-associated changes in white matter integrity and recollection and familiarity memory performance were assessed.
Participants and Methods: Tract Based Spatial Statistics (TBSS) were applied to 13 participants with TLE and 13 healthy controls. Voxelwise two-tailed t-tests were conducted comparing fractional anisotropy (FA) values between the TLE and control group. These analyses were conducted in the epileptogenic temporal lobe, the nonepileptogenic temporal lobe and the whole brain. TBSS was then used to correlate FA with performance of the TLE group on two experimental neuropsychological memory tasks: Object Recognition and Discrimination Task (ORDT; a measure sensitive to perirhinal function) and a Word Stem Completion - Process Dissociation Task (WSC-PDP; a measure capable of yielding parameter estimates of recollection and familiarity memory).
Results: Significantly lower FA was found in the TLE group compared to controls ($0.001<p<0.05$). These results were found in the hippocampus and temporal lobe white matter and were more prevalent in the epileptogenic than nonepileptogenic hemisphere. Lower FA was also found in the TLE group in extratemporal regions including the corpus callosum, corticospinal tract, thalamus and posterior parietal cortex. In the TLE group, lower FA was associated with worse performance on the ORDT ($r = 0.51$, $p<0.01$) and the WSC-PDP ($r = 0.47$, $p<0.05$).
Conclusions: TLE affects the white matter integrity of temporal lobe memory circuits. Loss of integrity of these circuits is related to reduced memory performance. Therefore, these white matter tracts play an important role in recollection and familiarity memory.
Correspondence: *Taylor Kuhn, M.S., University of Florida, 317 SW 54th Dr, Gainesville, FL 32607. E-mail: tkuhn@phhp.ufl.edu*

T. SOLOMON, P. SOLOMON & B. ANDREW. A Proof of Concept Study for a Randomized Double-Blind, Placebo Controlled, Parallel Group, Efficacy Study of AlphaBrain(TM) Administered Orally.
Objective: Many medical foods and nutriceuticals purport to improve cognition, but are not subject to the same rigorous scientific study and regulation of FDA approved medications. The goal of this study was to investigate the efficacy of a self-described cognitive enhancing nutriceutical on cognitive functioning in a group of healthy adults by utilizing a randomized double blind controlled design.
Participants and Methods: A total of seventeen 18-35 year old, treatment naïve individuals were screened for inclusion criteria and were randomized for participation into the double-blind controlled trial. All participants completed a two-week placebo run in before receiving either active product, AlphaBrain™, or new placebo. Participants followed the manufactures instructions for use for six weeks. Participants undertook a battery of neuropsychological tests, post placebo run in, on day +15 and again approximately six weeks later. Primary outcome measures included neuropsychological tests from the WMS-IV, DKEFS, CVLT-II, Trails A & B and PSAT.
Results: Following the two-week placebo run in, significant differences were found between groups on scores for Logical Memory I & II and Trials B ($p < .05$). At six weeks these effects diminished, however significant improvement was seen in CVLT-II long delayed verbal recall and DKEFS Color-Word Inhibition score ($p < .05$) among those participants randomized to the treatment group. Overall, the control group neither significantly deteriorated or improved on neuropsychological measures, while the treatment group showed significant improvement on several outcome measures. Overall compliance was excellent for both groups (94% at 2-weeks, 96% at 6-weeks) and the product was well tolerated.
Conclusions: The use of AlphaBrain™ for 6-weeks improved verbal memory and areas of executive functioning, when compared with controls, in a group of healthy adults aged 18-35. The small sample size limits any generalizability, however this proof of concept study justifies further clinical trials.
Correspondence: *Todd Solomon, PhD, Solomon, Todd, 822 Boylston Street, Suite 201, Chestnut Hill, MA 02467. E-mail: Todd@bostonmemory.com*

S.A. MAGNUSON & J.B. ALLEN. The Effects of Stroke on Prospective Memory.
Objective: This study examined the effect of stroke on prospective memory as measured by the Memory for Intentions Screening Test (MIST).
Participants and Methods: Data were collected from 21 individuals on an inpatient rehabilitation unit. Individuals were tested within 30 days of their stroke and performances were compared to individuals who had been diagnosed with cerebrovascular risk factors (type 2 diabetes, hypertension, and hyperlipidemia). The two groups did not significantly differ in regards to age, education, gender, or MoCA score.
Results: A between-groups MANOVA indicated statistically significant overall effects between group performances on the MIST (Pillai's Trace = .85), $F(8, 12) = 8.513$, $p < .001$, partial eta squared = .85. Univariate main effects were found for the following MIST indices: Prospective Memory Total, 15-Minute Time Delay, Time Cue, Event Cue, Verbal Response, Action Response, and Retrospective Recognition Total. In order to further analyze the differences between group performances, a between-groups multivariate analysis of variance was performed comparing the raw scores of the two groups' performances on the eight individual tasks on the MIST. The MANOVA results indicated statistically significant effects between group performances on the eight tasks (Pillai's Trace = .773), $F(8, 12) = 5.110$, $p = .006$, partial eta squared = .773. The univariate main effects were examined and significant main effects were found for Trial 4 (15-minute time delay, time cue, verbal response) $F (1, 19) = 6.81$, $p = .017$, partial eta square = .264, power = .697; and Trial 5 (15-minute time delay, event cue, action response) $F (1, 19) = 12.27$, $p = .002$, partial eta square = .392, power = .913.
Conclusions: The overall findings suggest that individuals who have had a stroke display significant prospective memory impairment, as measured by the MIST, in comparison to individuals who have not had a stroke but have been diagnosed with cerebrovascular risk factors.
Correspondence: *Scott A. Magnuson, M.A., Wright State University, 7 Kings Pointe Cove, Little Rock, AR 72211. E-mail: scottamagnuson@gmail.com*

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

S.P. WOODS, K.L. DOYLE, E. WEBER, M. KLIEGEL, Y. KAO & F. VAIDA. Implications of Prospective Memory for Real-World Functioning: A Meta-Analysis.

Objective: It is widely held that prospective memory (PM) plays an important role in real-world activities (e.g., medication adherence), but the empirical literature on this topic thus far has been somewhat inconsistent.

Participants and Methods: A quantitative review of 32 studies with 2397 participants across healthy, medical, psychiatric, and neurological populations was conducted to determine the magnitude of the association between PM and real-world functioning, including general activities of daily living (ADL), medication adherence, quality of life (QoL), and engagement in risk behaviors.

Results: Random effects models revealed that both time-based (r = .26 [0.20, 0.31]) and event-based (r = .24 [0.19, 0.29]) PM were significantly associated with real-world functioning outcomes in the expected directions (ps < .0001). With regard to the different types of real-world outcomes, both time-based and event-based PM were significantly associated with ADL (rs = .24 and .28, respectively) and medication adherence (r = .22 and .19, respectively) (ps < .01); however, only time-based PM was significantly associated with QoL (r = .21, p = .03) and risk (r = .43, p < .0001).

Conclusions: This meta-analysis showed that both time- and event-based PM are significantly associated with real-world outcomes, with effect sizes in the small-to-medium range. That time-based PM was a stronger predictor of QoL and risk as compared to event-based PM suggest that PM's role in everyday life may vary based on the strategic versus automatic capacity and demands of the individual and the everyday functioning outcome, respectively. Future studies regarding the potentially moderating influence of compensatory strategies, motivation, and clinical co-factors (e.g., depression) are warranted to guide ongoing efforts to design effective PM-based interventions to improve real-world outcomes in neuropsychological populations.

Correspondence: *Katie L. Doyle, University of California, San Diego, 220 Dickinson Street, Suite B, San Diego, CA 92103. E-mail: kldoyle@ucsd.edu*

S. RASKIN & D. CORRELL. Using a Measure of Prospective Memory to Predict Onset of Dementia.

Objective: Early detection of dementia may help slow the progression of the illness and increase treatment efficacy. The Memory for Intentions Test (MIST) was given to older individuals who did not exhibit dementia. They were re-tested one year later to determine if first testing significantly predicted those individuals that converted to a diagnosis of dementia.

Participants and Methods: Sixty participants 60- 80 years old; exclusion criteria: dementia diagnosis, neurological or psychiatric illness, significant cardiac or pulmonary illness, significant hearing or visual loss, Beck Depression Inventory-II score >15, Beck Anxiety Inventory > 25 or Global Deterioration Scale (GDS) score >10. All participants received Tower of Hanoi, Controlled Oral Word Association Test, Hopkins Verbal Learning Test, and the Logical Memory and Visual Paired Associates subtests from the Weschler Memory Scale- Revised and MIST. One year after initial testing participants were administered the Dementia Rating Scale-2 (DRS-2) and Alzheimer's Disease Assessment Scale (ADAS-Cog).

Results: A forward stepwise logistic regression analysis was conducted to predict performance on the DRS-2 using the summary score from the MIST and other measures. A binary variable was created for the DRS-2 with a cutoff of 122. Neuropsychological variables were entered in block one and MIST in block two. The predictors reliably distinguished between individuals having a total DRS-2 of less than 123 with those having a higher score (chi square = 6.31, p =0.009 with df =1). Prediction success overall was 75%. The Wald criterion demonstrated that Total on the MIST made a significant contribution to prediction (p =.040). The remaining tested variables were not significant predictors.

Conclusions: Neuropsychological measures are easily obtained and well tolerated. The use of a neuropsychological measure that accurately predicts conversion to dementia would be helpful for early treatment and management.

Correspondence: *Sarah Raskin, Ph.D., Psychology, Trinity College, 300 Summit Street, Hartford, CT 06119. E-mail: sarah.raskin@trincoll.edu*

A. BENEDETTO & S. RASKIN. Prospective Memory and Natural Actions Tasks in Individuals with Traumatic Brain Injury.

Objective: Prospective memory is defined as the ability to remember to do something in the future and is a vital aspect of every day life. It is likely involved not only in long-term functions in daily life but in successful completion of individual multi-step activities. This study compares prospective memory performance with performance on a test of natural actions in a group of individuals with traumatic brain injury and a healthy adult group.

Participants and Methods: All subjects were ages 20-55, English-speaking, and right-handed. TBI subjects were at least one year post injury. Exclusion criteria: previous neurologic or psychiatric illness, history of substance abuse or learning disability, visual impairment, and post-traumatic seizure disorder. The MIST is a functional measure of prospective memory. The test measures three variables: type of cue (time or event); type of response (verbal or action); time delay (short or long). The Naturalistic Actions Test (NAT), was used to evaluate an individual's ability to perform every day, natural actions such as preparing a sandwich or wrapping a gift.

Results: The TBI group had more difficulty than the healthy group on the MIST test; significant differences between the two groups were observed in the MIST test involving a two-minute time delay, time cue, verbal response and action response based tasks. Individuals with TBI did not perform significantly differently on the NAT test compared to healthy adults; however, both groups demonstrated ceiling effects. It is likely that the NAT is not sensitive enough for this population. Interestingly, for the group with TBI but not the healthy group, the MIST total significantly predicted performance on the NAT total, and MIST total, MIST errors and MIST recognition all correlated significantly with NAT total.

Conclusions: This suggests a strong relationship between these two functions and highlights the need to assess prospective memory when planning treatment programs.

Correspondence: *Sarah Raskin, Ph.D., Psychology, Trinity College, 300 Summit Street, Hartford, CT 06119. E-mail: sarah.raskin@trincoll.edu*

Y. HSU & M. HUA. Metacognitive Awareness of the Prospective Memory in Time-based and Event-based tasks.

Objective: Prospective memory is an essential ability for everyday life and the use of proper aids to facilitate successful performance relies on metacognitive awareness of the functioning. We thus aimed to investigate people's awareness on their future prospective memory performance.

Participants and Methods: The current study adopted the Judgment of Learning approach where 30 healthy college students gave separate predictions to performances on the prospective and the retrospective memory components in both event-based and time-based prospective memory tasks.

Results: Results show that people have better awareness of performances on the retrospective memory component compared to the prospective memory component, and better awareness on the time-based tasks compared to the event-based tasks.

Conclusions: Our findings indicate that people's meta-memorial awareness to prospective memory is task- specific and component-specific. Different compensatory strategies may be considered to improve each condition.

Correspondence: *Mau-Sun Hua, Department of Psychology, National Taiwan University, No. 1, Sec. 4, Roosevelt Rd., Taipei 10617, Taiwan. E-mail: huams@ntu.edu.tw*

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

P. PARK, H. YAMAKADO, R. TAKAHASHI, S. DOTE, S. UBUKATA, T. MURAI & T. TSUKIURA. Effects of Facial Attractiveness on Memory for Faces in Patients with Parkinson Disease.

Objective: Episodic memories encoded with the deep or elaborated processes such as the semantic judgments are remembered more accurately than those with the shallow or superficial processes such as the perceptual judgments. Functional neuroimaging studies have demonstrated that episodic memories are enhanced by the processing of monetary or social rewards, and that the enhancement is modulated by interaction between reward- and memory-related regions. However, little is known about the effect of social rewards on episodic memories in brain-damaged patients. The current study investigated this issue in patients with Parkinson disease (PD).

Participants and Methods: In this study, we employed 14 PD patients (mean age: 64.6) and 25 healthy controls (mean age: 64.9). During encoding, participants were presented with unfamiliar faces one by one, and encoded them under three conditions including the attractiveness (A) judgments, semantic (S) judgments, and perceptual (P) judgments for faces. During retrieval, participants were presented with old and new faces at a random order, and recognized whether each face was old or new.

Results: Hit rates for faces encoded with three encoding conditions were computed in each subgroup. A repeated-measure ANOVA with a factor of condition (A, S, and P) for healthy controls showed higher hit rates for faces encoded in both A and S than those in P, whereas the ANOVA for PDs identified the enhanced recognition for faces encoded in S but not in A, compared to P.

Conclusions: Given that PD patients are impaired in the processing of monetary rewards, the present results suggest that the attractiveness judgments as a social reward could not contribute to the enhancement of retrieving faces in PD patients, who are often disturbed in the dopaminergic neurons as a reward system, but the semantic judgments as a deep encoding process could act as an enhancing factor of face memories in both PDs and normal controls. Further analyses would be required to identify the direct difference between subgroups.

Correspondence: *Paeksoon Park, Kyoto University, Yoshida-nihonmatsu-cho, Sakyo-ku, Kyoto 606-8501, Japan. E-mail: park.paeksoon.5w@kyoto-u.ac.jp*

L. OELKE, M. SZMYGLEWSKI, J. SANCHEZ-RAMOS & C. CIMINO. Source Memory and Generation Effects in Parkinson's Disease.

Objective: While many studies have investigated the executive nature of cognitive deficits in Parkinson's disease (PD), source memory performance has been relatively overlooked. The few existing studies in PD have not adequately controlled for difficulty across item and source memory tasks, confounding the interpretation of findings. Furthermore, the impact of generation on source memory performance has not been examined at all in the PD population. The primary aim of this study was to investigate source memory performance in individuals diagnosed with PD. The secondary goal was to explore how item and source memory were impacted when subjects were asked to generate responses during encoding.

Participants and Methods: Fifty idiopathic PD patients and fifty healthy control subjects were matched by age, education and gender. All subjects were screened with mood and cognitive measures to ensure they met study criteria. The memory tasks were developed based on prior work by Mulligan et al. (2006) and adapted for use with PD patients. Participants completed a task measuring item memory and source memory. For half of the items, participants completed a generative rhyme completion task during the study phase.

Results: Relative to controls, PD patients exhibited overall deficits in source memory but not item memory. Both groups demonstrated enhanced memory performance in the generative condition of the item memory task. Interestingly, the PD group, but not controls, displayed a marginally significant trend toward improvement in source memory when instructed to generate a response.

Conclusions: These findings lend strong support to the notion of a selective pattern of source memory impairment in PD, highlighted by a dissociation between item and source
memory performance when difficulty across tasks is equated. Generative tasks may be related to increased activation of key frontal regions that facilitate memory performance. These results have the potential to inform new perspectives for cognitive rehabilitation in PD.

Correspondence: *Lynn Oelke, University of South Florida, 4202 E. Fowler Ave., Tampa, FL 33620. E-mail: loelke@mail.usf.edu*

C. MCALISTER, K. ROBERTSON & M. SCHMITTER-EDGECOMBE. Noncontent Memory and Its Relation to Everyday Functioning in Individuals with Mild Cognitive Impairment.

Objective: Few studies have explored the relationship between multiple memory processes and everyday functioning. We examined the contributions of content and noncontent memory (i.e., source memory, temporal order memory, and prospective memory) to everyday activity completion in individuals with mild cognitive impairment (MCI) using a naturalistic task completed in a real-world setting.

Participants and Methods: Thirty four individuals with MCI and 34 healthy older adults completed multiple memory measures as well as a number of subtasks in a campus apartment to prepare for a day out (e.g., gather change, pack a picnic basket).

Results: Individuals with MCI performed more poorly than controls on both the content and noncontent memory measures. Compared to controls, MCI participants also had greater difficulty with activity completion, taking longer and performing more subtasks incompletely and inaccurately. For individuals with MCI, noncontent memory measures made an independent contribution, explaining an additional 16-42% of the variance in performance measures over and above age and content memory, as measured by delayed story recall. The one exception was for a measure of inaccurate/incomplete task performance where content memory explained 20% of the variance with noncontent memory measures accounting only for an additional 9% of the variance. Temporal order memory was a unique predictor for total accuracy and subtasks completed efficiently. Temporal order memory and prospective memory were both unique predictors for task sequencing, where the noncontent measures explained 42% of the variance, and source memory was a unique predictor of subtasks completed inefficiently. While content memory played an important role in subtasks left incomplete and inaccurate, noncontent memory difficulties appeared to contribute to poorer task sequencing and to task inefficiency.

Conclusions: These findings highlight the important role that noncontent memory processes play in everyday functioning in individuals with MCI.

Correspondence: *Courtney McAlister, Washington State University, P. O. Box 251, Albion, WA 99102. E-mail: courtneymcalister@ymail.com*

J.W. KIRTON, S.M. SZYMKOWICZ, C.N. SOZDA & V.M. DOTSON. Cognitive Sequelae of Increased Body Mass Index.

Objective: Obesity's association with cognition has mostly been studied in medical illness with disparate findings regarding which measures of obesity best predict cognitive decline. In the few community studies conducted, Body Mass Index (BMI) has been associated with frontally mediated cognitive processes including processing speed, fine motor speed, attention, and executive function across the lifespan. One study showed a stronger association of BMI with cognitive deficits at older ages. The current study was undertaken to characterize the cognitive sequelae of increased BMI and its relationship with age. It was hypothesized that executive, attention, and processing speed deficits would be seen at higher BMI, and that BMI and age would interact to decrease cognitive function.

Participants and Methods: We examined a sample of 84 dementia-free adults (56 women; mean age=41.16; SD=22.4). We first conducted bivariate correlations between BMI and memory, executive functioning, attention, language, processing speed, and general cognitive status.

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

Cognitive functions that were significantly correlated with BMI were then entered into mixed random effects models in SAS to evaluate the relationship with BMI, controlling for education and sex, and to evaluate the interaction of BMI with age.
Results: Bivariate correlations showed significant negative associations between BMI and Mini Mental State Exam, digits forward total, digit span total, and letter number sequencing (LNS). Age and BMI were also correlated. In the mixed effects models only LNS, a measure of working memory (WM), remained significant.
Conclusions: We found decline in general cognitive status, attention, and WM are associated with higher BMI, consistent with previous studies showing frontally mediated cognitive deficits associated with BMI. Contrary to our hypothesis, associations were not stronger in older adults. BMI may serve as a proxy for general or vascular health independent of age.
Correspondence: *Joshua W. Kirton, M.S., Clinical and Health Psychology, University of Florida, P.O. Box 100165, Gainesville, FL 32610. E-mail: joshuakirton@phhp.ufl.edu*

K.N. PAINTER, S.T. LI & B.J. NAGEL. Obesity Relates to Decreased Verbal Memory in Adolescents.
Objective: In 2012, the Center for Disease Control estimated that approximately 18% of adolescents in the United States are obese. Emerging research has shown reduced neuropsychological functioning in adults with high body mass index (BMI) compared to normal-weight individuals, particularly in the areas of executive function and memory. Studies examining children and adolescents, combined, have also suggested reduced visual-spatial and executive functioning in those with high BMI; however, results have been somewhat equivocal. Adolescence is an important period of brain development, such that adolescents with high BMI may show a unique pattern of neuropsychological impairment that differs from other stages of life.
Participants and Methods: Here, we examined neuropsychological performance in obese (n = 28, BMI above 95th percentile) versus normal-weight adolescents (n = 32, BMI between 20th and 80th percentiles) on a brief battery of neuropsychological tasks, including tests of executive functioning (Delis-Kaplan Color-Word Inhibition and Switching tasks, Paced Auditory Serial Addition Task), speed of processing (Delis-Kaplan Color-Word Naming and Reading tasks), verbal memory (Rey Auditory Verbal Learning Test – delayed recall), and estimated intelligence (Wechsler Abbreviated Scale of Intelligence, 2-subscale). Independent samples t-tests confirmed no group differences in age, gender, ethnicity, or socio-economic status.
Results: Multivariate analysis of variance showed significant differences between groups on this battery (Wilks' $\lambda = .76$, $F_{7,52} = 2.49$, $p < .05$, partial $\eta 2 = 0.25$). A significant univariate main effect for verbal memory was found ($F_{1,58} = 7.25$, $p < .01$, partial $\eta 2 = 0.11$). No other significant univariate main effects were observed.
Conclusions: These results suggest obesity may be related to decreased verbal memory retrieval in adolescents. It is possible that obesity may impact frontal regions necessary for efficient memory retrieval – a finding not present until this critical stage of development.
Correspondence: *Kimberly N. Painter, M.S., School of Professional Psychology, Pacific University, 818 SW Vista Ave., Portland, OR 97205. E-mail: pain6257@pacificu.edu*

A.M. BUTTS, M. CAREY & M.W. HAUT. Case Study: Intact Procedural Memory with Dense Amnesia in an Adolescent with Bilateral Medial Thalamic and Hippocampal Lesions.
Objective: The thalamic nuclei and hippocampi uniquely contribute to explicit memory. The neuroanatomy subserving intact implicit/procedural memory, in the context of impaired explicit memory is less well studied. Because these cognitive skills are difficult to study experimentally, case studies are of particular value. Lesions to these regions are rare and typically occur in adults with a complicated medical history.
Participants and Methods: A 15-year-old girl suffered a severe anoxic event resulting in bilateral medial thalamic and hippocampal tail lesions. She completed a standard clinical neuropsychological battery with additional experimental measures 4 months post-injury.
Results: Estimated premorbid intelligence was average with no history of developmental delay or significant medical conditions. She was an elite athlete with anosagnosia and severely impaired anterograde memory on standard memory measures. This dense amnesia was more salient and functionally impairing than the global reduction in other cognitive skills. Notably, 5 immediate trials of Trails A resulted in reduced completion time that was maintained after a delay, despite no explicit familiarity with the task. At 6.5 months post injury, an evaluation with experimental measures was conducted. Subtle qualitative improvements were observed in episodic and implicit recall, recognition of people, and general awareness. Importantly, procedural memory for an executive functioning task (D-KEFS Tower Test) improved over multiple repetitions and was maintained over a delay.
Conclusions: We report on a young patient who suffered an anoxic event resulting in lesions to the bilateral medial thalami and hippocampal tails. She now suffers from dense anterograde amnesia that has shown minimal qualitative resolution over a 6.5-month period. Yet, procedural memory for basic and higher order executive tasks appears to be relatively preserved. Results suggest procedural memory has a different neuroanatomical circuitry than other measures of explicit and implicit memory.
Correspondence: *Alissa M. Butts, Ph.D, Psychiatry and Psychology, Mayo Clinic, 62 Grandeville Rd SW, Unit 1521, Rochester, MN 55902. E-mail: Alissa.m.butts@gmail.com*

R. PERNA, A.R. LOUGHAN & J. HERTZA. Visual Memory testing in Children with Developmental Disorders: CMS Visual Memory versus the Rey Complex Figure Recall.
Objective: Deciding which visual memory tests to give should be based on empirical data rather than clinician preference. Two commonly used measures, the CMS visual memory and the Rey Complex Figure Recall (RCF) may provide different information, not only resulting in different interpretations such as implicit versus explicit memory, but also a different likelihood of a diagnosed cognitive impairment. The hypothesis of this study is that children will have a significantly different performance on the RCF compared to the CMS.
Participants and Methods: Data was collected from 113 child evaluations (Girls=44, Boys=69) for academic and behavioral presenting complaints. Mean age [12.19(3.9)], mean grade [6.19(3.5)], and mean FSIQ was [89.9(15.9)]. No children had ID, ASD, moderate or severe TBI, or epilepsy. All children completed a full evaluation. Frequencies and correlations were performed using SPSS.
Results: Delayed visual memory as measured by both the RCF and CMS correlated significantly with FSIQ (r = .54 and .63), but the RCF had far more children with delayed visual memory scores significantly below FSIQ (>15 points lower). Specifically, 15% of the children had visual memory impairments based on the CMS and 48% had visual memory impairments based on the RCF. Each instrument correlates significantly better with itself (r = .80-90) than with the other instrument (r = .40's).
Conclusions: Choice of instrument (RCF vs. CMS) may affect the likelihood of a diagnosed memory impairment.
Correspondence: *Ashlee R. Loughan, Ph.D., NeuroBehavioral Associates, 1355 Independence Dr, Augusta, GA 30901. E-mail: aspicer88@yahoo.com*

L.L. JORDAN, C.E. TYNER & S.C. HEATON. Pediatric Verbal "Memory" Impairments Stem from Encoding Deficits.
Objective: Children with developmental and neurological disorders often present with memory problems. However, the exact nature of the memory deficits is not clearly understood within or across diagnostic groups. The goal of this study was to examine the verbal memory profiles

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

(encoding, retention, and retrieval abilities) of three clinical pediatric populations frequently referred to pediatric neuropsychology clinics.
Participants and Methods: Neuropsychological data from 99 ADHD, 44 TBI, and 47 epilepsy patients were pooled from a clinical database and TBI research study. Standardized scores from the Children's Memory Scale (CMS) verbal subtests were used to examine verbal memory encoding (the Verbal Immediate Memory Index score), retention (a calculated percent retention composite score), and retrieval abilities (a calculated composite difference score between Delayed Recognition and Recall scores). Descriptive statistics and analyses of variances (ANOVA) were conducted.
Results: On average, the epilepsy group displayed a clinically significant impairment in verbal encoding (i.e., scored 1 standard deviation lower than the normative mean). Although the ADHD and TBI groups did not demonstrate clinically significant impairments at the group level; the ADHD and TBI groups performed statistically significantly worse on the verbal encoding index than on the verbal retention and retrieval indices, $p<.05$.
Conclusions: The verbal memory performance profiles of the epilepsy, ADHD, and TBI groups suggested a common verbal encoding deficit. Retention and retrieval abilities appeared relatively intact. Although the etiology of the detected encoding deficits are undoubtedly diverse, results suggest that a variety of pediatric patients may benefit from cognitive interventions that focus on improving the encoding stage of the verbal memory process.
Correspondence: *Lizabeth L. Jordan, M.S., Clinical & Health Psychology, University of Florida, PO Box 100165, Gainesville, FL 32610. E-mail: liz1127@phhp.ufl.edu*

J.M. CONSTANCE, S.W. LARSON & M.Y. KIBBY. An Investigation of Rote and Semantically-Related Verbal Short-term Memory in a Children with RD and/or ADHD.
Objective: Children with reading deficits (RD) often have poor verbal short-term memory (VSTM) when learning lists, while there are inconsistent findings regarding VSTM in children with Attention-Deficit/Hyperactivity Disorder (ADHD). There is limited research examining VSTM for semantically-related material (e.g., passages) in both groups. Thus, we assessed rote and semantically-related VSTM in children with ADHD, RD, comorbid RD/ADHD and controls.
Participants and Methods: Data were collected as part of larger, NIH/NICHD-funded, university-based projects (R03 HD048752, R15 HD065627). Participants (N=228), ages 8 to 12 years, were administered the Test of Nonverbal Intelligence – Third Edition (TONI-3) and select subtests of the Children's Memory Scale including Stories and Word Lists (selective reminding format).
Results: Statistical assumptions were checked, and transformations were performed on TONI-3 and Stories to remove skewed distributions. A MANCOVA was then used to determine whether children's performance on Stories and Word Lists differed as a function of diagnostic group adjusted for nonverbal intelligence (TONI-3). The results of the MANCOVA were significant (Wilks's $\Lambda=.878$, $F(6, 444)=4.98$, $p<.001$). At the univariate level, groups differed on Word Lists ($F(3, 223)=9.51$, $p<.001$) but not Stories ($F(3, 223)=2.06$, $p=.106$), and none of the pairwise comparisons for Stories were significant ($ps>.4$). Pairwise comparisons with Bonferroni correction revealed that all three diagnostic groups performed worse than controls on Word Lists. Furthermore, the RD/ADHD group performed worse than the ADHD group.
Conclusions: Our findings suggest that VSTM for semantically-related material is intact in RD and ADHD. Contrary to some prior research, deficits in rote VSTM were not specific to RD, as children with ADHD had poor VSTM when lists were presented in selective reminding format. Furthermore, those with RD/ADHD performed the worst, scoring even poorer than ADHD at the group level.
Correspondence: *Jordan M. Constance, BS, Clinical Psychology, Southern Illinois University - Carbondale, 1125 Lincoln Drive, Life Science II #219A, Carbondale, IL 62901. E-mail: jordan.m.constance@gmail.com*

Imaging (Functional)

E. MCINTOSH, A. JACOBSON & C. MURPHY. Investigating the associations between brain activation and depressive symptoms and measures of adiposity during hedonic evaluation of sucrose.
Objective: Depression and obesity are two of the most prevalent diseases in the US today. Recent studies have found that obese individuals have decreased neural responses during hedonic evaluation of sweet tastes in brain regions associated with sensory and taste processing. Given the prevalence of depression and obesity, it is of interest to investigate both associations between depressive symptoms and brain activation and measures of adiposity and brain activation during hedonic evaluation of sweet tastes.
Participants and Methods: The current study uses functional magnetic resonance imaging (fMRI) to investigate the effect of depressive symptoms, defined as scores on the Beck Depression Inventory (BDI), and body mass index (BMI) on the neural response to sucrose. Twenty-nine participants were scanned in a 3.0T scanner using an event-related fMRI paradigm. Prior to scanning, participants fasted for 12 hours and BMI measurements were obtained. During functional imaging runs, participants were orally administered sucrose in an aqueous solution for a total of 16 repetitions. Immediately following each taste presentation, participants used a joystick to indicate the pleasantness of sucrose on a general labeled magnitude scale. The imaging data were processed using Analysis of Functional NeuroImages (AFNI) software and beta coefficients were extracted from a priori regions of interest (ROIs) implicated in taste and reward processing. ROIs were defined using the Talairach atlas, except for the orbitofrontal cortex which was manually defined.
Results: For the analyses, activations in a priori ROIs were regressed on BDI and BMI. Our results reveal that there were significant associations between both BDI and BMI and neural activation in brain regions involved in primary and secondary taste processes and reward during the hedonic evaluation of sucrose.
Conclusions: These findings warrant further investigation to better understand the roles of depressive symptoms and adiposity on neural responses during hedonic evaluation of taste.
Correspondence: *Elissa McIntosh, BS, Psychology, San Diego State University, 6363 Alvarado Court, Suite 101, San Diego, CA 92120. E-mail: emcintos@rohan.sdsu.edu*

J.A. RAO, M. KASSEL, A. WELDON, E. AVERY, E. BRICENO, M. MANN, B. CORNETT, H. KALES, J. ZUBIETA, R. WELSH, S. LANGENECKER & S. WEISENBACH. Depression and Aging Interact in Producing Aberrant Activation of Frontostriatal Circuits in Major Depressive Disorder.
Objective: Poor cognitive control is common among individuals with late life depression (LLD). fMRI research using a stop signal task has found that patients with LLD activate additional areas within frontostriatal-limbic brain circuitry when compared to a healthy cohort, despite comparable behavioral performance. The purpose of this study is to further examine this finding with a larger sample of older adults with LLD . We also sought to investigate the interaction effects of depression and aging on cerebral functioning during cognitive control.
Participants and Methods: Thirty-seven older adults (M age =64; 20 with LLD) and 33 younger adults (M=24 years, 15 with depression) participated in this study. All participants completed a go/no-go task requiring sustained attention and inhibitory control while undergoing functional MRI.
Results: Behavioral measures of accuracy did not reveal significant differences between groups, though younger controls were significantly

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

faster than the other three groups. fMRI findings demonstrated an interaction of age and depression, such that older adults with LLD had greater recruitment of fronto-subcortical regions when correctly responding to a stimulus relative to older controls ($p<.001$), but no differences were found for activation between younger depressed individuals and controls . Additionally, during omission errors, older adults with LLD demonstrated activation in the middle and medial frontal gyrus to a greater degree than younger depressed adults and older controls.
Conclusions: These results are consistent with prior research showing that older adults with LLD recruit more fronto-striatal regions in order to perform at the same level as their nondepressed peers while engaged in a task of sustained attention and inhibitory control. Additionally, these findings reveal that compensation during inhibitory control is unique to LLD, as younger depressed individuals do not show this pattern.
Correspondence: *Julia A. Rao, Ph.D., Psychiatry, University of Illinois-Chicago, 912 S Wood St. Rm 841, Chicago, IL 60612. E-mail: jrao@psych.uic.edu*

J.A. RAO, D.L. HARRINGTON, S. DURGERIAN, C. REECE, L. MOURANY, K. KOENIG, M.J. LOWE, V.A. MAGNOTTA, J.D. LONG, H.J. JOHNSON, J.S. PAULSEN & S.M. RAO. Disruption of Response Inhibition Circuits in Prodromal Huntington Disease.
Objective: Cognitive changes in the prodromal phase of Huntington disease (prHD) are found in multiple domains, yet their neural bases are not well understood. One component process that supports cognition is inhibitory control. In the present fMRI study, we examined brain circuits involved in response inhibition in prHD participants.
Participants and Methods: Response inhibition was assessed using the fMRI stop signal task with 65 prHD participants and 36 gene-negative (NEG) controls. PrHD participants were subdivided into three groups (LOW, MEDIUM, HIGH) based on their CAG-Age Product (CAP) score, an index of disease progression.
Results: Poorer response inhibition (stop signal duration) correlated with CAP score. When response inhibition was successful, activation of the classic frontal inhibitory-network was normal in prHD, yet stepwise reductions in activation with proximity to diagnosis were found in the posterior ventral attention network (inferior parietal and temporal cortices). Failures in response inhibition in prHD were related to changes in inhibition centers (supplementary motor area/anterior cingulate and inferior frontal cortex/insula) and ventral attention networks, where activation typically decreased with proximity to diagnosis. The LOW group showed evidence of early compensatory activation (hyperactivation) of right-hemisphere inhibition and attention reorienting centers, despite an absence of cortical atrophy or deficits on tests of executive functioning. Moreover, greater activation for failed than successful inhibitions in an ipsilateral motor-control network was found in the control group, whereas such differences were markedly attenuated in all prHD groups.
Conclusions: These results are the first to demonstrate that inhibitory control in prHD is associated with altered functioning in brain networks that govern inhibition, attention, and motor control.
Correspondence: *Julia A. Rao, Ph.D., Psychiatry, University of Illinois-Chicago, 912 S Wood St. Rm 841, Chicago, IL 60612. E-mail: jrao@psych.uic.edu*

J. MANNING, S. WHITFIELD-GABRIELI & J. GABRIELI. Decreased Functional Connectivity In The Reward System In Social Anxiety Disorder.
Objective: We investigated the functional connectivity in the reward system in people with social anxiety disorder (SAD). SAD is characterized by fear of social environments leading to increased anxiety and avoidance of social situations (Hofman, 2007). The nucleus accumbens (NAcc) and ventromedial prefrontal cortex (vmPFC) are key regions in the reward system. The NAcc shows increased activation to reward anticipation, while the vmPFC shows an increase to the value of rewards (Knutson et al., 2001; Montague & Berns, 2002). However, people with SAD may have less connectivity between the reward anticipation and value-encoding regions. We hypothesized that there is decreased functional connectivity between the NAcc and the vmPFC in SAD participants compared to healthy controls.
Participants and Methods: Participants were 54 SAD patients and 33 healthy control participants. The NAcc and vmPFC were used as regions of interest (ROI) for the functional MRI connectivity analysis. We compared the differences of correlations in resting-state functional connectivity between control and patient participants for both ROI's.
Results: There was decreased connectivity between the NAcc and reward regions, including the vmPFC, putamen, anterior prefrontal cortex, anterior cingulate cortex (ACC), and inferior frontal gyrus for SAD participants. There was also decreased connectivity between the vmPMC and regions associated with reward including the NAcc, ACC, and dorsolateral prefrontal cortex for control participants.
Conclusions: Social anxiety patients had altered functional connectivity between regions that respond to rewards and encode value. Activation in the vmPFC, which encodes value, was less correlated with activation in the reward center, or NAcc for SAD participants. These results indicate that there are differences in the functional connections between regions responding to reward and value. Therefore, the reward response of the NAcc in social anxiety patients may not translate into positive value in the vmPFC.
Correspondence: *Joshua Manning, Brain and Cognitive Sciences, MIT, 43 Vassar St., 46-4033A, Cambridge, MA 02139. E-mail: joshuam@mit.edu*

G.S. BROWN & B.M. HAMPSTEAD. Dissociable Neural Networks are Preferentially Engaged During Allocentric and Egocentric Spatial Learning.
Objective: Navigation can be achieved through the use of two interactive approaches. An allocentric approach relies on spatial processing and is mediated by a hippocampal (HP)-dependent network. An egocentric approach relies on stimulus-response relationships and is dependent on a caudate nucleus (CN)-dependent network. These systems interact to maximize navigation. Previous functional magnetic resonance imaging (fMRI) studies examining these approaches had several methodological limitations. We developed a novel paradigm requiring one approach or the other to directly examine if these networks remain dissociable.
Participants and Methods: Twelve healthy participants learned three allocentric and three egocentric environments during fMRI. The allocentric task required participants to develop a cognitive map. We instructed them to learn key areas of the environment and their spatial relationships to one another. The unique egocentric environments used the same map so participants were instructed to learn only the sequence of turns. We created standardized videos to hold exposure constant across participants. Memory was tested after fMRI.
Results: Behaviorally, there was no effect of maze type, which is unsurprising given the healthy status of the participants. Conjunction analysis of fMRI data (task vs. baseline) revealed both tasks recruited a common network involving dorsal and ventral visual streams, prefrontal cortex and HP. However, the HP and spatial network were significantly more active during allocentric processing whereas the CN and some prefrontal and lateral parietal areas were more active during egocentric processing.
Conclusions: These results demonstrate the preferential recruitment of distinct, processing-dependent networks. We posit that this paradigm will be effective for studying age- and disease-related changes and the rehabilitation thereof given the evidence of a shift from allocentric to egocentric processing in these populations.
Correspondence: *Gregory S. Brown, M.A., RR&D, Atlanta VAMC, 1441 Clifton Rd. NE, Suite 170, Atlanta, GA 30322. E-mail: gsbrow2@emory.edu*

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

Z.Z. ZLATAR, C.E. WIERENGA, K.J. BANGEN & A.J. JAK. Hippocampal Cerebral Blood Flow and Sedentary Behavior in Older Adults: An Arterial Spin Labeling Study.

Objective: Age-related changes in cerebral blood flow (CBF) have been associated with genetic risk for Alzheimer's disease (AD). In the medial temporal lobes, cognitively normal apolipoprotein E (APOE) ε4 carriers (increased genetic risk for developing AD) show higher CBF than non-carriers, suggesting a compensatory response for early dysregulation in cerebral perfusion. Physical activity and exercise alter CBF; however the effects of sedentary behaviors on resting CBF in individuals at genetic risk for developing AD (APOE ε4 carriers) have not yet been studied. We investigated the relationship between resting hippocampal CBF, physical activity, and sedentary time using arterial spin labeling magnetic resonance imaging.

Participants and Methods: Participants (N=33) were cognitively healthy older adults (ages 52-81), nine of which were APOE ε4 carriers. Participants' physical activity and sedentary time was monitored for one week via accelerometer and associations between CBF, cognition, and accelerometer measures were studied via general linear modeling.

Results: There was a significant interaction between genetic risk and sedentary behavior (β =.4, t=2.3, p<.05), such that resting left hippocampal CBF was highest in APOE ε4 carriers compared to non-carriers as sedentary time increased, $F(4,28)=5.5$, $R^2=.44$, Adjusted $R^2=.36$, $\Delta R^2=.25$, p<.01. There was a trend for verbal memory performance to correlate with CBF only for APOE ε4 carriers (r=.62, p=.076).

Conclusions: It can be concluded that sedentary time may act as a compounding behavioral risk factor, perhaps increasing CBF to compensate for early dysregulation in cerebral perfusion in individuals at genetic risk for AD. Clinicians should aim to not only increase physical activity, but also reduce sedentary behaviors in older adults, especially in those at risk for developing AD.

Correspondence: *Zvinka Z. Zlatar, PhD, Psychiatry, University of California, San Diego, 9500 Gilman Dr MC 0664, La Jolla, CA 92093. E-mail: zvinka@gmail.com*

N. HANTKE, K.A. NIELSON, S. DURGERIAN, J.L. WOODARD, M. SEIDENBERG, C. SMITH & S.M. RAO. Multi-Voxel Pattern Analysis of Famous and Non-Famous Names in Older Adults.

Objective: Previous fMRI research suggests that examination of the neural networks underlying semantic memory, specifically activation for famous versus non-famous names, reveals early activation differences between older adults at risk for Alzheimer's disease (AD) and those at lower risk. Multi-voxel pattern analysis (MVPA) presents an alternative to traditional univariate fMRI analysis. MVPA assesses stimulus-driven patterns of activation without relying on broad areas of activation coalesced by cluster thresholds. It is possible that MVPA could reveal group differences heretofore unrevealed with more traditional univariate analyses. Yet, the technique has not before been applied towards distinguishing voxels by stimulus fame. The present study set out to evaluate the efficacy of MVPA for making that distinction as a first step toward applying it to distinguishing patterns of activation by risk groups.

Participants and Methods: 99 cognitively intact older adults performed an event-related fMRI task (famous name discrimination of 90 famous and 90 non-famous names). In order to examine the ability of MVPA to delineate famous and non-famous stimulus-based activation, the AUC for each condition in a scan run was collapsed across subjects then averaged. This resulted in an average AUC for each name. A leave-one-out method, limited by an OR mask and feature selection, was utilized to train and test the classifier.

Results: MVPA was able to correctly classify famous and non-famous names stimuli with 90% accuracy, statistically greater than chance. Findings indicate widespread task activation, including regions traditionally involved in name discrimination.

Conclusions: The different patterns of activation between famous and non-famous names, despite their similarity in nature, suggest disparate neural networks and potential for unique contribution in classification of fMRI data by risk group.

Correspondence: *Nathan Hantke, San Francisco VAMC, 4150 Clement Street, San Francisco, CA 94121. E-mail: Nathan.Hantke@mu.edu*

M.A. SUGARMAN & J.L. WOODARD. Functional Correlates of Verbal Working Memory in Healthy Aging and Early Alzheimer's Disease.

Objective: Working memory impairment is common in patients with Alzheimer's disease (AD). However, few studies have investigated the neurobiological basis of this impairment. The current study examined the functional correlates underlying verbal working memory abilities in older adults with AD as well as cognitively intact controls using positron emission tomography (PET).

Participants and Methods: Participants included patients with mild AD (n = 15, mean age = 68.5 years) and cognitively intact elders (n = 16, mean age = 71.5 years). All participants performed a verbal working memory task (word rehearsal) with two levels of difficulty (5- and 10-word lists) during PET. Word repetition was used as a control task.

Results: Both groups displayed increased regional cerebral blood flow (rCBF) in a network of parietal, prefrontal, and cerebellar regions during the word rehearsal tasks compared to word repetition. However, lesser rCBF was observed in AD participants across all regions, especially in the parietal lobes. In the control group, parietal activity was prominent during 5-word rehearsal, whereas greater utilization of prefrontal resources was observed for 10-word rehearsal. This shift in activity from parietal to frontal resources with increased load demands was not observed in the AD group. The strongest recruitment in the AD group was in right prefrontal cortex for both word rehearsal tasks, with weaker utilization of parietal regions. Additionally, parietal rCBF was significantly correlated with working memory performance in control (but not AD) participants.

Conclusions: In cognitively intact elders, verbal working memory abilities involve a network of parietal, frontal, and cerebellar regions. As task demands increase, heavier reliance is placed on frontal resources. In patients with AD, the strongest activity is observed in prefrontal cortex regardless of task demands. Prefrontal recruitment in AD patients might reflect compensatory activity for dysfunctional parietal contributions to working memory.

Correspondence: *Michael A. Sugarman, Master of Arts, Psychology, Wayne State University, 5057 Woodward Ave, 7th Floor, Detroit, MI 48202. E-mail: mike.sugarman@wayne.edu*

A. LE BERRE, E. MULLER-OEHRING, T. SCHULTE, A. PFEFFERBAUM & E. SULLIVAN. Functional Network of Metamemory Performance During an Episodic Feeling-Of-Knowing Judgment.

Objective: Metamemory refers to personal knowledge about general memory functioning and capacities with implications for cognitive processes relevant to monitoring and controlling memory. Functional MRI (fMRI) studies of healthy adults highlight the contribution of frontal, limbic, and parietal regions activated in episodic Feeling-Of-Knowing (FOK) judgment challenges. Our fMRI study aimed to explore the pattern of brain activations produced during metamemory judgments.

Participants and Methods: 15 healthy adults made FOK judgment involving 1) a learning task conducted before the scanning session when participants memorized 48 unrelated words pairs; 2) a scanning session when participants performed the FOK metamemory task and a control task; 3) a post-fMRI recognition task. During the FOK task, participants viewed the first word of each previously learned word pair associated with 3 answer options for judging the second word: K (know), FOK, DK (don't know). The control task required participants to count whether 1, 2, or 3 Xs appeared.

Results: The contrast of Control > Metamemory revealed the expected activation in sensorimotor areas. The Metamemory > Control contrast revealed a network of activity in frontal (bilateral inferior orbitofrontal and left superior medial frontal cortices), limbic (left hippocampus and

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

thalamus), parietal (left precuneus and lateral parietal cortex), and calcarine sulcal regions (pFDRcorrected = .05).
Conclusions: Our results identified two networks involved in FOK judgment: 1) fronto-limbic network subserving episodic memory encoding and introspective thought and 2) fronto-parietal network subserving attention, executive monitoring, and memory retrieval. This quantitative fMRI metamemory paradigm has the potential of identifying neural substrates of inaccurate self-estimation of mnemonic ability in vulnerable populations, such as those with mild cognitive impairment, mild traumatic brain injury, or alcohol use disorder.
Support: AA017168, AA017923, AA010723.
Correspondence: *Anne Pascale Le Berre, PhD, Psychiatry and Behavioral Sciences, Stanford University School of Medicine, 401 Quarry Road, Stanford, CA 94305. E-mail: aleberre@stanford.edu*

J. LAM, A. RODRIGO, B. GRAVES, H. AYAZ & A.C. RUOCCO. A Problem-Solving Task Specialized for Functional Neuroimaging: Validation of the Scarborough Adaptation of the Tower of London (S-TOL) using Near-Infrared Spectroscopy.
Objective: To investigate pre-frontal cortex activation during the Scarborough Adaptation of the Tower of London task using functional near-infrared spectroscopy.
Participants and Methods: This study used 35 healthy controls and measured pre-frontal cortex activation using 16 channel functional near-infrared spectroscopy.
Results: We found that, compared to baseline, problems that required two or three steps were associated with higher activation bilaterally in the dorsal-lateral prefrontal cortex and less activation in the medial pre frontal cortex. Higher accuracy was related to greater activation primarily within the right dorsal-lateral pre-frontal cortex.
Conclusions: Our results are consistent with previous research. Our findings suggest that problem=solving may recruit the bilateral DLPFC, although functioning of the right DLPFC might underlie performance accuracy. Based on these results, the S-TOL may serve as a standardized task to evaluate problem-solving abilities in functional neuroimaging studies.
Correspondence: *Jaeger Lam, University of Toronto, 36 Milroy Lane, Toronto, ON l61b1b5, Canada. E-mail: jaeger.man.lam@gmail.com*

M. STOUTEN-KEMPERMAN, M.B. DE RUITER, W. BOOGERD, L. RENEMAN & S.B. SCHAGEN. Treatment-dependent cognitive impairment and brain function in breast cancer survivors ≥10 years post-treatment.
Objective: Adjuvant chemotherapy (CT) for breast cancer (BC) is associated with cognitive problems and brain function alterations. In our previous multimodality study, we assessed BC survivors who received high-dose CT (HI-CT) or radiotherapy (RT) 10 years earlier. In this study, we examined neurotoxicity profiles of different treatment strategies by extending our measurements to BC survivors who received conventional-dose CT (CON-CT) ≥10 years earlier and healthy controls (HC).
Participants and Methods: Twenty CON-CT (60.5±5.7yrs) and 20 HC (58.9±3.9yrs) were assessed using neuropsychological tests and 3T-MRI. Executive functioning and memory were measured with an fMRI version of the Tower of London (ToL) and a Paired-Associate Learning task (PAL). Data were compared to 17 HI-CT (57.1±5 yrs) and 15 RT-only patients (58.2.±5.8yrs). Specific treatments were compared.
Results: Participants showing cognitive impairment were 26.3% (Hi-CT), 12.5% (CON-CT), 0% (RT-only) and 3.7% (HC). ToL data showed a significantly worse performance for HI-CT vs. RT-only. Further, HI-CT and CON-CT responded faster than RT-only. Interestingly, hypoactivation in parietal areas was found for both CT-groups vs. RT-only. No differences were found in ToL performance between RT-only and HC, but parietal hyperactivation was found for RT-only. On the PAL, HI-CT responded marginally faster than RT-only. Again, both CT-groups showed hypoactivation in parietal areas vs. RT-only, and the RT-only showed hyperactivation vs. HC.
Conclusions: Our findings suggest different neurotoxicity profiles for CT and RT-only. We found a CT association with late cognitive impairment. fMRI measures suggest a possible mechanism of hypoactivation in parietal regions, which could be related to attentional problems, possibly leading to more impulsive responses. Further, hyperactivation in parietal areas after RT-only is suggestive of a compensatory mechanism to perform at a similar level as HC. These findings are relevant for the growing population of long-term BC survivors.
Correspondence: *Myrle Stouten-Kemperman, MSc, Radiology, AMC, Meibergdreef 9, Amsterdam 1105 AZ, Netherlands. E-mail: m.kemperman@nki.nl*

U.M. VENKATESAN, R.A. BERNIER, N.P. CASTELLANOS, S.M. RAJTMAJER & F.G. HILLARY. Hyperconnectivity as a Fundamental Network Response After Neurological Disruption.
Objective: Within the systems neurosciences, there has been recent movement to measuring neural networks via "connectivity modeling" as opposed to signal amplitude. This change in brain imaging research is also seen in the clinical neurosciences, where there is a growing literature examining network change in neurological disorders. We conducted a review of the functional imaging literature examining neural connectivity changes in traumatic brain injury (TBI), multiple sclerosis (MS), mild cognitive impairment (MCI), and Alzheimer's disease (AD). We anticipated that the most common network response to neurological insult is hyperconnectivity between network regions, and that this is expressed secondary to situational demand and resource availability.
Participants and Methods: Eight search terms focusing on functional connectivity modeling in TBI, MS, MCI, and AD were employed. We reviewed results from over 1,000 studies examining functional brain connectivity in these clinical populations. From this review, 140 studies that directly examined connectivity differences between clinical and healthy samples were analyzed.
Results: Findings supported a hyperconnectivity hypothesis in clinical groups where neural resources remain available after onset of pathology (TBI, MS). However, there was a downward trend for hyperconnectivity (both local and global) in MCI and more extensive connectivity loss in AD.
Conclusions: Hyperconnectivity is a common brain response to neurological disruption, but as we predicted, the expression of hyperconnectivity is dependent upon pathology and resource availability. Future work should establish transient/situational demands associated with hyperconnectivity and physical resource thresholds that permit its expression.
Correspondence: *Umesh M. Venkatesan, Psychology, The Pennsylvania State University, 419 Moore Building, University Park, PA 16802. E-mail: umv5002@psu.edu*

V.M. LEAVITT & J.F. SUMOWSKI. The Neural Basis of Cognitive Preservation in Multiple Sclerosis.
Objective: Some persons with neurologic disorders are able to preserve cognition despite brain pathology. The cognitive reserve hypothesis posits that enriching experiences help build a reserve against disease-related cognitive impairment, but the neurophysiologic basis of this reserve remains unknown. The current study is the first project to derive a pure measure of reserve (rather than relying on sources or proxies of reserve; e.g., education) and use fMRI to investigate the neural basis of this pure reserve. In addition, this is the first neurofunctional investigation of cognitive preservation (CP) in any neurologic population.
Participants and Methods: Participants were 30 relapsing-remitting multiple sclerosis (MS) patients. CP was derived as the difference between actual cognitive performance (memory, cognitive efficiency) and expected cognitive performance (predicted by a regression model including demographic and disease variables). The neural basis for CP

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms.
https://doi.org/10.1017/S1355617714000381

was assessed by correlating CP with functional connectivity (FC) within two functional brain networks subserving the cognitive domains most affected by MS, memory and cognitive efficiency.
Results: Higher preservation of memory was associated with higher FC within a primary memory network of the brain (p=.05), and higher preservation of cognitive efficiency was associated with higher FC within a primary attention network of the brain (p=.05). Specificity was established by a double-dissociation whereby memory preservation was unrelated to the attention network, and cognitive efficiency preservation was unrelated to the memory network.
Conclusions: This is the first evidence supporting the neural basis of cognitive preservation using a pure measure of reserve, rather than a source or proxy of cognitive reserve (e.g., education). We show that FC within specific brain networks is related to cognitive preservation in MS patients. These findings support FC as a candidate target for treatments to ameliorate and / or prevent cognitive decline in patients with MS.
Correspondence: *Victoria M. Leavitt, Ph.D., Kessler Foundation, 300 Exec Dr, West Orange, NJ 07040. E-mail: vleavitt@kesslerfoundation.org*

W.D. KILLGORE, M. KIPMAN, O. TKACHENKO, H. GOGEL, L. PREER, L.A. DEMERS, S.C. DIVATIA, E.A. OLSON & M. WEBER. Predicting Resilience Against Sleep Loss with Multi-Modal Neuroimaging.
Objective: There is considerable trait-like inter-individual variability in the ability to resist the adverse effects of sleep deprivation (SD) on cognition. Prior work has suggested that more SD-resistant individuals may demonstrate greater basal levels of prefrontal activation than SD-vulnerable individuals. We tested this hypothesis by obtaining baseline measures of brain structure and function, including functional magnetic resonance imaging (fMRI) and voxel-based morphometry (VBM) several days prior to an overnight sleep deprivation session.
Participants and Methods: Ten healthy right-handed adult volunteers (5 male; 5 female), ranging in age from 20 to 43, underwent baseline neuroimaging at 3T when normally rested. During fMRI, participants completed the multi-source interference task (MSIT), a complex cognitive control task. Data were processed in SPM8 for fMRI and VBM. One to three days later, participants underwent a 30-hour sleep deprivation session. A 10-minute psychomotor vigilance test (PVT) was administered hourly. Mean PVT performance was entered as the dependent variable in a multiple regression analysis for fMRI and VBM. Areas of concordance of significant activation were evaluated between modalities.
Results: A significant correlation between fMRI responses to the MSIT and SD-resistance was found bilaterally within the left (r = .85) and right (r = .76) dorsolateral prefrontal cortex and left (r = .88) and right (r = .96) posterior parieto-occipital cortex. These four regions showed concordance with identical areas of increased gray matter volume, which also correlated with resistance to SD.
Conclusions: Findings suggest that individuals with concordant overlap of larger gray matter volume and higher functional activation at baseline within a fronto-parietal attention network were more resistant several against the adverse effects of a single night of sleep deprivation on cognition days later. Future work may focus on training activation in these regions to voluntarily enhance vigilance capacities.
Correspondence: *William D. Killgore, Ph.D., McLean Hospital, 115 Mill Street, Belmont, MA 02478. E-mail: killgore@mclean.harvard.edu*

Emotional Processes

L. PREER, O. TKACHENKO, H. GOGEL, J.S. BARK, M. KIPMAN, E.A. OLSON & W.D. KILLGORE. The Role of Personality in Sleep Initiation Problems.
Objective: The arousal theory of insomnia posits that problems with sleep onset are secondary to excessive activation of cognitive, affective, and physiological systems that hinder sleep. Evidence suggests that certain personality traits are prone to arousal, worry, and poor cognitive control, which may contribute to sleep onset problems. We hypothesized that sleep onset insomnia would be related to the personality traits of neuroticism, impulsivity, and excessive emotional control.
Participants and Methods: Sixty-one healthy adults (31 males; 30 females) ages 18 to 41 completed a questionnaire about sleep problems and measures of personality, including the NEO-PI-R, Barratt Impulsivity Scale, and Courtauld Emotional Control Scale. T-tests were used to determine whether individuals with self-reported trouble falling asleep differed from normal sleepers in terms of personality, emotional control, and impulsiveness. Pearson correlations were used to examine the association between the personality factors and minutes to fall asleep on weekdays and weekends. Logistic and multiple linear regression analyses were used to assess the combined influences of the personality factors on sleep onset problems.
Results: Participants with sleep initiation problems scored higher on neuroticism, impulsivity, and excessive emotional control (p<.05). When personality traits were combined using stepwise logistic regression, only impulsivity was a significant predictor of sleep onset problems (p<.05). When linear regression analyses were conducted, only neuroticism predicted sleep latency on weekdays, whereas impulsivity was the only predictor of sleep latency on weekends.
Conclusions: Findings suggest that personality factors involved in negative emotional arousal are related to sleep onset problems, but most of the variance is attributable to deficits in cognitive and emotional control. Treatment approaches that address these cognitive and emotional control issues should be explored.
Correspondence: *William D. Killgore, Ph.D., McLean Hospital, 115 Mill Street, Belmont, MA 02478. E-mail: killgore@mclean.harvard.edu*

W.D. KILLGORE, O. TKACHENKO, M. WEBER, M. KIPMAN, L. PREER, H. GOGEL & E. OLSON. The Association Between Sleep, Functional Connectivity, and Emotional Functioning.
Objective: Sleep deprivation is associated with altered emotional functioning and increased ratings of psychological distress. These behavioral changes correspond to patterns of reduced prefrontal metabolism and weakened prefrontal-amygdala functional connectivity, which may affect top-down modulation of emotion. Here, we expand this line of research beyond typical laboratory settings by studying whether self-reported sleep duration at home would be associated with altered cortico-limbic functional connectivity and emotional functioning.
Participants and Methods: Sixty-five healthy adults (33 men), ranging in age from 18-45 years completed a questionnaire about their sleep the previous night, as well as the Personality Assessment Inventory (PAI), Mayer-Salovey-Caruso Emotional Intelligence Test (MSCEIT), and Bar-On Emotional Quotient Inventory (EQ-i), followed by resting-state functional magnetic resonance imaging (fMRI). The Functional Connectivity Toolbox for SPM8 was used for data analysis.
Results: Self-reported sleep the preceding night was not associated with MSCEIT scores, but was correlated with higher scores on the EQ-i and lower scores on the psychopathology scales of the PAI. Sleep duration was also associated with stronger negative functional connectivity between the right ventromedial prefrontal cortex and right amygdala. Moreover, the magnitude of this inverse connectivity was associated with higher self-reported emotional intelligence and fewer symptoms of psychopathology.
Conclusions: Sleep duration the night before the scan was significantly correlated with greater inverse prefrontal-amygdala connectivity, higher perceived emotional intelligence, and lower psychological distress. Thus, even variations in a single night of sleep are significantly related to the strength of functional connectivity and emotional functioning the following day.
Correspondence: *William D. Killgore, Ph.D., McLean Hospital, 115 Mill Street, Belmont, MA 02478. E-mail: killgore@mclean.harvard.edu*

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

Y. HASHIMOTO, R. MITSUTO, T. MUNESAWA, K. SAWADA, M. MARUISHI & H. YOSHIDA. Sensitivity to the Facial Expression after Traumatic Brain Injury: In the case of Diffuse axonal Injury.

Objective: Various factors affect facial recognition including brain injury. Previous studies revealed impairments of facial expression recognition in various type of brain injury. For example, lesions to the amygdala can lead to impairments in the recognition of fearful facial expressions (Adolph et al., 1994). Impairments in facial recognition of emotions are also significant problem for people with TBI (Radice-Neumann et al., 2007). Furthermore, patients without evidence of focal injury, such as diffuse axonal injury (DAI), also exhibit the impairments (Green, Turner, & Thompson, 2003). However, the numbers of stimuli have been limited and performance was assessed only by using accuracy data in identifying expressions in previous studies. In the present study, young patients with DAI were tested for the ability of recognition of emotion from facial expression. The task can measure the discrimination threshold of recognition using psychophysiological methods (Kumada et al., 2011).

Participants and Methods: Fourteen male with DAI and 51 normal male controls participated in this study. Participants were required to classify the facial expression stimulus using linguistic labels. The intensity of stimulus was controlled by morphing technology. The up and down method was used in the task. Participants were required to classify the facial expression stimuli using linguistic labels, after practicing for 30 trials using non-morphed faces. Stimulus threshold was measured by recording 6 reversal points (10 for normal controls).

Results: The threshold level was compared between DAI and controls. An ANOVA revealed a main effect of Stimulus and Group ($p<.05$).

Conclusions: The result of discrimination threshold indicated young individuals with DAI performed more poorly on the low intensity stimulus in comparison with age matched controls. We discuss the differences between the results of this study and previous studies based on the characteristics of our task.

Correspondence: *Yukari Hashimoto, Fukuyama University, 1-Sanzo, Gakuenmachi, Fukuyama 7290292, Japan. E-mail: yukari@fuhc.fukuyama-u.ac.jp*

A.A. HAZAMY, M. TROCHE, A.E. BRANDIMORE & L. ALTMANN. Language Processing in Parkinson's Disease: Effects of Word Valence and Concreteness.

Objective: Emotional processing deficits are commonly reported in persons with Parkinson's disease (PD) within a number of domains including prosody and facial processing. However, little is known regarding how persons with PD process emotional language. Thus, the current study sought to address this gap within the literature.

Participants and Methods: Thirty cognitively-intact individuals aged 35-80 participated (15 persons with PD, 15 healthy adults). Participants were presented words on a computer screen and completed an implicit (lexical decision) task in which they decided whether the stimuli were English words and an explicit (semantic rating) task in which participants rated the pleasantness of the words. Word stimuli varied on emotional valence (i.e., positive, negative, neutral) and concreteness (i.e., abstract, concrete).

Results: Response time analysis of the lexical decision task revealed no significant effects of group. Conversely, results of the semantic rating task revealed a significant 3-way (valence x concreteness x group) interaction. Parkinson's participants had shorter response times to negative abstract than negative concrete words. Furthermore, they exhibited shorter response times to positive concrete than positive abstract words. Healthy controls exhibited similar response patterns to both abstract and concrete negative and positive words. Both groups demonstrated similar patterns of response to neutral words. There were no effects of group on semantic ratings. These effects were not explained by group differences in simple response time.

Conclusions: Null effects in the lexical decision task suggest intact implicit emotional language processing in persons with PD. This is consistent with prior research. However, group differences in response patterns to negative and positive words suggest that persons with PD experience difficulty with explicit processing of emotional words of varying concreteness.

Correspondence: *Audrey A. Hazamy, University of Florida, 336 Dauer Hall, PO Box 117420, Gainesville, FL 32611. E-mail: ahazamy1@ufl.edu*

K. DENNY, M.A. ROSSETTI, C. MYERSON, H. KATZEN, A. MAUDSLEY, V. GOVIND & B.E. LEVIN. Characterization of depressive symptomatology in ALS and Parkinson's.

Objective: ALS and PD are both neurodegenerative disorders in which depression is common. While PD and ALS patients may endorse similar overall levels of depression, the specific features of their mood profile has not been well characterized. This study compared individual items from the Beck Depression Inventory-II (BDI-II) in a sample of ALS patients, PD patients and healthy controls to characterize specific features of depression in ALS and PD.

Participants and Methods: 44 ALS patients (mean age: 54.8, sd=10.2; mean symptom duration: 16.1 months, sd=8.2), 72 PD patients with modified Hoehn and Yahr scores of 2.5 or less (mean age: 63.3, sd=8.9; mean symptom duration: 10.9 years, sd=3.9), and 43 controls (mean age: 48.1, sd=10.6) were evaluated with the BDI-II as a part of comprehensive neuropsychological battery.

Results: For BDI-II total scores, ALS and PD patients scored higher than controls (mean=3.7, sd=3.8) but did not differ from each other (ALS mean=10.1, sd=6.7; PD mean=11.8, sd=8.0).

The most frequently endorsed symptoms for both ALS and PD patients were: decreased energy (81%, 87% respectively), fatigue (77%, 83%), and changes in sleep (52%, 79%).). When PD and ALS patients were compared, PD patients exhibited more indecision ($t(114)=3.3$, $p=.001$), changes in sleep ($t(114)=3.2$, $p=.002$), and decreased concentration ($t(114)=2.6$, $p=.01$), whereas ALS patients endorsed higher levels of crying ($t(114)=2.5$, $p<.02$).

Conclusions: These results demonstrate that while ALS and PD patients exhibit similar levels of depression, they differ in the manifestation of their specific mood symptomatology, which may be linked to the underlying neural circuitry associated with each disease entity. PD patients report more problems involving indecision and difficulty concentrating. ALS patients endorse increased crying. These features are consistent with an extensive literature documenting executive dysfunction in PD and emotional lability in ALS.

Correspondence: *Katherine Denny, M.A., Psychology, University of Miami, 5665 Ponce de Leon, Miami, FL 33146. E-mail: katie.denny@gmail.com*

J. CREIGHTON, R. STAFFORD, E. MELTZER, J. BOROD, G. SALIM, S. ASSURAS, W. TSE, J. GRACIES, N. FOLDI, D. WALDER, H. KAUFMANN, C. OLANOW, A. VOUSTIANIOUK & T. HALBIG. Differential Effects of Emotion on Aspects of Reaction Time (Movement and Decision Time) in Mild Parkinson's Disease (PD).

Objective: Research has shown that individuals with PD exhibit deficits in emotion processing in addition to motor and cognitive slowing. The current study examined the effects of emotion on two components of reaction time (RT) in PD: Movement Time (MT) and Decision Time (DT).

Participants and Methods: Participants were 15 non-demented, medicated individuals with PD (M age = 61.7 ± 11.1, 60% male) and 15 healthy controls (HCs; M age = 57.7 ± 9.6, 53% male). PD participants had a mean motor score of 15.2 on the UPDRS (Fahn et al., 1987). Participants viewed images (positive, negative, & neutral) of varying arousal levels from the International Affective Picture System (Lang et al., 2001). Previously seen ("old") images and new images were subsequently randomly presented, and participants indicated whether each image was "new" or "old" with a button press. RT (time from stimulus onset to button press), DT (time from stimulus onset to first muscle contraction), and MT (time from first muscle contraction to button

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

press; RT – DT) were measured during the image recognition task using arm electrodes and Visual Basic computer software.
Results: Eight 1-way Kruskal-Wallis ANOVAs were conducted to compare the groups (PD & HC) on MTs and DTs, separately for positive, negative, and neutral images and for all images combined. DT was significantly longer for PD than HC participants, regardless of valence. MT was longer for PD patients only for neutral pictures; there were no group differences in MT for negative or positive images. Of note, the differential impact of emotion on MT was less pronounced when controlling for depression via questionnaire.
Conclusions: Results suggest that emotion differentially affects motor speed in mild PD, as affective content may increase motor speed. This finding is similar to evidence that music therapy facilitates motor functioning in PD (Pacchetti et al., 1998). The present work has implications for the development of therapeutic interventions for improving motor functioning in PD patients.
Correspondence: *Remington Stafford, Psychology, Queens College, City University of New York, 67-24 161st St. Apt. 2K, Flushing, NY 11365. E-mail: remington.stafford@gmail.com*

D.M. O' SHEA, P. MANLY & P. STERN. Examining the Association between Late Life Depressive Symptoms and Cognitive Function in the Context of Cognitive Reserve.
Objective: Depressive symptoms in late life are reported to have a pervasive negative influence on cognition in some individuals (Butters et al., 2004) but not all (Lockwood et al., 2000). The present study aimed to investigate whether cognitive reserve moderated the association between depressive symptoms and neuropsychological test performances in a sample of older adults.
Participants and Methods: Non-demented, neurologically intact participants (N=3411) were selected from the Washington Heights/ Hamilton Heights Inwood Columbia Aging Project (Northern Manhattan). Depressive symptomatology was assessed using the Center for Epidemiologic Studies Depression Scale. Reading ability and years of education were used as our measures of cognitive reserve. Four distinct composite cognitive ability scores were calculated from multiple neuropsychology tests; speed of processing, memory, visual-spatial, and language/executive ability.
Results: Multiple regression analysis revealed significant interaction effects between the cognitive reserve measures and depressive symptoms on at least two cognitive domains. However, this association was the inverse of what we had predicted i.e., those with greater levels of cognitive reserve exhibited decrements in cognitive performances as depressive symptoms increased, while this effect was minimal in those with lower cognitive reserve
Conclusions: Our results suggest that greater cognitive reserve does not buffer individuals from the effects of depressive symptoms on cognition but instead renders these effects more apparent. This may be because those with greater levels of cognitive reserve may use differential cognitive strategies that are more sensitive to disruption from negative affect than those with lower cognitive reserve. Future research would benefit from exploring whether these decrements, observed in individuals with greater cognitive reserve, would dissipate after depressive symptoms remit.
Correspondence: *Deirdre M. O'Shea, MS, The Taub Institute, Columbia University,Medical center, 630 West 168th street, P &S box 16, New york, NY 10032. E-mail: dmo2123@cumc.columbia.edu*

V. LLAMAS, N. COLLINS & P. HAERICH. Alexithymia and the Role of Attention in Processing Emotion.
Objective: Alexithymia is characterized by difficulty experiencing, identifying, and expressing feelings, and has been associated with many psychiatric disorders. Evidence suggests that higher order frontal lobe processes may contribute to alexithymia. Thus, the present study examined the impact and variation of attentional demands on alexithymia and the processing of emotion.
Participants and Methods: Fifty university students were administered parity tasks and the Toronto Alexithymia Scale-20 (TAS-20). The parity task requires subjects to determine whether two digits match (or mismatch) in being odd or even. Across four versions of the task, digits were presented left and right of – or superimposed on – a central, potentially interfering, task-irrelevant stimulus (a color block or image). The digits were presented alone or intermixed with two letters.
Results: The image-based parity task produced robust interference associated with all task versions, and normed-arousal and valence values of images. Subjects high on Externally Oriented Thinking (EOT) were generally faster responders than those low on EOT regardless of image arousal or valence. Importantly, subjects high on Difficulty Identifying Feelings (DIF) demonstrated less accuracy interference for positively arousing images than those low on DIF. Whereas, those lower on DIF had less accuracy interference for negatively arousing images than subjects high on DIF. Correlations between calculated interference scores and TAS-20 scores generated mixed results.
Conclusions: Overall, the current findings somewhat support previous evidence that attention may moderate the processing of emotion with varying levels of alexithymia. Findings further demonstrate that different types of alexithymia (e.g., high DIF) may be less sensitive to emotional information and cues in their immediate surroundings. The results indicated significant effects for cognitive characteristics associated with alexithymia.
Correspondence: *Veronica Llamas, Department of Psychology, Loma Linda University, 11130 Anderson Street, Suite 106, Loma Linda, CA 92350. E-mail: vlla709@gmail.com*

L.M. JENKINS, M.T. KASSEL, L.B. GABRIEL, E.A. HYMEN, A. VERGES, M. CALAMIA, N.A. CRANE, R.H. JACOBS, O. AJILORE, R.C. WELSH & S.A. LANGENECKER. Hyperactivation and Hyperconnectivity of the Emotional Salience Network are Associated with Intact Facial Emotion Perception in Young Adults with Remitted Major Depressive Disorder.
Objective: Identification of intermediate phenotypes (IPs) for psychiatric disorders by studying individuals in remission could improve detection of those at risk of relapse. We aimed to identify neurobiological IPs of Major Depressive Disorder (MDD) using resting state connectivity (RSC) and the Facial Emotion Perception Test (FEPT) during fMRI in young adults.
Participants and Methods: Twelve participants with remitted MDD (rMDD) and 11 healthy controls (HC) aged 18-23 completed the FEPT during fMRI. The FEPT presents angry, fearful, happy, sad and neutral facial expressions, and control trials present different animals. Participants selected which emotion or animal they perceived with a five button response-box. A RSC scan was performed for 11 of the rMDD participants to compare with performance.
Results: Groups did not differ significantly in accuracy on the FEPT. The rMDD group exhibited greater fMRI BOLD activation relative to HC during the FEPT in primary, secondary visual, and limbic regions. RSC was examined using seeds in two areas of the emotional salience network (ESN): the left subgenual anterior cingulate and left amygdala. ESN connected regions that correlated with performance in rMDD overlapped with the ventral frontal and anterior temporal areas that were more activate in rMDD than HC during the FEPT.
Conclusions: Performance was not different between these euthymic rMDD and HC groups. This contrasts studies showing impaired emotion perception in active MDD, suggesting emotion perception in MDD is state dependent. Increased activation in the rMDD group during the FEPT likely represents recruitment of additional brain areas to compensate performance. Connectivity analyses indicated that in the rMDD group, higher perception accuracy was associated with increased connectivity with areas within the emotional salience network. This study will follow participants for one year to establish whether the IPs of hyperactivation and hyperconnectivity predict relapse of MDD.

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

Correspondence: *Lisanne M. Jenkins, PhD, Psychiatry, The University of Illinois at Chicago, 1601 W Taylor St, Chicago, IL 60612. E-mail: ljenkins@psych.uic.edu*

B.L. ALLEN & S.A. ROGERS. The Relationship Between the Factors of the Beck Anxiety Inventory and Executive Functioning.

Objective: Multiple studies have examined the factorial dimensions underlying the Beck Anxiety Inventory (BAI) to differentiate between anxiety disorders. However, no further studies have been conducted to discriminate between the distinctive effects of the somatic and cognitive factors of anxiety on executive functions in an older population. Therefore, the current study seeks to further examine the differential relationship between the BAI factors and frontal-executive functioning among older adults.

Participants and Methods: Eighty-five older adults (65 woman, M age = 76.83) completed the BAI and selected WAIS-III subtests (i.e., Similarities, Digit Span, Digit Symbol), the CVLT-II, Trailmaking A and B, and WMS-III Visual Reproduction I and II.

Results: Correlational analyses revealed that overall BAI score was significantly negatively correlated with Digit Span, Digit Symbol, Similarities, Visual Reproduction I, Trails A & B, and CVLT-II Trial 5, ps < .05. When the BAI was broken in subfactors, there were significant negative associations between the cognitive symptoms and Digit Span, Digit Symbol, Trails A & B, CVLT-II Trial 5, and Visual Reproduction I, ps < .04. The somatic symptoms of anxiety were significantly negatively correlated with Digit Symbol, Trails A, and Similarities, ps < .02.

Conclusions: The results of this study reveal a significant negative association between anxiety and frontal-executive functioning among older adults, although this association varies with the subtypes of anxiety. Both the cognitive and somatic symptoms of anxiety negatively impacted visual processing speed. The cognitive symptoms adversely affected simple auditory attention, visual processing speed, learning, and divided attention, whereas verbal abstraction was only adversely related to the somatic symptoms of anxiety. These results demonstrate that the subtypes of anxiety appear to impact different areas of frontal-executive functioning.

Correspondence: *Brittany L. Allen, student, psychology, Westmont, 1945 pippin lane, Select a country, Click the 'Find' button to select a state/province, CA 93405. E-mail: allenbrittany11@gmail.com*

E.M. BRICENO, L.J. RAPPORT, M.T. KASSEL, A.L. WELDON, L.A. BIELIAUSKAS, J. ZUBIETA, R.C. WELSH, S.L. WEISENBACH & S.A. LANGENECKER. Unique and divergent neural activation associated with better and poorer emotion perception in healthy adults.

Objective: Dysfunction in emotion processing is prevalent across a number of neurologic and psychiatric disorders, yet is relatively understudied in neuropsychology. Facial emotion recognition is a primary and ecologically relevant aspect of emotion processing. The Facial Emotion Perception Task (FEPT) requires rapid, accurate classification of photographs of faces, providing an ecologically valid measurement of emotion processing. The present study reports the neural substrates of the FEPT and its relationship to performance accuracy in a sample of healthy adults to aid in interpretation of the FEPT in a clinical setting.

Participants and Methods: Thirty-nine healthy adults (40.8 +/- 17 years; 19 females) underwent 3T fMRI while completing the FEPT. They viewed photographs of faces and categorized the emotion perceived (happy, sad, angry, fearful). Activation for each emotion was evaluated with an event-related design, with sex and age as covariates and accuracy as a regressor.

Results: In general, performance accuracy was positively related to few regions across specific emotions, with no clusters significant for anger, and one cluster significant for the sad (cuneus/lingual gyrus), happy (middle frontal gyrus), and fearful (superior temporal gyrus) contrasts. In comparison, accuracy was negatively related to a number of cortical (particularly inferior, middle, and medial frontal) and subcortical (e.g., insula, caudate) clusters for each emotion, with both overlapping and distinct clusters for each emotion.

Conclusions: Poorer accuracy in facial emotion processing is accompanied by increased activation in a number of regions critical for emotion processing, perhaps serving either an interfering or a compensatory role. Poorer accuracy for specific emotions was associated with a network of overlapping, but distinct, neural networks. Clarification of these networks can lead to improved understanding of dysfunctional emotion processing in the clinical setting.

Correspondence: *Emily M. Briceno, Ph.D., Psychiatry, University of Michigan Health System, 2021 Commonwealth Blvd Suite C, Ann Arbor, MI 48105. E-mail: emilybriceno@gmail.com*

J. HAMILTON, T. WHITTINGTON, K. FROMING & D. NEMETH. Basic Emotion Processing Assessment and its Functional Implications.

Objective: Deficits in emotion processing have been linked to poor social interactions in healthy and clinical populations across the life-span. In children, more accurate decoders of facial emotional expressions are also seen by peers as more likable. The Comprehensive Affect Testing System (CATS) is a computerized emotion processing test designed to assess facial emotional expression identification (FEEI). The CATS has previously been used in adult but not child populations. The CATS was used to assess the relationship between children's FEEI proficiency and teacher report of behavioral functioning.

Participants and Methods: A representative mainstreamed classroom sample of children between age 6 and 13 (10.7 ± 2.9) was recruited (N= 87; male = 45.2%). Each participant completed the CATS and each participant's teacher completed the Behavior Assessment System for Children, Second Edition (BASC-2).

Results: Pearson correlations revealed less accurate fear FEEI decoding was significantly associated with greater Learning Problems (r=-.29,p <.01), Atypicality (r=-.23,p <.05), and Anxiety (r=-.25,p <.05). Less accurate disgust FEEI was significantly associated with greater Anxiety (r =-.22,p <.05). No significant correlations existed between happy, surprise, angry, and sad FEEI and teacher report.

Conclusions: The significance of fear FEEI across behavioral domains is consistent with emotion processing literature that has disproportionately focused on fear processing both functionally and neuroanatomically. FEEI and associated behavior suggest basic emotion decoding skills are detectable with the CATS and can have significant functional and interpersonal consequences. Functional neuroimaging paradigms comparing neural substrates of emotion processing between groups with known social interaction difficulties (e.g., children with pervasive developmental disorders) and control groups could further elucidate neuroanatomical underpinnings associated with poor decoding of emotionally salient stimuli.

Correspondence: *John Hamilton, PhD, Psychology, St. Jude Children's Research Hospital, 262 Danny Thomas Place, Mail Stop 740, Memphis, TN, TN 38105. E-mail: jhamilton@paloaltou.edu*

N. KESHAVARZIAN, R.L. BAILEY, J. GRIFFIN, R. STOKES & K. KEE. An Analysis of Emotional Processing in Natural Sciences Versus Humanities and Social Sciences University Students.

Objective: Recent studies have demonstrated that autism-spectrum disorders seem to be prevalent in people pursuing a career in Mathematics, Physics, Engineering, or Computer Programming. These healthy individuals with traits of autism have also shown impairments in identifying emotional valence. However, little is currently known about other aspects of emotional processing that are critical for adaptive functioning.

Participants and Methods: The current study compared 30 undergraduate students in the Natural Sciences (NS) versus 23 students in the Humanities/Social Sciences (HSS) on a broad scope of emotional processes (identifying emotional valence and arousal, emotional awareness, and emotional creativity). Participants' viewed a series of 60 positive, neutral, and negative images selected from the International Affective

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

Picture System, and then identified emotional valence and arousal using the Self-Assessment Manikin. In addition, participants' emotional awareness was assessed using the Toronto Alexithymia Scale and emotional creativity was measured using the Emotional Creativity Inventory.
Results: Results revealed that students in the NS reported less unpleasantness and experienced less arousal when viewing negative images ($t(51) = 2.35$, $p = 0.0115$, Cohen's $d = 0.65$ and $t(51) = -1.68$, $p = 0.0495$, Cohen's $d = 0.46$, respectively), but identified more unpleasantness when viewing positive images ($t(51) = -1.77$, $p = 0.042$, Cohen's $d = 0.49$) compared to students in the HSS. The NS students also tended to report more unpleasantness when viewing neutral images, $t(51) = -1.64$, $p = 0.054$, Cohen's $d = 0.44$. The group effects were at a trend level for emotional awareness ($t(51) = -1.55$, $p = 0.0635$, Cohen's $d = 0.43$) and emotional creativity ($t(51) = 1.39$, $p = 0.086$, Cohen's $d = 0.39$), with the NS sample showing poorer outcomes compared to the HSS sample.
Conclusions: These findings may potentially expand our understanding of the role of various aspects of emotional processing in different groups of healthy individuals.
Correspondence: *Neggin Keshavarzian, California State University Channel Islands, 653 Bennett, Simi Valley, CA 93065. E-mail: neggin.keshavarzian892@myci.csuci.edu*

S. JIVANI, I.J. HUNT, P.E. CLAYSON, T.J. FARRER, R. JONES & M.J. LARSON. Differences in Interhemispheric Transfer Time Across the Corpus Callosum Due to Emotional Valence of Stimuli.
Objective: Studies assessing interhemispheric transfer time (IHTT) of sensory information across the corpus callosum have been used to demonstrate a processing advantage for emotionally-salient stimuli. Past studies have primarily used behavioral data (accuracy and reaction time) to show an advantage for interhemispheric processing of angry and happy faces versus neutral faces. The latency of the P1 component of the event-related potential (ERP) provides a direct electrophysiological indicator of sensory processing and time in milliseconds for crossing the corpus callosum. Few studies to date have assessed sensory processing of IHTT using ERPs as a function of emotional valence.
Participants and Methods: Healthy controls (N=29) were presented with angry, happy, and neutral faces to their right or left visual fields while ERP data were recorded, specifically the P1 latency to both hemispheres.
Results: All images, regardless of valence, were fastest when presented to the contralateral visual field relative to ipsilateral field ($F=98.29$, $p<0.001$). An interaction effect was found for the valence of presented stimuli and the laterality (contralateral vs. ipsilateral) of stimulus presentation to P1 latencies ($F=3.84$, $p=0.03$). Specifically, P1 interhemispheric transfer latencies were faster following the presentation of angry faces relative to happy or neutral faces; happy and neutral interhemispheric transfer times did not differ.
Conclusions: Our results suggest a speeded interhemispheric transfer of information when presented with an angry stimulus. One plausible explanation may be that due to an inherent potential threat present in an angry face, there may exist an evolutionary advantage for faster processing of angry faces.
Correspondence: *Sanam Jivani, Clinical Psychology, Brigham Young University, 14925 Ox Cart Lane, Draper, UT 84020. E-mail: sanam47@gmail.com*

Psychopathology/Neuropsychiatry (Other)

I. ZILBERFAYN, E.A. WILDE, J.K. TRAN, D.S. MENEFEE, R. SANYAL, W.S. LEOPOULOS, J.L. WANNER, J.M. HICKEY, J. ANDERSON, E.D. BIGLER, R. AGARWAL & S.R. MCCAULEY. Effects of PTSD, Mild Traumatic Brain Injury, and Alcohol Abuse on Sleep Quality in OEF/OIF Veterans.
Objective: Sleep disturbance is commonly reported in Veterans, particularly those with posttraumatic stress disorder (PTSD), mild traumatic brain injury (mTBI), and alcohol abuse (ETOH). This study compared sleep quality using the Pittsburgh Sleep Quality Index (PSQI) in Veterans with varying degrees of PTSD symptoms, trauma exposure, and/or alcohol abuse.
Participants and Methods: Data from 69 previously-deployed OEF/OIF Veterans ages 18-54 years were used to investigate the impact of PTSD, mTBI, and ETOH on sleep quality. A measure of PTSD was obtained using the total score from the PTSD Checklist-Military version (PCL-M). Alcohol abuse was screened with the Alcohol Use Disorders Identification Test (AUDIT), and the total score was used as a measure of abuse. Sleep disturbance was assessed with the self-rated Pittsburgh Sleep Quality Index (PSQI: Total Sleep score). Presence/absence of mTBI was assessed with a structured clinical interview.
Results: Linear regression was conducted to determine which independent variables including 1) AUDIT (ETOH), 2) PCL-M (PTSD), and 3) presence/absence of mTBI were predictors of PSQI Total Sleep score. PCL-M and Total Sleep score were significantly correlated (0.73, $p< 0.001$), though neither mTBI nor AUDIT score was correlated with the PSQI Total Sleep score. The regression model was significant ($R2=0.537$, $Radj=0.52$, $F(3, 68)=25.16$, $p<0.001$), but only PCL-M predicted Total Sleep score from the PSQI (accounting for 54% of variance in PSQI Total Sleep score).
Conclusions: The data provide preliminary evidence that of the three conditions, PTSD symptom severity had the strongest influence on sleep quality. The relation between sleep and psychopathology is likely bidirectional, such that greater sleep disturbance exacerbates existing psychopathology (PTSD), and existence and severity of mental health conditions impacts sleep quality. Further research is needed to elucidate the impact of PTSD on sleep and to inform the development of effective sleep interventions in Veteran populations.
Correspondence: *Elisabeth A. Wilde, PhD, Physical Medicine and Rehabilitation, Neurology, and Radiology, Baylor College of Medicine, 1790 Dryden Rd., Ste 1200, Houston, TX 77030. E-mail: ewilde@bcm.edu*

J. HIGHSMITH, K. LEHOCKEY, E. WATSON, K. BICKEL, J. LOVELESS & E. EVERHART. Generalized Clinical and Subclinical Anxiety Effects on Neuropsychological Test Performance.
Objective: Many with anxiety disorders experience hypervigilance, manifested as sustained awareness to monitor for negative stimuli or threats. This state is also a sequelae of subclinical anxiety, suggesting that individuals with higher trait anxiety may recruit increased attention resources for performance monitoring. It was hypothesized that participants with Generalized Anxiety Disorder (GAD) and normal participants reporting high subclinical anxiety would show increased performance on tests requiring vigilance and error monitoring.
Participants and Methods: Fifty-six healthy, adult participants completed the State-Trait Anxiety Index (STAI), and a neuropsychological test battery focused primarily on executive functioning measures. A follow-on study used an identical procedure with fourteen participants with Anxiety Disorders Interview Schedule (ADIS-IV) confirmed GAD, and fourteen matched controls.
Results: Test scores were factor analyzed, which revealed a four factor solution of Memory, Processing Speed, Vigilance, and Higher Executive Functions. Unit-weighted factor scores were computed for each participant. For normal adult participants, trait anxiety was significantly positively correlated with Vigilance scores ($r = .281$, $p = .036$). Between group one-way ANOVA identified significantly higher Vigilance factor scores for the GAD group over controls, $F(1, 27) = 10.237$, $p = .004$, $\eta^2 = .394$, with a trend toward significantly lower Processing Speed factor scores for the GAD group, $F(1, 27) = 3.611$, $p = .069$, $\eta^2 = .139$.
Conclusions: These findings are of clinical significance in interpreting the effects of anxiety on neuropsychological test performance. Participants with both generalized and subclinical anxiety demonstrated increased vigilance for errors, although possibly at the expense of processing speed. While this may signify differing approaches to the tests,

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

it does suggest that trait anxiety scores would aid in interpreting profiles for both clinical and subclinical anxiety patients.
Correspondence: *Jonathan Highsmith, East Carolina University, 10261 Green Moss Dr. S, Cordova, TN 38018. E-mail: jon.m.highsmith@gmail.com*

P.E. CLAYSON, A. CLAWSON & M.J. LARSON. Cognitive Control Processes in Generalized Anxiety Disorder: Sex Differences in Error-Related Performance Monitoring Indices.
Objective: Abnormal cognitive control processes related to performance monitoring have been observed in individuals with generalized anxiety disorder (GAD). Previous research in healthy controls evidenced sex differences in early error detection and a functional relationship between anxiety and early error detection that may be specific for females. The current investigation examined sex differences in the relationship between GAD and the ERN, an electrophysiological index of early error detection, in healthy controls and individuals with GAD.
Participants and Methods: Behavioral (response time [RT], error rates) and high-density event-related potential (ERP) data were acquired while 54 healthy controls (38 female, 16 male) and 20 individuals with GAD (26 female, 4 male) completed a modified Eriksen flanker task. Behavioral data were analyzed using a Group (controls, GAD) x Sex (male, female) x Congruency (congruent, incongruent) analysis of variance (ANOVA) and ERN amplitude was examined using a Group x Sex x Accuracy (correct, error) ANOVA.
Results: Although participants showed longer RTs and increased error rates to incongruent compared to congruent trials (ps<.001), group- and sex-related behavioral differences were not observed. A larger ERN to error trials compared to correct trials was observed (p<.001). A significant Sex x Accuracy interaction was also observed for ERN amplitude (p=.01). Males exhibited a larger ERN and reduced correct-trial ERN compared to females (ps<.05). The GAD x Sex interaction was not significant.
Conclusions: Results suggest a similar relationship between error-related performance monitoring and sex in controls and individuals with GAD. Findings contradict previous research in healthy individuals that indicated a sex-dependent relationship between anxiety symptoms and error-related performance monitoring. Sex should be considered when investigating performance-monitoring processes but the functional relationship between anxiety symptoms and early error detection may not be sex specific.
Correspondence: *Peter E. Clayson, MA, University of California-Los Angeles, 1285 Franz Hall, Box 951563, Los Angeles, CA 90095. E-mail: pclayson@ucla.edu*

P.E. CLAYSON, A. CLAWSON & M.J. LARSON. Cognitive Control Processes in Major Depressive Disorder: Sex Differences in Error-Related Performance Monitoring Indices.
Objective: Research indicates higher rates of major depressive disorder (MDD) in females compared to males. Considering that decreased cognitive control processes related to performance monitoring have been observed in MDD, the current investigation examined sex differences in the relationship between MDD and the error-related negativity (ERN), an index of early error detection, in healthy controls and individuals with MDD.
Participants and Methods: Behavioral (response time [RT], error rates) and high-density event-related potential (ERP) data were acquired while 54 controls (38 female, 16 male) and 34 individuals with MDD (22 female, 12 male) completed a modified Eriksen flanker task. Behavioral data were analyzed using a Group (controls, MDD) x Sex (male, female) x Congruency (congruent, incongruent) analysis of variance (ANOVA) and ERN amplitude was examined using a Group x Sex x Accuracy (correct, error) ANOVA.
Results: Longer RTs and larger error rates to incongruent compared to congruent trials were observed (ps<.001). Males showed shorter RTs and reduced error rates compared to females (ps<.05). ERN amplitude was larger for error trials compared to correct trials (p<.001) and for individuals with MDD compared to controls (p=.03). A significant Group x Sex x Accuracy interaction was observed (p<.001). In controls males showed an enhanced ERN compared to females (p=.02), whereas in individuals with MDD, males showed the opposite relationship—enhanced correct-trial ERN relative to females (p=.04). Males with MDD showed a larger correct-trial ERN compared to male controls (p<.01); however females with MDD showed an enhanced ERN compared to female controls (p=.03).
Conclusions: Sex differences related to MDD were observed in error-related performance monitoring. Findings indicate sex should be considered when investigating performance-monitoring processes in MDD. Sex dissimilarities in error-related performance monitoring have potential implications for investigations of sex differences in depressive symptomatology.
Correspondence: *Peter E. Clayson, MA, University of California-Los Angeles, 1285 Franz Hall, Box 951563, Los Angeles, CA 90095. E-mail: pclayson@ucla.edu*

M. REINLIEB, P. SIDDARTH, L. ERCOLI, N. ST. CYR & H. LAVRETSKY. Cognitive outcomes following methylphenidate augmentation of citalopram in geriatric depression.
Objective: Cognitive impairment is common in late-life depression (LLD) and deficits often persist despite remission from depression. Cognitive symptoms in LLD are poorly responsive to serotonergic treatment alone, and some studies have even reported that SSRIs can have deleterious cognitive effects. We hypothesized that the addition of methylphenidate (MPH) to an SSRI, citalopram (CIT), may improve cognitive outcomes when treating this population.
Participants and Methods: 143 depressed older adults were treated in a 16-week double-blind placebo (PBO) controlled trial of MPH augmentation of CIT (n=47) compared to CIT and PBO (n=48) and MPH and PBO (n=48). All participants received a neuropsychological evaluation at baseline and endpoint, and weekly assessments of depression severity (HDRS-24). We used mixed effects models to compare cognitive change between and within treatment groups, and determine whether cognitive change (if any) was moderated by remission of depression (HDRS≤6).
Results: There were no differences in baseline neuropsychological test performance between groups. Controlling for age and education, there were no significant differences between treatment groups on cognitive change. Within group, all treatment groups demonstrated significant improvement in language (BNT, FAS) and nonverbal memory (RCFT delay). The CIT+PBO group additionally improved in processing speed (WAIS-III Digit Symbol, TMT-A). Remission status moderated improvement in nonverbal memory for MPH+PBO and CIT+PBO groups.
Conclusions: Antidepressant treatment led to improved cognition across all groups, but remission status moderated improvement only in nonverbal memory for MPH+PBO and CIT+PBO groups. Although antidepressant treatment appeared beneficial for cognition, augmentation with MPH did not offer additional cognitive benefits in LLD. Our findings suggest that cognitive improvement as a result of antidepressant treatment may be independent of improvement in depression. These findings have important implications in the treatment of LLD.
Correspondence: *Michelle Reinlieb, UCLA, 633 Midvale Avenue, apt 6, Los Angeles, CA 90024. E-mail: reinliebm@gmail.com*

A. CARTER, M.R. BASSO, A. MILLER, A. HARIKUMAR, D. WHITESIDE, B. ROPER & D. COMBS. Punishment Response Biases in Depression: Implications for Neural Models.
Objective: Depression is characterized by deficient response to reward contingencies. This appears mediated by medial and orbital frontal lobe structures, and is most pronounced among patients with anhedonic symptoms (Pizzagalli et al., 2008; 2009). However, response of depressed patients to adverse or punitive outcomes is undefined, and it is also unclear whether specific depressive features exert a salient effect

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

upon an abnormal response to punishment. The present study addressed these issues using an implicit reward-learning task.
Participants and Methods: Participants included 27 young adults (20 females and 7 males; age: M=21.93, SD=3.47; education: M=14.26, SD=1.3). 16 met criteria for major depressive disorder based on a structured diagnostic interview. To measure facets of depression, the Mood and Anxiety Symptom Questionnaire-Short Form (MASQ; Watson & Clark, 1991) was administered. To assess punishment responsiveness, participants completed a computer administered probabilistic punishment task (Pizzagallie et al. 2008). Responsiveness to punishment was assessed by implicitly learned response biases.
Results: Anxiety-specific symptoms correlated negatively with response to punishment (r's = -.40, p = .04). Anhedonia and depressed mood did not correlate with any measures of punishment response.
Conclusions: In contrast to research concerning reward responsivity, anhedonia did not correlate with response to punishment. Rather, anxiety emerged as a more salient correlate of punishment responsivity. Thus, diminished ability to modulate behavior according to adverse outcomes may be more specifically associated with anxiety and unrelated to anhedonia. They further imply that punishment recruits other regions of cerebral activity than those normally implicated in depression. These findings have implications for clinical interventions that target depressive symptoms and for neural models of major depressive disorder.
Correspondence: *Michael R. Basso, Ph.D., Psychology, University of Tulsa, 800 South Tucker Drive, Tulsa, OK 74104. E-mail: michael-basso@utulsa.edu*

E. ESTEVIS, M.R. BASSO, R. PURDIE, D. COMBS, D. WHITESIDE & B. ROPER. Melancholic vs. Atypical Syndromes of Major Depressive Disorder: A Dissociation of Executive Function Deficits.
Objective: Neuropsychological deficits occur often among depressed inpatients but, few studies have determined the factors that contribute to such impairment. Recently, Basso et al. (2013) showed that agitated features and general negative affect predict impairment in depressed inpatients. Other clinical features may also coincide with impairment, and this study examined whether melancholic and atypical features correspond with neuropsychological impairment in depressed inpatients.
Participants and Methods: 12 unipolar depressed inpatients and 11 controls were administered a structured diagnostic interview, a brief neuropsychological battery and measures of emotional distress to assess symptom severity. Demographically corrected scores were analyzed, precluding the need to statistically control for such factors.
Results: To reduce Type I error, a P<.01 was used, and significant correlations ranged from .4-.5. Correlations revealed significant relationships between melancholic features and concept formation tests (WCST and VCAT), but not with other measures. In contrast, atypical features correlated significantly with measures of ideational fluency/flexibility (Stroop and Fluency Measures) and verbal memory (CVLT-2) but not with measures of concept formation. Poor grooved pegboard performance correlated with both melancholic and atypical features.
Conclusions: Patients with melancholic depression are apt to experience difficulties involving reasoning and concept formation, whereas those with atypical features display dysfunction involving mental flexibility, ideational fluency, and new-learning. Both correspond with poor dexterity. Consistent with theory and neuroimaging research, these data imply frontal lobe dysfunction in depression. However, these findings are unique, because they imply that distinct neural substrates exist for each symptom cluster, each suggesting the involvement of different aspects of frontal lobe dysfunction.
Correspondence: *Michael R. Basso, Ph.D., Psychology, University of Tulsa, 800 South Tucker Drive, Tulsa, OK 74104. E-mail: michael-basso@utulsa.edu*

A. HARIKUMAR, M.R. BASSO, A. CARTER, A. MILLER, D. COMBS, D. WHITESIDE & B. ROPER. Neuropsychological Correlates of Atypical Depressive Symptoms Among Outpatients.
Objective: Deficits involving executive function and new learning occur commonly among people with depression. These deficits have been linked to psychotic features, depression chronicity, and severity of depression. However, the impact of agitation or atypical features of depression have received little attention. Their relationship with neuropsychological dysfunction was assessed among depressed outpatients and a control sample.
Participants and Methods: Participants included 48 young adults recruited from a university setting. 16 met diagnostic criteria for major depressive disorder based on structured diagnostic interview. All were administered the Inventory of Depressive Symptoms (IDS), Stroop Color Word Test, California Verbal Learning Test-2 (CVLT-2), and the Iowa Gambling Test (IGT). IDS items were summed to assess total depressive severity, agitated symptoms, and atypical symptoms.
Results: To control for Type I error, a p<.01 was employed. Atypical symptoms correlated with IGT(r=-.4), and CVLT-2 recall and recognition (r's=-.4). Agitated symptoms correlated with Stroop inhibition (r=-.4) and inhibition/switching (r=-.5) and CVLT-2 delayed recall (r=-.5). Total IDS score correlated only with Stroop inhibition (-.4) and CVLT-2 recall (-.5) and delayed recall (r=-.6). No other correlations were significant.
Conclusions: Distinct patterns emerged, with agitation relating to mental flexibility, and atypical symptoms associating with impulsive responses. Both related to recall, but only atypical symptoms reflected poor recognition, implying that poor acquisition is consequent to atypical symptoms. Overall depressive severity failed to demonstrate a unique relationship with neuropsychological function, offering credence to the unique associations manifested with agitation and atypical symptoms. These data conform with emerging data concerning neuropsychological heterogeneity with specific depressive dimensions.
Correspondence: *Michael R. Basso, Ph.D., Psychology, University of Tulsa, 800 South Tucker Drive, Tulsa, OK 74104. E-mail: michael-basso@utulsa.edu*

D. STRINGER, B. PESTER, A. BAKER, P. PRESNELL, K. ANGERS, N. GREER, C. ARCHER, R. RINGROSE, S. LANGENECKER, M. KAMALI, M. MCINNIS & K.A. RYAN. Title: Personality As A Clinical Tool For Estimating Cognition Among Individuals With Bipolar Disorder.
Objective: Cognitive functioning is important in psychopathology, but it is difficult for non-specialists to assess comprehensively, often requiring complex measures that can be used to screen for broad cognitive problems. If a personality proxy variable for cognition can be found in mentally ill individuals, this would aid real-time screening of cognition and streamline referrals for more comprehensive testing. Positive relations between openness to experience (O) and several aspects of cognitive functioning have been found among community adults (e.g., DeYoung, et al., 2005), but little is known about the relationship in a Bipolar Disorder (BD) population.
Participants and Methods: Using data from the ongoing Prechter Longitudinal study of BD, we examined (1) whether this relation extends to eight empirical cognitive factor scores (Langenecker, et al., 2010) in a BD sample, (2) whether other five-factor personality variables relate to cognitive factors differently in BD and healthy control (HC) samples, and (3) whether demographic and clinical variables account for shared personality/cognition variance in our samples. We hypothesized that O and cognitive variables would relate in both the BD and HC samples, whereas neuroticism and extraversion would correlate with cognitive variables in the BD sample but not the HC sample.
Results: We found that neuroticism and extraversion did not consistently correlate with cognitive performance in either the BD or HC groups, but O explained a small but significant proportion of cognitive variance (~5%) in both groups. Further, this relation persisted in the BD sample (but not the HC) when demographic variables were considered.

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

Conclusions: Clinically, O may serve as an incremental source of information about cognitive functioning among individuals with BD and may serve as an additional variable to consider when deciding who to refer for neuropsychological evaluation; nonetheless, more clinical predictors of cognitive status are needed.
Correspondence: *Deborah Stringer, Ph.D., University of Michigan, 2101 Commonwealth Blvd, Suite C, Ann Arbor, MI 48105. E-mail: dstringe@med.umich.edu*

D.F. MARSHALL, K.A. RYAN, D.M. STRINGER, M. KAMALI, B.D. PESTER, A. BAKER, P. PRESNELL, E.F. SAUNDERS, M.G. MCINNIS & S.A. LANGENECKER. Cognitive Functioning in Euthymic Bipolar Disorder and Controls with Cardiovascular Diseases and Risk Factors.

Objective: Cardiovascular diseases (CVD) and risk factors may be more predominant and may be evident earlier in the course of bipolar disorder than in the general population, yet few studies have examined the cognitive profile in these patients. This study aimed to elucidate the cognitive performance of euthymic bipolar disorder (BD) and healthy controls (HC) with and without CVD.
Participants and Methods: Groups were selected from the Prechter Longitudinal Study of Bipolar Disorder. CVD included heart attack and stroke, as well as the risk factors diabetes, high blood pressure, and obesity. One hundred thirty two individuals with euthymic BD (67 with CVD and 65 without CVD) and 150 HCs (30 with CVD and 120 without CVD) completed diagnostic interviews, neuropsychological testing, and symptom severity scales. Eight factor scores were utilized from a previous derived confirmatory factor analysis of neuropsychological tests.
Results: After covarying for age, there was a significant group effect for fine motor functioning (p=0.021), visual memory (p=0.012) and processing speed with interference resolution (p=0.001). A two-way analysis of variance revealed a significant main effect for CVD on fine motor functioning (p=0.031), as those with CVD had significantly poorer performance. There was also a significant main effect of diagnosis on visual memory (p=0.003), auditory memory (p=0.025), verbal fluency and processing speed (p=0.047), processing speed and interference resolution (p<0.001), and inhibitory control (p=0.017), as those with BD had significantly poorer performance than those without BD.
Conclusions: Results showed that those with vascular disease, regardless of diagnosis, showed greater dysfunction in fine motor functioning compared to those without a history of CVD. Future research might address identification and prevention techniques in order to reduce the burden of CVD on cognitive function.
Correspondence: *David F. Marshall, Ph.D., University of Michigan, 2101 Commonwealth Blvd., Suite C, Ann Arbor, MI 48105. E-mail: davimars@med.umich.edu*

A. BAKER, B. PESTER, P. PRESNELL, K. ANGERS, E. SAUNDERS, D. MARSHALL, D. STRINGER, M. MCINNIS, M. KAMALI, S. LANGENECKER & K. RYAN. Subjective sleep problems not related to cognitive performance in a large sample of patients with bipolar disorder.

Objective: Adverse effects of sleep on cognitive functioning have been clearly demonstrated in healthy and ill populations, even when using subjective reports of sleep. However, this relationship in patients with Bipolar Disorder (BD) has not been thoroughly investigated, despite both being pervasive problems, and sleep difficulties contributing to relapse and quality of life. We predict that those who report poorer sleep quality/greater insomnia will perform worse on cognitive tests compared to those who report better sleep.
Participants and Methods: BD participants (n=260) who were enrolled in the Prechter Longitudinal Study completed a clinical evaluation and a self-report measure of their sleep (Pittsburgh Sleep Quality Index). Current medications were coded based on prior literature. The Hamilton Depression Rating Scale-17 total excluded sleep items. Eight cognitive factors were used to represent memory, executive functioning, emotion processing, and fine motor dexterity.
Results: Controlling for mood, which was significantly related to sleep and all cognitive factors, there was no significant relationship between subjective sleep quality/duration and performance across the cognitive areas (p>.05). As expected, use of sleep inducing medications was significantly related to 7 out of 8 cognitive factors, and to sleep variables; those on sleep inducing medications (n= 187) had worse cognitive performance and sleep quality/duration than those not taking medications. Analyses excluding those on medications continued to show no relationship between sleep and cognitive performance when controlling for mood.
Conclusions: Poor subjective sleep quality was not a predictor of cognitive performance in our BD sample, questioning the reliability of self-report of sleep disturbance in BD. Further studies should investigate the accuracy of self-report measures, use objective sleep measures, or consider other contributors that explain the lack of relationship. Sleep medications are a confounding variable in sleep and cognition research.
Correspondence: *Amanda M. Baker, B.S., University of Michigan, 2101 Commonwealth Blvd, Ste C, Ann Arbor, MI 48105. E-mail: ambake@med.umich.edu*

B.D. PESTER, A.M. BAKER, P.M. PRESNELL, K.A. ANGERS, D.F. MARSHALL, D.M. STRINGER, S.A. LANGENECKER, M. KAMALI, K. LAVIN, M.G. MCINNIS & K.A. RYAN. Clinical and Cognitive Predictors of Work Performance in Bipolar Disorder.

Objective: Despite high unemployment and absenteeism in Bipolar Disorder (BD), factors related to work performance are under studied. Our prior work showed that emotion processing and executive functioning predict work status in BD. This study examined whether these same factors predict actual work functioning or if there is a subset of other cognitive/clinical factors that predict work performance.
Participants and Methods: A subsample of employed BD participants from the Prechter Longitudinal Study completed clinical, neuropsychological, and personality evaluations at baseline and a Life Functioning Questionnaire (LFQ) and mood measures at one year. The total work functioning score from the LFQ was used to categorize participants as good (n=26) or poor (n=18) work functioning based on a healthy control comparison group. Subscales assessed included degree of difficulty at work in terms of time spent at work, amount of conflict, satisfaction, and quality of work performance. Groups were compared using eight factor scores previously derived from a factor analysis of neuropsychological tests.
Results: Those with poor functioning had higher one-year depression scores compared to the good functioning group. After controlling for depression, the poor functioning group exhibited significantly worse performance on measures of inhibitory control compared to the good functioning group and had higher neuroticism/extroversion scores. Further, those with worse performance, high conflict with others, and less satisfaction, performed worse on tasks of inhibitory control compared to those with better performance, little conflict, and higher satisfaction. There were no differences between work functioning groups on any of the baseline clinical indices.
Conclusions: Inhibitory control, beyond current depression and history of important clinical indicators, appears to be a strong predictor of work performance, conflict with others, and work satisfaction. Treatments aimed at targeting inhibitory control could lead to better work recovery.
Correspondence: *Bethany D. Pester, Bachelor of Arts, Psychiatry-Neuropsychology, University of Michigan, 2101 Commonwealth Blvd, Ann Arbor, MI 48105. E-mail: bpester@med.umich.edu*

S. MACKALA, J.M. KOZICKY, E.E. MICHALAK, L.N. YATHAM & I.J. TORRES. Cognitive Performance and Quality of Life Early in the Course of Bipolar Disorder.

Objective: There is increasing scientific interest in the assessment of quality of life (QoL) in Bipolar Disorder (BD) as an indicator of

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms.
https://doi.org/10.1017/S1355617714000381

well-being and functional outcome. Several studies have reported cognitive functioning to be a significant predictor of QoL in patients with established BD, in addition to mood symptoms. However, it is unclear whether cognitive functioning predicts QoL early in the course of illness. The purpose of this study was to evaluate the relationship between neuropsychological functioning and self-reported QoL early in the course of BD.

Participants and Methods: Clinically stable patients (n=55) recently diagnosed with Bipolar I Disorder completed neuropsychological tests assessing sustained attention, verbal memory, executive functioning, and working memory. QoL was assessed 6 months later using the Quality of Life Enjoyment and Satisfaction Questionnaire. Cognitive predictors of QoL were assessed through Pearson correlations and multiple hierarchical regression.

Results: After accounting for mood rating scores at baseline ($\Delta R2=.14$, $p<.05$), measures of sustained attention ($\Delta R2=.09$, $p<.05$), verbal memory ($\Delta R2=.10$, $p<.05$), working memory ($\Delta R2=.08$, $p<.05$), and executive functioning ($\Delta R2=.10$, $p<.05$) each predicted QoL when entered independently in separate regression models. However, when entered simultaneously in a separate hierarchical regression, the four cognitive domains explained an additional 17% ($p<.05$) of the variance in QoL beyond mood symptoms, although none of the four cognitive measures predicted significant unique variance.

Conclusions: Cognitive performance is a significant predictor of reduced QoL early in the course of BD, even after controlling for mood symptoms. Cognitive-enhancing interventions may be important targets for restoring QoL among BD patients early in the course of illness.

Correspondence: *Sylvia Mackala, Psychiatry, University of British Columbia, 2C7 2255 Wesbrook Mall, Vancouver, BC V6T 2A1, Canada. E-mail: sylvia.mackala@ubc.ca*

S.I. DEV, B.S. MCKENNA, A.N. SUTHERLAND & L.T. EYLER. Increased Cerebral Blood Flow Associated with Better Inhibition in Bipolar Disorder.

Objective: Impairment on inhibitory tasks has been well documented in bipolar disorder (BD). Differences in cerebral blood flow (CBF) between BD patients and healthy comparison (HC) participants have also been shown, although both hypo - and hyper-perfusion in BD groups have been reported in PET and SPECT studies. Few studies have examined the relationship between cognitive performance and regional CBF in this patient population. We hypothesized that group differences on a neuropsychological task involving inhibition (the Delis-Kaplan Executive Function Scale's Color-Word Inhibition task) would be associated with differential CBF in frontal and parietal regions.

Participants and Methods: Whole brain resting CBF was measured using Multiphase Pseudocontinuous Arterial Spin Labeling (MP-PCASL) MR imaging for 26 euthymic BD and 35 HC participants. Total grey matter (GM) CBF was measured, and regional CBF values were extracted for each cortical lobe using Freesurfer-based individual parcellations. Group, CBF, and group X CBF interactions were examined as predictors of inhibition performance.

Results: Groups did not differ in age, gender or education. BD patients performed significantly worse on Color-Word inhibition ($p = .04$). There were no significant group differences in total GM or regional CBF. There was a group by CBF interaction in the right and left frontal ($p = .02$ and $p = .03$) and right parietal ($p = .03$) lobes such that those with higher CBF had better inhibitory performance in the BD group, while the opposite was true of the HC group. A similar group by total GM CBF interaction approached significance ($p = .07$).

Conclusions: Although CBF was not abnormal in this euthymic BD sample, results confirm previous reports of inter-episode inhibitory deficits and indicate that the perfusion-cognition relationship is different in BD compared to HC individuals. Further investigations are needed to determine if clinical symptoms of BD contribute to neurovascular health, and how this relates to cognitive performance.

Correspondence: *Sheena I. Dev, B.S., Psychiatry, University of California, San Diego, 3350 La Jolla Village Drive, Building 13, San Diego, CA 92161. E-mail: sdev25@gmail.com*

N. OJEDA, J. PEÑA, C. SCHRETLEN, A. GARCIA, E. BENGOETXEA, N. IBARRETXE & G. MIGUEL. Cognitive Impairment in First-Episode Bipolar I Disorder: The Processing Speed Hypothesis.

Objective: Cognitive impairment in bipolar disorder has been well documented. Specifically, processing speed has been recognized as a core cognitive impairment in several disorders, including bipolar disorder. The aim of this study was to determine whether processing speed underlies cognitive impairment on verbal memory, visual memory, verbal fluency, working memory, motor speed and executive functioning in first-episode bipolar disorder. We also tested if controlling for the rest of cognitive domains independently would show similar results to those found after controlling for processing speed.

Participants and Methods: Twenty-nine patients with first-episode bipolar I disorder and 56 healthy controls were assessed in terms of sociodemographic, clinical and cognitive variables. Cognitive domains included processing speed, verbal memory, visual memory, verbal fluency, working memory, executive functioning and motor speed.

Results: Patients showed significant impairment on all cognitive domains compared to normal controls. Most impaired domains were processing speed (effect size; $\eta2 = 0.45$) and visual memory ($\eta2 = 0.42$). However, after controlling for the effect of processing speed, significant differences in verbal fluency, executive functioning, motor speed and working memory disappeared. Differences in verbal and visual memory remained significant although effect size considerably diminished. In contrast, when other cognitive domains were entered as covariates, differences remained significant for all domains, except for executive functioning.

Conclusions: Processing speed may be considered a core deficit in bipolar disorder that underlies other higher cognitive functions. Future treatment guidelines should target this underlying feature of the illness to improve quality of life of patients with bipolar disorder.

Correspondence: *Natalia Ojeda, PhD, of Methods and Experimental Psychology, Universidad de Deusto, Avenida de las Universidades 27, Bilbao 48007, Spain. E-mail: nojeda@deusto.es*

Psychopathology/Neuropsychiatry (Schizophrenia)

N. OJEDA, J. PEÑA, A. GARCIA, N. IBARRETXE & M. GUTIERREZ. Insight Mediates the Relationship of Cognitive Reserve and Functionality in First Episode Psychosis.

Objective: The current literature is inconsistent with how well both insight and neurocognition can predict long-term outcome measures. Moreover, Barnet et al suggested in 2006 that cognitive reserve is important in neuropsychiatric disorders. Nevertheless, it has not been explored in the prediction of functionality. Therefore the aim of the present study was to analyze the role of insight and cognitive reserve in the prediction of functionality in psychosis.

Participants and Methods: Sixty nine patients with First-Episode-Psychosis were recruited. All underwent a full clinical, cognitive and functional evaluation with baseline and six-month follow-up. Insight was assessed with the Scale to Assess Unawareness of Mental Disorders. Functionality was measured with the Global Assessment of Functioning. Cognitive reserve score was estimated using Vocabulary subtest from WAIS-III and years of formal education completed by each subject.

Results: Insight dimensions ($r=-0.32$ to -0.43; $\alpha<0.05$) and cognitive reserve ($r=0.25$; $\alpha<0.05$) were correlated to functionality. Mediational analysis showed that each insight dimension mediated totally the relationship between cognitive reserve and functionality. In other words, insight dimensions are the mechanism by which cognitive reserve influences functional outcome at six-month follow-up. Unstandarized β

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

dropped from 0.296 to 0.146, 0.161, 0.108 and 0.111 (respectively to the insight dimension explored). These changes were significant at 0.05 level (Z=1.93; Z=1.73; Z= 2.23; Z=2.18).
Conclusions: Our results offer a closer picture of the complexity of the interactions explaining final outcome in psychosis. Patients with a larger cognitive reserve will potentially present a better functional outcome after the FEP.
Funding sources: Department of Health and Consumption of the Basque Government. Project N: 2011111102
Correspondence: *Natalia Ojeda, PhD, of Methods and Experimental Psychology, Universidad de Deusto, Avenida de las Universidades 27, Bilbao 48007, Spain. E-mail: nojeda@deusto.es*

T. CARRATHERS, J.E. ROSEBERRY & S.K. HILL. Serial Position Effect and Error Types for Sequential Recall Tasks in Schizophrenia.
Objective: Serial position deficits are well established in schizophrenia. Previous research on the serial position effect for sequential processing tasks in individuals with schizophrenia is limited and has focused on either verbal or nonverbal tasks.
Participants and Methods: Serial position effects were examined in 27 schizophrenia patients and 25 demographically similar healthy controls for both verbal and nonverbal sequential recall tasks. Primacy and recency were examined in participants across domains, including norm-referenced and experimental sequential recall tasks. Additionally, group differences in error patterns in these tasks were examined.
Results: Patients and controls did not display differential performance across tasks, which may reflect how well the groups were matched. Both patients and controls had reduced recall for the last two items compared to the first two items across tasks [F (1, 47) = 52.92, p < .01] and had significantly lower recall for nonverbal (Spatial Span, externally paced and unpaced experimental tasks) compared to verbal (Digit Span) recall [F (1, 47) = 16.28, p < .001]. Additionally, both groups displayed a pattern of performance characterized by significantly more errors during nonverbal compared to verbal sequential recall, a higher rate of transposition errors early in responding (first two serial positions) [F (1, 46) = 9.16, p < .01], and a higher likelihood of intrusion errors in the final two positions [F (1, 46) = 23.01, p < .001].
Conclusions: Information at the end of a sequence must be maintained longer and may thus be is more vulnerable to degradation, distraction, or other disruption. Loss of information for the end of lists may increase the probability of guessing and subsequent intrusion errors; whereas the tendency to switch the serial position of two correct responses (transposition) is more likely in the beginning when the correct items are held in memory and the position is recalled incorrectly.
Correspondence: *Tarra Carrathers, M.S., Rosalind Franklin University, 7305 314th Ave, Salem, WI 53168. E-mail: tarra.carrathers@my.rfums.org*

M. KIM & B. KANG. Relationship between IGT and WCST performances in individuals with schizotypal traits.
Objective: We investigated decision-making deficits in individuals with schizotypal traits using Iowa Gambling Task (IGT) and the relationships between IGT and Wisconsin Card Sorting Test (WCST) performances.
Participants and Methods: Participants: College students who obtained the highest 5% scores and average scores (± 0.5SD) on Schizotypal Personality Questionnaire were included in schizotypal-trait (n=21) and control groups (n=21), respectively.
Iowa Gambling Task: A computerized IGT was used to measure the decision-making. Participants were required to select one card from four decks, and each card resulted in monetary gain or loss. There were 2 advantageous decks (C& D) and 2 disadvantageous decks (A & B). Decision-making was measured by net-scores calculated by [(C+D)-(A+B)]. A total net-score and 5 block net-scores (100 trials are divided by 5 blocks) were calculated.
Wisconsin Card Sorting Test: WCST involves sorting cards based on the color, shape and number of forms appearing on the cards. WCST measures executive function including problem-solving & mental flexibility.
Results: For IGT, schizotypal-trait group showed lower total net-scores, t(40)=3.89, p<.001, and 4th, t(40)=3.90, p<.01, & 5th block net-scores, t(40)=3.58, p<.01 and selected more B cards than did control group. Control group showed increased block net-scores as blocks were progressed, F(4,80)=9.28, p<.01, whereas schizotypal-trait group did not show these increases of block net-scores, F(4,80)=2.67, ns. For WCST, schizotypal-triat group showed more total, t(40)=-2.41, p<.05 and perseverative errors, t(40)=-2.43, p<.05, than control group. There was a significant negative correlation between perseverative errors and 4th block net-score of IGT, r=-.44, p<.05, in schizotypal-trait group.
Conclusions: These results indicate that individuals with schizotypal traits have a decision-making deficit, possibly due to the perseverative tendency, and decision-making deficit could serve as a biological marker of schizospectrum disorders.
Correspondence: *Myung-Sun Kim, Ph.D, Sungshin Women's University, Sungbuk Dongsun 3ga, Department of Psychology, Seoul 136-742, Republic of Korea. E-mail: kimms@sungshin.ac.kr*

M. PARK, D. JEONG, S. KIM & M. KIM. Neuropsychological profiles of patients with schizophrenia and nonclinical individuals with schizotypal traits.
Objective: We investigated the neuropsychological profiles of schizophrenia patients and nonclinical individuals with schizotypal traits.
Participants and Methods: Participants: Schizophrenia patients (n=25), nonclinical individuals who obtained the highest 5% scores on Schizotypal Personality Questionnaire (n=28) and normal controls (n=27) participated.
Neuropsychological tests: A comprehensive neuropsychological tests, which measure the executive function (Wisconsin Card Sorting Test: WCST), verbal memory (Korean version of California Verbal Learning Test: K-CVLT), visual memory (Resy-Osterrieth Complex Figure Test: RCFT) and attention (Stroop Test), were administered.
Results: The schizophrenia, schizotypal-trait and control groups showed significant differences on WCST, K-CVLT, RCFT and Stroop tests. The schizophrenia group showed significantly worse performances on all neuropsychological tests than did control group, and schizotypal-trait group showed impaired performance only on WCST than control group. For WCST, both schizophrenia and schizotypal-trait groups showed more total errors (F(2,75)=9.17, p<.001) and perseverative errors (F(2,75)=5.27, p<.01) than control group. Schizophrenia and schizotypal-trait groups did not differ on WCST performances. For K-CVLT, schizophrenia group showed worse performance on recall of List A 1-5 trials (F(2,75)=4.89, p<.05) than schizotypal-trait and control groups. For RCFT, schizophrenia group showed worse performance on delayed recall (F(2,75)=4.34, p<.05) than did schizotypal-trait and control groups. Schizophrenia group committed more errors on color-word condition of Stroop test (F(2,75)=5.98, p<.01) than did schizotypal-trait and control groups.
Conclusions: These results indicate that schizophrenia patients have impaired functions in all cognitive domains investigated in present study, and executive dysfunction could serve as a trait marker of schizospectrum disorder.
Correspondence: *Minseok Park, sungshin woman university, gildong 103-4, Seoul 134-808, Republic of Korea. E-mail: lpf1052@hanmail.net*

A.L. PEECHATKA, J.E. JENSEN, D.A. GANSLER, M.J. KAUFMAN, A.E. EVINS & A.C. JANES. Dorsal Anterior Cingulate Glutamate Levels as an Indication of Disorder Severity in Chronic Schizophrenia.
Objective: Schizophrenia is a disorder characterized by disturbances of thought and behavior. Research suggests that schizophrenia is associated with lower levels of frontal glutamate (Glu). However, it is unclear if reduced Glu influences symptom severity and inherent brain function within a population of schizophrenics.

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

Participants and Methods: Using multimodal imaging consisting of proton magnetic resonance spectroscopy (MRS) and functional MRI (fMRI), we examined the influence of dorsal anterior cingulate (dACC) Glu levels on resting state network (RSN) function and symptom severity. We examined two commonly defined RSNs, the executive control network (ECN) and default mode network (DMN). RSNs exhibit correlated low-level brain fluctuations indicative of inherent function and organization. The sample included 20 participants who met criteria for schizophrenia or schizoaffective disorder-depressed type. MRS and fMRI data were acquired on a 4 tesla (T) and 3T scanner, respectively. MRS data were processed with LCModel and fMRI data were processed using FSL. A median split was used to establish relative high and low Glu groups (N's=10). An independent components analysis was used to identify the ECN and DMN, and RSN differences were compared between groups using non-parametric permutation testing. A two-tailed t-test was used to examine group differences on clinical measures.
Results: Participants with lower dACC Glu levels demonstrated both greater connectivity within the ECN and DMN ($p > 0.05$) and exhibited more severe negative symptoms (t=-2.40, p=.028) than those with higher dACC Glu. There were no differences between the groups' Glu levels in control regions or control metabolite dACC levels, suggesting that the findings are specific to dACC Glu.
Conclusions: Our results suggest that chronic schizophrenics with relatively lower Glu have enhanced RSN functional connectivity and heightened negative symptom severity. Dorsal ACC Glu may be a biomarker for differentiating disorder severity among people with schizophrenia.
Correspondence: *Alyssa L. Peechatka, BS, Psychology, Suffolk University, 7 Harvard Terrace, Apartment 1, Allston, MA 02134. E-mail: alpeechatka@suffolk.edu*

A.S. BODAPATI, E.S. HERBENER & M. HARROW. Verbal Memory Differentially Predicts State and Trait Anhedonia across Schizophrenia Subtypes.
Objective: Both memory dysfunction and anhedonia are common attributes of schizophrenia. A relationship between memory deficits and anhedonia has been posited in the literature (Herbener, Rosen, Khine, & Sweeney, 2007; Strauss & Gold, 2012), because while consummatory pleasure remains largely intact in schizophrenia, anticipatory enjoyment is reduced in schizophrenics relative to controls, suggesting dysfunctional memory formation of enjoyable experiences. If this is true, then a measure of learning potential should strongly relate to anhedonia.
Participants and Methods: Data was drawn from the Chicago Follow-up Study (Harrow, Grossman, Jobe, & Herbener, 2005) and included 19 participants with paranoid schizophrenia and 25 with undifferentiated schizophrenia. State anhedonia was assessed using a symptoms checklist, trait anhedonia was determined through a modified version of the Chapman anhedonia scale, and various aspects of learning and memory were measured by the California Verbal Learning Test.
Results: A series of regressions were conducted in both subtype groups, with verbal memory scores (Trial 5, Trials 1-5, and Learning Slope) regressed onto state and trait anhedonia scores. Results indicated that verbal memory scores accounted for significant variance in trait anhedonia in the paranoid schizophrenia group ($R2 = .56$), $F(3, 13) = 4.27$, $p < .05$, whereas verbal memory significantly predicted state anhedonia in the undifferentiated schizophrenia group ($R2 = .37$), $F(3, 24) = 4.13$, $p < .05$. Notably, the groups did not significantly differ in their state or trait anhedonia levels.
Conclusions: The results of this study indicate that learning does, in fact, predict anhedonia, and that the relationship is unique across paranoid and undifferentiated schizophrenia, providing support for the theory that memory deficits are an underlying mechanism of anhedonia. These findings may have implications for differential treatment approaches across schizophrenia subtypes.
Correspondence: *Anjuli S. Bodapati, MA, Psychology, University of Illinois at Chicago, 1007 W Harrison Ave, Chicago, IL 60607. E-mail: asingh31@uic.edu*

C.Z. BURTON, L. VELLA & E.W. TWAMLEY. Associations Between Prospective Memory, Level of Disability, and Return to Work in Severe Mental Illness.
Objective: Prospective memory (the ability to remember to do things) has clear implications for everyday functioning, including employment, in severe mental illness (SMI). This study aimed to evaluate prospective memory performance and its relationship to real-world functional variables in an employment-seeking sample of people with SMI.
Participants and Methods: 153 individuals with depression (n=58), bipolar disorder (n=37), or schizophrenia (n=58) who were receiving outpatient psychiatric care at a university clinic enrolled in a trial of supported employment and completed a baseline assessment. On average, participants were 44 years old and had completed 13 years of education. Prospective memory was measured with the Memory for Intentions Test (MIST); real-world functional status included work history variables, clinical history variables, baseline functional capacity (UCSD Performance-based Skills Assessment-Brief), and work outcomes (weeks worked and wages earned during the first year of supported employment).
Results: Participants with schizophrenia performed significantly worse on the MIST than did those with affective disorders. The MIST summary score was significantly related to measures of disability and illness burden (months worked in the past five years, r=.19, p=.019; amount of disability benefits, r=-.22, p=.011; number of hospitalizations, r=-.17, p=.045 and months hospitalized r=-.301; p=.001), functional capacity (r=.32, p<.001), and work outcomes in the first year (weeks worked, r=.26, p=.003; wages earned, r=.17, p=.049). These relationships were particularly strong within the schizophrenia group.
Conclusions: Prospective memory appears to be associated with illness burden and functional disability in SMI. Mental health clinicians and employment specialists may counsel clients to use compensatory prospective memory strategies to improve work performance and decrease functional disability associated with SMI.
Correspondence: *Cynthia Z. Burton, SDSU/UCSD Joint Doctoral Program in Clinical Psychology, 140 Arbor Drive, San Diego, CA 92103. E-mail: czburton@ucsd.edu*

C.D. GILBERT, G.S. HELLEMANN, J.W. ANDERSEN, V. OGARYAN, L. BENNETT, A. KOCH, N. DETORE, R.M. BILDER, C.E. BEARDEN, E.L. BLOCH, R. MENDOZA & D.L. LEVY. Incremental Validity of a Performance-based Measure of Formal Thought Disorder in a Sample of Adults with Schizophrenia.
Objective: Formal thought disorder (FTD) and impaired psychosocial functioning are hallmarks of schizophrenia, yet the relationship between these two features of the illness is poorly understood. This study has two objectives: (1) to examine FTD as a predictor of psychosocial functioning, and (2) to examine the incremental validity of a performance-based measure of FTD over clinician-rated measures of FTD in adults with schizophrenia.
Participants and Methods: Participants (n=40) completed tests to measure several known predictors of role and social functioning, including negative and positive symptoms, FSIQ, verbal fluency, and duration of illness. FTD was measured using clinician-rated symptom scales, including the Scale for the Assessment of Positive Symptoms (SAPS) global rating of FTD and the Conceptual Disorganization item of the Brief Psychiatric Rating Scale (BPRS), as well as the performance-based Thought Disorder Index (TDI). The TDI yielded a Total TDI Score and scores for two components of FTD (Idiosyncratic Verbalizations and Combinatory Thinking).
Results: Results of stepwise regressions indicated that TDI Idiosyncratic Verbalizations provided the best additional prediction of role functioning ($R2\Delta=0.08$, $p=0.005$) and the SAPS Global FTD score provided the best additional prediction of social functioning ($R2\Delta=0.11$, $p=0.009$) after accounting for other known predictors of functional outcome. However, results of hierarchical regressions indicated that none of the TDI variables contributed significant additional variance in functional

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

outcome above that accounted for by the SAPS, BPRS, and other known predictors of functional outcome.
Conclusions: These preliminary results indicate that although FTD predicted additional variance in psychosocial functioning after accounting for other known predictors, the performance-based TDI did not provide significant incremental validity over clinician-rated symptom scales in the prediction of role or social functioning.
Correspondence: *Chelsea D. Gilbert, M.A., UCLA; Alliant International University, 4616 Norwich Ave, Sherman Oaks, CA 91403. E-mail: cdgilbert@ucla.edu*

A.A. MULLANE, M. BENNETT & P. RYAN. Relationship between Cognitive Scores, Psychotic Symptoms, and Effort in Veterans with Serious Mental Illness.
Objective: Cognitive deficits are a prominent feature of serious mental illness (SMI). However, the extent to which low cognitive test scores in people with SMI may be related to suboptimal effort has not been widely studied. This study examined the rates of valid responding in veterans with SMI using an embedded measure of cognitive effort developed for the Repeatable Battery for the Assessment of Neuropsychological Status (RBANS) and their relationship to cognitive scores and psychotic symptoms.
Participants and Methods: Archival RBANS data were obtained from a sample of Veterans with SMI (n = 138; mean age = 55 ± 7; 80.9% male; 70.6% African American, 14.7% Caucasian). Descriptive, correlational, and regression analyses were conducted to examine the relationship between cognitive scores, effort (RBANS Effort Index; EI; Silverberg et al., 2007) and symptom presentation as measured by the Brief Psychiatric Rating Scale.
Results: Using an EI cutoff of > 3, 8.1% of veterans demonstrated invalid performance. After controlling for effort, global cognitive impairment scores (M = 80.91 ± 22.17) were lower for participants presenting with more negative symptoms (r = -.23, p = .011). Stepwise regression analysis found that effort accounted for a small but significant proportion of variance in overall cognitive scores above that accounted for by age, education and severity of negative symptoms (R^2 = .08, p = .002).
Conclusions: Rates of valid responding in this sample population was higher than those in other studies examining effort for individuals with SMI. Only negative symptoms were significantly inversely correlated with effort scores. Studies have suggested that suboptimal effort is attributable to negative symptoms. However, effort accounted for a larger part of the variance in cognitive impairment scores above the contribution of negative symptoms. This study highlights the continuing need for inclusion of effort measures in research examining cognitive functioning.
Correspondence: *Audrina A. Mullane, M.A., Neuropsychology, VAMHCS/UMB Psychology Internship Consortium, 3020 Fallstaff Manor Ct, Apt H, Baltimore, MD 21209. E-mail: aa.mullane@gmail.com*

L. GAVRON, J. PAULSON, M. FISHER & S. VINOGRADOV. Social Functioning and Social Cognition as Related to Coping Strategies in Individuals with Schizophrenia.
Objective: Social cognitive deficits are primary features of schizophrenia that are associated with important coping strategies. Understanding relationships between social cognition, social functioning, and coping may inform treatment.
Participants and Methods: The present study examined social cognitive performance and social functioning predictors of coping strategies in 55 individuals with schizophrenia or schizoaffective disorder who participated in an ongoing study of cognitive training for schizophrenia. Participants were recruited from community mental health settings and outpatient clinics in the San Francisco Bay Area. Social cognition was assessed with The Mayer-Salovey-Caruso Emotional Intelligence Test, and social functioning was assessed with the Social Functioning Scale. Coping strategies were measured with the Brief Cope Inventory.
Results: Results of multiple regressions indicated that, after controlling for a premorbid IQ estimate, social cognition and social functioning have unique relationships with coping strategies. Social functioning uniquely accounted for 10.4% of the variance in acceptance, 15.5% of the variance in active coping, 20.5% of the variance in emotional support above and beyond premorbid IQ and social cognition. Social cognition, on the other hand, uniquely accounted for 8.5% of the variance in emotional support above and beyond social functioning. However, social cognition did not significantly account for unique variance in acceptance, active coping, behavioral disengagement, or instrumental support above and beyond premorbid IQ and social functioning.
Conclusions: Results indicate that social functioning and social cognition have independent relationships with various coping strategies. These results emphasize the importance of treatment that focuses on functioning as well as cognitive remediation for individuals with schizophrenia.
Correspondence: *Lauren Gavron, Psychiatry, University of California, San Francisco, 316 19th Ave., #2, San Francisco, CA 94121. E-mail: gavronla@gmail.com*

A. BUCHHOLZ, H. AMSBAUGH, S.K. HILL, J.L. REILLY, J.M. GOLD, J.R. BISHOP, C.A. TAMMINGA, G.D. PEARLSON, M.S. KESHAVAN & J.A. SWEENEY. Beyond General Neuropsychological Deficits, Familiality of Working Memory Impairment is Evident in Schizophrenia but Not in Schizoaffective and Psychotic Bipolar Pedigrees.
Objective: Working memory impairment is well established in disorders with prominent psychotic features. The relative magnitude, diagnostic specificity, familial patterns, and degree of independence from the generalized cognitive deficit associated with psychotic disorders remains to be clarified. This report from the Bipolar and Schizophrenia Network on Intermediate Phenotype (B-SNIP) consortium examined working memory across the bipolar-schizophrenia continuum in probands and first-degree relatives in the context of generalized neuropsychological deficits.
Participants and Methods: Participants included probands with schizophrenia (N=289), psychotic bipolar disorder (N=227), schizoaffective disorder (N=165), their first-degree relatives (N=315, N=259, N=193, respectively), and healthy controls (N=289). Participants completed the Brief Assessment of Cognition in Schizophrenia (BACS) neuropsychological battery and the WMS-III Spatial Span subtest. Separate ANCOVA were computed for probands and relatives while covarying for the BACS composite to account for overall neuropsychological level.
Results: Significant findings indicate specific working memory deficits that extend beyond generalized cognitive impairments. In probands there were no significant group differences on forward span. However, backward span performance was impaired for both schizophrenia and schizoaffective probands compared to controls. In relatives, forward and backward span deficits were observed for relatives of schizophrenia patients compared to controls. When assessing unaffected relatives of schizophrenia probands, only those with Cluster A traits were impaired compared to controls.
Conclusions: Against a background of robust cognitive deficits along the psychotic bipolar-schizophrenia dimension, the present findings indicate diagnosis specific, domain specific, and familial deficits in working memory only in schizophrenia pedigrees. Thus, working memory may be a promising disease specific intermediate phenotype rather than a shared endophenotype.
Correspondence: *Alison Buchholz, Rosalind Franklin University of Medicine and Science, 3506 Green Bay Road, Apt. 104A, North Chicago, IL 60064. E-mail: alison.buchholz@my.rfums.org*

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

Autism Spectrum Disorders

J.J. VAN STEENBURGH, M. VARVARIS, P. CHAMBERS, T.D. VANNORSDALL, B. GORDON & D.J. SCHRETLEN. Transcranial Direct Current Stimulation Changes Frontoparietal Control Network Connectivity Associated with Working Memory Performance in High-Functioning Autism.

Objective: To test whether transcranial direct current stimulation (tDCS) can alter mechanisms of working memory in high functioning adults with autism (HFA).

Participants and Methods: Eight adults with HFA (6 men; mean age = 32 years; mean education = 14.5 years) received separate sessions of anodal, cathodal, and sham tDCS over the left and right dorsolateral prefrontal cortices (DLPFC) while solving letter and spatial n-back problems. Functional MRI measured DLPFC functional connectivity (FC) before and after stimulation. Participants again solved n-back problems after their second scan. We identified regions associated with post-stimulation n-back accuracy using a seed-to-voxel approach at a threshold of $p<.05$, family-wise corrected.

Results: After sham stimulation, solution of 3-back problems depended on coherence between the left DLPFC and posterior elements of the left frontoparietal control (FPC) network (letter, $r = .874$, $p = .005$; spatial, $r = .914$, $p = .002$). After excitatory anodal stimulation was applied over the left DLPFC, 3-back accuracy depended on bilateral DLPFC synchrony (letter, $r = .878$, $p = .004$; spatial, $r = .740$, $p = .036$). After inhibitory cathodal stimulation was applied at left DLPFC, 3-back accuracy depended on synchrony among DLPFC and parietal regions bilaterally (letter, $r = .874$, $p = .005$; spatial, $r = .917$, $p = .001$).

Conclusions: Keeser et al. (J Neurosci, 2011; 31: 15284) showed that anodal tDCS applied over the left DLPFC at rest can strengthen left FPC network synchrony in healthy adults. We found that excitatory anodal tDCS applied over the left DLPFC in adults with HFA altered left FPC network activity such that bilateral DLPFC synchrony was associated with better working memory. Our findings might be explained by anterior-posterior disconnection in autism. The effects of inhibitory tDCS suggest that parietally-mediated attentional mechanisms may be recruited for working memory tasks when left-hemisphere top-down control mechanisms are inhibited in adults with HFA.

Correspondence: *Joseph J. van Steenburgh, Ph.D., Psychiatry, Johns Hopkins School of Medicine, 600 North Wolfe Street, Baltimore, MD 21287. E-mail: jvanste1@jhmi.edu*

L. KENWORTHY, C. LUONG-TRAN, K. DUDLEY, D. NAIMAN, J. STRANG, M. WERNER, K. ALEXANDER, L. CANNON, E. BAL & L. ANTHONY. Randomized Controlled Effectiveness Trial of Executive Function Invention for Children on the Autism Spectrum.

Objective: Executive dysfunction is common in autism spectrum disorders (ASD) and linked to academic, social and adaptive problems. Unstuck and On Target (UOT) is a school/home-based intervention targeting flexibility, goal-setting and planning through a cognitive/behavioral program that emphasizes self-regulatory scripts, guided/faded practice, and visual/verbal cueing.

Participants and Methods: To assess effectiveness of UOT as compared to a social skills intervention (SS) of equal intensity, 3rd-5th grade children with ASD (mean IQ=108) received UOT (n=47), or SS (n=20). Participants were matched for age, sex, race, IQ, medication status and SES prior to the interventions. UOT and SS were matched for dose of intervention and training and were delivered by school staff in small groups. Classroom teachers and parents were trained to reinforce UOT or SS. Pre-post change was measured through contextual data (BRIEF and classroom observations) and lab measures (WASI Block Design (BD) subtest, and a structured flexibility and planning measure, the Challenge Task (CT)). Evaluators were blinded. Follow-up data (9-11 months post intervention) was collected in the UOT group.

Results: ANCOVAs assessing relative improvement following UOT and SS revealed a significant main effect of group (improvement for UOT > SS) on: WASI BD, CT Flexibility, Parent/Teacher BRIEF Shift, and Parent/Teacher BRIEF Plan/Organize scores (effect sizes: medium-large); gains on many measures were sustained 9-11 months after UOT completion. Classroom observations showed UOT > SS in improvements in participants' ability to: follow directions, transition, and be flexible (all Chi sq.s >6.3).

Conclusions: UOT, a phenotype specific treatment, improves flexibility in children with ASD. Some benefits are sustained 9-11 months after intervention. UOT was implemented in mainstream schools by existing school personnel, which makes it more accessible to children and increases its potential for generalization and wider adoption as an evidence-based practice.

Correspondence: *Lauren Kenworthy, Children's National Medical Center, 111 Michigan Ave, NW, Washington, DC 20010. E-mail: lkenwort@cnmc.org*

A.M. CARSON, S. STEVENS, B. DOLAN, J.S. KARST, K. SCHOHL & A.V. VAN HECKE. Electroencephalogram Coherence in Teens with and without Autism Spectrum Disorders.

Objective: EEG coherence estimates the synchronization between neural populations. During the dynamic period of adolescence, it is important to understand how neural connections in ASD compare to typical development in regions associated with social behaviors (frontal and temporal lobes).

Participants and Methods: Teen males [26 ASD; 28 typically developing (TYP)] participated in baseline EEG. The Autism Quotient and Social Responsiveness Scale were completed. Coherence was computed in Compumedics-Neuroscan and Mathworks MATLAB at delta, theta, alpha, beta, and gamma frequencies. Coherences between electrodes in left-right frontal (F3-F4), left frontal-parietal (F3-T5) and right frontal-parietal (F4-T6) lobes were computed. A 3-way mixed repeated measures (RM) ANOVA was completed (between-groups factor: diagnosis; within group factors: electrode pairing and frequency band; dependent variable: EEG coherence) with follow-up tests. Correlations between EEG coherence and AQ and SRS were completed.

Results: RM ANOVA results showed an interaction for frequency x electrode x diagnosis ($F(4.54, 235.97)=4.49$, $p=.001$). Separate RM ANOVAs for each electrode pairing were completed. Only the left-right frontal pairing showed an interaction for frequency x diagnosis ($F(3.01, 156.72)=6.3$, $p=.001$). T-tests revealed differences between groups in theta ($t(47.94)=2.54$, $p=.01$) and alpha frequencies ($t(49.84)=23.56$, $p=.001$). Correlations for the whole sample showed increased left-right frontal alpha coherence was negatively correlated with AQ. Left-right frontal theta and alpha coherences were positively correlated with SRS in the whole sample.

Conclusions: Findings suggest potential differences in long-distance connectivity related to inter- versus intra-hemispheric connections in teens with ASD and TYPs. Correlations for the whole sample revealed that better social skills were related to increased left-right frontal alpha and theta coherence; less symptoms of ASD were related to higher left-right frontal alpha coherence.

Correspondence: *Audrey M. Carson, PhD, Baylor College of Medicine/Texas Children's Hospital, 6701 Fannin St, Suite 1630, Houston, TX 77030. E-mail: audreymcarson@gmail.com*

R. MCLEAN, A. JOHNSON, E. ZIMAK, R. JOSEPH & E.M. MORROW. Executive Function Deficits are Associated with Adaptive Function Impairment in Individuals with Autism and Average IQ.

Objective: This study aims to characterize the nature of executive functioning deficits in pedigrees with children with autism spectrum disorders with IQ in the average range. We examine the hypothesis that deficits in executive functioning relate to lower levels of adaptive functioning.

Participants and Methods: Analyses were conducted on families from the Autism Consortium Clinical Genetics Database. Proband executive functioning was assessed via the BRIEF (n=109) and D-KEFS (n=28).

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

Executive functioning was also assessed in parents (D-KEFS n=204) and unaffected siblings (BRIEF n=114, D-KEFS n=39).
Results: Individuals with ASD (with average IQ) demonstrated a high burden of executive functioning weaknesses. This was true for both preschool and school-aged children. Multiple regression analyses revealed that parent reported executive functioning deficits were related to profound reductions in adaptive functioning even after controlling for IQ. Partial correlations demonstrated that examiner-administered executive functioning measures related to adaptive socialization abilities after controlling for IQ. Interestingly, in our pedigree analysis of first-degree relatives, parents and unaffected siblings did not demonstrate executive functioning weaknesses relative to normative data.
Conclusions: These results support the hypothesis that executive functioning deficits are related to adaptive skills in children and adolescents with ASD with average IQ, and that these executive function deficits are not shared by genetic relatives. A thorough evaluation including not only cognitive functioning but executive functioning capabilities may help clinicians to determine more adeptly what therapeutic supports may be necessary for achieving best adaptive functioning outcomes in children with ASD and IQ in the average range. This study was supported in part by a Career Award in Medical Science from the Burroughs Wellcome Fund and from NIMH 1K23MH080954-05.
Correspondence: *Rebecca McLean, Brown University, 555 Prospect St., Pawtucket, RI 02860. E-mail: rebecca_mclean@brown.edu*

L.D. HAISLEY, E. TROYB, K. KNOCH, L. HERLIHY & D. FEIN. Relationship Between Executive Functioning and Restricted and Repetitive Behaviors in 8-10 Year Olds with Autism Spectrum Disorders.
Objective: There is a paucity of knowledge regarding the etiology and function of restricted and repetitive behaviors (RRBs) in individuals with autism spectrum disorders (ASD). One theory suggests that RRBs result from an underlying executive function (EF) deficit. The current study examined the associations between EF skills and RRBs in children with an ASD.
Participants and Methods: Participants (N=40) were originally diagnosed with an ASD at two years of age (M=26.23 months, SD=3.76) as part of a larger longitudinal study. Participants' diagnoses were confirmed at four (M =51 months, SD=5.28). During their final evaluation at 9 years of age (M=9.87 years, SD=0.81), 22 children were given direct EF measures (Inhibition, Animal Sorting and Tower subtests from the NEPSY-II), and the parents of 35 children were given a questionnaire assessing their child's EF skills (BRIEF-P), and RRBs (Repetitive Behavior Scale-Revised; RBS-R).
Results: Correlations showed a significant relationship between the Stereotyped Behavior subscale and both the Tower and total errors on the Inhibition subtest (r= -.509, p=.037; r=.537, p=.048 respectively). The Restricted Behavior subscale was marginally correlated with the Inhibition Total Error and significantly correlated with Semantic Word Generation subtests (r=.575, p=.051; r= -.609, p=.032), and the Compulsive Behavior subtest was also related to the Semantic Word Generation subtest (r=-.618, p=.032). Controlling for Verbal IQ, parent-reported EFs significantly contributed to models of Stereotyped Behaviors and Sameness Behavior; accounting for an additional 27% and 32% of the variance respectively.
Conclusions: Results suggest that some RRBs are related to deficits in EF skills, as assessed by both direct and indirect measures. Specifically Stereotyped Behaviors (purposeless, repetitive movements) were related to deficits in Inhibition as measured by both direct measures and parent-report. This suggests that deficits in inhibition may contribute to increased repetitive behaviors.
Correspondence: *Lauren D. Haisley, B.A., University of Connecticut, 12 Stone Pond RD, Tolland, CT 06084. E-mail: lauren.haisley@uconn.edu*

C. SONGY & D.G. NEMETH. Using the Variable of Impulsivity on the Test of Variables of Attention to Improve Medication Management in Children with Asperger's Disorder and Attention-Deficit/Hyperactivity Disorder.
Objective: A significant correlation has been found between Asperger's Disorder (AD) and Attention-Deficit/Hyperactivity Disorder (ADHD), Hyperactive-Impulsive Type. According to Goldstein & Schweback (as cited in Grodberg & Kolevzon, 2009, p. 35), out of a sample of 101 children diagnosed with an Autism Spectrum Disorder, which includes AD, 50% exhibited impulsive behavior (2004). Goldstein & Schweback used a variety of test data gathered from parents, teachers, and children, including, but not limited to, the following: Cognitive Assessment System, Conners Parent & Teacher Rating Scales, and the Wechsler Intelligence Scale for Children, Third Edition. Using multiple tests to determine if AD children have ADHD symptoms is time-intensive. The purpose of this clinical study was to find a one measure method of determining this correlation. The Test of Variables of Attention (TOVA) was chosen.
Participants and Methods: 21 children and adolescents who were diagnosed with AD were given the TOVA to see if they also qualified for a diagnosis of ADHD, Hyperactive-Impulsive Type.
Results: A significant correlation between AD and ADHD, Hyperactive-Impulsive Type emerged. Of the 15 children and adolescents who were diagnosed with both AD and ADHD, 11 had clinically significant findings (Standard Score <80) on the Impulsivity variable of the TOVA.
Conclusions: These findings allow for more efficient clinical management of children and adolescents who would benefit from medication to reduce impulsivity and improve attention. This would not only improve classroom performance, but also social interaction. In this sample, Intuniv and/or Vyvanse were found to be most effective.
Correspondence: *Chelsie Songy, B.A., The Neuropsychology Center of Louisiana, LLC, 4611 Bluebonnet Blvd, Baton Rouge, LA 70809. E-mail: chelsie1990@cox.net*

E. WODKA, T. KORIAKIN, N.A. PUTS, E.M. MAHONE, R.A. EDDEN, M. TOMMERDAHL & S.H. MOSTOFSKY. Relationship between Attention, Hyperactivity/Impulsivity, and Sensory Behavior in Autism.
Objective: To employ a multi-method multi-trait examination of the relationship between attention, hyperactivity/impulsivity, and sensory behavior in children with autism.
Participants and Methods: Sixteen children with autism spectrum disorder (ASD) ages 8-12 years completed measures assessing tactile perception (e.g., detection threshold, frequency, amplitude discrimination), attention (alerting, orienting, executive, and divided), and stereognosis. Parent reports of sensory behavior (Sensory Processing Measure: SPM) and inattention/hyperactivity (Conners) were collected.
Results: Parents rated children with ASD as having elevated sensory behaviors (Mean T-score=62.2, SD=6.7), symptoms of inattention (Mean T-score=65.5, SD=9.3) and hyperactivity (Mean T-score=66.7, SD=13.3). Children with ASD performed significantly below the mean on a measure of divided attention (Mean ScS=7.7, SD=3.3; t(1, 15)=-2.9, p<.01).Significant within-method associations were observed between parent reports of sensory behavior and both hyperactivity (r=.708, p=.001) and inattention (r=.737, p<.001).Among performance-based measures, executive attention was significantly correlated with tactile perceptual reaction time (r=.517, p=.048); while divided attention was significantly associated with tactile frequency discrimination (r=-.614, p=.015).The only significant cross-method correlation was between stereognosis and hyperactivity symptoms (r=.519, p=.033).
Conclusions: Parents of children with ASD report that their children have high levels of behavioral response to sensory input, inattention and hyperactivity; these behaviors appear strongly intercorrelated when rated by parents.Fewer and weaker associations were observed between performance-based measures; thus, it appears that some elements of sensory functioning in ASD overlap with more global self-regulation difficulties, particularly as reported by parents.

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms.
https://doi.org/10.1017/S1355617714000381

Correspondence: *Ericka Wodka, Ph.D., Kennedy Krieger Institute, 3901 Greenspring Ave, Baltimore, MD 21211. E-mail: wodka@kennedykrieger.org*

I. HUNT, A. CLAWSON, S. BALDWIN & M. LARSON. Cognitive Control and Performance Monitoring in Individuals with Autism Spectrum Disorders: A Meta-Analytic Review.

Objective: Individuals with Autism Spectrum Disorders (ASDs) often present with decreased performance monitoring and cognitive control abilities. The error-related negativity (ERN) component of the event-related potential (ERP) can be used as a physiological measure of performance monitoring. There appears to be a general consensus that ASD is associated with reduced ERN amplitudes indicating impaired performance monitoring. The aim of the current meta-analysis was to quantitatively review the nature and extent of such deficits.

Participants and Methods: 78 relevant studies were identified in a comprehensive search of the ASD literature. Of these studies, 7 met all inclusion criteria. Total participants included in the meta-analysis were 129 individuals with ASD and 112 healthy controls (total n=241). Effect sizes were corrected for small sample bias, and Cohen's d was calculated as a measure of effect size comparing the mean (+sd) of ERN amplitudes between ASD and healthy individuals. An overall between-groups effect size was calculated using a random effects model. Influence and heterogeneity analyses were also conducted.

Results: The between-groups effect size of ASD on the ERN was moderate and significant (d=0.61, p=0.02), suggesting that performance monitoring is impaired in individuals with ASD relative to psychiatrically-healthy controls. However, tests of heterogeneity were also significant $Q(df=6) = 14.05$, p=0.03. The percentage of total variability due to heterogeneity (I2) among the studies was 56.88%. This heterogeneity indicates that the individual study effect sizes are not normally distributed.

Conclusions: The current findings support the general consensus that performance monitoring is impaired in individuals with ASD. Possible causes of the heterogeneity of the data are discussed.

Correspondence: *Isaac Hunt, Brigham Young University, 4287 W Queens Ferry Dr, South Jordan, UT 84095. E-mail: isaacjameshunt@gmail.com*

A. CLAWSON, P.E. CLAYSON, W. WORSHAM, O. JOHNSTON, M. SOUTH & M.J. LARSON. Watching Others: Cognitive Control During Observation in Autism.

Objective: Individuals with autism spectrum disorder (ASD) show deficits in cognitive control, including a reduced ability to utilize performance feedback to regulate behavior. It is unclear how alterations in the environmental context affect autism-related feedback processing and contribute to cognitive control deficits. We utilized the observational FRN (oFRN), an event-related potential component that indexes feedback processing while observing feedback directed toward another person, to examine the effect of motivational and social demands on feedback processing in ASD.

Participants and Methods: High-density electroencephalogram recordings were collected from 38 individuals with ASD and 31 control participants similar on age and IQ while they observed a confederate perform the Eriksen Flanker task. Participants were instructed to count the confederate's errors and were told they would be awarded based on performance: the confederate would either earn points for the participant or herself. oFRN amplitudes were analyzed using 2-Group (ASD, Control) x 2-Accuracy (observed correct, incorrect) x 2-Point Type (own, confederate's) ANOVAs. Zero-order correlations were conducted to examine relationships between oFRN amplitudes, anxiety, and autism symptom severity.

Results: Results revealed more negative oFRN amplitudes for error trials relative to correct trials (p=.03), but no group differences for group (p=.42) or points type (p=.93). There were no significant correlations with oFRN amplitude and levels of anxiety (ps>.13) or autism symptom severity (ps>.44).

Conclusions: Results indicated no differences in feedback processing between individuals with ASD and controls while observing a confederate's performance. Accordingly, the social context of the task and motivational significance of the confederate's performance did not limit feedback processing in ASD. Future research in which the context is manipulated further is warranted to determine whether increased environmental complexity influences cognitive control in ASD.

Correspondence: *Ann Clawson, B.S., Brigham Young University, 6575 S. 2475 E., Salt Lake City, UT 84121. E-mail: clawson.ann@gmail.com*

J.A. WELLER, J. VENTER, J.H. PROST & H. ALBASHA. Do Internalizing Disorders Change Performance on Measures of Cognition and Emotion in Children with Autism Spectrum Disorder (ASD)?

Objective: Explore effects of depression and anxiety (D/A) on measures of cognitive and emotional functioning in ASD children

Participants and Methods: Seventy-nine ASD children completed measures, including the California Verbal Learning Test, Children's Version (CVLT-C), Conners' Continuous Performance Test, Second Edition (CPT-II), Wechsler Intelligence Scale for Children – Fourth Edition (WISC-IV), Revised Children's Manifest Anxiety Scale, Second Edition (RCMAS-2), and Children's Depression Inventory (CDI). ASD children were divided into two groups (those with and those without D/A) based on clinical diagnosis. Differences in performance on measures were examined. Effect sizes were utilized, due to low sample sizes (range of Ns was 30 to 40 participants).

Results: Children with and without D/A had similar Full Scale IQ scores (Low Average range). On the CVLT-C, non-D/A youth recalled a greater number of words, performed better on delayed recall, and made fewer repetitions. On the CPT-II, non-D/A children made fewer commission errors and perseverations, but showed poorer detectability. Non-D/A youth reported lower levels of physiological anxiety and negative self-esteem. Comparisons of overall and subscale scores on measures showed small to medium effect sizes in the anticipated direction and consistent with expectations based on normative data.

Conclusions: It was anticipated that ASD children with D/A would perform more poorly on measures of memory and attention and report higher levels of internalizing symptoms than their non-D/A counterparts. These hypotheses were born out in our data. The effects of internalizing disorders on children with ASD should be taken into account when conducting neuropsychological assessment of this unique subgroup. Study limitations included small sample sizes and selection bias from including only high functioning ASD. Findings provided support for future measurement work on validity of test instruments for ASD children.

Correspondence: *Jennifer A. Weller, Ph.D., Psychiatry (Child), District Medical Group, Desert Vista Behavioral Health Center, 570 W. Brown Road, Mesa, AZ 85201. E-mail: drjweller@gmail.com*

A. PERREAULT, C. HABAK, L. MOTTRON, F. LEPORE & A. BERTONE. Local Information Influences Visual Shape Perception in Autism.

Objective: Although studies have identified altered visual perception in autism at early and higher levels of visual analysis, much less is known about whether alterations at each level are related at different periods of development. Therefore, the objective of this study is to assess whether the types of local information, mediated by early (local) level perception, differentially affect intermediate level (global) visual perception in autism at different periods of development.

Participants and Methods: Forty autistic and 44 non-autistic participants were placed into school-aged (7-12), adolescent (13-18) and adult (> 18) age groups. All participants were asked to discriminate between luminance- or texture-defined circles and Radial Frequency Patterns (RFP), whose circumferences was modulated by three, five, or ten bumps. Depending on the number of bumps surrounding the

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

contour, both local and global visual analysis can be targeted. RFP discrimination thresholds (bump amplitude at threshold) were measured.
Results: Separate 2 (group) X 3 (age group) X 3 (# of bumps) mixed factorial ANOVAs were conducted for each type of stimulus attribute. For luminance-defined RFPs, no group-differences were identified at any RFP condition for any of the developmental periods assessed. For texture-defined RFPs, group-differences were identified for adolescents and adult groups, with decreased performance across all types of RFP conditions in autism.
Conclusions: The presented results support the hypothesis that decreased global perception in autism, when present, may have early (local) visual origins. Specifically, manipulating the complexity (from luminance to texture) of local attributes affected global shape perception to a greater extent in autism. Based on these results, it can be argued that alterations at early levels of analysis can in part contribute to the atypical perception of objects in autism, especially since the perception of certain types of objects, such as faces, precedes global shape analysis.
Correspondence: *Audrey Perreault, Université de Montréal, 90 ave Vincent d'Indy, Montreal, QC H2V 2S9, Canada. E-mail: perreault.audrey@gmail.com*

K. DUMAS, H. FREY, J. FOXE & S. MOLHOLM. Altered Visually Driven Dampening of Auditory Processing in Children with Autism.
Objective: Reduction of auditory sensory response is possible if the visual part in an auditory-visual stimulus is presented before the auditory part. This phenomenon has been demonstrated in both speech and non-speech electrophysiological studies in humans. The effective functioning of these mechanisms could be crucial in preparing the cortex for an incoming sensory input by using visual sensory information in a predictive manner. Any alterations in these processes could lead to sensory overload. The current study proposed to test the integrity of this sensory dampening mechanism in children with autism spectrum disorders (ASD) compared to that in typically developing children. We examined electrophysiological auditory evoked N1 response to audiovisual speech and non-speech stimuli. We predicted diminished reduction of the N1 component in the clinical compared to the control group.
Participants and Methods: We recorded evoked cortical activity in a group of typically developing children (n=32; Mage=12.1) and children with ASD (n=12; Mage=12.6). The participants were presented with three dynamic stimulus conditions (speech, non-speech, and control), both audiovisual and unisensory, randomly distributed across 11 blocks. The audiovisual stimuli were either predictive, with video onset preceding the onset of the sound (a truck moving toward an object), or non-predictive (a finger snapping), with video and sound onsetting simultaneously. Participants were instructed to click a mouse button every time they saw an unrelated briefly appearing icon in the middle of the screen.
Results: All participants understood the task (hit rate > 90% in both groups). As predicted, analyses of evoked activity revealed highly significant dampening of the auditory N1 component in the predictive conditions in the control group ($p < 0.001$). A drastic reduction of this effect was observed in the clinical group.
Conclusions: Children with ASD demonstrated altered auditory dampening effect compared to intact processing in typically developing children.
Correspondence: *Kristina Dumas, M. A., Yeshiva University, 560 West 218th Street, Apt. 5A, New York, NY 10034. E-mail: kristina.dumas@psych.ferkauf.yu.edu*

T. DUFFIELD, H. TRONTEL & E. BIGLER. Neuropsychological Investigation of Stability of Motor Functioning in Autism Spectrum Disorder (ASD).
Objective: Motor deficits on strength-of- grip (SOG) and the finger tapping test (FTT) have been reported in ASD. The purpose of this study was to examine consistency of motor performance on these two measures over time.
Participants and Methods: An all-male sample of 31 typically developing (TD) controls and 60 individuals with ASD completed FTT and SOG testing at two different time points and were a subset of participants from a longitudinal study. Motor testing was obtained at baseline (Time 1) and follow-up (Time 2), on average, 5 years apart [Time 1 mean age =15.34 (SD = 8.24); Time 2 = 20.54 (SD = 8.41)].
Results: A MANCOVA examining motor task performance between the two groups for both motor tasks (using both hands) at two time points, controlling for age, revealed a significant multivariate effect ($F(8,80) = 2.90$, $p = .007$). The magnitude of effect was small [$\rho\eta 2 = .225$; Cohen, 1988]. No group differences existed for Time1 motor performances, and thus the multivariate effect was driven completely by change over time. On follow-up, univariate effects revealed significant differences between the groups for: SOG dominant hand, $F(1,87) = 15.85$, $p < .001$; SOG nondominant hand, $F(1,87) = 9.40$, $p = .003$; FTT dominant hand, $F(1,87) = 9.82$, $p = .002$; FTT nondominant hand, $F(1,87) = 8.17$, $p = .005$. Typically developing participants outperformed ASD individuals on all measures at Time 2, although the magnitude of difference for each univariate effect was minimal ($\rho\eta 2 < 0.2$). The smallest difference was FTT nondominant hand performance ($\rho\eta 2 = .086$) and the largest was SOG dominant hand ($\rho\eta 2 = .154$). Motor performance improved for all tasks (both hands on the SOG and FTT) for both groups from Time 1 to Time 2.
Conclusions: Although initially not different, over time reduced motor performance was observed in the ASD group. Developmental issues in motor function in ASD will be discussed.
Correspondence: *Tyler Duffield, M.A., Brigham Young University, 1210 Harrison Ave, Salt Lake City, UT 84105. E-mail: tduffield2009@yahoo.com*

R. FUKATSU, H. ITO, Y. ICHIYA, M. SANO, E. TSUTAMORI, K. HAYASHI, T. FUJII & H. TAKAHASHI. Motor Functioning in Young Children with Autism.
Objective: Although social impairments are the defining features of autism spectrum disorder (ASD), children with autism often have difficulty with motor functioning. The purpose of this study was to investigate the basic motor skill in 4-, 5- and 6-year-old children with ASD.
Participants and Methods: We studied 6 boys with ASD, Case 1 to Case 6, by having them complete the Test of Gross Motor Development 2(TGMD-2) and Japanese National Standard Five-point scale Motor Ability Assessment for Young Children to assess their basic motor skills. Their chronological ages were 5 year and 7 month-old, 4 year and 7 month-old, 5 year and 9 month-old, 6 year and 3 month-old, 6 year and 0 month-old and 5 year and 10 month-old, respectively.
Results: Based on the TGMD-2, the equivalent ages for locomotor for the Case 1 to 6 were 4 year and 3 month-old, 3 year and 3 month-old, 4 year and 9 month-old, 5 year and 0 month-old, 4 year and 0 month-old and 3 year and 9 month-old, respectively, whereas their equivalent age for object control were 3 year and 0 month-old, under 3 year-old, under 3 year -old, 3 year and 0 month-old, 3 year and 0 month-old and under 3 year-old, respectively. As for the results of 25 meter-sprint, horizontal jump, a tennis ball throwing and a plastic ball (10 cm diameter) catching tests in the Five-point scale Motor Ability Assessment, their scores were all low for their ages; however, there was no apparent difference in the scores between tasks involving a tool, a ball throwing/catching, and ones not involving a tool, sprint and jump.
Conclusions: Their basic motor skills were low for their ages, and their developments of object control were poor. Since 25 meter-sprint, horizontal jump, and a ball throwing/catching are major learning tasks in physical education in elementary school in Japan, the fact that their scores are below the national average might have negative effect on their relationship with peers and their social communication when they reach school-age.

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

Correspondence: *Reiko Fukatsu, MD, PhD, Clinical Research, National Rehabilitation Center for Persons with Disabilities, Hospital, 1-4 Namiki, Tokorozawa 359-8555, Japan. E-mail: fukatsu-reiko@rehab.go.jp*

E. TROYB, K. KNOCH, L. HERLIHY, C. PAJARDO, M. STEVENS, C. CHEN, K. TREADWELL, M. BARTON & D. FEIN. Do Restricted and Repetitive Behaviors During Early Childhood Predict School-Age Outcome Among Children with Autism Spectrum Disorders?

Objective: Restricted and Repetitive Behaviors (RRBs) are core features of Autism Spectrum Disorders (ASDs) and include motor stereotypies, preoccupation with parts of objects, restricted interests, insistence on sameness, and sensory interests. Theories proposed to explain the purpose of RRBs predict a negative relationship between the presence of RRBs and the long-term outcome of children with ASD. However, studies exploring the relationship between the presence of RRBs and subsequent functioning have yielded mixed results. The current study used a longitudinal design to examine the extent to which RRBs at two points in early childhood predict school-aged functioning in 40 children with ASDs.

Participants and Methods: RRBs were examined at age 1-2 years (M=2.2, SD=0.3) and 3-5 years (M=4.3 years, SD=0.4), and were assessed using both direct observation and parent report. RRBs were used to predict cognitive functioning, adaptive abilities, and ASD symptom severity at age 8-10 years (M=9.9, SD=0.8; M(VIQ)=70.8, SD=31.5; M(NVIQ)=81.4, SD=27.4).

Results: Results indicate that RRBs observed at age 1-2 do not predict later functioning (*Adjusted* R^2<.01, *ns*), likely because RRBs are still emerging during the toddler years in children with ASD. However, when RRBs were assessed in the preschool period, they were more useful prognostic indicators of school age cognitive ability (VIQ: $F(6, 27)$=1.97, p=.11, *Adjusted* R^2=.15; NVIQ: $F(6, 27)$=1.81, p=.14, *Adjusted* R^2=.13), ASD symptom severity ($F(6, 27)$=1.53, p=.21, *Adjusted* R^2=.09), and adaptive functioning ($F(6, 27)$=1.81, p=.13, *Adjusted* R^2=.13). Specifically, more severe preoccupations with parts of objects and sensory interests in the preschool period predicted less developed cognitive skills (both *betas*=–0.36, p<.05).

Conclusions: Overall, these results indicate that whereas RRBs during the toddler years do not appear to predict subsequent functioning, RRBs during the preschool years emerged as a negative prognostic indicator for school age outcome in children with ASD.

Correspondence: *Eva Troyb, Department of Psychology, University of Connecticut, 406 Babbidge Road, Unit 1020, Storrs, CT 06269. E-mail: eva.troyb@uconn.edu*

S. DUVALL, N. KNOBLE, L. HUANG-STORMS & E. FOMBONNE. Examining Gender Differences in Autism Spectrum Disorder.

Objective: Gender differences in autism spectrum disorder (ASD) have been reported to be variable with some studies finding differences in autism severity measures and overall cognitive level and other studies demonstrating no differences. The objective was to evaluate possible gender differences in a large sample of children diagnosed with ASD.

Participants and Methods: Data were collected at the Oregon Health and Science University (OHSU; Portland, OR) an Autism Treatment Network (ATN) site. Our sample comprised 388 children with ASD including 66 girls (17%; 4.9:1 male: female ratio).

Results: No difference between girls and boys for age of referral (4.7 vs 5.2 years; p=.15), parental education (p=.70), DSM-IV diagnostic subtype (p=.99) or number of DSM-IV symptoms endorsed (7.3 vs 7.9; p=.07) were found. There was a trend for girls to be more impaired as indicated by Autism Diagnostic Observation Schedule (ADOS) Module 1 being more often used in girls (70.7% vs 56.3%; p=.07) and more girls described as non verbal (48.6% vs 35.4%; p=.14). However, girls had lower total severity scores on the ADOS (6.7 vs 7.2), a difference that just fell short of significance (p=.051). No gender differences were detected in adaptive skills (Vineland Adaptive Behavior Scale) or behavioral comorbid problems (Child Behavior Checklist). On 94 subjects with Stanford Binet-5 data (12 girls, 82 boys), no difference was found for the mean scores of NVIQ, PIQ and FSIQ. For 169 subjects (33 girls, 143 boys; mean age: 3.9 years) with Mullen ELC available, girls had lower mean scores (52.6 vs 58.0), a difference that was not significant (Wilcoxon test: p=.19).

Conclusions: Although no statistically significant gender differences were demonstrated in this sample, results suggest several trends including lower ADOS total severity scores and indications of lower cognitive and language level in girls. Future directions include more in-depth analyses with a larger multi-site ATN sample.

Correspondence: *Susanne Duvall, PhD, Psychology, Oregon Health & Science University, Institute on Development & Disability, 707 SW Gaines Street, Portland, OR Oregon. E-mail: duvall@ohsu.edu*

A. NAIR, C.L. KEOWN, M. DATKO, R. CARPER, I. FISHMAN & R. MULLER. Differential patterns of disrupted functional connectivity between thalamus and prefrontal and temporal cortex in Autism Spectrum Disorders (ASD).

Objective: In a prior study we found that children with ASD showed overall reduced thalamocortical connectivity, with some overconnectivity with temporal lobe. However, this study used very large cortical regions of interest that make functional interpretations of these findings challenging. The current study will investigate specific thalamocortical connectivity patterns for functional subregions within the frontal and temporal lobes in ASD.

Participants and Methods: Resting-state fcMRI data were acquired for 34 children with ASD (ages 8-17 years) and 34 age, sex, IQ, and motion-matched typically developing peers. Data preprocessing included motion and field map correction, spatial smoothing, isolation of low frequency fluctuations (.008<f<.08), normalization to MNI space, nuisance regression, and "scrubbing". The Harvard-Oxford cortical atlas was used to obtain masks for thalamus and for frontal and temporal subregions. Time series were extracted from frontal and temporal masks and submitted to partial correlation analyses with thalamus.

Results: We found widespread underconnectivity between most frontal subregions and thalamus bilaterally. Within the temporal lobe, underconnectivity was observed for the ASD group between thalamus and temporal pole, and fusiform gyrus. Conversely, parahippocampal, Heschl's, and superior temporal gyri showed robust overconnectivity with the thalamus bilaterally. Mixed effects were detected for inferior frontal and middle temporal gyri.

Conclusions: Extensive fronto-thalamic underconnectivity may be related to executive impairment reported in ASD. The dichotomous pattern of temporo-thalamic connectivity, with overconnectivity in auditory regions, could relate to hypersensitivity in ASD, whereas underconnectivity with other temporal regions, such as fusiform gyrus, was expected given known face perception impairment. However, further investigation will be needed to determine the functional relevance (e.g., potential compensatory role) of islands of partial thalamocortical overconnectivity.

Correspondence: *Aarti Nair, UCSD, 4455 Vision Drive Apt 2, San Diego, CA 92121. E-mail: anair@ucsd.edu*

N. LUDWIG, S. FINK, M. MOORE, L. BRADSTREET, T. KING & D. ROBINS. Behavioral Validation of a Novel Measure of Social Attribution: The Dynamic Interacting Shape Clips (DISC).

Objective: Humans naturally attribute mental states to objects that move in animate and contingent ways. This process, social attribution, is an important aspect of social cognition and is disrupted in some clinical populations. The purpose of this study was to validate a novel measure of social attribution, the Dynamic Interacting Shape Clips (DISC), designed for use in a broad range of research contexts. Specifically, this study explored whether participants recognized the social intent of the DISC.

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

Participants and Methods: Twenty-two typically developing adults (μ=22.2 y, SD=1.73) were presented with 36 DISC, which are animations (10s each) depicting simple moving geometric shapes that were intended to elicit interpretations of aggression, avoidance, approach, or non-engagement (movie types). Participants were asked to answer yes/no questions about whether the shapes were "friends" or not. They were also asked to verbally describe each clip, and these descriptions were coded for animacy (Klin, 2000) by two independent raters (Intraclass Coefficient =.879).
Results: Results indicated that participants recognized the social intent of the DISC. Participants generally answered "Yes" when asked "Were any not friends?" after viewing aggressive (μ=.924, SD=.143) and avoidance movies (μ=.909, SD=.234). In addition, participants generally answered "Yes" when asked "Are any friends?" after viewing approach movies (μ=.915, SD=.134). A between-subjects ANOVA revealed significant differences in animacy scores across movie type ($F(1,14)=9.729$, $p=.001$); a post-hoc Tukey test demonstrated that non-engagement movies were described as less animate than aggress and approach movies, but not avoid movies.
Conclusions: These data support that the DISC elicit social attributions specific to DISC designed to convey social intent based on animate and contingent movements alone. Future neuroimaging studies will extend the use the DISC to better understand the neural mechanisms underlying social attribution in typical and clinical populations.
Correspondence: *Natasha Ludwig, M.A., Georgia State University, 855 Peachtree St. NE, Atlanta, GA 30308. E-mail: natashaludwig@gmail.com*

Y. GRANADER, C. LUONG-TRAN, L. ANTHONY, S. REYNOLDS, R. EULAU, H. MEAGHER, M. ADLER WERNER & L. KENWORTHY. Exploring Cogmed in Children with Autism Spectrum Disorders.
Objective: Children with autism spectrum disorders (ASD) are known to have significant executive functioning (EF) weaknesses. Although many studies have focused on cognitive inflexibility in ASD, there are deficits across all areas of EF, including working memory. Cogmed is a computerized intervention designed to improve working memory abilities. Previous research using Cogmed with children with ADHD, epilepsy, and cancer, has shown positive effects, but there are no studies assessing its effectiveness with children with ASD, who often respond well to computerized interventions. This study aimed to pilot Cogmed with a group of children with ASD.
Participants and Methods: 15 high functioning children with ASD participated in this project as a school-based intervention at a private special education setting for children with ASD and behavioral issues. There were 5 controls who did not receive Cogmed (2 males, ages 8-10) and 10 participants who did receive the intervention (9 males, ages 9-11). Pre and post measures included: verbal and spatial span tasks, nonverbal reasoning task, classroom observations, and behaviors recorded during a structured academic situation.
Results: Despite extensive behavioral support, only 1 participant with ASD was able to complete the Cogmed protocol. A Wilcoxon signed-rank test revealed significant improvements on verbal and spatial span tasks following administration of Cogmed, while no significant results were found within the comparison sample. There was a significant correlation with a large effect (Pearson's r = .642) found between the verbal span task and the number of Cogmed sessions completed.
Conclusions: These data raise significant concerns about the feasibility of Cogmed with children with ASD. However, they do indicate promise for Cogmed increasing both visual and verbal span. Participants provided suggestions for adaptation of Cogmed (e.g., no negative feedback), prior to a trial with a broader ASD sample.
Correspondence: *Yael Granader, Children's National Medical Center, 2201 L Street NW, Apt 708, Washington, DC 20037. E-mail: yaelgranader@gmail.com*

H. TRONTEL, T.C. DUFFIELD, E.D. BIGLER, A. FROEHLICH, M.B. PRIGGE, J.A. NIELSEN, J.R. COOPERRIDER, A.N. CARIELLO, B.G. TRAVERS, J.S. ANDERSON, B.A. ZIELINSKI, A. ALEXANDER, N. LANGE & J.E. LAINHART. Intellectual Functioning and Differences in Memory Performance in Autism.
Objective: tudies have shown that individuals with autism spectrum disorder (ASD) tend to perform significantly below typical developing (TD) individuals on standardized measures of memory, even when matched on IQ. The current study sought to examine within ASD whether anatomical correlates of memory performance differed between those with average to above average IQ (AIQ Group) compared to those with low-average to borderline ability (LIQ group).
Participants and Methods: A total of 56 ASD male participants (AIQ group, N=38; LIQ group, N=18) underwent MRI and were assessed with the Test of Memory and Learning (TOMAL). The TD group was comprised of 30 individuals matched in age. Volumetric findings were based on FreeSurfer measurements that included regions of interest (ROI) within the medial temporal lobe associated with memory.
Results: Volumetrically, the LIQ group did not differ on any ROI measure compared to the AIQ and TD groups. The TD and AIQ groups performed significantly better than the LIQ group for: Paired Recall, Letters Forward, Memory for Location, or Word Selective Reminding Delayed. Both ASD groups performed significantly worse than TD for: Digits Backward, Letters Backward, Facial Memory (immediate and delayed) and Abstract Visual Memory. Although no group differences on any brain volumetric measures were observed, significant negative correlations were found between amygdala volume and memory indices for the LIQ ASD group.
Conclusions: ASD appears to be associated with reduced memory performance regardless of IQ level. Although a negative correlation between memory and amygdala volume was observed in the LIQ group, volumetrically no gross differences were observed.
Correspondence: *Haley Trontel, Ph.D., Univ Montana, 1210 E Harrison Ave, Salt Lake City, UT 84105. E-mail: htrontel@gmail.com*

Invited Symposium: Clinical Trials of Behavioral Interventions in Neurologic Patients : Developing Evidence (CE Session J)

Chair: Sureyya Dikmen

Discussants: Charles Bombardier, Nancy Temkin

1:30–3:00 p.m.

S. DIKMEN, D. EHDE, J. FANN, S.S. DIKMEN, K.R. BELL, C. BOMBARDIER & N. TEMKIN. Clinical Trials of Behavioral Interventions in Neurologic patients : Developing Evidence.
Symposium Description: Symposium Description: While much is known about impairments and disabilities in cognition, emotional health and functional limitations associated with diseases and insults to the brain, much less is known about how successful cognitive behavioral interventions are in these populations. In addition, such interventions are outside the reach of many patients due to cost, distance from health care providers, and transportation difficulties. Tele-health has proven effective in providing medical care but its success in delivering psychological interventions has not been well studied. In this symposium we present four randomized clinical trials primarily delivered by phone. Ehde will present the results of a trial involving treatment of chronic pain in subjects with MS and spinal cord injuries. The other three trials involved subjects with traumatic brain injuries. Fann will present the results of a trial for depression. Two of the other trials involved patients with moderate to severe traumatic brain injury, treated post acutely and targeting a broad range of difficulties. Dikmen will present the results of the single site and Bell that of the multisite trial.

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms.
https://doi.org/10.1017/S1355617714000381

The results of these studies highlight a number of considerations for future studies of cognitive-behavioral interventions. Our discussants Charles Bombardier (Psychologist) and Nancy Temkin (Biostatistician) will address the role of non-specific effects and therapeutic relationships in controlled trials, inter-therapist and inter-site variability, and study design issues including choice of comparison treatments and of subjects as well as outcome measures and data analysis approaches. With the current emphasis on evidence-based medicine, we need to learn how to better evaluate treatments that could potentially improve the lives of so many people who have survived traumas and diseases of the brain and are living with their sequelae.

Correspondence: *Sureyya Dikmen, PhD, University of Washington, UW Box 356490, 1959 NE Pacific Street, Seattle, WA 98195. E-mail: dikmen@u.washington.edu*

D.M. EHDE. Efficacy of Telephone-Delivered Cognitive Behavioral Therapy for Pain in Neurologic Conditions.

Objectives: Few people with chronic pain and neurologic conditions have access to in-person behavioral interventions for managing chronic pain, despite the evidence-base for such interventions in other populations such as low back pain. This presentation will discuss results from a randomized controlled trial evaluating the efficacy of a telephone-delivered cognitive behavioral therapy pain intervention (T-CBT) relative to a telephone-delivered pain education intervention (T-Ed) in a national sample (N = 207) of adults with acquired neurological disabilities, including multiple sclerosis and spinal cord injury. Methods: Participants (52 years old on average, 57% female) were randomly assigned to receive either 8 weekly 1-hour sessions of T-CBT or T-Ed, both adapted for neurologic conditions and delivered by telephone by trained therapists. The primary outcome was average pain intensity. Secondary outcomes included pain interference and psychological functioning; all were collected at pre-, mid-, post-, 3-, 6-, and 12-months post randomization. Results: Participants in both treatments had significant reductions in pain intensity; 30% of the T-CBT arm reported a clinically meaningful reduction in pain (> 30% reduction in pain intensity), whereas 28% of the T-Ed arm achieved this goal. T-CBT was superior to T-Ed in reducing pain interference and depression. Results were sustained at 6 and 12 months. Treatment satisfaction was high, with 98% of participants stating that they would recommend the study interventions. About 70% of participants noted no drawbacks of the phone-based intervention, although 24% would have wanted some in-person interaction.

Conclusions: This study supports the feasibility of telehealth interventions for patients with chronic pain secondary to neurologic conditions and raises important questions regarding control group selection in randomized trials of behavioral interventions.

Correspondence: *Dawn M. Ehde, 325 9th Ave, Box 359612, Seattle, WA 98104. E-mail: ehde@uw.edu*

J.R. FANN. Telephone and In-Person Cognitive Behavioral Therapy for Major Depression after Traumatic Brain Injury: A Randomized Controlled Trial.

Purpose

Major depressive disorder (MDD) is common after traumatic brain injury (TBI). Less than half of individuals with TBI and MDD receive any depression treatment. We performed an RCT of telephone administered and in-person brief, structured cognitive behavioral therapy (CBT) for persons with TBI and MDD.

Methods

100 adults with MDD within 10 yrs of complicated mild to severe TBI were randomized to: (1) telephone CBT (CBT-T), (2) in-person CBT (CBT-IP), or (3) Usual Care (UC). We used choice-stratified randomization to maximize ecological validity. CBT consisted of 12 sessions over 16 wks. Primary outcomes were change in depression severity on the Hamilton Depression Rating Scale (HAMD-17) and the Symptom Checklist (SCL-20) at 16 wks. Mixed effects regression models were used. We also assessed rates of MDD remission on the SCID and Patient Global Impression (PGI) scale and satisfaction with depression care.

Results

58 subjects received CBT (40 CBT-I, 18 CBT-IP) and 42 received UC. Subjects were 45.8 (SD 13.3) years old, 63% male, 90% White and 3.3 (SD 2.72) yrs post-TBI. 53% were depressed for >1 year and 38% had a history of pre-injury MDD. On the HAMD-17 there were no significant differences between the CBT and UC groups (p=.38) at 16 wks. On the SCL-20 there was a trend for the combined CBT group to improve more than UC (p=.068) and among completers the difference was significant (p=.014). The CBT-T group improved more than UC (p=.038), but the CBT-IP group did not (p=.18). 70% of the CBT-T group, 80% of the CBT-IP group and 57% of the UC group (p=.25) no longer met MDD criteria at 16 wks. CBT participants reported greater improvement on the PGI (p=.014) and greater satisfaction with depression care (p<.001), compared to UC. TBI severity and cognitive functioning did not modify treatment effects.

Conclusions

Although further research is warranted, telephone CBT holds particular promise for enhancing access to effective depression treatment after TBI.

Correspondence: *Jesse R. Fann, Box 356560, 1959 NE Pacific Street, Seattle, WA 98195. E-mail: fann@uw.edu*

S.S. DIKMEN. The Effect of a Scheduled Telephone Intervention on Outcome After Moderate to Severe Traumatic Brain Injury.

Objectives: To test the effectiveness of a scheduled telephone based intervention involving counseling and education in improving behavioral outcomes as compared to usual care in persons with moderate to severe TBI

Methods:

Design: Two group randomized clinical trial carried out over the first year after injury

Subjects: 171 adults with moderate to severe TBI were randomized into Telephone Intervention (TI) vs. Usual Care (UC) at the time of discharge from inpatient rehabilitation.

Intervention: The intervention included 9 sessions carried out over the first year focusing on problems brought up by the subject and/or significant other. The calls consisted of counseling using motivational interviewing, education, and facilitating usual care appointments. The subjects were also given toll free number to contact the therapists as needed. The Usual Care group subjects were only seen for outcome assessments

Outcome Measures: A composite outcome was used as the primary endpoint on an intent –to- treat basis. Secondary analyses involved individual measures. Outcome was assessed by measures of functional status, emotional health, and perceived quality of life.

Results:

At 1- year those who received the scheduled telephone interventions fared better on the primary composite outcome index (p<.002) as well as on some individual measures involving functional status, quality of wellbeing, and emotional health. However, there were no significant differences on vocational status or community integration.

Discussion:

Scheduled telephone based counseling and education responding to the varied needs of individual subjects and their significant others resulted in improved overall outcome, particularly in quality of wellbeing and emotional health when compared to usual outpatient care. Telephone counseling shows promise as a low-cost intervention that overcomes many barriers to outpatient rehabilitation interventions.

Correspondence: *Sureyya S. Dikmen, Box 359612, 325 Ninth Ave, University of Washington, Seattle, WA 98104-2499. E-mail: dikmen@u.washington.edu*

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

K. BELL. The Effect of a Scheduled Telephone Intervention on Outcome After Moderate to Severe TBI.
Objectives: To confirm the effectiveness of Scheduled Telephone Intervention (STI) in improving outcomes in persons with moderate-severe TBI over 1-2 years post injury.
Design: Multi-center 2 group randomized clinical trial
Subjects: 433 adults with moderate-severe TBI were randomized into STI vs. Usual Care (UC) at inpatient rehabilitation discharge.
Intervention: 12 sessions (3 to 4 days, 2-, 4-, 8-, and 12-weeks post discharge, and 5-, 7-, 9-, 12-, 15-, 18-, and 21 months post injury) focusing on self-identified problems. Master's-trained clinicians used a semi-scripted approach emphasizing self-management principles (personal autonomy, problem solving, and goal setting), education, and case management. Decision trees directed the clinicians to the intervention level needed (Level I – telephone based problem solving; Level II – local referrals; Level III – expert referrals; Level 4 – urgent). Telephone calls were digitally taped for review. The clinicians were supervised weekly by investigators. The UC group subjects were only seen for outcome assessments.
Outcome Measures: A composite outcome at 1 year was the primary endpoint. Analysis on intent-to-treat basis used linear regression adjusted for site, Glasgow Coma Scale, race/
ethnicity, age, FIM, sex, and Disability Rating Scale (DRS). Secondary analyses were conducted on individual and composite measures (FIM, DRS, community participation indicators, Glasgow Outcome Scale [Extended], Short Form-12 Health Survey, Brief Symptom Inventory-18, EuroQOL, and modified Perceived Quality of Life).
Results: No significant differences were noted between the groups at years 1 or 2 for primary (P=.987 regression for year 1, P=.983 for year 2) or secondary analyses.
Discussion: A number of factors may have entered into the lack of success of this trial: ineffectiveness of telephone-based counseling; insufficient fidelity to a treatment model; insufficient dose; difficulty in measuring effects of broad-based intervention.
Correspondence: *Kathleen Bell, University of Washington Dept Rehabilitation Medicine, Box 356490, Seattle, WA 98195. E-mail: krbell@uw.edu*

Symposium 6: Neuropsychology, Technology, and the 21st Century

Chair: Robert Kane

1:30–3:00 p.m.

R. KANE, T. PARSONS, E. BIGLER, A. CHEN, M. CULLUM & R. KANE. Neuropsychology, Technology, and the 21st Century.
Symposium Description: The objective of this symposium is to bring together presentations to explore ways in which modern technology can enhance traditional approaches to neuropsychological assessment. Dr. Thomas Parsons will present data and address concepts supporting the use of virtual reality and scenario-based assessment in neuropsychology. He will review work done in this area and discuss the potential of scenario-based assessment to enhance the ecological validity of neurocognitive evaluations and to capture aspects of executive functioning that are difficult to measure using traditional task-based testing. Dr. Erin Bigler will address integrating cognitive test performance with physiological measures and imaging metrics as an enhanced method for assessing the effects of injury and disease on cognition. He will present work showing how combining neurocognitive tests and biological measures can provide greater insight into alterations in brain functioning. He will also demonstrate how imaging can contribute to the definition of cognitive constructs and help refine assessment methods. Dr. Anthony Chen will present his work using both functional imaging and scenario-based approaches in cognitive rehabilitation. He will demonstrate individual differences in how neural networks respond to tasks. He will also demonstrate the use of computer presented scenarios in rehabilitation and how these can be implemented through telehealth. Dr. Munro Cullum will present data from his work in remote cognitive assessment. Dr. Cullum is engaged in research to better serve different populations including the implementation of telemedicine approaches. He has conducted studies to establish the clinical validity of remote cognitive assessment and will present data from these investigations. Dr. Robert Kane will serve as the discussant and also comment on the enhanced use of computer-based cognitive tests and the implications of mobile health for neuropsychology.
Correspondence: *Robert Kane, Ph.D., TATRC, 3604 Whitehaven Pkwy NW, Washington, DC 20007. E-mail: rlkane@mac.com*

T.D. PARSONS. Virtual Environment-Based Computerized Neuropsychological Assessment Devices.
The increasing availability of sophisticated simulation technologies (e.g., virtual and augmented reality) offers potential for enhancing current approaches to neuropsychological assessment of cognition and real-life activities of daily living. Like two-dimensional computerized neuropsychological assessment devices (CNADs), three-dimensional virtual environment-based CNADs (or CNAD-VEs) promise increased accuracy of timing presentation, logging of response latencies, and randomized presentation of stimuli for repeat administrations. While standard neuropsychological measures (e.g., paper-and-pencil; CNADs) are well standardized and have been found to have adequate predictive value, their ecological validity may diminish predictions about real world functioning. Since CNAD-VEs allow for precise presentation and control of dynamic perceptual stimuli (e.g., visual, auditory, olfactory, ambulatory, and haptic conditions) in simulations of real-world activities, they may provide ecologically valid assessments that combine the veridical control and rigor of laboratory measures with a verisimilitude that reflects real life situations. While CNAD-VEs offer potential for enhanced metrics within ecologically valid environments, there is a need for rigorous analysis of the psychometric properties of CNAD-VEs. Paper-and-pencil neuropsychological tests offer the advantage of being standardized in their administration, materials, and scoring. This presentation will cover the following: 1) definition of CNAD-VEs including similarities to and differences from examiner-administered neuropsychological instruments (e.g., paper-and-pencil batteries) and CNADs; 2) a brief overview of development and use of CNAD-VEs; 3) examples of CNAD-VE (e.g., virtual reality stroop task) validations with traditional neuropsychological assessments (e.g., paper-and-pencil; CNADs); and 4) discussion of the need for the development of appropriate standards and conventions for CNAD-VEs.
Correspondence: *Thomas D. Parsons, 1155 Union Circle #311280, Denton, TX 76203. E-mail: Thomas.Parsons@unt.edu*

E.D. BIGLER. 21st Century Integration of Neuroimaging with Neuropsychology.
Twenty-first Century neuroimaging and electrophysiological technology has advanced at an incredible pace. Furthermore, image analysis tools now permit automated three-dimensional (3-D) visualization of all major brain structures along with any region of interest combined with volume quantification and shape analysis. All cortical regions may be quantified in terms of volume and thickness. A number of the automated image analysis programs now have large normative databases being developed that permit comparison to healthy, typical developed individuals for age and sex. The "connectome" initiative is being driven by neuroimaging where tools from resting state functional MRI (rs-fMRI) and diffusion tensor imaging (DTI) are providing great insights into brain networks and neural connectivity. These methods are being integrated with the above mentioned structural imaging that provides comprehensive neuroanatomical and neuropathological information about normal and disorder-specific conditions. Traditional neuropsychological measures are being adapted for use within fMRI paradigms and combined with electophysiological measures that provide the temporal resolution

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms.
https://doi.org/10.1017/S1355617714000381

to assess neural function in real time (msecs). All of these technologies have become standard research tools in cognitive neuroscience but to date have not been incorporated into clinical neuropsychological assessment. It is now time for this to begin and this presentation will outline steps on how neuroimaging and electrophysiological data may be integrated with the standard clinical assessment in neuropsychology.
Correspondence: *Erin D. Bigler, 1001 SWKT, Provo, UT 84602. E-mail: erin_bigler@byu.edu*

A.J. CHEN. From Brains to Games: Technology Contributions to Sharpening Cognitive Functioning after Brain Injury.
The most common, persistent and disabling consequences of brain injury disrupt functions that direct brain processes based on goals. Effective goal-direction requires coordination of a continuum of brain functions, from a 'gateway' of selection of relevant information for processing through to guidance of actions, particularly in the context of distractions and other complexities of daily life. The speaker will discuss a line of work aimed at improving functions that regulate processes of goal-direction, highlighting projects that connect interventions with measurements of targeted functions to guide advances in intervention development. Discussion will include the following: (1) Translation of key principles into design of training interventions for improving regulation of goal-directed attention as well as behavioral and neural markers of the target functions; (2) Intervention studies that suggest that cognitive functioning can be improved even after injuries have become 'chronic,' with functional neuroimaging data delineating mechanisms that support functional improvements. Biomarkers have revealed changes in goal-directed control of neural processing and the importance of changes in brain network states. (3) Convergence of these lines of work in the development of game-assisted training, where goal-based game scenarios support application of skills and strategies to a range of cognitive contexts and challenges. Design features that augment training goals will be highlighted. Training tools have been user tested and modified for individuals with cognitive difficulties. Potential added value as well as limitations of this technology-assisted approach will be discussed, illustrated by quantitative and qualitative analyses of training data. Ultimately, intervention development informed by best clinical practices and advances in neuroscience, assisted by technology, should lead to improvements in learning and adaptation after brain injury.
Correspondence: *Anthony J. Chen, 150 Muir Rd., Center for Integrated Brain Health and Wellness, Martinez, CA 94553. E-mail: anthony.chen@ucsf.edu*

M. CULLUM. Teleneuropsychology: Evidence for Remote Neuropsychological Assessment.
Telehealth technology and clinical telemedicine applications are growing, as is the evidence base for teleneuropsychology. This presentation will cover the following topics: 1) a review of recently published guidelines (APA and American Telemedicine Association) for clinical applications of teleneuropsychology, 2) overview of practical considerations in setting up a teleneuropsychology examination, 3) review of the literature on the feasibility, reliability, and validity of teleneuropsychology, and 4) data regarding subject satisfaction with teleneuropsychology procedures. This will include data from the largest teleneuropsychology validation study to date (N > 200) using a brief battery of tests commonly used in the evaluation of older individuals with and without cognitive impairment. Tests included the MMSE, Hopkins Verbal Learning Test-Revised, Letter and Category Fluency, Boston Naming Test (15 item), Digit Span, and Clock Drawing. Test condition (i.e., teleneuropsychology vs in-person) and test forms were counterbalanced. Subjects included 119 healthy controls and 84 Ss with Alzheimer disease or mild cognitive impairment. Across all subjects, intraclass correlations (ICC) between teleneuropsychology and in-person test results were significant, with ICCs ranging from .55 to .91. Results suggest good agreement between the tests examined under VTC- and in-person administration conditions, with similar sensitivity of tests. Additional data suggest good acceptability of the procedure among individuals with and without cognitive impairment. Conclusion: Teleneuropsychology appears to be a valid means of assessment. Implications, opportunities, and future applications of remote neuropsychological assessment techniques will be discussed.
Correspondence: *Munro Cullum, U. of Texas Southwestern Med. Ctr., 5323 Harry Hines Blvd., Dallas, TX 75390-8846. E-mail: munro.cullum@utsouthwestern.edu*

Symposium 7: Early Life Experience and Late Life Cognitive Change

Chair: Bruce Reed

1:30–3:00 p.m.

B. REED, D. MUNGAS, R. MELROSE, L. BARNES, L. ZAHODNE, P. BOYLE & B. REED. Early Life Experience and Late Life Cognitive Change.
Symposium Description: Do the experiences and circumstances of childhood affect how well people retain cognitive function in the face of aging and age-associated disease? There is emerging evidence that this is true, at least for certain aspects of childhood experience. This symposium explores the possibility that childhood circumstances modify rates of cognitive decline in late adulthood. Rate of change, as opposed to baseline cognitive ability, is of particular interest methodologically, and because modifiers of change link to concepts of reserve and resilience. Most studies relating childhood circumstances to late life cognition measure cognition cross sectionally, making conclusions about effects on change quite tenuous. In contrast, the presentations of this symposium emphasize longitudinally measured cognition. Our participants will present data addressing the question of whether and how potentially malleable aspects of childhood may be associated with cognitive change. Dr. Mungas leads off with empirical modeling of the role of ethnicity in cognitive aging, making an important, and under-appreciated distinction between determinants of baseline function versus longitudinal trajectories of change in aging. Dr. Melrose's presentation, focusing on late life effects of childhood growth and SES, builds directly on that work. Dr. Barnes considers similar factors, but from a unique perspective in the powerful Rush longitudinal aging studies and will present her work on relationships between childhood adversity and late life cognitive change. The complex role of education in late life cognition is the topic of Dr. Zahodne's talk. Her strong quantitative modeling of data from the multi-ethnic WHICAP cohort has revealed interesting new perspectives on this major variable. Finally, Dr. Boyle will return to data from the Rush cohorts to present data on how experience is and is not linked to neuropathology, thus opening up a discussion of mechanism.
Correspondence: *Bruce Reed, PhD, Neurology, University of California, Davis, UC Davis ADC-East Bay, 1 Shields Ave, Davis, CA 95616. E-mail: brreed@ucdavis.edu*

D. MUNGAS, D.R. EARLY, S. TOMASZEWSKI FARIAS & B.R. REED. Demographic diversity and cognition in late life: Determinants of baseline differences are not mirrored in longitudinal change.
Cross sectional differences between elderly persons are often thought of as reflecting a combination of baseline ("premorbid") ability and a variable degree cognitive decline. Because decline is often disease related, it is important to understand the factors that are specifically associated with change. Ethnicity is a significant predictor of between person differences on neuropsychological tests. Ethnicity is also a marker for major between person differences in circumstances and life experiences. In this talk we report on investigations of how demographic variables relate to cognitive change and whether cross-sectional demographic

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms.
https://doi.org/10.1017/S1355617714000381

effects on cognitive tests are mirrored in differences in longitudinal trajectories of cognitive decline. Study participants were approximately 400 older adults (cognitive status normal to mildly demented) enrolled in an ongoing longitudinal study of cognition. Mixed-effects regression analyses were used to measure baseline status and longitudinal change in episodic memory, executive functioning, and semantic memory. We generally find that ethnicity and education are strongly associated with baseline scores but are weakly or not at all associated with longitudinal change after accounting for confounding variables. These results suggest that cross-sectional effects of demographic variables on cognitive-test scores result from differences in life experiences that directly influence test performance and do not indicate greater disease effects on cognition in minorities and those with limited education.

Correspondence: *Dan Mungas, 4860 Y Street, Sacramento, CA 95817. E-mail: ddmmungas@ucdavis.edu*

R.J. MELROSE, P. BREWSTER, M.J. MARQUINE, A. MACKAY-BRANDT, B. REED, S. FARIAS & D. MUNGAS. Low Physical Growth and Childhood SES Increase the Rate of Cognitive Decline in Late Life: Findings from the UC Davis Aging Diversity Cohort.

Childhood environmental deprivation is a risk factor for dementia. Low physical development, as evidenced by small head size and shorter height, may reflect poorer nutrition and medical illness. Low childhood socioeconomic conditions (SES), captured by family characteristics, may reflect reduced access to resources. It remains unclear how these variable impact the rate of cognitive decline in late life. Participants included 333 age 60+ adults (Caucasian, n=104; African American, n=120; Hispanic, n=109) from the UC Davis Aging Diversity cohort of Northern California. We used latent variable modeling to create two factors representing Growth (adult morphometric measurements) and childhood SES (parental education, father's occupation, family size, siblings deceased). Cognitive abilities were obtained from Spanish and English Neuropsychological Assessment Scales, a battery with equivalent psychometric properties across ethnicity and language. We used mixed effects longitudinal analysis to examine the impact of Growth and SES on global cognitive decline, controlling for ethnicity, education, gender, language of test administration, and APOE. Growth and SES were modeled as quintiles. At baseline, 66% had normal cognition, 25% were diagnosed with MCI, and 9% were diagnosed with dementia. We found good fit of a 2-factor model reflecting Growth and Childhood SES ($\chi 2[24]=37.1$, CFI=0.988). Those in the lowest two quintiles of Growth showed greater rate of cognitive decline compared to the top quintile. Those in the lowest four quintiles of SES had faster rate of cognitive decline relative to those in the top. The results of both Growth and SES were attenuated when modeled simultaneously. These findings demonstrate that early life experiences influence cognitive aging. The quality of the environment in childhood appears to provide the basis upon which additional risk and protective factors interact in the development of dementia.

Correspondence: *Rebecca J. Melrose, 11301 Wilshire Blvd., Los Angeles, CA 90073. E-mail: rjmelrose@ucla.edu*

L. BARNES, R. WILSON, S. EVERSON-ROSE, M. HAYWARD, D. EVANS & C. MENDES DE LEON. Early-life adversity and late-life cognitive decline among diverse older adults.

Early-life adversity has been shown to influence health and cognition in old age. Due to historical conditions in the U.S., older African Americans were more likely than non-Hispanic whites to experience severe adversity in early life. We examined whether early-life adversity is related to more rapid cognitive decline in late-life, and whether the relation differs by race. Participants are over 6,100 older residents (mean age = 74.9 (7.1); 61.8% African American), from the Chicago Health and Aging Project, a population-based study of risk factors for Alzheimer's disease. They underwent baseline evaluations of early-life adversity (cognitive, financial, and health), and had cognitive function tests on up to five follow-up evaluation over 16 years. In mixed effects models stratified by race, and adjusted for age and sex, early-life adversity was differentially related to decline in African Americans and Whites. While no measure of early-life adversity related to cognitive decline in Whites, both food deprivation (beta estimate = 0.022, $p<.01$) and being thinner than average (beta estimate = 0.0.021, $p<.01$) in early life were associated with a slower rate of cognitive decline in African Americans. The relations were not mediated by late-life education and persisted after adjustment for cardiovascular risk factors. Subsequent analyses restricted to African Americans revealed that the protective effect of food deprivation in early life extended to total brain volume and number of infarcts. Findings suggest that older African Americans in this population-based sample are resilient against the effects of early-life disadvantage.

Correspondence: *Lisa Barnes, Rush University Medical Center, 600 S. Paulina, Suite 1038, Chicago, IL 60612. E-mail: lbarnes1@rush.edu*

L.B. ZAHODNE, Y. STERN & J.J. MANLY. "Good Enough Schooling": Only Early Education Protects against Late-Life Cognitive Decline.

Although the relationship between education and cognitive status is well-known, evidence that education moderates the trajectory of cognitive decline in late life is conflicting. Early studies suggested that higher levels of education attenuate late-life cognitive decline. More recent studies using improved longitudinal methods have not found an effect of education on decline. For example, using latent growth curve models, we found no impact of education on 12-year declines in four cognitive domains among older adults in the Victoria Longitudinal Study (N=1,014). However, the range of education in this relatively homogenous volunteer sample was restricted, and most participants were college-educated.

The community-based Washington Heights-Inwood Columbia Aging Project follows a multi-ethnic cohort of older adults living in Northern Manhattan. On average, initially non-demented participants (N=3,443) completed 9.8 years of education. Using latent growth curve models controlling for age, sex, race, ethnicity, birth cohort, recruitment year, and time-varying indicators of depressive symptoms and chronic disease burden, we found that greater educational attainment attenuated 17-year declines in a general cognitive factor, as well as a composite score of executive and language measures. Stratified analyses revealed that these protective effects of education were present in the subgroup of participants (N=1,428) with 0 to 8 years of education, but not those (N=2,015) with 9 to 20 years of education.

Together, these studies suggest that educational experiences in early life (e.g., elementary or middle school) protect against late-life cognitive declines, whereas supplementary educational experiences in early adulthood (e.g., high school or college) do not confer additional protection. The importance of primary school quality (e.g., length of school year, student-teacher ratio, expenditures, racial segregation, urban versus rural location) will also be discussed.

Correspondence: *Laura B. Zahodne, 630 W 168 St, P & S Box 16, New York, NY 10032. E-mail: lbz2105@columbia.edu*

P. BOYLE, R. WILSON & D. BENNETT. Potential mechanisms linking childhood circumstances to trajectories of cognitive aging.

Cognitive aging is a complex phenomenon with considerable heterogeneity in cognitive trajectories; whereas some persons decline rapidly, others decline more slowly and still others remain stable or even improve as a result of practice and learning. Understanding the basis of these individual differences is essential to prevent cognitive decline in old age, and a growing body of evidence suggests that potentially modifiable early and late life experiential factors are important determinants of late life cognitive trajectories. Data from the Rush Memory and Aging Project and the Religious Orders Study, ongoing longitudinal clinical-pathologic studies of more than 2,800 older persons, will be used to illustrate how experiential factors across the lifespan (e.g., childhood adversity, cognitive activity, purpose in life) influence cognitive trajectories in old age. Potential mechanisms underlying the association of experiential

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

factors with cognitive trajectories also will be discussed, with a focus on the neuropathologies of the common causes of dementia in old age (i.e., Alzheimer's disease, cerebrovascular disease, Lewy body disease). Emerging data suggest that some of the experiential factors are directly related to these neuropathologies; however, others modify the deleterious effects of neuropathology on cognition, and still others have an association with cognition that is independent of pathology and thereby adds to (or subtracts from) the overall impact of pathology. A better understanding of the influence of potentially modifiable experiential factors on cognitive aging and the neurobiologic mechanisms linking life span experiences with cognition will suggest novel strategies for the maintenance of cognitive health in old age.
Correspondence: *Patricia Boyle, Rush Alzheimer's Disease Center, 600 S Paulina, Suite 1020B, Chicago, IL 60612. E-mail: paboyle@gmail.com*

Poster Session 8: Executive Functions/Frontal Lobes, Electrophysiology, Structural Imaging

2:00–3:15 p.m.

Executive Functions/Frontal Lobes

J.H. SANZ, M. DONOFRIO, A.C. ARMOUR & M. BERL. Executive Function and Quality of Life in School Age Children with Congenital Heart Disease.

Objective
Children with congenital heart disease (CHD) have a high rate of neurodevelopmental problems. This study evaluates the prevalence and pattern of parent reported executive dysfunction (EdF) and its relationship to quality of life (QOL) in school age children with CHD.
Participants and Methods
58 Parents of children with CHD (mean age 8.9, SD = 2.77) completed questionnaires by mail, including the Behavior Rating Scale of Executive Function (BRIEF) and PedsQL (quality of life inventory). For the BRIEF, normative data was available to provide an age and gender matched control group. Profile of scores across subscales, likelihood of clinical elevations, and relationships between Executive Function (EF) and QOL were examined with repeated measures ANOVA, $\chi 2$, odds ratios, and correlation analyses.
Results
63.2% of children with CHD had at least one clinically significant elevation on the BRIEF (vs. 35.1% of controls), and 58.6% of children reported at least one area of QOL that fell 1 SD below the mean. The pattern of scores suggests greater concern with metacognitive skills vs. behavior regulation ($p=.023$). Working memory was the most elevated scale, followed by concerns with flexibility, emotional control, and other metacognitive skills ($p<.05$). Parents report significantly more concerns with Psychosocial QOL vs. physical QOL, and all aspects of EF strongly correlate with QOL (p's$<.05$). There is no significant difference in profiles between children with different types of CHD (e.g., single vs. two ventricle, acyanotic/cyanotic).
Conclusions
Over half of children with CHD—regardless of type—had an area of EdF. Metacognitive skills, working memory in particular, are vulnerable. Parents report a high rate of concerns with psychosocial outcomes as opposed to physical outcomes. A possible explanation is that EdF is strongly related to QOL. Providing support for EdF and psychosocial problems may be critical to improving overall outcomes in CHD.
Correspondence: *Jacqueline H. Sanz, 15245 Shady Grove Road, Suite 350, Rockville, MD 20850. E-mail: jsanz@childrensnational.org*

L. KRIVITZKY. Executive Functioning Profiles in Children with a history of Pediatric Stroke.

Children with a history of stroke often experience neurocognitive and behavioral deficits, including a high incidence of ADHD. We examined aspects of executive functioning to better understand the patterns in pediatric stroke and the relationship to other factors including age, disease factors, and neuropsychological variables. Participant variables, parent questionnaires (including BRIEF) and paper/pencil test data were collected in a retrospective study (n=19 with in-utero/perinatal stroke-"PN", n=26 with stroke outside neonatal period-"NonPN"). Results found that general intellectual abilities were in the Low average range for the PN group (mean FSIQ=85) and the Average range for the NonPN group (mean FSIQ=92). Children with a history of stroke demonstrated significant weaknesses in aspects of attention and executive functioning (performances generally.5 to 2 SD below population norms), both on questionnaires and paper/pencil tasks. Both stroke groups had a higher incidence of ADHD and ID relative to the normal population; PN group: ADHD ~30%, ID~15%. NonPN group: ADHD~15%, ID~12%. Executive functioning profiles on the BRIEF was similar across the two groups, with the PN group reporting slightly higher overall levels of EF problems. Peak difficulties in both groups on Working Memory (PN T=67, NonPN T=65), followed by elevations in self-monitoring and plan/organize. Greater weaknesses in Inhibition were noted in the PN group. In summary, despite generally good outcomes in terms of intelligence, children with a history of stroke demonstrate significant weaknesses in aspects of attention and executive functioning (particularly working memory), and elevated levels of ADHD (particularly in the perinatal group). Future research examining factors that predict the development of Intellectual Disabilities and ADHD are crucial for designing interventions for those at greatest risk for sequelae from pediatric stroke.
Correspondence: *Lauren Krivitzky, 34th and Civic Center Blvd, CSH - 021, Philadelphia, PA 19104. E-mail: krivitzkyL@email.chop.edu*

M. ARTNAK, M. SEMRUD-CLIKEMAN, N. VANDERBURG, M. GONZALEZ, J. TORKELSON & K. SARAFOGLOU. Executive Functioning and Quality of Life in Pediatric Congenital Adrenal Hyperplasia Patients.

Objective: This study investigates the quality of life, attention, and executive functioning skills in a population of patients diagnosed with Congenital Adrenal Hyperplasia (CAH) due to 21-hydroxylase deficiency. A higher occurrence of ADHD and anxiety within pediatric CAH patients has been observed, particularly in males. Given this previous finding, we hypothesized that attention problems, executive functioning difficulties, and poorer quality of life would be observed within parent ratings of children and young adults diagnosed with CAH.
Participants and Methods: Parents of 22 patients who are receiving medical management of a CAH diagnosis completed rating scales including the Pediatric Quality of Life Inventory (PedsQL), Behavior Rating Inventory of Executive Function (BRIEF), and the Connors Checklist, and statistical analysis was performed.
Results: A 2 (gender) X 6(PedsQL scores) MANOVA resulted in a significant gender difference within cognitive fatigue scale ($p=.017$), such that males experienced more difficulties with cognitive fatigue than females. No gender differences or significant age effects were present on the BRIEF or Connors. Additional analyses of the BRIEF and Connors data indicated that there were no statistically significant effects. The mean scores on these measures also did not reach a level of clinical significance, based upon the criteria for cutoff scores on these measures.
Conclusions: These results indicate that the male participants with CAH were rated as having more difficulties with cognitive fatigue, as compared to female participants with CAH. Cognitive fatigue can lead to difficulties in completing work, following through on tasks, and the child's overall functioning. Contrary to the original hypothesis, no significant effects were found regarding executive functioning skills or attention symptoms within the CAH patients.

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms.
https://doi.org/10.1017/S1355617714000381

Correspondence: *Melissa Artnak, Psy.D., Pediatric Neuropsychology, The University of Minnesota, 420 Delaware Street S.E., Mayo Mail Code 486, Minneapolis, MN 55455. E-mail: mcartnak@umn.edu*

J.J. MIETCHEN, C. JENSEN & S. GALE. Executive Function and Sleep-Related Disordered Breathing among Adolescent Behavioral Weight Loss Program Participants.

Objective: Examine cognitive and behavioral differences between overweight adolescents at risk for Sleep-related Breathing Disorders (SRBD) and those who are not at risk.

Participants and Methods: Twenty-two overweight adolescents (72% female; M age=14.73, SD=1.32; M BMI percentile=97.37, SD=1.93) participating in a behavioral weight loss program completed a Behavior Rating Inventory of Executive Function- Self-Report Version (BRIEF-SR) while the parent/guardian completed a Behavior Rating Inventory of Executive Function (BRIEF) Parent Form and the Pediatric Sleep Questionnaire (PSQ). Using the Sleep-related Breathing Disorder (SRBD) scale on the PSQ, adolescents were categorized as either at risk for SRBD or not at risk. Potential differences on the BRIEF-SR and BRIEF between at risk and not at risk groups were explored.

Results: Significant differences were found on several clinical scale T-Scores of the BRIEF Parent Form. These differences include the Shift scale (p=.012), the Initiate scale (p=.001), and the Plan/Organize scale (p=.034) indicating that overweight adolescents at risk for SRBD may have difficulty performing behavioral and cognitive tasks relating to these clinical scales. No differences on the BRIEF-SR were observed.

Conclusions: Potential difficulty performing executive functions, including planning/organizing and behavioral initiation, may have important implications that may affect achievement of weight loss goals for adolescents with SRBDs. Another finding that may hold importance is suggested by the significant differences on clinical scales of the BRIEF Parent Form but no evidence of significant findings on the BRIEF-SR. This may indicate that adolescents who are at risk for SRBD may have problems with executive function but are not aware of them. This finding may also have important implications for behavioral weight loss treatment planning.

Correspondence: *Jonathan J. Mietchen, BS Psychology, Department of Psychology, Brigham Young University, 1001 SWKT, Provo, UT 84602-5543. E-mail: jonathan.mietchen@gmail.com*

S.E. WOODS & R. MENNA. The Mediating Role of Executive Function in the Link Between Parenting and Children's Physical Aggression.

Objective: Young children's physical aggression has been linked with executive function deficits and with negative parenting practices. In particular, children's difficulty with emotional control and parents' tendencies to react with distress to children's negative emotions have been identified as important predictors of physical aggression. The mechanism through which these two major factors might interact to influence the development of aggressive behavior has not yet been established. The purpose of this study was to explore whether children's emotional control mediates the link between parenting practices and children's physical aggression.

Participants and Methods: 136 mothers of children ages 3 to 6 completed the Behavior Rating Inventory of Executive Function – Preschool (BRIEF-P), the Coping with Children's Negative Emotions Scale, and the Preschool Social Behavior Scale. Linear regression analyses were used to test a model predicting children's physical aggression from mothers' distress reactions, with children's emotional control as a mediator.

Results: Children's physical aggression was predicted by children's emotional control difficulties and mothers' distress reactions. Children's emotional control difficulties were found to completely mediate the link between mothers' distress reactions and children's physical aggression.

Conclusions: Results confirm that physical aggression is associated with children's emotional control problems and parents' tendency to react with distress to children's negative emotions. Results suggest that parents' distress reactions may contribute to emotional control difficulties in children, which then lead to higher levels of physical aggression. This has important implications for practice, suggesting that intervention programs for aggression should target executive function skills (especially emotional control) for both children and their parents.

Correspondence: *Sara E. Woods, PhD, University of Windsor, 1425 McNeil St Apt B103, Dupont, WA 98327. E-mail: sara.woods29@gmail.com*

S.M. HENRIQUEZ, E. GUSTAFSON & S.J. HUNTER. Executive Functioning in Ethnic Minority Youth and Reporter Congruence in Relationship with Objective Measure Performance.

Objective: Executive functions (EF) are processes that guide and direct broader cognitive function. Clinical assessment of EF typically involves performance and questionnaire-based evaluations. There is limited research examining self-report and parent ratings in comparison with youths' performance on objective EF measures. Moreso, there is a dearth of research examining this relationship in conjunction with ethnic minority status and its potential impact on how youth are rated regarding their EF. The present study examined ethnic differences across two core EF: working memory (WM) and inhibition, and whether score differences between youth and parents predicted performance on objective EF tasks.

Participants and Methods: Data from 431 youth aged 11-16 (66% male; 54% Caucasian, 33% African American, 13% other) who were tested by a Pediatric Neuropsychology Service were examined. Inhibition was assessed with the Color-Word subtest of the D-KEFS and WM was assessed with the WISC-IV. To assess youths' and parents' perceptions of EF, respective BRIEF scores were examined.

Results: Analyses revealed significant mean differences across ethnic groups on parent reported inhibition ($F(4,427) = 2.64$, $p = .03$) and WM ($F(4,427) = 2.51$, $p = .04$), with significant differences in ratings for Caucasian and African American youths. Similarly, there were significant mean differences across groups on performance-based scores of inhibition ($F(4,286) = 2.76$, $p = .02$) and WM ($F(4,368) = 6.33$, $p = .00$). Regression analyses revealed parent-child differences predicted performance on tasks of inhibition ($\beta = -.17$, $t = -2.18$, $p < .03$).

Conclusions: Overall, African American parents reported more symptoms of disinhibition and poorer WM in their children, and African American youth scored lower than Caucasians on performance tasks. Larger discrepancies between parent-child reports predicted poorer performance on tasks of inhibition. Results are considered in regard to SES and cultural factors that may influence ratings and objective performance on EF.

Correspondence: *Silvia M. Henriquez, M.A., DePaul University, 421 W Barry Ave #502, Chicago, IL 60657. E-mail: shenriqu@depaul.edu*

E.L. GUSTAFSON, N.S. KARNIK & S.J. HUNTER. A Targeted Executive Functioning Intervention Model for Vulnerable Youth.

Objective: Youth facing social and economic adversity are at increased risk for cognitive and behavioral difficulties. Specifically, executive functioning (EF) skills may be negatively impacted due to the adverse circumstances during this vulnerable developmental period. Because EF are essential to decision-making and problem solving, deficiencies can have broad implications in the lives of these youth. In light of this, it is important to develop targeted interventions to help bolster EF. The present study focused on developing an EF specific intervention and examining its impact on a group of low SES high school students. The aim was to develop a model that targeted specific EF domains – memory, attention, problem solving, and time management – that fostered awareness of these skills and how to apply them across environments.

Participants and Methods: 35 youths in grades 9-11 (77% male) attending an inner city charter high school participated. Participants were African American and Latino youth from low SES background with limited home resources. The intervention consisted of eight sessions taught over one month, each module focusing on a different EF. The BRIEF

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

self and teacher report were used to assess youths' EF before and after the intervention. Grades, demerits, and absences were also considered.
Results: Analyses indicated no clear improvement in EF from the intervention. However, student and teacher pre-intervention reports revealed a significant difference between reporters, where students endorsed average functioning and teachers reported deficient functioning. The same was true of post-intervention scores; students again reported average EF while teachers reported deficient EF.
Conclusions: Results highlight a disparity between student's self-assessment and their teacher's assessment of EF. Such a disparity in ratings suggests that youth may not be aware of their weaknesses in EF, impacting efficacy of the intervention. The implications of these findings will be discussed.
Correspondence: *Erika L. Gustafson, University of Chicago, 5841 S. Maryland Ave, MC 3077, Room W410, Chicago, IL 60637. E-mail: erika.l.gustafson@gmail.com*

K.L. KASZYNSKI, N.S. KARNIK & S.J. HUNTER. Executive Functioning, Temperament, and Antisocial Personality Disorder in Homeless Youth.
Objective: Homeless youth are susceptible to various adverse cognitive and emotional outcomes given their circumstances. Behavioral patterns consistent with antisocial personality disorder (ASPD) are disproportionally prevalent among homeless youth. Executive dysfunction (EdF) has also been highlighted as a significant concern. However, research is limited regarding the relationship between EdF and persistent personality and temperament characteristics. Understanding this relationship is believed essential to developing interventions targeting long-term psychological health and well-being in homeless youth. The current project examines executive functioning related to ASPD and underlying temperament among homeless youth.
Participants and Methods: Eighty youth, recruited from homeless shelters in Chicago and Los Angeles, were administered a battery of neurocognitive, temperament, and diagnostic measures (i.e., D-KEFS, BRIEF, ATQ, and MINI, among other tests). Mean age was 19.19 years and gender was evenly split. The majority of participants were African American (68%).
Results: Analyses revealed significant relations between self-reported EdF and ASPD traits. Specifically, clinically significant problems with inhibition, shifting, initiation, working memory, planning, task monitoring, and organization were positively associated with meeting criteria for ASPD. Additionally, self-reported problems with initiation as well as performance on a rapid word reading task were both positively associated with inhibitory control as a temperament characteristic.
Conclusions: Results indicate significant EdF among homeless youths who show poor effortful control and behavioral characteristics consistent with ASPD. More specifically, those reporting problems with behavioral aspects of executive functioning demonstrate characteristics of poor inhibitory control and persistent delinquent behavior. The implications of these findings will be discussed.
Correspondence: *Erika L. Gustafson, University of Chicago, 5841 S. Maryland Ave, MC 3077, Room W410, Chicago, IL 60637. E-mail: erika.l.gustafson@gmail.com*

K. ARES, E. GUSTAFSON, K. KASZYNSKI, N. KARNIK & S.J. HUNTER. The Relationship between Executive Functioning, Memory, and Risk Taking Behaviors in Homeless Youth.
Objective: Homelessness among youth and emerging adults has increased annually due to adverse economic conditions, family conflict, and poor decision making. Many youth experiencing homelessness are exposed to challenges and maladaptive opportunities that can impact their neurocognitive development. This study examined the relationship between risk taking behaviors, executive functioning, and memory in homeless youth
Participants and Methods: 122 emerging adults, aged 18-25, (46% male; 75% African American, 5% Hispanic, 5% Caucasian, and 15% other) were recruited from homeless shelters in Chicago and Los Angeles. Participants completed a risk-taking behavior survey, targeting variables including exposure and use of marijuana, tobacco, alcohol, drugs, and sexual activity. Executive functioning (EF) was assessed using the BRIEF, subtests from the D-KEFS, and the Iowa Gambling Task (IGT). The CVLT-2 and subtests from the WRAML-2 were utilized to assess verbal and visual memory.
Results: Analyses revealed significant correlations between amount of tobacco, alcohol, marijuana, and illicit drugs used; sexual behaviors; and self reported EF on the BRIEF. Specifically, there was a significant negative relationship between each risk behavior domain and inhibition. Additionally, significant correlations between tobacco, marijuana and drug use and verbal memory performance on the CVLT, specifically clustering and recall were identified. No significant relationships were found between risky behaviors and objective EF measures.
Conclusions: Results indicate a relationship between risky decision making, self-reported executive dysfunction, and verbal memory. Implications will be discussed.
Correspondence: *Kathleen Ares, M.A., The Chicago School of Professional Psychology, 1255 West Belden Ave, At 5B, Chicago, IL 60614. E-mail: kathleenares@gmail.com*

A.E. MOLNAR & M.Y. KIBBY. Unique and Shared Executive Functioning Deficits in Children with ADHD or Dyslexia when Not Controlling for Intellectual Functioning.
Objective: The purpose of this study was to determine unique and shared executive functioning (EF) deficits in children with ADHD or dyslexia as both groups present with EF deficits when studied separately. Analyses were run twice, with and without intellectual functioning (IQ) as a covariate, given the debate over whether IQ should be used as a covariate when studying EF.
Participants and Methods: This study included 123 8-12 year-old children with ADHD, dyslexia, or were controls, who participated in a university-based study. Children were recruited as part of larger, grant-funded research projects (R03 HD048752, R15 HD065627). Descriptive and inferential analyses were conducted, including MANOVA and MANCOVA. We hypothesized that both clinical groups would have EF deficits when IQ was not used as a covariate. We used measures of working memory, fluency, shift, problem solving and planning, but we did not have a good measure of inhibition.
Results: When IQ was included as a covariate, there were no significant differences between groups. However, when IQ was not included, children with dyslexia had unique deficits in processing speed and phonological short-term storage, a component of verbal working memory. Furthermore, children with dyslexia and ADHD shared EF deficits in nonverbal fluency and problem-solving compared to controls. Planning was intact in both groups. Children with ADHD did not have unique EF deficits on measures that were used for this study; however, a large literature indicates that these children present with significant behavioral regulation difficulties compared to other clinical samples.
Conclusions: Removing IQ as a covariate effected the results of this study. Consistent with the recommendations of Mahone et al. (2002), these findings provide further support for not including IQ as a covariate when testing executive functioning deficits in a child-clinical sample. Limitations, clinical implications, and future directions will be discussed.
Correspondence: *Andrew E. Molnar, Psychology, St. Louis Children's Hospital, 1 Children's Place, 3N-14, St. Louis, MO 63110. E-mail: aemolnar@gmail.com*

E.H. GERST & P. CIRINO. Performance and Behavioral Executive Function Measures and Academic Outcomes in Children.
Objective: Executive Functions (EF) in children are assessed with performance measures or rating scales. Prior studies show weak relationships across these methods (Toplak et al., 2013), but the use of total scores to represent EF in either case may mask relations among separate

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

but relatable EFs (Miyake et al., 2000). To clarify these relations, we assessed EF domains with performance measures and rating scales and related them to key outcomes (e.g. academics). We expected moderate relations between types of measures within EF domain, but expected both kinds of measures to relate to academic function.
Participants and Methods: Participants were 4th and 5th graders (n = 96). Four EF domains (inhibition, shift, working memory, and planning) were assessed with performance measures from the D-KEFS, the WMTB-C, and the Tower of London, respectively. Corresponding behavioral scales from the teacher version of the BRIEF were used. Academic skill included WJ-III Calculations, and the Gates MacGinitie. Correlation analyses evaluated relationships.
Results: Both measurement types showed modest relationships within each EF domain (range r = -.20 to -.26), with significance for planning and working memory ($p < .05$). All measures correlated significantly with academic function. For inhibition, performance based measures were more strongly related to both math and reading (r = .56 and r = .49), relative to behavioral measures (r = -.27 and r = -.29). For the remaining EF domains both performance and behavioral measures were related to both academic skills (range r = .36 to .55).
Conclusions: We found modest relationships across measurement type and EF domain, consistent with prior studies (e.g., Toplak et al., 2013). Both types of measurements correlated significantly with both math and reading skill; however, only inhibition showed a clear advantage for one type (performance). Results suggest a unique contribution of performance and behavioral assessments for key outcomes, and therefore the need to consider both forms of information.
Correspondence: *Elyssa H. Gerst, University of Houston, 8383 el Mundo St, Apt 411, Houston, TX 77054. E-mail: elyssa.gerst@gmail.com*

G. LALONDE, C. MATTE-GAGNÉ, M.H. BEAUCHAMP & A. BERNIER. Links Between Early Childhood Language And The Development Of Executive Functions.
Objective: Verbal ability is thought to play an important role in children's executive function (EF) development, but previous studies have generally treated concurrent expressive or receptive verbal ability as covariates rather than as developmental predictors of EF, and therefore little is currently known of the developmental links between different types of language and child EF. Accordingly, the aim of this study was to investigate the prospective relations between prior expressive and receptive language and preschoolers' EF.
Participants and Methods: 27 mother-infant dyads (13 boys) participated in this study and took part in three assessments at 2, 3 and 5 years of age. Mothers rated children's expressive language at 2 years with the MacArthur Communicative Development Inventory (Fenson et al., 1993) and receptive language was evaluated at 3 years with the Peabody Picture Vocabulary test (Dunn & Dunn, 1981). EF was measured at 5 years with: (1) The Dimensional Change Card Sort (DCCS; Zelazo, 2006), (2) a computerized version of the Flanker task (Rueda et al., 2004), and (3) the Forward and Backward word span tests (Davis & Pratt, 1996). These EF scores were submitted to an exploratory factor analysis and one averaged standardized score was computed and retained for further analysis.
Results: Correlations showed that child expressive ($r= .38$, $p= .04$) and receptive language ($r= .54$, $p< .001$) are both related to subsequent EF performance. A regression analysis demonstrated that expressive and receptive languages explain 26% of the variance in child EF. While expressive language at 2 years ($\beta= .43$ $p= .02$) remained significantly related to EF when controlling for receptive language at 3 years, receptive language did not relate to EF when controlling for previous expressive language.
Conclusions: The findings of this study suggest that expressive vocabulary, even when assessed more distally in time to EF than receptive vocabulary, may play an especially significant role in child subsequent EF development.
Correspondence: *Gabrielle Lalonde, University of Montreal, 2900 Boulevard Edouard-Montpetit, Montreal, QC H3T 1J4, Canada. E-mail: gabrielle.lalonde@hotmail.com*

K.A. MCCUE & S.J. HUNTER. Specificity of Deficits in Executive Functioning in Youth with Nonverbal Learning Disability and Attention Deficit Hyperactivity Disorder.
Objective: Many of the characteristics associated with Nonverbal Learning Disorder (NLD) are similar to those found in other more established disorders such as ADHD, Specific Learning Disorders and Autism Spectrum Disorder. While research has shown some shared neurocognitive deficits in ADHD and Specific Learning Disorders, additional research and better diagnostic differentiation is required to determine whether the specified characteristics of NLD define a distinct disorder. Of particular interest is the recent observation that NLD is often comorbid with, and may be a subtype of ADHD. This study sought to investigate shared patterns of EF in youth with NLD and ADHD, and to assess their diagnostic utility, using objective, performance-based measures.
Participants and Methods: Data from 122 (NLD=61; 61% male, ADHD=61; 78% male) youth, ages 6-18, who were assessed between 2003 and 2013 by the Pediatric Neuropsychology Service at the University of Chicago were analyzed. Participants achieving a Full Scale IQ (FSIC) ≥85 on the WISC-IV and who met either DSM-IV-TR criteria for ADHD or a Rourke based clinical profile for NLD were included. Specific EF were assessed using the WISC-IV and Rey Complex Figure Test (RCFT)
Results: Analyses revealed a pattern of differences in EF across NLD and ADHD, with difficulties seen in regard to working memory, visuospatial organization, and executive aspects of figural memory. Separate diagnostic profiles were identified that were specific to the two disorders, although significant overlap was observed.
Conclusions: Commonalities in executive dysfunction were observed between youth with NLD and ADHD diagnoses. NLD youth were noted to share many similarities with youth with ADHD, highlighting diagnostic concerns about NLD as a separate disorder. As diagnostic comorbidities in children and adolescents are being more meticulously examined, it appears that cognitive deficits once thought to represent certain disorders need to be further examined.
Correspondence: *Kimberly A. McCue, MA, College of Psychology, Illinois Institute of Technology, 10 W. 35th Street, 14th Floor, Chicago, IL 60616. E-mail: kimmycue@gmail.com*

M.E. DIQUATTRO, S. KVAAL, L. LU & S. HUNTER. Executive Functioning in Children with Autism, Attention-Deficit/Hyperactivity Disorder, and Comorbid Autism and Attention-Deficit/Hyperactivity Disorder.
Objective: Executive functions (EF) are often impaired in children with separate diagnoses of ADHD and autism spectrum disorder (ASD). Limited research has been conducted on children with comorbid ADHD and ASD; as such, it is difficult to determine if ADHD is truly a separate disorder in children with ASD, or if ADHD symptoms are better subsumed under the diagnosis of ASD. It was hypothesized that children with comorbid ASD and ADHD would demonstrate significantly greater difficulty with inhibition, working memory, and planning and organization skills when compared to children with a primary diagnosis of ASD or ADHD.
Participants and Methods: 53 clinic-referred youth between the ages of 8-18 years were enrolled. Subjects were divided into three groups according to diagnosis (ADHD, ASD, ASD+ADHD). Children with IQ < 70 were excluded. Dependent variables included standardized EF measures examining inhibition, working memory, and planning.
Results: ANOVAs were used to compare scores for each domain of EF across the three diagnostic groups. Results indicated that youth with ADHD demonstrated significantly better performances on inhibition and working memory when compared to children with ASD or comorbid ASD+ADHD. However, results were inconsistent across tasks, highlighting

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

significant intraindividual variability. Notably, there were no significant differences in planning skills across the three diagnostic groups.
Conclusions: The ASD and ADHD+ASD groups did not differ in any area of executive function; thus, despite the arguments made with DSM-V, there remains mixed support for diagnosing ADHD separately in children with ASD, given results from this study. Of importance, significant intraindividual variability was observed, highlighting a diverse clinical picture. Diagnostic and clinical implications are discussed.
Correspondence: *Megan E. DiQuattro, Psy.D., Psychiatry, University of Chicago, 5841 S. Maryland Ave., MC 3077, Chicago, IL 60637. E-mail: diquattro.megan@gmail.com*

P.T. CIRINO, E. GERST, J. MICIAK & R. JAZAIRY. Incorporating Executive Function into Reading Instruction.
Objective: Approaches to instruction and intervention for young readers are well established (NICHD, 2000). Approaches to reading comprehension (RC) are more variable, although this research is expanding (Kamil et al., 2008; Shanahan et al., 2010). Prior studies (e.g., Wigfield et al., 2008) show promising results for self-regulatory interventions of long duration. This study reports a brief training experiment that incorporates executive function (EF) and regulatory processes into RC instruction. We hypothesized that such a group would outperform students receiving a text-based approach, or who were control.
Participants and Methods: There were 31 3rd grade students in a school where most are eligible for free/reduced lunch and whose ethnicity was African American. Students were randomized to control, or one of two active conditions: Text Based (TB) and TB+EF. Active conditions covered the same material (4th grade social studies) in 10 40-minute sessions over 2 weeks. Primary outcomes were taught text, near-transfer text (another social studies topic), and far-transfer text (science). Analyses included ANCOVA with pretest as covariate.
Results: Groups did not differ at pretest, $p = .055$, although effect sizes showed lower performance for TB+EF group. For taught text outcome, $F(3,27) = 5.15$, $p = .006$. Pretest was significant ($p < .001$), but treatment effect was not, $p = .111$. Effect sizes for TB+EF to CON was +1.00, and for TB to CON was +.82, but for raw score comparisons of TB+EF and TB relative to CON were only +.14 and +.39. Similar patterns were noted for near-transfer text and far transfer text.
Conclusions: There was suggestion of improvement for the active treatment conditions, but effects were smaller than found in prior reviews, even considering the experimental (vs. standardized) nature of the outcomes (Scammacca et al., 2007). Larger effects are expected for struggling readers, with more intervention, larger sample sizes, and manipulation of within-group activities. Such a study is planned.
Correspondence: *Paul T. Cirino, PhD, Psychology, University of Houston, UH TMC Annex, 2151 W Holcombe Blvd, 224a, Houston, TX 77204-5053. E-mail: pcirino@uh.edu*

C.I. BERMUDEZ, M. VILLA, J. TSIKIS & F. TAMEZE-RIVAS. Transcranial Doppler Velocity Levels in relation to Memory and Executive Functioning in Children with Sickle Cell Disease.
Objective: To examine the correlation between Transcranial Doppler velocity rates and decreased executive functioning and memory scores in neuropsychological assessments of children with sickle cell disease (SCD).
Participants and Methods: Twenty-four subjects ages 6-14 years. Subjects were part of a comprehensive parent intervention study examining neurocognitive and academic outcomes in children with SCD. Eligibility criteria for the study included; confirmed diagnosis of SCD, a recent Transcranial Doppler scan, completion of the Delis–Kaplan Executive Function System (D-KEFS) assessment, and completion of Children's Memory Scale (CMS).
Demographic and clinical information was obtained for all subjects, including gender, age at time of study, Right Middle Cerebral Artery Mean Velocity Reading (RMCA), Left Middle Cerebral Artery Mean Velocity Reading (LMCA), Right Internal Carotid Artery Mean Velocity Reading (RICA), and Left Internal Carotid Artery Mean Velocity Reading (LICA). Exclusionary criteria included history of overt stroke.
Results: Lowered executive functioning scores on the D-KEFS were significantly correlated with elevated mean velocity readings at the $p = .05$ level. These included the Category Switching task ($r = .526$) and the Number-Letter Switching task ($r = .610$).
Lowered memory scores were also found to correlate with higher velocity rates at the $p = .05$ level. The Visual Immediate Memory scale of the CMS was found to have a Pearson's correlation of .412 with elevated velocity levels in the RICA.
Conclusions: Children with elevated velocity levels may experience difficulty on tasks that require set shifting and cognitive flexibility even if they do not meet cerebral blood flow velocity criteria for arterial stenosis. Visual memory and learning may also be impacted by elevated velocity levels. This is an important consideration when recommending academic interventions for children with SCD.
Correspondence: *Christina I. Bermudez, M.Ed., M.A., M.S., Psychology, Nova Southeastern University, 6510 Main St Apt 312, Miami Lakes, FL 33014. E-mail: christina.bermudez1@gmail.com*

W.R. MOORE, E.C. DUGGAN & M.A. GARCIA-BARRERA. Fostering an understanding of the bilingual advantage in young adults: Application of a comprehensive model of executive function.
Objective: Enhanced executive functioning (EF) in bilingual children and older adults has been well documented; however, evidence from the literature is mixed for young adults. This has been attributed to the developmental trajectory of EF, which reaches its peak in early adulthood. Age of acquisition is also thought to influence the underlying development of language and executive neural networks. We assessed five interacting executive components—attentional control (AC), inhibitory control (IC), updating working memory (UWM), problem representation (PR), and valence/reward processing (V/RP; Garcia-Barrera et al. 2012)—to examine if early bilinguals demonstrate an advantage over late bilinguals and monolinguals in a young adult population.
Participants and Methods: 175 undergraduates (Mage = 20.49, 23% male) completed five computerized tasks assessing executive components: IOWA gambling task (V/RP); Raven's progressive matrices (PR); Go/No-Go (IC); N-Back (UWM); and Local-global (AC). The sample was separated into three groups: (a) early bilinguals who learned two languages before age six (n=64); (b) late bilinguals who learned a second language after age 12 (n=32); and (c) monolinguals (n=79).
Results: Early bilinguals performed significantly better on the IC task than late bilinguals and monolinguals, $F(2,171) = 3.26$, $p < 0.05$. UWM approached significance, $F(2,171) = 2.84$, $p = 0.061$, also suggesting a possible advantage for early bilinguals. No other significant effects were found between groups. Significant effects did not remain when bilinguals were collapsed into one group.
Conclusions: Despite similar overall performance across groups, early bilinguals appear to have advantageous IC mechanisms. This suggests the importance of age of acquisition. Some suggest EF tasks may not be sensitive enough to detect differences in early adults. Our results demonstrate that this may not be the case when a dimensional model for EF is applied and when early and late bilinguals are not collapsed into the same group.
Correspondence: *William R. Moore, University of Victoria, 206-240 Cook St, Victoria, BC V8V 3X3, Canada. E-mail: wrmoore@uvic.ca*

S. DUVALL, S. ERICKSON, P. MACLEAN & J. LOWE. Multimodal Executive Function Measurement in Preschool Children Born Very Low Birth Weight and Full Term: Relationship Between Performance, Parent Report and Observational Coding.
Objective: To compare executive function (EF) in preschoolers born very low birth weight (VLBW≤1500g) and full term (FT) using performance measures of EF, parent report of EF, and naturalistic child behaviors. Examining the relationship between multimodal measures of

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

EF may elucidate the interrelations between different EF measurement methods.
Participants and Methods: Participants included 61 preschoolers born VLBW and 40 born FT between the ages of 3 and 4.5 years. Performance measures of EF (Bear Dragon, Progressive Executive Categorization Battery (PECB), Gift Peek and Gift Touch), parent report of EF (BRIEF-P), and behavioral coding of EF (NICHD Cleanup Child Compliance) were utilized. Spearman correlations were used to investigate the relationship between EF measures. Analysis of covariance (ANCOVA) controlling for FSIQ and age; and chi-squared tests were performed to examine the relationship between groups.
Results: FT Preschoolers showed superior EF than VLBW preschoolers on measures of: PECB, Bear Dragon, Gift Peek, Gift Touch BRIEF-P Global Executive Composite (GEC), BRIEF-P Inhibit, BRIEF-P Working Memory and BRIEF-P Plan/Organize and NICHD Cleanup Child Compliance. These differences remained after correcting for age and FSIQ. In the FT sample, BRIEF-P GEC scores were not found to correlate with any of the EF performance measures, while BRIEF-P GEC correlated with PECB and Gift Peek in the VLBW group. In the VLBW group, better compliance during a clean-up task was associated with better performance on Gift Peek and Gift Touch; whereas in the FT group the NICHD Compliance scores were correlated with PECB performance.
Conclusions: Children born VLBW had poorer EF outcomes than the FT group regardless of measurement method. Correlations among diverse measures of EF demonstrated different patterns of association in the VLBW and FT groups. Results suggest that parent report of EF may be especially variable, with BRIEF-P scores not found to associate with any EF performance measures in the FT group at this age.
Correspondence: *Susanne Duvall, PhD, Psychology, Oregon Health & Science University, Institute on Development & Disability, 707 SW Gaines Street, Portland, OR Oregon. E-mail: duvall@ohsu.edu*

V. CHIASSON, C. GREEN, S. BUNGE & M.H. BEAUCHAMP. Neuropsychological Outcomes After Early Frontal Lesion : A Case Study.
Objective: The case of a patient (female, 17 years old) with resection centered in left frontal white matter after a cerebral arteriovenous malformation (AVM) rupture is reported. A detailed neuropsychological investigation of the patient's sociocognitive ability was carried out in an attempt to determine the ensuing deficits and target effective rehabilitation.
Participants and Methods: The patient is a 17 year old female high school student who was evaluated two years after an emergency craniotomy with presumed resection of hemorrhagic tissue. The battery of tests administered included: Clinical Interview with the patient's mother, Wechsler Intelligence Scale for Children-IV, Conners' Parent/Self Rating Scale Revised; Delis Kaplan Executive Functional subtests (Verbal Fluency; Stroop Color and Word Task; Trail Making Test; Sorting; Tower of London). In addition, moral reasoning was assessed using a new visual task designed for adolescents (So-Moral).
Results: Overall, the patient demonstrates strengths (average to high average performance) in fluid reasoning, spatial reasoning, spatial working memory, planning, and verbal processing. However, she has relative weaknesses in speed of cognitive processing, verbal reasoning, visual attention and task switching. Further, she displays notable deficits in moral reasoning (preconventional level) and internalizing behavior problems.
Conclusions: This clinical case provides insight into the neuropsychological determinants of frontal lobe functions and highlights the need for innovative and ecological measurement approaches to assessing these skills. A comparison with pre-morbid testing would clarify whether these impairments pre-existed the injury, enabling evaluation of the extent of decrement in these areas of sociocognitive function due to the injury.
Correspondence: *Vincent Chiasson, Bsc, Psychology, University of Montreal, 752 place de chaumont, Laval, QC H7N5V8, Canada. E-mail: vincent.chiasson@hotmail.com*

M.T. BUELOW, B.M. OKDIE & A. BLAINE. The Influence of an Additional 100 Trials on Iowa Gambling Task Performance.
Objective: Previous research has shown that a significant minority of participants fail to learn to decide advantageously on the Iowa Gambling Task (IGT). Various personality characteristics, state mood, and other factors have been correlated with decision making deficits on this task. The present study sought to examine whether providing additional practice trials would improve decision making on the task.
Participants and Methods: Participants were 276 undergraduate students (111 males; mean age 19.18 [SD = 2.58]). All participants completed the standard computerized IGT; however, after the 100 trials, the IGT was restarted (i.e., all decks refilled) for an additional 100 trials. Performance on the IGT was broken into percentage of selections from each of the four decks (A, B, C, D) for Trials 1-40 (Block 1), Trials 41-100 (Block 2), Trials 101-140 (Block 3), and Trials 141-200 (Block 4).
Results: Participants began to prefer Deck B and D during Block 2. During Block 3, participants preferred Decks B and D; however, during Block 4, participants began to prefer Deck D to the remaining decks. 26.5% of participants failed to develop a deck preference during the standard IGT, but 75.7% of these individuals developed a preference during the second IGT administration. This preference was driven by an increase in Deck D selections and a decrease in Deck A selections.
Conclusions: The results provide some of the first evidence that decision making on the IGT can be improved by providing additional practice trials. Implications for the assessment of decision making are discussed.
Correspondence: *Melissa T. Buelow, Ph.D., Psychology, The Ohio State University Newark, 1179 University Drive, Newark, OH 43055. E-mail: buelow.11@osu.edu*

M.T. BUELOW, B.M. OKDIE & A. BLAINE. Association Between the Delay Discounting Task and Individual Deck Selections on the Iowa Gambling Task.
Objective: The Iowa Gambling Task (IGT) has been shown to assess "hot" decision making, as participants are asked to choose between decks with small, immediate rewards but long-term positive outcomes and decks with larger immediate rewards but long-term negative outcomes. The Delay Discounting task also assesses participants' focus on immediate versus long-term reinforcement. The present study examined the relation of these two measures.
Participants and Methods: Participants were 183 undergraduate students (76 males; mean age 19.18 [SD = 2.25]). All participants completed the Delay Discounting task (Kirby & Marakovic, 1996) as well as a 200-trial version of the standard computerized IGT. Correlations were found between the percentage of individual deck selections on IGT Trials 41-100 (Block 1) and Trials 141-200 (Block 2) and the average delayed reward sizes on the Delay Discounting Task.
Results: Decks A and B are associated with larger immediate rewards but long-term negative outcomes, whereas Deck D is associated with smaller immediate rewards but long-term positive outcomes. Individuals who selected more from Deck A on Block 1 also tended to prefer smaller, more immediate rewards over larger but distant rewards. In addition, individuals who selected more from Deck B and less from Deck D on Block 2 also tended to prefer smaller, more immediate rewards, regardless of the size of the delayed reward.
Conclusions: The present results indicate that individuals who focus on larger shorter-term gains at the expense of long-term outcomes on the IGT also fail to focus on long-term outcomes on a secondary task.
Correspondence: *Melissa T. Buelow, Ph.D., Psychology, The Ohio State University Newark, 1179 University Drive, Newark, OH 43055. E-mail: buelow.11@osu.edu*

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

M.T. BUELOW, B.M. OKDIE, A. BRUNELL & Z. TROST. Social Exclusion Affects Risky Decision Making.

Objective: The Cyberball task is frequently used to assess the effects of social exclusion on mood and well-being. Recent research suggests that exclusion may also negatively affect cognition. The present study sought to examine whether individuals who were excluded during the Cyberball task exhibited riskier decision making on the Iowa Gambling Task (IGT) and Balloon Analogue Risk Task (BART) than individuals who were included on the Cyberball task.

Participants and Methods: Participants were 63 undergraduate students (23 males; mean age 19.02 [SD = 3.40]). Thirty-two were randomly assigned to the Exclusion condition on Cyberball, and 31 to the Inclusion condition on the Cyberball task. During the Cyberball task, participants played an online ball-catch game in which two other computer-controlled players either ignored (Exclusion) or included (Inclusion) the participant. Following completion of this task, all participants completed the IGT and BART in a counterbalanced order.

Results: Individuals in the Exclusion condition selected significantly more from Deck B, a disadvantageous deck with larger immediate rewards and long-term negative outcomes, during the decision making under risk trials. No between-group differences were found on the BART.

Conclusions: The present results provide the first evidence social exclusion can have a negative effect on cognition. Specifically, excluded individuals prefer a decision making strategy that results in larger immediate gains but negative outcomes in the long-term. While disadvantageous overall, this strategy may appeal to excluded individuals as it may be perceived as an opportunity to restore their positive affect or thwarted emotional needs.

Correspondence: *Melissa T. Buelow, Ph.D., Psychology, The Ohio State University Newark, 1179 University Drive, Newark, OH 43055. E-mail: buelow.11@osu.edu*

M.T. BUELOW. Relationships between Personality Characteristics, Mood, and the Columbia Card Task.

Objective: The Columbia Card Task (CCT) is a relatively new measure of both "hot," affective decision making and "cold," deliberative decision making. It has been shown sensitive to age-related changes in decision making, and correlates with performance on another decision making task, the Balloon Analogue Risk Task (BART). However, to date no research has examined whether the personality and mood factors shown to affect performance on other decision making tasks (such as the BART) affect performance on the CCT.

Participants and Methods: Participants were 534 undergraduate students (240 males; mean age 19.32 [SD = 2.99]) who completed either the CCT-Cold (n = 380) or CCT-Hot (n = 200). In addition, the Barratt Impulsiveness Scale (BIS), BIS/BAS, Reward Responsiveness scale, Impulsive Sensation Seeking subscale, Beck Depression Inventory-II, and Positive and Negative Affect Scale were administered. Variables that correlated with CCT performance were then entered as predictors in linear regressions.

Results: Linear regressions indicated that BIS nonplanning impulsiveness, reward responsiveness, and gender were significant positive predictors of CCT-Cold performance. Males were riskier on the task than females. For the CCT-Hot, depression was a positive predictor of performance.

Conclusions: The present results provide the first evidence that personality characteristics are associated with performance on the CCT. In addition, these characteristics appear more correlated with performance on the CCT-Cold than the CCT-Hot.

Correspondence: *Melissa T. Buelow, Ph.D., Psychology, The Ohio State University Newark, 1179 University Drive, Newark, OH 43055. E-mail: buelow.11@osu.edu*

S. MAGRYS & M.C. OLMSTEAD. Alcohol and Acute Stress Interact to Increase Impulsive Responding Among Undergraduates.

Objective: Stress and alcohol intoxication are each associated with increased impulsivity, which can lead to harmful behavioural consequences such as aggression and risky sex. Since stress is a common antecedent to drinking, it is important to understand how these factors interact to affect impulsivity. The purpose of this study was to explore the separate and combined effects of alcohol and stress on impulsive responding, and to assess whether these effects generalize to other frontally-mediated cognitive skills.

Participants and Methods: Seventy five undergraduates were assigned to alcohol, placebo or sober groups, and underwent stress (Trier Social Stress Test) or no-stress manipulations. Participants drank ad libitum then completed a computerized continuous performance test (Immediate Memory Test) that measures impulsivity and sustained attention.

Results: A 2 x 3 (stress manipulation x beverage group) ANOVA revealed a significant interaction between stress and alcohol in their effect on impulsivity. Alcohol increased impulsivity only in the stress condition, and stress increased impulsivity only in the alcohol group. Within the alcohol group, increased impulsivity correlated (Pearson's r) with higher blood alcohol levels and greater subjective stress post-stressor. A 2 x 3 ANOVA showed no significant effect of stress or alcohol, nor interaction, on sustained attention.

Conclusions: When paired, alcohol and acute stress increase impulsivity. It is unlikely that this relates to a global impairment of frontal function since neither alcohol nor stress affected sustained attention. Undergraduates exhibit high rates of drinking as well as stress, thus, these data may help inform interventions in this population by highlighting the adverse consequences associated with these factors. This work was supported by the Natural Sciences and Engineering Research Council of Canada.

Correspondence: *Sylvia Magrys, Queen's University, 62 Arch St, Kingston, ON K7L 3N6, Canada. E-mail: samagrys@gmail.com*

P. SUNDERARAMAN, P. SYLVESTER, J. ANG & M.T. SCHULTHEIS. The Influence of Cognitive Abilities on Different Aspects of Everyday Decision Making Competency in Young Adults.

Objective: Decision making competency (DMC) involves selecting a choice with a favorable outcome. It is suggested that DMC comprises of different component abilities. One such standardized tool measuring such abilities is the DECIDE instrument (Finucane and Guillion, 2010). However, much remains to be known regarding the extent to which different cognitive abilities contribute to the component DMC abilities.

Participants and Methods: In this cross-sectional design, participants were administered standardized subtests of the working memory (WM) and perceptual reasoning (PR) indices from the WAIS-IV. The DECIDE instrument was used to measure each of the three component ability of DMC (Comprehension, Dimension Weighing Cognitive Reflection). At the end of the study, data was collected from 65 participants [81.5% female, mean age=22.94 (SD=4.34), mean education=15.11 (SD=1.43), 53.8% Caucasian].

Results: Two sets of simultaneous multiple regressions were conducted. The first set (WM subtests as predictor variables) showed that although the overall model was significant for both Comprehension (R=0.47, R2=0.22, F(3,56)=5.40, p=0.002) and Cognitive Reflection (R=0.64, R2=0.41, F(3,56)=13.49, p=0.000), only one of the three subtests -Arithmetic- was significant for both these outcome variables. The second set (PR subtests as predictor variables) showed that although the overall model was significant for both Comprehension (R=0.66, R2= 0.44, F(3,62)= 15.75, p=0.000) and Cognitive Reflection (R=0.53, R2=0.29, F (3, 62)=8.16, p=0.000), different subtests were uniquely associated with each outcome variable. Specifically, whereas Visual Puzzles significantly predicted Comprehension, Matrix Reasoning significantly predicted Cognitive Reflection.

Conclusions: The current study findings reflect that whereas Arithmetic robustly contribute to several components of DMC, more specific and

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

varied abilities from the perceptual reasoning index may be influencing DMC among healthy individuals.

Correspondence: *Preeti Sunderaraman, M.S., Psychology, Drexel University, 2215 Arch St., Apt 403, Philadelphia, PA 19103. E-mail: preetis.ps@gmail.com*

C. LANTRIP, P. ISQUITH, N. KOVEN, K. WELSH & R. ROTH. Relationship between Emotion Regulation Strategies and Executive Functions in Adolescents' Daily Lives.

Objective: Emotion regulation develops over time, shifting from reliance on suppression in adolescence to greater use of reappraisal in adulthood. This transition is thought to parallel developmental changes in executive functions. Greater use of suppression as a regulatory strategy has been associated with poorer scores on performance-based measures of executive function in some studies. However, the relationship between emotion regulation strategy use and executive functioning in everyday life remains to be explored. In this study, we evaluated whether reappraisal and suppression are differentially related to executive functions in the everyday life of adolescents.

Participants and Methods: A sample of 70 adolescents aged 12 to 18 years (M= 15.26, SD=1.73) completed the Emotion Regulation Questionnaire for Youth (ERQ-Y) and the Behavior Rating Inventory of Executive Function–Self Report (BRIEF-SR).

Results: Partial correlations, controlling for age, revealed that greater use of reappraisal was associated with better emotional control (r=-.37) and overall executive control (r=-.23), as well as a trend for better impulse control. In contrast, worse working memory (r=.3), maintaining an organized environment (r=.32), task completion (r=.27), and overall executive function (r=.34) was associated with greater reliance on suppression strategies. Suppression was also associated with a trend for poorer impulse control, monitoring of one's behavior, and ability to plan/organize.

Conclusions: Better executive functions in everyday life are associated with greater use of reappraisal strategies for emotion regulation in adolescents. In contrast, reliance on suppression is associated with poorer executive functions. These findings suggest that enhancement of executive functions may facilitate adolescents' use of the more adaptive strategy of reappraisal for emotion regulation.

Correspondence: *Crystal Lantrip, Ph.D., Geisel Medical School at Dartmouth, 1 Meadowbrook Village #21, West Lebanon, NH 03784. E-mail: crystal.lantrip@utexas.edu*

A.C. GRAEFE, K.E. PATRICK & M.T. SCHULTHEIS. Decision Making and Executive Functioning Correlates of Risky Driving Behavior in Young Adults.

Objective: Risky driving behavior is one of the leading causes of crash in late adolescence and early adulthood. Although driving is a cognitively complex task, little research has investigated its cognitive correlates in this age group. The few existing studies have focused on executive functioning and risky decision making as potential contributors. The present study developed a stressful and challenging driving simulator task in order to mimic real-life situations in which participants would be tempted to compromise their driving behaviors, and then examined the relationship between risky driving behavior during the task and neuropsychological test performance.

Participants and Methods: Participants (N=43; age, M = 20.30, SD = 2.03) completed a driving task on a virtual reality driving simulator and a battery of neurocognitive tests. Risky decision making was measured using the Balloon Analog Risk Task (BART). The Wisconsin Card Sorting Test (WCST) was used to measure problem solving, the Stroop Color Word Test was used to measure inhibition, Symbol Digit Modalities Test (SDMT) was used to measure processing speed, and the Attention Network Task (ANT) was used to measure executive control aspects of attention.

Results: Multiple linear regression was used to examine the relationship between neuropsychological measures and driving outcome variables of average speed and variability in lane position. Results showed that greater risk taking behavior on the BART predicted faster speeds, and that faster processing speed predicted less variability in lane position. Measures of executive functioning did not predict any driving outcome measures.

Conclusions: These findings give evidence that risky decision making is related to risky driving behaviors such as speeding; however, previous findings that executive functioning is related to driving behavior in young adults were not supported. Driving simulation offers an innovative way to examine the relationship between neuropsychological functioning and risky real-world behaviors.

Correspondence: *Anna C. Graefe, M.S., Drexel University, 2318 Spruce St. Apt. 2R, Philadelphia, PA 19103. E-mail: anna.graefe@gmail.com*

L. RHODEWALT, E. FRANCHOW & Y. SUCHY. Executive Problems, Neuroticism, and Affect Suppression: Cognitive and Personality Contributions to Unhealthy Coping.

Objective: Cognitive reappraisal (CR) is a highly adaptive coping style that involves actively altering emotional experience; it is associated with good executive and psychological functioning (John & Gross, 2003). In contrast, affect suppression (AS) is an emotion regulation strategy that involves regulation of overt emotional responses. Chronic overuse of AS is maladaptive, being associated with poorer psychological functioning and high trait neuroticism (Li, Zhanbiao, & Huanhuan, 2009), as well as depletion of executive resources (Baumeister & Alquist, 2009). However, because neuroticism and executive dysfunction are themselves correlated, independent contributions of these two constructs to coping style is unknown. This study aimed to address this question.

Participants and Methods: 166 adults (67% female) ages 21.61 years completed 11 items assessing frequency of AS and CR over the past two weeks, the Behavior Rating Inventory of Executive Functioning – Adult Version (BRIEF-A), and the NEO Personality Inventory - Revised Version (NEO-PI-R).

Results: AS and CR scores were criterion variables in two sets of hierarchical regressions; three BRIEF subscales (Initiation, Inhibition, and Shifting) and the NEO Neuroticism raw scores were entered as predictors. Although executive dysfunction was a significant predictor of AS, it did not significantly contribute after taking neuroticism into account. In contrast, lower neuroticism contributed significantly to CR (R2change .039) and higher neuroticism contributed significantly to AS (R2change .103) above and beyond executive dysfunction.

Conclusions: While these results support an association between executive problems and frequency of AS, they suggest that trait neuroticism is more closely associated with tendency to suppress or reappraise in general.

Correspondence: *Lauren Rhodewalt, University of Utah, 8204 South 2680 East, Sandy, UT 84093. E-mail: l.rhodewalt@gmail.com*

J. RAAK, R. GOLDSWORTHY, R. O'NEIL & R. SKEEL. The Impact of Working Memory and Scenario Intuitiveness on Moral Judgments.

Objective: The concept of working memory has come to play a prominent role in dual process theories of decision-making (Evans & Stanovich, 2013); however, working memory has played a subordinate role in moral reasoning literature. Research on moral reasoning processes has tended to focus on higher-order questions (e.g. agency, utilitarian distinctions, and intention) rather than on fundamental reasoning processes such as working memory. The current study systematically varied working memory load and intuitiveness of morally ambiguous vignettes to further define the role of working memory in dual process theories of moral reasoning.

Participants and Methods: Ninety participants (71.1% female, mean age 18.95) read morally ambiguous vignettes with systematic variations across participants in the intuitiveness of subjects actions within the vignettes. Participants rated how appropriate they found the final action in the vignette. Participants were randomly assigned to positive,

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

neutral, or negative valence conditions for the outcome of each scenario. In the experimental condition, subjects completed an n-back task to limit working memory while completing the scenarios.
Results: In addition to main effects, results showed significant interaction effects between intuitiveness of final action and working memory condition on participants' responses. Individuals in working memory conditions rated vignette subjects' actions as less acceptable in the counter-intuitive condition, while rating vignette subjects' actions more acceptable in the intuitive condition.
Conclusions: These results strengthen the findings that working memory is important in making moral judgments, particularly when outcomes are counter-intuitive to expectations. This suggests moral reasoning processes follow patterns similar to those seen in the general reasoning literature.
Correspondence: *Jacob Raak, Central Michigan University, 1020 York Drive, Mount Pleasant, MI 48858. E-mail: raak1jd@cmich.edu*

E.I. FRANCHOW & Y. SUCHY. Abnormally-High Affect Suppression and Longer Motor Planning Time: an Executive Effect.
Objective: High recent affect suppression (AS), which is regulation of overt emotional responses, is associated with depletion of cognitive and behavioral control (Baumeister & Alquist, 2009). We recently demonstrated the depletion effect with executive performance, but not with processing speed (Franchow and Suchy, 2013). However, prior findings indicated a trend for the depletion effect with motor speed (Franchow, Meadowcroft, & Suchy, 2013). Since speed is a multi-faceted construct, we used a behavioral measure to examine whether different aspects of motor speed may be more susceptible to the depletion effect.
Participants and Methods: 63 adults (M=22.9 years old; 65% female; M=13.7 years of education) completed the Beck Depression Inventory (BDI-II), 11 items assessing burden of AS over the past two weeks (AS-2W) and on the testing day (AS-T), and the Push-Turn-Taptap task (PTT), measuring initiation/motor planning speed (I/Psp), simple motor speed (SMsp), and complex motor speed (CMsp).
Results: I/Psp, SMsp, and CMsp were criterion variables in separate hierarchical regressions; demographics were entered on Step 1, BDI-II total raw score on Step 2, AS-2W and AS-T total raw scores on Step 3, and the interaction (AS Tx2W) on Step 4. The interaction contributed significantly above and beyond previous steps to I/Psp (Fchange (1, 45)= 6.2, p= .017], but AS variables didn't contribute to SMsp or CMsp. Consistent with prior findings, longer I/Psp time was observed only for individuals with high AS-T and low AS-2W.
Conclusions: These results confirm a differential relationship between higher-than-usual burden of AS and decrements in the planning component of motor speed.
Correspondence: *Emilie I. Franchow, MS, Psychology, University of Utah, 220 E. 3300 S., Apt. 212, Salt Lake City, UT 84115. E-mail: emilie.franchow@psych.utah.edu*

R.M. WEISE, C. NORSETH, Y. XU, C. MOLDOVAN, I. PALMA, F. RIVERA, F. LEAF, A. ARÉCHIGA, S. RAJARAM & J. SABATÉ. The Relationship Between Social Support and Executive Function.
Objective: The aim of this study was to establish the nature of the relationship between perceived social support as measured by the Multidimensional Scale of Perceived Social Support (MSPSS) questionnaire and executive function as measured by the Trail Making Test, Part B (TMT B) in a healthy older adult population. Social support is an important metric of psychological health and well-being among the elderly that may impact cognitive function and executive function is a vital and complex cognitive process that is susceptible to interference from environmental influences, so it was hypothesized that perceived social support may be related to executive function such that greater perceived social support would predict better executive function.
Participants and Methods: The study sample consisted of 127 participants from the Walnut and Healthy Aging (WAHA) study at Loma Linda University. The WAHA study recruits healthy older adults aged 64 to 75 that participate in a neuropsychological testing battery, medical testing, and a nutritional intervention. The sample was 72% female and 28% male. The MSPSS was administered as part of a take-home questionnaire packet and the TMT B was administered as part of the neuropsychological testing battery.
Results: A significant correlation was detected between perceived social support and executive function, r(125) = .22, p = .014.
Conclusions: The results indicate that there is a small positive correlation between perceived social support and executive function. This suggests that individuals that feel greater emotional support from friends and family may have better cognitive function on executive function processes such as working memory, planning, and task switching than individuals who perceive less of this support. These findings support that social support plays a role in cognition and executive function.
Correspondence: *Robert M. Weise, M.S., Psychology, Loma Linda University, 105 W Sycamore Ave, Arcadia, CA 91006. E-mail: robert.maxwell.weise@gmail.com*

A. HULL, C. LOCKWOOD, C. EICKHOFF, P. SULLIVAN, B. SCHWARTZ & M. REINHARD. Subjective Cognitive Dysfunction: Understanding the Relationship Between Self-report of Cognitive Difficulties, Neurocognitive Performance, Social and Emotional Functioning, and Pain.
Objective: Chronic pain is commonly associated with neurocognitive impairment most evident in domains of attention, processing speed, memory, and executive functioning. It is unclear whether report of subjective cognitive dysfunction is consistent with objective neurocognitive performance. This study aimed to examine the relationship between subjective cognitive difficulties, neurocognitive performance, social and emotional functioning, and pain.
Participants and Methods: Participants were veterans with chronic pain (>2 years), recruited at a complementary and alternative medicine clinic at the War Related Illness and Injury Study Center (WRIISC). The present sample consisted of 20 veterans (12 male, 9 female), mean age 47 (range 29-69), mean education 15 years (range 9-22 years). Participants were administered a 90 minute neuropsychological battery including objective assessment measures and the Neuro-QOL General (NQG), Executive (NQE), and Social (NQS), Cognitive Difficulties Scale (CDS), Beck Depression Inventory (BDI-II), PTSD Checklist (PCL), and Defense & Veterans Pain Rating Scale (DVPRS).
Results: Correlational analyses revealed significant results for the following: 1) the CDS was correlated with PCL (r =.47; p =.04) and NQS (r =-.66; p =.001); 2) the NQG was correlated with the BDI-II (r =-.46; p =.04), PCL (r =-.48; p =.03), and NQS (r =.55; p =.01); and 3) the NQE was correlated with the BDI-II (r =.54; p =.02), PCL (r =.52; p =.02), DVPRS (r =.51; p =.02), NQS (r =.58; p =.01), WAIS-IV Arithmetic (r =.45; p =.04), DKEFS Category Fluency (r =.49; p =.04), and DKEFS Color Word Inhibition (r =-.54; p =.01).
Conclusions: Findings suggest self-report of general cognitive difficulties were more strongly associated with social and emotional functioning than with pain and objective cognitive performance. Subjective report of executive dysfunction was associated not only with social and emotional functioning but also with pain and objective executive measures.
Correspondence: *Amanda Hull, PhD, War Related Illness and Injury Study Center, Washington DC VA Medical Center, 50 Irving St NW, Washington, DC 20422. E-mail: amanda.hull2@va.gov*

G. WIDMANN, D.M. WHITESIDE, L.C. GRANITE, A. JULIANO, M.C. RAFAEL, L. RICE, M. BASSO & B. ROPER. The Influence of Obsessive Compulsive Symptoms on Executive Functioning.
Objective: Obsessive compulsive disorder (OCD) has been associated with various executive functioning (EF) difficulties including cognitive inflexibility (Bannon et al., 2006; Chamberlain et al., 2006). Bannon et al. (2006) reported that OCD patients exhibit persistently impaired set-shifting abilities even after symptom remission. The current study extends Bannon et al by examining ability of OCD symptom measure,

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

the Personality Assessment Inventory (PAI; Morey, 1991) Anxiety-Related Disorders subscale, Obsessive-Compulsive (ARD-O) to predict performance on various executive functioning measures.
Participants and Methods: Participants from a mixed neuropsychological sample (n=705) who completed both the PAI and these executive function measures were studied. The specific measures included: Controlled Oral Word Association Test (FAS, Animals; Benton & Hamsher, 1989), the Stroop Task (Color-Word Interference; Golden, 1978), the Wisconsin Card Sorting Test (WSCT, perseverative Errors, Perseverative Responses, Trials to First Category, and Number of Categories; Heaton et al., 1993), Conners' Continuous Performance Test (number of Commission errors; Conners, 2004), and Trailmaking Test A (TMT-A) & B (TMT-B). Participants were assigned to low, medium, high, and extremely high OCD symptom groups based on their obtained PAI ARD-O scores.
Results: Statistical analysis indicated evidence that group membership significantly predicted performance on measures of verbal fluency (FAS, $F(3, 701) = 3.09$, $p < .05$); Animals, $F(3, 701) = 2.79$, $p < .05$) and impulsivity (CPT Commissions, $F(3, 701) = 4.36$, $p < .05$), with higher levels of symptomatology being related to poorer performance on these EF measures.
Conclusions: The results partially supported Bannon et al (2006) and other research indicating that OCD symptoms are predictive of decreasing fluency and impulsivity, but cognitive flexibility measures from the WCST were not related.
Correspondence: *Gerard Widmann, B.A., Adler School, 3252 N Menard, Chicago, IL 60634. E-mail: gwidmann@my.adler.edu*

E. RHODES, M. LAMAR, T. GIOVANNETTI, R. SWENSON & D. LIBON. Perseverations and Related Graphomotor Errors Related to Leukoaraiosis Assessed with a Visual Working Memory Test: A Two-Factor Model.
Objective- Leukoaraiosis (LA) is associated verbal working memory (WM) defects; less is known regarding how LA affects visual WM and the production of perseveration/related graphomotor errors. The current research tested Luria's (1965) hypothesis that distinct perseveration/ graphomotor errors are associated with specific cognitive/ neuroanatomical substrates.
Methods- 43 dementia patients were divided into 2 groups based on MRI-LA (Low LA; n= 21; high LA; n= 22) and 22 healthy controls (HC) and completed the Object Span (OS) task consisting of 3 blocks of 2, 3, and 4 common geometric shapes. Each stimulus was shown for 3 seconds; patients were asked to "draw what you see in the order you see it". Errors were coded to reflect within-trial/ between-trial perseverations, error repetitions, construction errors, and intrusion errors.
Results- HCs were younger, better educated, and had higher MMSE scores compared to dementia groups. Controlling for these differences, significant results were obtained for total OS errors (HC<Low<High, $p<.030$, all analyses) and error repetitions (Low LA<High LA, $p<.040$). For the entire sample, as total errors increased, letter fluency and Mental Control test performance decreased ($p<.001$, all analyses). A whole sample principal component analysis revealed a 2-component model that accounted for 62.1% of variance (factor 1-within trial errors; 31.5% of variance; factor 2-between trial errors; 30.6% of variance). Factor 2 was associated greater bifrontal LA and impaired Mental Control test performance. Linear regression associating LA and both error components accounted for 17.4% of the variance (Factor 2; $p<.01$, $\beta=.40$).
Conclusions- Increasing MRI-LA disrupts temporal ordering of visual stimuli in AD/VaD spectrum dementia. Consistent with theoretical ideas suggested by Luria (1965) principal component analysis suggests that 2-factor model explains the association between MRI-LA and the production of graphomotor and related errors.
Correspondence: *Emma Rhodes, Department of Psychology- Temple University, 1701 North 13th Street, Philadelphia, PA PA. E-mail: emma.rhodes@temple.edu*

A. TART-ZELVIN, J. PILLAI, G. WICAS, J. EPPIG, M. SPIERS, J. WILLIAMS & D.J. LIBON. Perseverations and Graphomotor Errors Produced on a Visual Serial List Learning Test in Epilepsy.
Background
In epilepsy, the cognitive correlates of perseverations/ related graphomotor errors obtained from visual serial list learning tests has not been extensively studied. This study examined relationships between immediate free recall preservations/ related graphomotor errors and other domains of cognitive functioning.
Methods
Temporal lobe epilepsy patients (n= 37) and normal controls (n= 34) were studied with the Biber-Glosser Figure Learning Test, a visual serial list learning test modeled after the California Verbal Learning Test. List A consists of 15 geometric objects displayed for 3s administered over 5 immediate free recall trials. Age did not differ (NC= 40.97+/-12.27; epilepsy= 45.84+/-14.53); NCs were better educated (NC= 13.94+/-1.41; epilepsy= 12.97+/-2.42; $t[69]= 2.03$, $p< .046$). Executive errors included within/ between-trial perseverations, and chimeric errors, where correct portions of several figures were fused to create a novel figure. Non-executive errors included additions, deletions, and rotations.
Results
Differences were noted only for executive errors (NC= 3.00+/-2.90; epilepsy= 9.67+/-6.73; $t[66]= 5.30$, $p< .001$). For executive errors, a 2 group x 5 trial repeated measures ANOVA yield a significant interaction ($p< .001$) with patients generating more errors over test trial. In a series of regression analyses, executive errors were related only to poor performance on letter fluency tests (beta= -.545, $p< .001$). In a stepwise regression analysis, where delayed recognition discriminability was the dependent variable, only executive errors entered the model ($r= .462$, $R2= .213$, $F= 17.07$, $df= 1, 63$, $p< .001$, beta= -.462, $p< .001$); as executive errors increased, delayed recognition declined.
Conclusion
Immediate free recall errors can provide an assessment of executive impairment in epilepsy. Immediate free recall perseverations/ related graphomotor may disrupt the necessary consolidation for optimal encoding.
Correspondence: *Ariana Tart-Zelvin, 584 Pheasant Ridge Drive, Apt. A, Chubbuck, ID 83202. E-mail: atartz@gmail.com*

J. COHEN, D.L. PENNEY, R. DAVIS, A. KUMAR & M. LAMAR. A Pilot Study of Sex Differences in Graphomotor Planning as a Sign of Differential Executive Impairment in Vascular Aging.
Identifying early indications of later-life cognitive impairment sensitive to known sex differences would enable a more individualized approach to monitoring and intervention in at-risk individuals. We explored sex difference in motor processing as a possible early indicator of executive dysfunction in vascular aging. 66 healthy adults (37 females) >60 years of age completed a digital clock drawing task (dCDT). A digitized pen recorded graphomotor output in real time by taking 80 pictures/second during task completion. Metrics of graphomotor planning included anchoring of clock face digits (i.e., drawing 12,3,6 & 9 before other digits) and hooklets (i.e., an upstroke on the end of a number leading to the next number). Tasks of executive function were also administered. Men were slightly older, more educated, and had greater vascular risk than women ($p<.05$). Separate ANCOVAs controlling for these differences revealed men produced more dCDT hooklets than women ($p=.01$) but women anchored more than men ($p=.005$). In men, systolic blood pressure (sBP) and cholesterol (especially LDL cholesterol) were significantly associated with hooklet production. In women, only BP, both systolic and diastolic, associated with anchoring. Despite no differences in executive functioning, poorer performance on attention and self-monitoring tasks correlated with greater hooklet production in men while better problem solving correlated with greater anchoring in women. Thus, anchoring may be a positive sign in women while hooklet production may be a negative sign in men. Such sex-differences in graphomotor planning and their association to differential vascular risk may facilitate a more individualized approach to monitoring vascular aging and the risks inherent in such medical comorbidities. This pilot study suggests

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

a role for investigating graphomotor planning as a pre-clinical sign of sex-specific vascular aging.
Correspondence: *Jamie Cohen, 1601 West Taylor Street, MC 912, Chicago, IL 60612. E-mail: jcohen@psych.uic.edu*

J.R. WIENER, P. RAMBO, E. KEIFER & M.W. HAUT. Motor Perseverations in Frontal Versus Non-frontal Primary Brain Tumors.
Objective: Motor perseveration, originally discussed by Luria, has been studied as a measure of frontal lobe dysfunction. Previous work has demonstrated that frontal lobe lesions lead to perseveration on neuropsychological measures. We investigated whether primary brain tumors of the frontal lobe were associated with more motor-based perseverations than non-frontal brain tumors.
Participants and Methods: We retrospectively reviewed the neurobehavioral examinations of patients seen in a multidisciplinary brain tumor clinic between March and June 2013 (N=51). All patients had primary brain tumors. Patients were divided into two groups, frontal (N=34) versus non-frontal (N=17), based upon review of the most recent neuroimaging associated with their examination. The frontal group had statistically more females and more individuals with a history of radiation. There were no group differences based on WHO grade of the tumors. The frequency of occurrence and the number of motor perseverations was measured for Luria's loops and ramparts. Inter-rater reliability between two blinded raters was high (r=1.0).
Results: The presence of motor perseverations was more likely to occur in the frontal group than the non-frontal group (62.7% vs. 37.3%; Chi-square $p<0.05$). The total number of perseverations was greater in the frontal group (M=5.8, SD=8.2) than the non-frontal group (M=1.6, SD=2.0) when combining the two motor tasks [$F(1,49)=4.298$, $p<0.05$].
Conclusions: Motor perseverations on Luria's loops and ramparts are more common and more severe in individuals with primary brain tumors involving the frontal lobes compared with non-frontal tumors. These tasks may be used to quickly assess executive dysfunction in brain tumor patients.
Correspondence: *Jennifer R. Wiener, Psy.D., Behavioral Medicine and Psychiatry, West Virginia University School of Medicine, 930 Chestnut Ridge Road, Morgantown, WV 26505. E-mail: jwiener@hsc.wvu.edu*

M.L. COHEN, C. PRICE, N. SCHWAB & K. HEILMAN. Endogenously and Exogenously Evoked Movement Preparation, Initiation and Reprogramming in Parkinson's Disease.
Objective: Individuals with Parkinson's disease (PD) often demonstrate akinesia, a paucity of endogenously-evoked (internally generated) movement, but may be better able to move following exogenous (externally specified) cues. The present study aimed to quantify this clinical phenomenon, termed kinesia paradoxica, with a novel reaction time paradigm. It was hypothesized that PD participants, compared with healthy control (HC) participants, would demonstrate slower endogenously evoked reaction times when engaging and when stopping/switching motor movements.
Participants and Methods: 12 non-demented individuals with PD on dopaminergic medication, and 15 matched HC participants completed an experimental computerized paradigm designed to examine their reaction time to endogenous versus exogenous valid cues (i.e., "stay" trials). Participants were also assessed for their ability to abate this preparation, disengage, and program an alternative motor program ("switch" trials). Neuropsychological function, motor symptom severity, functional abilities, mood, and caregiver stress were also assessed.
Results: Participants with PD, when compared to controls, were relatively slower with endogenously than exogenously prepared switch trials, but were equivalent for other trial types. This slowing on endogenously evoked switch trials was associated with functional impairments and caregiver burden, as well as poorer performance on tests of executive functioning, semantic fluency, and finger tapping speed.
Conclusions: This study of individuals with PD on medications revealed that they had a deficit in endogenous motor stopping/switching, a "switch bradykinesia," that was associated with neuropsychological and functional impairments. These results are concordant with recent evidence that PD patients' difficulties with activities of daily living stem from errors of commission (e.g., perseveration) rather than omission.
Correspondence: *Matthew L. Cohen, Ph.D., Psychiatry and Behavioral Sciences, Johns Hopkins University School of Medicine, Meyer 218, 600 North Wolfe St., Baltimore, MD 21287. E-mail: mcohen69@jhmi.edu*

N.T. BOTT, E. JOHNSON, T. KIELY, N. SCHUFF, N. GALIFIANAKIS, J. KRAMER & K. POSSIN. Sensitive Measures of Executive Function Deficits in Non-demented Parkinson's Disease.
Objective: Executive function (EF) impairments are common in Parkinson's disease (PD), although it is not clear which tests are most sensitive to these impairments. We evaluated EF in PD patients without dementia using the NIH EXAMINER and a battery of traditional executive measures. The EXAMINER uses 9 computer-administered and paper-and-pencil tasks to generate 4 composite scores using item response theory to measure overall executive dysfunction, cognitive control, working memory, and fluency.
Participants and Methods: Patients with PD (N=18; mean MOCA=27.4, range 23-30) and controls (n=19) closely matched on age, education, and gender were compared using independent samples t-tests on Letter Fluency, Trails B, Stroop, Design Fluency and Digits Backward. Additionally, they were compared on NIH EXAMINER's Executive, Cognitive Control, Working Memory, and Fluency Composites. The Montreal Cognitive Assessment was administered to all patients as a measure of global cognitive impairment.
Results: PD patients scored significantly lower on the Executive ($p=.04$) and Cognitive Control Composites ($p=.02$), with trending significance for the Working Memory Composite ($p=.05$). No significant differences between groups were observed on Letter Fluency, Trails B, Stroop, Design Fluency, Digits Backward, and Fluency Composite (all $ps>.10$). Higher frequency of lower EF scores (> 1.5 SDs) in PD patients, relative to controls, were evidenced in the Cognitive Control (n=6) and Executive Composites (n=5). All other measures detected impairment in 2 or fewer PD patients.
Conclusions: These findings suggest that the NIH EXAMINER may be more sensitive to executive dysfunction in PD than traditional EF measures. The Movement Disorders Society's diagnostic criteria for PD-MCI require evaluation of EFs. These results highlight the differential sensitivity of executive measures to PD-related executive dysfunction, and suggest that the NIH EXAMINER may be particularly sensitive.
Correspondence: *Nicholas T. Bott, Psychiatry and Behavioral Sciences, Stanford University School of Medicine, 401 Quarry Rd., MC 5719, Palo Alto, CA 94305. E-mail: nbott@stanford.edu*

N.T. BOTT, M. SAGGAR, E. QUINTIN, E. KIENITZ, G. HAWTHORNE, A. ROYALTY & A. REISS. Strategy Use on the D-KEFS Design Fluency Test: Relationships with Personality and Creativity.
Objective: Interpretation of performance on executive functioning (EF) tests is based on quantification of responses, and often supplemented by qualitative appraisal of strategy. However, use of strategies has yet to be extensively quantified. We tested the hypothesis that strategy use would be related to measures of personality and creativity. We assessed strategy use on the Delis Kaplan Executive Function System (D-KEFS) Design Fluency (DF), a commonly used assessment of EF for which strategy use has not been examined.
Participants and Methods: Thirty-three healthy participants took part in the study (age mean(S.D)=29.0years(5.9); 17F). We measured personality with the NEO-FFI, and creativity with the Torrance Test of Creative Thinking - Figural (TTCT-F). Strategy use was defined as a string of two or more consecutive designs, with subsequent designs modified to create a unique design. Three types of strategies were quantified: Gestalt

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

(rotation or translation of design), Variation (change in one of the four lines), and Hybrid (combination of Gestalt and Variation strategies).
Results: Pearson's r correlations revealed significant associations between the number of strategy-based designs, controlling for total unique designs on the switching condition, and NEO-FFI neuroticism (r=.407, p=.023), and conscientiousness (r=-.491, p=.005), and TTCT-F resistance to closure (r=-.385, p=.032). Participants were divided into two groups: those who did vs. did not use a strategy. MANOVA revealed group differences on conscientiousness (F=4.473, p=.043), and resistance to closure (F=5.661, p=.024).
Conclusions: Results indicate that individuals who use a greater number of strategies on figural EF tasks exhibit greater amounts of neuroticism, less conscientiousness and less resistance to closure. These findings suggest that quantifying use of strategies holds promise for increased understanding of the relationship between strategic processing and aspects of personality and creativity, and supplements qualitative appraisal of performance.
Correspondence: *Nicholas T. Bott, Psychiatry and Behavioral Sciences, Stanford University School of Medicine, 401 Quarry Rd., MC 5719, Palo Alto, CA 94305. E-mail: nbott@stanford.edu*

R. LIM, C.N. ARESHENKOFF, J.E. KARR, E. CREVIER-QUINTIN, K.A. SUTTON & M.A. GARCIA-BARRERA. A Quantitative Review of Cognitive Training Effects on the Executive Functions of Older Adults.
Objective: Declines in executive functions have become a notable characteristic of the aging process and a plethora of recent research has evaluated the gains of cognitive training (CT) for executive functions among older adults. In turn, a meta-analysis examined the executive-related outcomes of controlled CT trials for participants at varying levels of cognitive decline.
Participants and Methods: The meta-analysis reviewed studies based on specific eligibility criteria (i.e., controlled interventions, executive-related outcomes and mean participant age of 65+). A pretest-posttest-controlled effect size (ES; Morris, 2008) was calculated for each outcome and averaged by executive-related constructs, including problem representation (PR), working memory (WM), attentional control (AC), and inhibitory control (IC). Using a random-effects model, further analyses evaluated study quality, publication year, treatment design, and sample characteristics as potential ES moderators.
Results: Twenty-two research studies yielded 63 executive-related ESs with significant heterogeneity ($p < .05$). CT generated an overall ES of 0.24 (95% CI [0.13, 0.36]) for executive functions. Positive ESs were found for PR (0.45 [0.25, 0.68]) and WM (0.21 [0.08, 0.41]), while ESs for AC (-0.05 [-0.25, 0.18]) and IC (0.10 [-0.16, 0.49]) did not reliably differ from zero. Studies with a greater percentage of male participants showed higher ESs (r = .32 [0.10, 0.53]). More recently published studies showed lower ESs (r = -.35 [-0.61, -0.06]). As well, ESs tended to decrease with higher baseline age (r = -.28 [-0.50, 0.07]).
Conclusions: Results indicated diverse CT outcomes based on construct, with PR presenting the highest ES. Younger samples with greater male representation tended to experience larger effects. More recent years of publication resulted in lower ESs, with better techniques, larger samples and better control groups potentially reducing an artificially large effect size.
Correspondence: *Ryan Lim, Psychology, University of Victoria, 307-870 Short St., Victoria, BC V8X 2V5, Canada. E-mail: rlim@uvic.ca*

K.A. SUTTON, C.N. ARESHENKOFF, J.E. KARR, E. CREVIER-QUINTIN, R. LIM & M.A. GARCIA-BARRERA. Physical Exercise Interventions for Executive Functions at Later Age: An Evaluation of Pre-Post Controlled Trials.
Objective: Several recent studies have examined the effects of physical exercise on the executive functions of older adults to promote healthy aging and prevent mental decline. To synthesize these findings, a meta-analysis was conducted on 23 research studies that met eligibility criteria (i.e., involving executive-related outcomes, control conditions, mean ages at or above 65 years, and sufficient information to calculate effect sizes).
Participants and Methods: A pretest-posttest-controlled effect size (Morris, 2008) was calculated for each outcome, providing estimates for change attributable to the intervention condition. For each study, effect sizes were averaged by their executive-related construct, including attentional control (AC), problem representation (PR), working memory (WM), and inhibitory control (IC). Using a random-effects model, moderator analyses examined the impact of executive-related construct, sample characteristics, publication date, and treatment design.
Results: After categorizing by executive construct, 45 effect sizes with significant heterogeneity ($p < 0.05$) were identified. Moderator analyses revealed modest mean effect sizes for each executive construct (AC, dPPC = 0.15 [95% CI: 0.06-0.29]; PR, 0.10 [-0.10-0.28]; WM, 0.13 [0.03-0.22]; IC, 0.10 [-0.01-0.23]), and a relatively small overall mean effect size (0.12 [0.07, 0.19]). There was a significant positive correlation between publication date and treatment (0.27 [0.04, 0.47] and a trending positive correlation between participant's age and treatment (0.18 [-0.06, 0.42]).
Conclusions: Smaller effect sizes were due in part to the unique calculation (e.g., analyses took into account change observed in control groups). Results suggest that physical exercise may help to improve overall executive function of older adults, but effects did not differ based on executive construct. More recently published studies produced more positive effects, validating exercise as a treatment for modestly improving cognitive function in older adults.
Correspondence: *Kelly A. Sutton, University of Victoria, 4001 Hopesmore Drive, Victoria, BC V8N 6A2, Canada. E-mail: ksutton@uvic.ca*

E. DIRENFELD, V. DURAN, J.E. KARR, M.A. GARCIA-BARRERA & D.A. PINEDA. Further Examination of a Cross-Cultural Executive Functioning Screener and its Utility in Clinical Populations.
Objective: An examination of the 25-item BASC executive functions screener (Garcia-Barrera et al., 2011) in Colombian children was previously conducted, which supported use of this screener cross-culturally and in clinical and healthy populations (Direnfeld et al., 2013). To further analyze the psychometric properties of the screener, Item-Response Theory (IRT) was applied to the screener items. To assess the clinical utility of the screener in discriminating executive functioning, indices of sensitivity and specificity were calculated for all four components of the screener (problem solving, attentional, behavioural, and emotional control) using receiver-operator characteristics (ROC) curves with the best cutoff point.
Participants and Methods: BASC teacher ratings were collected for children ages 6-11 from Colombia [healthy controls: n = 849 (M = 8.0 years) ADHD: n = 155 (M = 8.2 years)]. One of the integral components for scale construction is the discrimination parameter, which was set at 1 (Hambleton et al., 1991). Given IRT results, the original four-factor model supporting the screener (Garcia-Barrera et al., 2011) was applied to the set of items via confirmatory factor analysis (using MPlus v. 6.12).
Results: Based on IRT analyses, one item from the problem-solving factor was eliminated (a = 0.942). The screener's ability to discriminate ADHD cases from healthy controls ranged from poor to modest (sensitivity: 53-72%; specificity: 48-72%) for all scales. The 24-item overall four-factor model fit was adequate for controls: RMSEA = .07 (90% CI: .066-.074), $\chi 2$/df ratio = 5.14, CFI = .949; and for ADHD: RMSEA = .076 (90% CI: .065-.086), $\chi 2$/df ratio = 1.89, CFI = .925.
Conclusions: Results support the use of the 24-item screener in a cross-cultural context. Even though the screener is useful when examining executive functions, these results indicate that the screener should be used in combination with other measures to diagnose executive dysfunction in those with developmental disorders such as ADHD.
Correspondence: *Esther Direnfeld, Psychology, University of Victoria, P.O. Box 3050, University of Victoria, Victoria, BC V8W3P5, Canada. E-mail: edirenfe@uvic.ca*

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

D.C. BLINKOFF, G. POTTS & C. CIMINO. Examining Convergent Validity of a Novel Set of Executive Function Measures.

Objective: Many measures of executive function (EF) are complex, have limited reliability and validity, suffer from task impurity, and may be culture, language, or education bound limiting use in certain populations. To address issues with current clinical assessments, novel EF tasks that focus on set-shifting, inhibition, and updating were developed. The tasks are relatively simple and designed to allow for behavioral and neural (ERP) assessment. They use identical stimuli, varying only in cognitive operations. The purpose of this study was to demonstrate convergent validity of the novel tasks by comparing performance to current neuropsychological measures of set-shifting, inhibition, and updating. We predicted performance on the new EF tasks will be correlated with existing valid measures of EF.

Participants and Methods: 29 undergraduates, 8 males/ 21 females, ages 18-26 with no history of neurologic or psychiatric disorders, were recruited from the University of South Florida's subject pool. Neuropsychological tests theorized to be associated with set-shifting (WCST & Trails), updating (Letter Number Sequencing-LNS), and inhibition (Stroop) and the novel tasks (n-back-updating, inhibit, and set-shift) were administered in randomized order. Reaction time was recorded for the novel tasks and correlated with raw scores from neuropsychological measures.

Results: Updating: The 1-back task was associated with total LNS (r=-.38, p<.05) and longest letter number sequence (LLNS) (r=0.441,p<.05). 2-back was associated with LLNS (r=-.447, p<.05). Set-Shifting: The Shift task had a near significant relationship with Trails B (r=.38, p=.051). Inhibition: The Inhibit task had a trending relationship with Stroop Color-Word score (r=-.33, p=.09).

Conclusions: The novel EF tasks may offer a new way of measuring set-shifting, inhibition, and updating while minimizing confounds of existing measures. This study provides preliminary evidence of convergent validity of these novel tasks.

Correspondence: *Danielle C. Blinkoff, B.A., Clinical Psychology, University of South Florida, 13103 National Drive, Apt. D, Tampa, FL 33617. E-mail: dblinkoff@mail.usf.edu*

M. HUA, C. PENG, Y. CHEN, C. LIU & H. HWU. The Taiwan Odd-Even Number Sequencing Test: An Alternative Measuring Working Memory Function.

Objective: The Letter Number Sequencing Test (LNST) is one of the essential measures of working memory. However, its practical utility is limited for people using a non-alphabetic language. To develop a test free of the language boundary and compatible with the LNST in terms of psychometric properties and clinical value is thus imperative. The Taiwan Odd-Even Number Sequencing Test (TOENST) in which subjects are asked to repeat even numbers first and from the lowest, and then the odd ones from the highest was formed. The study was to examine its psychometric properties and its relations to demographic variables of normal adults in Taiwan.

Participants and Methods: In study I, 300 healthy participants with age range from 20 to 84 years old covering 11 age groups were recruited. In study II, 32 patients with schizophrenia and demographically matched controls were included. All participants received the TOENST, and mental and emotional screening tasks. Thirty healthy subjects were retested 3 months later, and 42 also received conventional working memory tests for examining reliability and validity features of the TOENST respectively.

Results: The split-half reliability coefficients of the TOENST ranged from .69 to .95 across 11 age groups and the test-retest reliability was .75. The validity was demonstrated with significant correlations with conventional working memory measures, and a notable decline of the test performance in normal elderly subjects compared with their younger counterparts. Additionally, patients with schizophrenia also poorly performed on the TOENST. The healthy participants' performance level was significantly associated with age and education variables.

Conclusions: Based on the present results, it appears that the TOENST bears adequate psychometric properties and clinical utility in measuring working memory. However, since the test performance was affected by age and education, further study on the issue of whether the norm needs a correction for both variables is suggested.

Correspondence: *Mau-Sun Hua, Ph.D., Psychology, National Taiwan University, Dept. of Psychology, National Taiwan University, #1, Sec. 4, Roosevelt Rd., Taipei 106, Taiwan. E-mail: huams@ntu.edu.tw*

C.S. ELLIOTT, T. GIOVANNETTI & D. OTTEMILLER. Evaluating Planning Models with Traditional Cognitive Tests and a Performance-based Test of Everyday Action.

Objective: To evaluate the cognitive components of planning as proposed by two models, which emphasize different processes (i.e., Supervisory Attentional System (SAS)- executive function; Constructive Episodic Simulation Hypothesis (CESH)- episodic memory). We hypothesized that planning time, reflecting plan formulation, would be related to episodic memory, whereas planning behaviors reflecting plan execution would be related to executive functions.

Participants and Methods: 92 participants (47.8% male; M_{age} = 21.80 years) completed tests of executive functions (Action Program; Haylings; Brixton Tests) and episodic memory (Logical Memory; Autobiographical Memory Interview). Planning was evaluated with traditional measures (Tower Test; Mazes; Zoo Map) and a performance-based everyday action test (2x3 Multi-Level Action Test). Plan formulation was defined as planning time before executing the tasks, and plan execution as planning behaviors during the tasks. Relations between planning measures and cognitive tests were evaluated with correlations and regressions.

Results: As predicted, planning behaviors on traditional planning measures was significantly related to an executive measure ($r = .35$, $p < .01$). Contrary to hypotheses, planning time on traditional planning measures was related to tests of both episodic memory and executive function, and the direction of the relations was opposite of that predicted (as planning time increased, episodic/executive test performance declined; $r > .20$, $p = .05$). When everyday task planning was examined, analyses revealed unexpected trends, with planning variables associated with slightly weaker episodic/executive test performance.

Conclusions: Results do not support the CESH model. There was some support for the SAS model, but only for traditional tests of planning. Neither model was supported in everyday tasks; rather, individuals with stronger cognitive skills did not formulate extensive plans prior to initiating tasks but may formulate plans rapidly or during task execution.

Correspondence: *Colette S. Elliott, PhD, Temple University, 135B New Haven Avenue, Milford, CT 06460. E-mail: colette.seter@temple.edu*

N.A. CRANE, M. KAMALI, R. BHAUMIK, K.A. RYAN, D.F. MARSHALL, E.F. SAUNDERS, M.T. KASSEL, A.L. WELDON, M.G. MCINNIS & S.A. LANGENECKER. Developing Dimensional, Integrated Constructs of Self-Report and Neuropsychological Data for Inhibitory Control.

Objective: Integrating neuropsychological (NP) and self-report measures is a crucial step in refining intermediate phenotypes that link genes to neurobiology, helping us to better understand mental illness. However, dimensional, integrated constructs are seldom used in mental illness or in illnesses with both performance and symptom change (e.g., Parkinson's). The present study examined how NP and self-report measures relate to each other among individuals with Bipolar Disorder (BD) and healthy controls (HC).

Participants and Methods: BD (n=180) and HC (n=102) subjects completed the Barratt Impulsiveness Scale (BIS), a self-report measure of executive functioning (EF), and a NP battery comprised of four EF factors including 1) Verbal Fluency and Processing Speed, 2) Conceptual Reasoning and Set-Shifting, 3) Processing Speed with Interference Resolution, and 4) Inhibitory Control. Confirmatory factor analysis had a marginally good fit for NP-EF and failed to converge for the BIS-EF. To examine underlying EF constructs, we performed 2 separate

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

exploratory principle component analyses using varimax rotation with 30 BIS and 12 NP variables, separately for BD and HC.
Results: A 4 factor model was found for BD, accounting for 44% of the total variance, while a 5 factor model was found for HC, accounting for 48% of the total variance. In addition, the factor structure for each group differed, in that overlap between NP-EF and BIS-EF variables was greater in HC than in BD.
Conclusions: Overall our findings demonstrate different relationships between NP and self-report measures in BD and HC. Further, BD self-report data converged less with NP performance than in HC, suggesting that BD have less insight into EF than HC. This is preliminary evidence that NP and self-report measures may be capturing different information about similar constructs, suggesting a need to measure and adjust for variability in insight when using self-report measures to determine key latent variables of interest.
Correspondence: *Natania A. Crane, University of Illinois at Chicago, 1007 W Harrison Street (M/C 285), Chicago, IL 60607. E-mail: ncrane3@uic.edu*

G.A. WITKIN. ASL-Based Clustering on F-A-S Among Deaf College Students.
Objective: Recent research has looked at how participants use clustering and switching techniques on F-A-S tests to ascertain information about their executive function and lexical organization. Among bilingual deaf/hard-of-hearing (d/HoH) participants, however, focusing on English-based clustering may be insufficient. This study analyzes American Sign Language (ASL) based clusters produced by d/HoH participants to determine which phonemic characteristics of ASL are most salient, and thus, used most often by d/HoH participants in organizational tasks.
Participants and Methods: This study utilizes archival data from the NSF-funded Science of Learning Center on Visual Language and Visual Learning (VL2). As part of the Psychometric Toolkit study, 37 profoundly deaf students at Gallaudet University were administered a battery of tests, including F-A-S, which was used for the current study. Participants' responses were scored for ASL-based clusters based on the system established by Witkin, Morere, & Geer (2013), and focused on the three main phonemic characteristics of ASL: handshape, location, and movement.
Results: After all responses were analyzed, a one-way ANOVA was run to determine if there was a significant difference in participants' use of clusters based on handshape, location, or movement. Participants generated clusters based on movement significantly less often than they did clusters based on handshape or location [$F(2,150) = 9.43$, $p < .01$]. There was no significant difference between clusters based on handshape and location.
Conclusions: When rapidly searching for words on an F-A-S task, characteristics of an ASL sign may influence lexical organization and word generation. These results indicate that d/HoH college students categorize signs based on handshape or location more often than movement. This is the first study to investigate ASL phonemes in this context. The large numbers of fingerspelled responses indicate that more complex factors may influence d/HoH participants' performance on these measures.
Correspondence: *Gregory A. Witkin, M.A., Psychology, Gallaudet University, 7149 Bay Dr. #10, Miami Beach, FL 33141. E-mail: gregory.witkin@gallaudet.edu*

E. HAYWARD, S. DONNELLY, M. ACEVEDO, B. HOMER & P. PRAMATARIS. The Effects of Bilingualism on Executive Functioning in a Clinic-Referred Population.
Objective: Contemporary research has examined the cognitive benefits of bilingualism, specifically with regard to Executive Functioning (EF; Bialystok at al., 2009). Research has shown that bilinguals tend to outperform monolinguals on tasks of inhibition (Carlson & Meltzof, 2008) and task switching (Barac & Bialystok, 2012). This bilingual advantage has not been explored in clinical groups. The current study sought to identify bilingual advantages in two EF constructs, inhibition and switching, in a clinic-referred population.
Participants and Methods: Thirteen bilinguals were matched with 13 monolinguals on age, verbal IQ and gender. Bilingual participants had emerging bilingual skills and came from a bilingual, Spanish-speaking home. Archival data from a clinic serving low-SES children with attention and learning problems in a Northeastern city was used. Participants were administered a measure of Verbal IQ, the D-KEFS Color-Word Interference Inhibition, and D-KEFS Verbal Fluency Category Switching. Paired t-tests were conducted to explore differences between groups.
Results: Bilingual and monolingual groups were equivalent in terms of gender (62% female), age($M(b) = 12.99$, $M(m) = 13.16$; $p = .73$), and Verbal IQ ($M(b) = 91.38$, $M(m) = 91.69$; $p = .95$). Paired-samples t-tests revealed that the groups did not differ on Inhibition ($t(12) = .21$, $p = .84$) or Switching ($t(12) = -1.65$, $p = .13$). The difference on Switching approached significance, favoring the monolinguals ($M(b) = 87.69$, $M(m) = 97.70$).
Conclusions: The current results fail to identify an advantage for clinic-referred bilinguals in EF. Recent research suggests that the EF advantages in bilinguals have been overstated and that differences in culture and SES may account for group differences (Kirk et al., 2013; Kousaie & Phillips, 2012). As groups were drawn from a clinic-referred population within a single city, the current sample was relatively homogenous, such that the lack of an advantage may result from this equivalency.
Correspondence: *Elizabeth Hayward, Center for Attention and Learning, Lenox Hill Hospital, 210 East 64th Street, New York, NY New York. E-mail: ehayward1@nshs.edu*

L.D. KEEN. Influence of Interleukin-6 on Neurocognitive Performance in A Community-Based Sample of African Americans.
Objective: Examine the association between IL-6, a marker of inflammation, and facets of neurocognition in a sample of middle aged, community-based African Americans.
Participants and Methods: Participants included 146 African American adults (50% male), with a mean age of approximately 46 years (SD = 10.83). Serum was drawn upon entry into the study and the participants completed a demographic questionnaire and a battery of neuropsychological tests.
Results: Employing multiple regression analyses and adjusting for demographic and physiological covariates, Il-6 was significantly associated with the inhibition (β=-6.89, p =.03), and both attention (β=14.51, p =.00) and executive function (β=.14, p =.06).
Conclusions: The current findings extend previous literature, which identifies IL-6 as a marker of neurocognitive dysfunction and cognitive decline in non-Hispanic white elderly samples, to relatively healthy middle aged African Americans.
Correspondence: *Larry D. Keen, Ph.D., University of Florida, 2330 SW Williston Road, Apt 2334, Gainesville, FL 32608. E-mail: larrydkeenii@phhp.ufl.edu*

M.F. DULAY, K.A. AGBAYANI, J.M. LAI, J.J. VOLPI, D. CHIU, T. KALDIS, P.N. DESAI, Y. ZHANG & G.W. BRITZ. Comparison of Cognitive Profiles After Frontal Versus Cerebellar Stroke.
Objective: Traditionally, the cerebellum was thought to primarily modulate balance and coordination of smooth movements. Recent research showed that cerebellar lesions also result in executive deficits such as disinhibition or poor planning. Executive impairment, usually associated with frontal lobe damage, is proposed to occur after cerebellar damage due to disconnection with frontal lobe of a feedback loop through the thalamus or feedforward loop through the pons. It is unclear whether deficits that occur after cerebellar damage are similar in rate and magnitude to deficits that occur after frontal lobe damage.
Participants and Methods: Executive data from 32 patients who sustained a cerebellar CVA (11 left-sided, 16 right, 5 bilateral) were compared to 29 patients with frontal lobe CVA (13 left, 11 right, 5 bilateral). Demographics were similar between groups (55% female;

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

sample mean age of 62-years; tested an average of 6 weeks post-CVA). Standard neuropsychological tests were used (e.g., TMT, WCST).
Results: Chi-square indicated that the rate of executive impairment (z-score -1.32 below normative data) after CVA was similar between groups for most tasks including working memory, mental flexibility, and problem solving (e.g., working memory deficits = 38.5% after cerebellar CVA; 44.4% after frontal CVA; NS chi-square). The two exceptions were that frontal CVA resulted in significantly reduced strategic verbal learning (55.2% after cerebellar CVA versus 73.1% after frontal) and phonemic fluency deficits. Controlling for age, MANCOVA indicated that left frontal and right cerebellar CVA led to greater phonemic fluency impairment ($F[3,58]=10.2, p<0.01$).
Conclusions: Results provide support for the hypothesis that a cerebro-cerebellar network exists given the similar deficits that occur in executive ability after damage to the cerebellum or frontal lobe. Understanding deficits associated with a 'Cerebellar Cognitive Affective Syndrome' allows clinicians to provide beneficial education to patient's who sustain cerebellar damage.
Correspondence: *Mario F. Dulay, Ph.D., Neurosurgery, Houston Methodist Neurological Institute, 6560 Fannin, Suite 944, Houston, TX 77030. E-mail: mdulay@tmhs.org*

A. MACKAY-BRANDT, S. COLCOMBE, C. SANTIAGO, R. TOBE, M. BRELAND, A. LIEVAL, L. PANEK, C. CRADDOCK, X. CASTELLANOS, B. LEVENTHAL & M. MILHAM. Preliminary Lifespan Trajectories of Cognitive, Behavioral, and Neuroimaging Data from the NKI-Rockland Sample Open Access Dataset.
Objective: To illustrate the breadth of brain/behavioral data collected and opportunities for data sharing using the NKI-Rockland Sample (NKI-RS).
To introduce a sampling of data available to the scientific community currently in data collection for the NKI-RS.
Participants and Methods: The NKI-Rockland Sample is a large scale (n>1000) cross-sectional community-ascertained lifespan neuroimaging study (ages 6-85 years) currently collecting data and prospectively released to the scientific community. Each participant undergoes detailed neuropsychological testing including the complete Delis-Kaplan Executive Function System (D-KEFS). In addition to cognitive testing, participants complete behavioral measures, diagnostic semi-structured interviews, laboratory testing, physical measures, genetic sampling, and neuroimaging.
Results: Developmental trajectories of performance on measures of processing speed and executive function are illustrated across the lifespan (6 to 85 years) from the pilot data of the NKI-RS (n = 250). Age-related increases in processing speed and executive function in the early decades were followed by expected age-related decreases in processing speed and executive function in the latter end of the lifespan. Regression analyses examined additional predictors (brain measures, health, and mood) of variance in cognitive performance.
Conclusions: Age-related trajectories of cognitive performance have substantial variance at each age point across the lifespan. Individual differences in brain measures, health, and mood contribute to our understanding of normative age-related trajectories of cognitive ability. Next steps include the integration of these measures with graph-theoretical measurements of neural efficiency in the human connectome derived from diffusion tensor imaging and resting state fMRI. NKI-RS is open access data freely available to the scientific community.
Correspondence: *Anna MacKay-Brandt, PhD, Outpatient Research, Nathan Kline Institute, 140 Old Orangeburg Road, N105, Orangeburg, NY 10962. E-mail: amackay-brandt@nki.rfmh.org*

I.B. MEIER, Y. GU, V.A. GUZMAN, A.F. WIEGMAN, N. SCHUPF, J.J. MANLY, Y. STERN, J.A. LUCHSINGER, A. VISWANATHAN, S. MARTINEZ-RAMIREZ, S.M. GREENBERG, R. MAYEUX & A.M. BRICKMAN. Lobar Microbleeds Are Associated With Decline In Executive Functioning.
Objective: Cerebral microbleeds (MB) are MRI signal voids due to hemosiderin deposit and are common in older adults. Lobar MB are thought to reflect the presence of amyloid angiopathy. Previous studies have reported a relationship between the occurrence of lobar MB and decreased executive functioning. Few studies have examined the effect of MB on cognition over time. Here, we used a retrospective longitudinal design to examine whether the presence of lobar MB is associated with the rate of cognitive decline among non-demented older adults.
Participants and Methods: Participants came from an ongoing longitudinal community-based aging study, in which subjects are evaluated at 18-24 month intervals. Gradient echo MRI scans were available on 197 non-demented participants (mean age: 84.15+/-5.02 years). Microbleeds were rated visually in subcortical (basal ganglia, cerebellum) and lobar (frontal, temporal, parietal, occipital lobe) regions. Cognition was assessed with a neuropsychological battery, providing summary scores for memory, language, executive, and visuospatial abilities. Using general estimating equations, we compared cognition cross-sectionally between individuals with (n=11) and without (n=186) lobar MB and examined longitudinal cognitive change 9.47 (SD=3.13) years before the MRI scan.
Results: Individuals with and without lobar MB were similar on all demographic factors. Subjects with lobar MB had worse executive functioning at the visit closest to the MRI scan and showed faster decline in executive function over time (B=-.163, p=.012) than subjects with no lobar MB. No effects were found for other cognitive domains.
Conclusions: Lobar MB are associated with an accelerated rate of executive function decline. The lack of association with other cognitive domains could reflect selective attrition, given the advanced participation age and their duration in the study. Future work will examine the prospective cognitive course of individuals with lobar MB, as well as the interaction of MB with other pathological markers.
Correspondence: *Irene B. Meier, MSc, Taub Institute, Columbia University, 630W 168th Street, New York, NY 10032. E-mail: ibm2106@columbia.edu*

E.C. DUGGAN, J.E. KARR, V. DURAN, C. MCMYNN, D. FINNAMORE & M.A. GARCIA-BARRERA. Derivation and Convergent Validity Analysis of a Screener for the Behavioral Assessment of Executive Functions in Young Adults.
Objective: Ecologically valid indicators of executive functioning (EF) are designed to capture EF deficits not easily measured in a lab setting. A four-factor EF screener (problem solving, attentional control, behavioral control, emotional control) has been derived from the Behavior Assessment System for Children (BASC) in preschoolers (Karr et al., 2013), kindergarteners (Sadeh et al., 2012) and children (Garcia-Barrera, et al. 2011). This study evaluated the screener in young adults and against a well-known EF ratings scale (the Behavior Rating Inventory of Executive Function-Adult Version; BRIEF-A).
Participants and Methods: 200 undergraduates (ages 18-25) completed the BASC-2 Self-Report Form-College, and a subset (n=98) completed the BRIEF-A. The screener was derived using 20 BASC-2 items assigned a priori to each EF component. Confirmatory Factor Analysis was used to evaluate the screener. Each factor (problem solving, attentional control, behavioral control, and emotional control) was also evaluated against its corresponding scale from the BRIEF-A (Plan/Organize, Shift/Task-Monitor/Working Memory, Self-Monitor, Emotional Control respectively).
Results: Moderate-to-high internal consistency was obtained within each factor (.50-.79). A confirmatory factor analysis model with 20 items loading on the 4 earlier mentioned latent factors was developed and demonstrated adequate fit (CFI=0.918; RMSEA= .053). All four BASC

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

factors were significantly correlated with their corresponding BRIEF-A scale(s) (r=.41 to .63, p<.0005).
Conclusions: These findings support the four-factor model measured through the screener in a young adult population and contribute to accumulating evidence in favor of the BASC-EF screener. Significant correlations between EF components and BRIEF-A scales provide additional support for the validity of the screener. Continued development of the BASC EF screener is warranted.
Correspondence: *Emily C. Duggan, Department of Psychology P. O. Box 1700, University of Victoria, Victoria, BC V8W 2Y2, Canada. E-mail: eduggan@uvic.ca*

E. CREVIER-QUINTIN, P. MACINTYRE & M.A. GARCIA-BARRERA. The Integrative Neuropsychological Theory of Executive-Related Abilities and Component Transactions (INTERACT): Best Predictors of Performance Across the Adult Lifespan.

Introduction:
Executive Functions (EFs) have been found to peak around age 25 and to wane steadily after 60. Little is known however, about what changes occur between the stages of optimal executive functioning, and the later periods of decline. This study aimed to investigate performance differences across the adult lifespan (N=32) on five tasks of EFs thought to measure the following components: shifting, updating, inhibiting, reward and valence processing, and problem representation.
Methods & Participants:
Group 1: included young adults from 30-40 (n=9); Group 2: middle-aged adults from 50-60 (n=10); and Group 3: older adults aged 70+ (n=13). It was hypothesized that (a) a global decline of EFs with age would be found through MANOVA, (b) performance differences would be observed across the three groups and five tasks via ANOVA, and (c) inhibitory control, allegedly the strongest predictor of cognitive aging, would show the greatest linear decline across the adult lifespan.
Results and Conclusions:
MANOVA tests with all tasks of EFs representing the Dependent Variables and age serving as the Independent Variable revealed no significant main effect. Follow-up separate ANOVA tests, indicated a statistically significant difference between the means of Groups 2 (50-60) and 3 (70+) for the updating task, $F(2,29)=5.374$, p=.010, Scheffe (p=.012) and Bonferroni (p=.010). Further, the performance of the middle-aged subjects (50-60) was found to be highly scattered across tasks compared to their younger and older counterparts, which was found to be rather clustered and consistent overall. While not statistically significant, this finding suggests the presence of greater variability in executive functioning for midlife (50-60), and indicates the presence of heterogeneity in the process of EF maturation from young to late adulthood.
Correspondence: *Emilie Crevier-Quintin, University of Victoria, Department of Psychology, P. O. Box 1700, Victoria, BC V8W 2Y2, Canada. E-mail: emiliecq@uvic.ca*

J.E. KARR, C.N. ARESHENKOFF & M.A. GARCIA-BARRERA. The Sensitivity of Executive Functions to Multiple Self-Reported Concussions.

Objectives: Current evidence shows limited support for increased overall cognitive impairment following multiple concussions, but executive functions appear especially sensitive to multiple minor head injuries, as evidenced by group comparisons (i.e., 2+ vs. 1 concussion: d = .24; Belanger et al., 2010) and head-contact exposure (e.g., frequency of heading in soccer: d = .54; Belanger & Vanderploeg, 2005). To delineate the specific abilities affected, the current study explored the cognitive sequelae of concussion by examining three diverse executive constructs (i.e., updating, shifting and inhibition; Miyake et al., 2000).
Method: A cross-sectional design evaluated athletes with 0, 1, or 2+ self-reported concussion(s) at seven or more days post-injury (i.e., post acute recovery; Belanger & Vanderploeg, 2005) through three higher-order cognitive tasks: the N-Back (Updating), Local-Global (Shifting), and Go/No-go (Inhibition).
Results: Using the trichotomous concussion history grouping as the dependent variable, ordinal logistic regression analyses identified shifting performance as the only significant predictor of group membership (β=1.52, p=.004, ΔR^2=.163), differentiating between 0 and 1 concussion (d=.42) and 1 and 2+ concussion(s) (d=.11).
Discussion: These results align with past researchers evaluating executive attention following concussion, showing post-concussion impairment and slower recovery compared to other cognitive abilities (Halterman et al., 2006; Sosnoff et al., 2007). Anterior cingulate functioning may underlie this result, but past neurophysiological results remain mixed (Larson et al., 2012; Pontifex et al., 2009).
Correspondence: *Justin E. Karr, University of Victoria, Department of Psychology, P. O. Box 1700, Victoria, BC V8W 2Y2, Canada. E-mail: jkarr@uvic.ca*

K. HILL, K. CARBINE, T. MASTERSON, E. CHRISTENSON, N. KILLPACK, R. LECHEMINANT, J. LECHEMINANT & M.J. LARSON. The Influence of Treadmill Walking on Working Memory and Attention: Paced Auditory Serial Attention Task (PASAT) Performance.

Objective: There is an increasing interest in walking due to benefits to overall health, maintaining healthy weight, strengthening bones, and lifting mood. As such, there is now an attraction to treadmill desk stations in replacement of traditional desks, allowing individuals to walk while performing office work. However, there is little research testing whether attention and working memory abilities would be affected while walking. We aimed to determine how working memory and attention would be affected while walking on a treadmill.
Participants and Methods: Participants included seventy-six healthy individuals assigned to sitting (n = 39; 17 female) or treadmill walking (n = 37; 23 female) conditions. Participants completed the Paced Auditory Serial Attention Task (PASAT) as a measure of attention and working memory while either walking or sitting. Data were analyzed using repeated measures analysis of variance (ANOVA).
Results: A Group x Time ANOVA on PASAT errors showed a main effect of group (p = .03), with those in the treadmill group committing significantly more errors than those in the sitting group on trials two (2.0 seconds) and four (1.2 seconds; ps < .03). The Group x Time interaction overall, however, was not significant (p = .26) as both groups significantly made more errors as the PASAT speed increased (p < .001).
Conclusions: We found significant overall differences in PASAT performance between participants in walking and sitting groups. Findings suggest treadmill walking may be associated with some decrements in the ability to hold in mind and rapidly process information. Thus, although treadmill desks may have health benefits, performance on speeded and complex attention tasks may be impacted.
Correspondence: *Michael J. Larson, Ph.D., Department of Psychology, Brigham Young University, 244 TLRB, Provo, UT 84602. E-mail: michael_larson@byu.edu*

Electrophysiology/EEG/ERP

K. HILL, D. LOGAN & M.J. LARSON. Electrophysiological Indicators of Error Awareness and Performance Monitoring.

Objective: Understanding our ability to monitor performance and detect when we have made mistakes is necessary for day-to-day adaptive behaviors. From electrophysiological studies the post-error positivity (Pe) and the error-related negativity (ERN) have both been possibly linked to error awareness and performance monitoring processes. We further investigated the electrophysiological indicators of error awareness using a novel task where participants identify their level of awareness of errors.

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms.
https://doi.org/10.1017/S1355617714000381

Participants and Methods: High-density ERPs were recorded while 65 healthy individuals completed the Error Awareness Task (EAT) wherein participants respond with separate button presses to hits, correct previous trials, and previous error trials. Response times, accuracy, and ERP amplitudes were tested using separate repeated measure analysis of variance (ANOVA) for correct, aware error, and unaware error trials.
Results: There was a significant main effect of accuracy for the Pe [$F(2,126)=35.94$, $p<.001$]. Aware errors were significantly larger than other trial types with no difference between correct and unaware error trials. There was a significant main effect of a 3-trial type ANOVA on ERN accuracy [$F(2,126)=3.18$, $p=.05$]. Pairwise comparisons of the ERN showed the effect between correct and error trials, but no difference between awareness conditions for the ERN [$F(1,63)=.19$, $p=.66$].
Conclusions: Findings provide support for the Pe as an indicator of error awareness as aware errors had larger Pe amplitudes, while there were no differences between unaware errors and correct responses. The ERN differentiated error from correct trials, but did not differ as a function of awareness. This study provides a framework for future research in understanding error-awareness in populations with various neurological conditions including Alzheimer's disease and traumatic brain injury.
Correspondence: *Michael J. Larson, Ph.D., Department of Psychology, Brigham Young University, 244 TLRB, Provo, UT 84602. E-mail: michael_larson@byu.edu*

K. JANG, S. KIM & M. KIM. An Event-related potential study of spatial working memory in nonclinical individuals with ADHD traits.

Objective: We investigated spatial working memory deficits in individuals with Attention-Deficit/Hyperactivity traits using the two-back task and event-related potentials (ERPs).
Participants and Methods: Participants: Based on the scores of the Korean version of Conners' Adult ADHD Rating Scales (CARRS) and Adult ADHD Self-Report Scale (ASRS) the ADHD-trait (highest 7% of scores on CARRS-K and over 24 scores on ASRS, n=12) and control (lowest 7% of scores on CARRS-K and below 16 scores on ASRS, n=10) groups were selected.
Two-back task: The two-back task was performed to assess spatial working memory. Participants were asked to respond whether present stimulus and stimulus presented 2 trials back were in the same location or not. The Stimulus was presented on a square black grid of 3 x 3 cells and total 360 trials (target 30% and nontarget 70%) were administered.
Electrophysiological recording procedure: EEG activities were recorded using a 64-channel Geodesic Sensor Net system. The EEG epochs (-100~900ms) were averaged for two conditions (target and nontarget). The N100, N200 and P300 amplitudes elicited by each condition were analyzed by ANOVA, repeated measure, mixed design.
Results: In terms of response time and accuracy, the two groups did not differ. For ERP results, N100 and N200 amplitudes were not significantly different between the two groups. The P300 amplitude elicited in target condition was greater than in nontarget condition($F(1,20)=8.87$, $p<.01$). ADHD-trait group showed significantly reduced P300 amplitude compared to the control group in target ($F(1,20)=4.67$,$p<.05$) and nontarget conditions($F(1,20)=9.61$,$p<.01$) than did control group.
Conclusions: These results indicate that individuals with the ADHD traits have impaired spatial working memory, possible because of deficit in updating of new relevant information. Furthermore, present results indicate that spatial working memory deficit could serve as a trait marker of ADHD.
Correspondence: *Kyoung-Mi Jang, Sungshin Women's university, 249-1, Dongseon-dong 3-ga, Seoul 136-742, Republic of Korea. E-mail: cest20@gmail.com*

J. HIGHSMITH, E. WATSON, K. LEHOCKEY, K. BICKEL, J. LOVELESS & E. EVERHART. Predicting Anterior Cingulate Cortex and Behavioral Responses to Errors: What do Executive Function Measures Tell Us?

Objective: An ever present consideration of neuropsychological testing is the ecological validity of results and generalizability to other tasks. While convergent evidence on similar tasks in the testing environment aids in making predictions of everyday functioning, electrophysiological and behavioral responses to cognitive neuroscience tasks may provide further evidence of the predictive utility of neuropsychological testing results. The current study provides evidence of the relative utility of executive function measures in predicting participant behaviors in a series of computer based tasks.
Participants and Methods: Fifty-six healthy, adult participants completed a neuropsychological test battery prior to electroencephalographic recording during a pattern response learning task, a gambling task, and both presented simultaneously. Participants were presented with monetary win and loss feedback after each selection. Event-related potentials were computed from differences between win and loss feedback processing within 1000ms post-stimuli.
Results: Executive functioning measures did not significantly predict participant winnings, adaptations, or feedback negativity amplitudes. However, achievement score from the D-KEFS Tower subtest significantly predicted overall approach to the task through increased choices to play the pattern learning task, Pattern% = .032*Tower(Scaled)+ 0..201 ($R^2 = .11$, $p = .012$). Feedback negativity amplitudes, but not executive function measures, predicted the percentage of successful adaptations to losses during the pattern task (FCZ electrode; $R^2 = .136$ $p = .005$).
Conclusions: Executive functioning measures were of little utility in predicting electrophysiological responses to errors during a pattern learning and gambling task. However, planning ability estimates significantly predicted greater participation in the task with higher cognitive load. Findings provide mixed evidence of the predictive utility of executive function measures to simple cognitive neuroscience tasks.
Correspondence: *Jonathan Highsmith, East Carolina University, 10261 Green Moss Dr. S, Cordova, TN 38018. E-mail: jon.m.highsmith@gmail.com*

R.D. ANNETT, C. HARTENBERGER, W. MORALES, L.L. ROMERO, R.D. SAVICH, E. STEPHENS & J.M. STEPHEN. Comparison of Mu-Rhythm Suppression in Term and Preterm Infants.

Objective: Sensorimotor mu rhythm is a resting brain rhythm that is present when sensorimotor areas are inactive. Research indicates that suppression of mu rhythm activity reflects activation of the Mirror Neuron System due to the desynchronization during both action execution and action observation (Altschuler et al, 1997; Iacoboni & Dapretto, 2006). Our previous work demonstrated a linear increase in mu rhythm frequency with increasing age in 3-12 month old infants (Berchicci et al. 2011) and the current study extends these findings. This study presents preliminary findings that identify marker(s) of brain connectivity in infants using a mu rhythm suppression paradigm employing simultaneous MEG/EEG. Data from rest and active phases of the mu rhythm suppression paradigm are contrasted with infant performance on the Bayley Scales of Infant Development-III (BSID-III).
Participants and Methods: 15 term infants (>37 weeks GA at birth) and 8 preterm infants (<29 weeks GA) were recruited from the newborn nursery and ICU. MEG/EEG and BSID-III examinations were conducted at 3 months chronological or corrected age. MEG data were collected using the Elekta Neuromag 306 channel system with real-time motion correction employed. Synchronous video and bipolar EEG channels were collected to monitor muscle activity in both the infant and investigator during task performance.
Results: Mu rhythm suppression is altered in 3-month age-corrected preterm infants relative to age-matched term infants. A significant group (term vs. preterm) by frequency interaction was observed where preterm

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

infants had more suppression (lower Active/rest ratio) at the higher motor-related frequency than term infants ($F(1,17) = 5.11$, $p = 0.037$).
Conclusions: Findings reveal differences in the suppression of mu rhythm in term and preterm infants. BSID-III findings exhibit less robust term versus preterm differences, suggesting MEG can provide sensitive information on infant cortical connectivity.
Correspondence: *Robert D. Annett, PhD, Pediatrics, University of New Mexico Health Sciences Center, MSC-10-5590, 1 University of New Mexico, Albuquerque, NM 87131-0001. E-mail: rdannett@unm.edu*

E. DIONNE-DOSTIE, O. COLLIGNON, P. VANNASING, M. LEFRANÇOIS, J. TREMBLAY & M. LASSONDE. The Use of Event-Related Potentials in the Study of the Development of Audiovisual Integration Abilities in Children.
Objective: In everyday life a considerable number of cognitive processes depend on the integration of information from multiple senses. The integration of sensory information is fundamental in order to react to our environment optimally. Infancy is a period of great change in brain structure and function reflected by the increase of processing capacities of the developing child. When the human brain integrates multisensory information after birth and how this develops over time has not been thoroughly examined so far. The aim of this study is to explore the neurodevelopmental trajectory of audio-visual multisensory integration (MSI) in children aged between 3 months and 9 years old and determine the age at which this phenomenon takes place.
Participants and Methods: We examined the timing and topography of cortical audio-visual interactions using high-density event-related potentials (ERPs). We recorded the cerebral activity of 75 subjects divided up into 6 age categories: 3-6, 7-9 and 10-12 months old, 2-3, 4-6 and 7-9 years old, through electroencephalogram. Three conditions were presented pseudo-randomly: an auditory condition (1000-Hz tone), a visual condition (black and white checkerboard) and the simultaneous presentation of the auditory and visual conditions.
Results: MSI is measured by comparing the sum of the ERPs elicited by auditory-only and visual-only stimuli together (A+V) with the simultaneous presentation of the same two stimuli (AV). The effects of MSI are expected to be found as differences between the AV and A+V waveforms. We observed a significant difference of amplitude on the N100 and P200 components between the AV and A+V waveforms in children aged from 7-9 years old. The data show that changes in the brain processes underlying MSI are related to heightened multisensory gains of the above components which increase with age.
Conclusions: Our results suggest that optimal MSI is a slow process that develops later in childhood.
Correspondence: *Emmanuelle Dionne-Dostie, Ph.D., Psychology, Université de Montréal, 211, Chemin de la Rotonde Apt. #403, Montreal, QC H3E 3L3, Canada. E-mail: emmanuelle.dionne-dostie@umontreal.ca*

J.B. PETERS, J.S. BUTLER, J.J. FOXE, K.M. BURKE & S. MOLHOLM. Neurophysiological Correlates of Task-Switching in Typically Developing Children and Adolescents.
Objective: Task-switching is the ability to shift from one thought or action to another. Developmental investigations of task-switching in conjunction with electrophysiology are sparse, yet electrophysiology permits characterization of the spatio-temporal dynamics of the underlying perceptual-cognitive operations. Here we used a cued task-switching paradigm and electrophysiology to examine the underlying neural circuitry in children and adolescents.
Participants and Methods: Sixteen typically developing children ages 8 to 17 (7 female) participated. 64-channel EEG was recorded while participants performed a task in which they were cued on a trial-by-trial basis to respond to targets in one of two stimulus types presented simultaneously (letters and numbers). Stimulation blocks were comprised of switch trials in which the task switched from the previous trial, and repeat trials, in which it did not. The increase in response times on switch trials compared to repeat trials served as the behavioral measure of switch cost. Event-related potentials in response to the cued imperative stimulus were compared between repeat and switch trials to characterize the neural processes underlying task-switching.
Results: A switch cost was seen both behaviorally (reaction times and errors) and in the electrophysiological data, with a more positive going evoked response to the cue in switch trials seen over central parietal scalp sites. The evoked response showed a separation of processing beginning approximately 200ms prior to onset of the target stimulus, suggesting enhanced preparatory activity in anticipation of the target when cued to switch tasks.
Conclusions: In a task-switching paradigm, children displayed behavior and electrical brain responses similar to what has previously been observed in adults. Thus these processes are already relatively mature by as young as 8-years of age. These data will serve as a bench mark against which to identify potential neurobiological aberrations in cognitive control processes in children with autism.
Correspondence: *Joanna B. Peters, M.A., Albert Einstein College of Medicine/Ferkauf Graduate School of Psychology, 1225 Morris Park Avenue, Bronx, NY 10461. E-mail: joannab.peters317@gmail.com*

C.N. LUKIE, S. MONTAZER-HOJAT & C.B. HOLROYD. Developmental Changes in the Reward Positivity: An Electrophysiological Trajectory of Reward Processing.
Objective: Children and adolescents learn to regulate their behavior by utilizing feedback from the environment but exactly how this ability develops remains unclear. We recorded the reward positivity, an event related brain potential (ERP), from children, adolescents and young adults as a means to assess the developmental trajectory of reinforcement learning. We predicted that reward positivity amplitude would increase with age, reflecting the developing maturity of the cognitive control system.
Participants and Methods: Participants included 20 children (8-13 years), 20 adolescents (14-17 years) and 20 young adults (18-23 years). We had participants engage in a computerized T-maze task in search of monetary rewards while an ongoing EEG was recorded. The reward positivity was measured as a difference wave. We also analyzed latencies of other ERP components (P200, N200, and P300) that occur in the "raw" ERPs. Finally, for the purpose of comparison, we extracted the mean voltages in three 100 ms windows (100-200 ms, 200-300 ms, and 300-400 ms) at channels FCz and Pz.
Results: ANOVAs for reward positivity amplitude and latency revealed no significant differences across the age groups. However, in comparison to adolescents and young adults, the latencies of other ERP components were significantly longer for the children. Additionally, a mixed-design repeated measure MANOVA found that children exhibited more negative mean amplitudes at channel FCz during the 100-200 ms and 300-400 ms window and a more positive mean amplitude in the 200-300 ms window.
Conclusions: We found that the three groups produced a reward positivity of comparable size, despite relatively variable component latencies for the children, suggesting that the reward processing system reaches maturity early in development. We relate this finding to the development of neural systems believed to produce the reward positivity, particularly the midbrain dopamine system and anterior cingulate cortex.
Correspondence: *Carmen N. Lukie, M.Sc., Psychology, Univ of Victoria, 3800 Finnerty Rd., Victoria, BC V8P 5C2, Canada. E-mail: clukie@uvic.ca*

R.D. MOORE, E.S. DROLLETE, A. BHARIJ, M.R. SCUDDER & C.H. HILLMAN. The Influence of Cardiorespiratory Fitness on Strategic, Behavioral, & Neuroelectric Indices of Arithmetic Cognition in Preadolescent Children.
Objective: Arithmetic proficiency plays an important role in everyday life and is a critical skill set for children to master. Further, aerobic

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms.
https://doi.org/10.1017/S1355617714000381

fitness has been found to influence aspects of cognition, which underlie arithmetic proficiency.
Participants and Methods: The current study used standardized and experimental tests to evaluate arithmetic proficiency in forty 9-10 year old children who varied in aerobic fitness. Measures included: standardized assessment of conceptual and computational achievement, self-reported strategy selection, and an experimental verification task comprised of small and large addition problems, which afforded measurement of event-related brain potentials (ERPs).
Results: Children demonstrated greater proficiency for math concepts relative to computation, and reported relying on retrieval strategies more frequently for small, relative to large addition problems. No fitness-related differences in achievement were observed, but higher fit children reported using retrieval strategies more often to solve large problems. During the verification task, all children took longer to respond and were less accurate for large relative to small problems, as well as for incorrect relative to correct solutions. Higher fit children were more accurate than their lower fit peers only for large problems. Further, early (P1, N170) and late (P3, N400) ERP components were modulated by problem size and solution correctness, and higher relative to lower fit children demonstrated selective modulations for N170, P3 and N400 amplitude; indicating differences in numeric encoding, more economic attentional deployment, and facilitated semantic processing, respectively.
Conclusions: The results contribute to the mathematical cognition literature by using a multimodal approach to understand arithmetic proficiency during development, and contribute to the fitness cognition literature by demonstrating that fitness positively influences multiple aspects of neurocognition critical to arithmetic proficiency.
Correspondence: *Robert D. Moore, MS, Kinesiology, University of Illinois, 316 Louise Freer Hall, 906 S. Goodwin Avenue, Urbana, IL 61801. E-mail: rdmoore@illinois.edu*

C.E. PERRY, T.J. FARRER, D.W. HEDGES, B.L. NIELSEN, J. HOLT-LUNSTAD, V. CALL & M.J. LARSON. Anesthesia Exposure, Cognitive Functioning, and Performance Monitoring in Older Adults.
Objective: Anesthesia is associated with diminished cognitive function in older adults. Although studies have examined cognitive function using event-related potentials (ERP) during anesthesia, few have examined if exposure to anesthesia has long-term effects on cognitive function and performance monitoring abilities in older adults. We examined the amount of exposure to anesthesia to determine if it was associated with cognitive function and with ERP indices of performance monitoring.
Participants and Methods: 129 older adults (mean age= 71) completed the Repeatable Battery for the Assessment of Neuropsychological Status (RBANS) and a modified Eriksen Flanker Task while ERPs were recorded. 33 participants were excluded due to incomplete data. Linear regressions adjusted for sex and education were used to examine the relationship between the amount of anesthesia exposure and the correct-response negativity (CRN), error-related negativity (ERN), and post-error positivity (Pe) indices of performance monitoring and the RBANS indices scores.
Results: While Pe for correct trials trended toward association with the amount of anesthesia exposure (p = 0.0.53), ERN and CRN were associated (p=0.04 and p=0.048, respectively). However, none of the scores on the RBANS indices or RBANS total score was associated with amount of anesthesia exposure.
Conclusions: Although cognitive functioning as measured with the RBANS was not associated with amount of anesthesia exposure, performance monitoring assessed by ERN was. While the meaning of CRN is still unclear, the amount of anesthesia was associated with CRN amplitude. One proposed function of CRN is that it is a comparison process reflecting a correct process without conflict due to error-related performance. It is possible, therefore, that increased anesthesia exposure is associated with heightened comparison processes, even on correct trials. Future research is needed to clarify this relationship.
Correspondence: *Cynthia E. Perry, BS, Psychology Department, Brigham Young University, 260 Dorchester Dr., Salt Lake City, UT 84103. E-mail: cindeeperry@gmail.com*

C.E. PERRY, T.J. FARRER, D.W. HEDGES, B.L. NIELSEN, J. HOLT-LUNSTAD, J.S. KAUWE, V. CALL & M.J. LARSON. ApoE Genotype, Performance Monitoring, and Attention in Older Adults.
Objective: The apolipoprotein E (ApoE) genotype is well known for its association with Alzheimer's disease and cognitive function. Part of cognitive function is performance monitoring, which can be measured using event-related potentials (ERPs). Many studies have examined the association between ApoE genotype and ERPs, but rarely with the addition of examining attention. We examined the relationship of attention to ApoE phenotype and ERP indices of performance monitoring.
Participants and Methods: 129 older adults (mean age=71) completed a modified Eriksen Flanker Task while ERPs were recorded and the Repeatable Battery for the Assessment of Neuropsychological Status (RBANS). Saliva was collected and DNA extracted for genotyping of two SNPs (rs7412 and rs429358) to determine ApoE genotype. Due to incomplete data, we excluded 48 participants for a final sample size of 81. Linear regressions adjusted for gender and education were used to examine the association between ApoE genotype, correct-response negativity (CRN), error-related negativity (ERN), post-error positivity (Pe), and score on the RBANS Attention Index (AI).
Results: 23.7% of the sample were ApoE E4 carriers, but none were homozygous for E4. 98.7% were carriers of the E3 allele, and 11.8% carried the E2 allele. Although ERN and Pe were not associated with AI scores or ApoE status, CRN and the Pe difference between correct and error trials were both associated with ApoE genotypes, namely E2/E4 for CRN (p=0.019) and E3/E4 (p= 0.015), E3/E3 (p=0.015), and E2/E3 (p=0.027) for Pe difference.
Conclusions: CRN and the Pe difference are both associated with ApoE genotype. The meaning of CRN is still unclear but is thought to represent a comparison process of performance monitoring that is conflict free because no error was made during performance. Those with E4 ApoE genotype may have increased comparison processes after a correct response. Similarly, Pe difference may be increased for those with E4 or E3 genotypes.
Correspondence: *Cynthia E. Perry, BS, Psychology Department, Brigham Young University, 260 Dorchester Dr., Salt Lake City, UT 84103. E-mail: cindeeperry@gmail.com*

T.J. FARRER, C. PERRY, D.W. HEDGES, J. HOLT-LUNSTAD, V. CALL, B. NIELSEN & M.J. LARSON. Attention and Dopamine Function in Relation to Performance Monitoring in Community-Dwelling Older Adults: An Event-Related Potential Study.
Objective: Older adults often show decreased event-related potentials (ERP) associated with performance monitoring. Further, dopamine transmission is related to attention and working memory, factors also associated with performance monitoring. Few studies, however, have examined the association between attention, dopamine transmission, and ERP indices of performance monitoring. The neural bases of performance monitoring can be measured using the error-related negativity (ERN), correct-response negativity (CRN), and post-error positivity (Pe) ERP components. The present study sought to determine if performance monitoring is associated with attention function and abnormalities with dopamine transmission related to the TaqA1 polymorphism.
Participants and Methods: A group of 129 community-dwelling older adults (mean age 71) completed testing for the Attention Index of the Repeatable Battery for the Assessment of Neuropsychological Status (RBANS). Salivary samples were gathered for genetic analysis, and all subjects completed a modified Eriksen flanker task while ERPs were recorded. The study group ultimately consisted of 101 adults after 28 were removed due to missing/unusable data. Linear regression was used to examine if attention and TaqA1 status predicted ERP indices of performance monitoring while controlling for sex and education level.

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

Results: TaqA1 status did not predict CRN, ERN, or Pe. However, the Attention Index was associated with Pe ROI (p= 0.001), and the Pe difference (p= 0.001) but not CRN or ERN. Also, the interaction of TaqA1 and the Attention Index failed to predict CRN or ERN but significantly predicted Pe ROI (p= .001) and Pe difference (p= .001).
Conclusions: Although dopamine function alone was not associated with performance monitoring, our findings suggest that neuropsychological performance on attention measures may be associated with the awareness of errors as measured by the Pe component. Dopamine function may moderate the association between attention measures and the Pe ERP component.
Correspondence: *Thomas J. Farrer, M.S., Psychology, Brigham Young University, 1001 Kimball Tower, P.O. Box 25543, Provo, UT 84602-5543. E-mail: thomasfarrer@yahoo.com*

J. DIETZ RENFROE, M.M. BRADLEY, P.J. LANG, M.S. OKUN & D. BOWERS. Electrocortical Correlates of Preparation for Action in Parkinson Disease: Role of Incentive Motivation.
Objective: Previous research has indicated that individuals with Parkinson disease (PD) have deficits in preparation for action, both behaviorally and as indicated by muted electrocortical responses, such as the contingent negative variation (CNV). The current study tested the hypothesis that preparatory deficits in PD would be differentially modulated by aversive/appetitive incentives such as threat of loss or monetary reward. Based on previous findings of blunted startle potentiation and reduced electrocortical response during negative picture viewing, it was predicted that CNV of PD patients would be reduced during threat of loss relative to reward contingencies.
Participants and Methods: Eighteen non-demented PD and 15 healthy controls engaged in an incentive motivation task where visual cues signaled an imperative RT response that could earn or lose money, or have no consequence. EEG was recorded from an EGI 129-electrode net. CNV amplitude was computed during the 1 second preparatory interval as an index of motor preparation, and motor RTs were obtained. PD patients were tested on dopa medications.
Results: PD patients showed significantly reduced overall CNV amplitude prior to the button press, as well as slower RTs, compared to controls. However, for both groups, the CNV was enhanced when anticipating potential monetary reward or loss, relative to the neutral condition. The group x incentive interaction was not significant.
Conclusions: These findings with non-demented PD patients indicate that preparatory behavior, as indexed by CNV, is overall reduced but is nevertheless sensitive to motivating incentives (i.e., money) similar to controls. These findings add to literature by suggesting that behavioral issues in PD may be related to globally impaired preparation for action but this deficit is not emotion-specific.
Correspondence: *Jenna Dietz, M.S., University of Florida, PO Box 100165, Gainesville, FL 32605. E-mail: jdietz@phhp.ufl.edu*

C. BEAULIEU, B. BRISSON, M.C. BOURASSA, P. JOLICOEUR & L. DE BEAUMONT. Electrophysiological correlates of implicit motor sequence learning.
Objective: The Error-related negativity (ERN) is a component of the event-related brain potentials (ERPs) elicited by error commission. It is known as an index of the evaluative processes of cognitive control involved in one's own performance monitoring. As potential associations with clinically validated symptoms measures or behavioral performance have yet to be demonstrated, limited clinical significance has been granted to changes in ERN amplitude. This study aims to monitor the dynamics changes of the ERN component throughout Serial Reaction Time (SRT) task performance.
Participants and Methods: Twenty healthy participants (8 males, mean age= 24.19; SD= 2.58) completed a modified serial reaction time (SRT) task during which continuous EEG activity was recorded. The SRT task consists of series of stimulus-response pairs and involves implicit motor learning of a repeating sequence. Learning was computed as the difference in mean response time between the last sequence block and the last random block that immediately follows it. ERN amplitude elicited by error commission was extracted from ERP recordings.
Results: A negative correlation was found between the mean ERN amplitude recorded from learning blocks and mean response accuracy (r = -.532; p = .016) (i.e.; greater ERN negativity is linked to higher response accuracy). Mean ERN amplitude difference between the first six learning blocks and the last four learning blocks of the SRT task correlated significantly with sequence-specific learning (r =,593 ; p =,006). Mean ERN latency was significantly shorter for the last four learning blocks than for the first six learning blocks (t (19) = 2.133; p = .046).
Conclusions: The finding that subjects who most improved at the SRT task were those whose ERN size most increased throughout task performance suggest a dynamic adaptation of the strategies used to enable continuous implicit learning of the motor sequence.
Correspondence: *Louis De Beaumont, Ph.D., Montreal Sacred Heart Hospital Research Centre, 5400 Blvd Gouin W, CEAMS, Room 1340, Montreal, QC H4J1C5, Canada. E-mail: louis.debeaumont@uqtr.ca*

D.A. HENNING, A.C. PARKS, K. KAMIJO & M.B. PONTIFEX. Single Bouts Of Physical Activity Sustain Neural Inhibition.
Objective: A growing body of literature suggests that a single bout of physical activity may have transient benefits to attention. However, few studies have utilized functional neuroimaging techniques such as event-related brain potentials (ERPs) to investigate the effect of physical activity on the underlying component processes of attention.
Participants and Methods: Using a within-participants design, ERPs and task performance were assessed in response to a perceptually challenging three-stimulus oddball task immediately prior to and following a bout of physical activity or seated rest during two separate, counterbalanced sessions.
Results: Findings revealed that following a single 20 minute bout of physical activity, ERP component amplitude was maintained from pretest for both the P3a to the distractor stimulus and the P3b to the oddball target stimulus. In contrast, decreased amplitude was observed following a similar duration of seated rest for both the P3a and P3b ERP components.
Conclusions: These findings replicate previous research observing greater attentional resource allocation and subsequent memory processing (as indexed by larger P3b amplitude) after exercise relative to rest. However, contrary to prior interpretations of exercise induced enhancements in attention; these findings indicate that single bouts of physical activity appear to sustain such attentional processes reflecting neural inhibition whereas prolonged sitting results in impairments. Further, single bouts of physical activity appear to more broadly sustain multiple aspects of attention including focal attention resulting from attentional orienting (as indexed by the P3a ERP component).
Correspondence: *Matthew B. Pontifex, Ph.D., Department of Kinesiology, Michigan State University, 27P IM Sports Circle, 308 W. Circle Drive, East Lansing, MI 48824. E-mail: pontifex@msu.edu*

K. BICKEL, K.A. LEHOCKEY, J.M. HIGHSMITH, E. WATSON, A. STEPHENSON & E.D. EVERHART. Individual Differences in Coping Mechanisms Influence Electrophysiological Responses to Novel Visual Affective Stimuli.
Objective: The use of active, adaptive coping mechanisms during stressful life events may result in improved mental and physical wellbeing. It is important to understand neurophysiological processes associated with coping.
Participants and Methods: This study examined individual differences in coping strategies and attenuated responses to novel visual affective stimuli presentations via behavioral and event-related potential responses among 77 young adults. In this experiment, stimuli were chosen from the IAPS based on valence, and were arranged into the following two conditions for presentation during a visual oddball ERP paradigm: positive-standard, negative-target (PS/NT) and negative-standard,

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

positive-target (NS/PT). Participant's individual coping styles were assessed using the Brief COPE Inventory. After completion of the study, P300 responses were identified by visual inspection as the most positive peak occurring between 250ms and 500ms after stimulus presentation.
Results: Main findings include significant negative correlations between the Brief COPE Subscale Planning and negative target stimulus at the FZ electrode (r= -.228, p= .046) as well as a negative correlation between the Subscale Positive Reframing and positive target stimulus at the F3 electrode (r= -.281, p= .013) which indicated an attenuated amplitude of the P300 in that condition.
Conclusions: These results demonstrate the utility of understanding individual coping constructs as they involve individual appraisal processes that reduce the stressor's perceived significance and/or intensity and, in turn, one's physiological responses to it.
Correspondence: *Kelly Bickel, Psychology/Neuroscience, Psychology, East Carolina University, 134 Blackheath Dr, New Bern, NC 28560. E-mail: bickelk11@students.ecu.edu*

K.A. LEHOCKEY, J.M. HIGHSMITH, E.M. WATSON, K.D. BICKEL & D.E. EVERHART. Investigating Arousal and Attention Mechanisms of Inhibition.
Objective: Inhibition plays a significant role in normal functioning and can be affected by emotional states. Ways in which people cope with emotional states vary according to individual differences in affective styles. Since impaired inhibition is a hallmark of many cognitive syndromes, it is imperative to study the complexities of this construct. Present study investigated arousal and attention mechanisms of inhibition by using a temporal, affective Go/NoGo task to elicit inhibitory event-related potentials (ERPs).
Participants and Methods: Electroencephalogram and behavioral recordings of 45 adults were made during the task, comprised of three phases: 1. Learning, consisting of repeated exposure to a neutral visual standard. 2. Practice, during which participants practiced responding and inhibiting to "Go" and "NoGo" neutral stimuli of varying durations, respectively. For "Go" stimuli, participants' responses were based on subsequent comparisons of stimuli to standard via button press. 3. Test, during which participants responded in the same manner as the practice phase, but "Go" and "NoGo" stimuli were defined according to valence.
Results: Paired samples t-test indicated significantly larger N2 amplitudes for NoGo than for Go stimuli ($t(37)=1.721$, $p=.047$). GLM ANCOVAs were conducted to evaluate the influence of valence and duration of stimuli presentation on ERP amplitude across Go and NoGo conditions while considering affective style covariates. Significant interactions were investigated. Significant correlations were observed between ERP responses to short (280ms) positive stimuli and Behavioral Inhibition System scores $r = .549$, $n = 24$, $p = .967$, 95% CI [0.187, 0.780], as well as between ERP responses to long (910ms) negative stimuli and Behavioral Activation System scores $r = .496$, $n = 26$, $p = .995$, 95% CI [0.134, 0.741].
Conclusions: Findings highlight attention and arousal mechanisms of inhibition, as well as clinical implications of considering individual differences in affective styles.
Correspondence: *Katie A. Lehockey, M.A., Psychology, East Carolina University, 104 Rawl Building, East Carolina University, Greenville, NC 27858. E-mail: lehockeyk05@students.ecu.edu*

Imaging (Structural)

W.D. KILLGORE, M. WEBER, J.S. BARK, M. KIPMAN, H. GOGEL, L. PREER, O. TKACHENKO, L. DEMERS, S.C. DEMERS & E.A. OLSON. Physical Exercise Correlates with Hippocampal Volume in Healthy Adults.
Objective: Physical activity has been shown to facilitate neurogenesis of dentate cells in the rodent hippocampus, a region of the brain critical for memory formation and spatial representation. As for humans, recent data suggest that physical exercise can lead to increased hippocampal volume and enhanced cognitive functioning in elderly individuals. However, no studies have examined the association between physical activity and hippocampal volume among healthy young to middle-aged adults.
Participants and Methods: Sixty-one healthy right-handed adult volunteers (33 males), ranging in age from 18 to 45, completed a questionnaire about their exercise habits and underwent structural neuroimaging at 3T. Three voxel-based morphometric (VBM) multiple regression analyses were conducted to examine the gray matter correlates of self-reported frequency of workouts per week, minutes per workout, and total weekly minutes of exercise (weekly frequency x minutes), with age and gender as nuisance covariates. The hippocampus was set as the primary region of interest (ROI, $p < .001$, $k \geq 20$).
Results: Within the a priori hypothesized hippocampal ROIs, neither the frequency of workouts nor minutes per session correlated with hippocampal volume. However, total weekly minutes of exercise correlated significantly with larger gray matter volume in the right hippocampus (23 voxels, $p = .04$, FDR corrected). Whole brain exploratory analyses also showed that gray matter volume in several cortical areas, including the medial prefrontal cortex, insula, and postcentral gyrus was correlated with minutes of exercise per session and total minutes per week, but not with frequency of workouts per week.
Conclusions: Consistent with findings from animal studies and neuroimaging studies of the elderly, we found that the number of minutes of self-reported weekly physical exercise correlates with increased gray matter volume of the hippocampus and other cortical regions involved in memory and cognitive functioning even in healthy young to middle age adults.
Correspondence: *William D. Killgore, Ph.D., McLean Hospital, 115 Mill Street, Belmont, MA 02478. E-mail: killgore@mclean.harvard.edu*

O. TKACHENKO, M. WEBER, E. OLSON, H. GOGEL, L. PREER, S.C. DIVATIA, L.A. DEMERS & W.D. KILLGORE. Gray Matter Volume within the Medial Prefrontal Cortex Correlates with Behavioral Risk Taking.
Objective: Risk-taking behavior has been associated with altered functioning of the ventromedial prefrontal (vmPFC) and dorsolateral prefrontal cortex (dlPFC). The Balloon Analog Risk Task (BART) is a behavioral task that has been used to examine risk-taking behavior by having participants win money by inflating a virtual balloon. Value accrues with additional pumps to inflate the balloon, but all money is lost if the balloon pops before it is cashed in. Little is known about the relation between prefrontal gray matter volume and BART performance. We explored the structural neural substrates of this task using voxel-based morphometry (VBM).
Participants and Methods: Fifty healthy right-handed individuals (25 males) between the ages of 18 and 45 underwent structural neuroimaging at 3T, and completed an offline version of the Balloon Analogue Risk Task (BART), a behavioral measure of risk-taking. Two VBM multiple regression analyses were conducted using SPM8 to explore the gray matter correlates of risk taking tendencies exhibited on the BART (whole brain $p < .001$, $k \geq 68$ voxels). Risk taking was assessed with two indices from the BART: 1) the adjusted average number of pumps (AP) and 2) a calculated cost to benefit ratio (CBR) based on the percent of total exploded balloons versus the percentage of money won. Higher scores indicate greater risk-taking. Both age and gender served as covariates.
Results: Greater AP was positively associated with larger gray matter volume in the ventromedial prefrontal and left lateral orbitofrontal cortex, while increased CBR correlated significantly with increased gray matter volume in the medial gyrus rectus.
Conclusions: Findings suggest that gray matter volume within the ventromedial prefrontal and orbitofrontal cortex is positively correlated with risk-taking behavior as measured by the BART. However, further work may be necessary to elucidate the degree to which this reflects actual risk-taking behavior versus response optimization to maximize potential winnings.

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

Correspondence: *William D. Killgore, Ph.D., McLean Hospital, 115 Mill Street, Belmont, MA 02478. E-mail: killgore@mclean.harvard.edu*

E.A. OLSON, M. WEBER, J.S. BARK, L. DEMERS, S. DIVATIA, H. GOGEL, M. KIPMAN, L. PREER, O. TKACHENKO & W.D. KILLGORE. Sex Differences in Threat Evaluation of Emotionally Neutral Faces.

Objective: The amygdala and posterior face-sensitive brain regions are involved in the evaluation of emotionally neutral faces. Sex differences in neural activation in response to threatening facial stimuli have been previously identified. We examined whether healthy men and women would differ in their risk assessment of neutral faces and whether this would influence decisions related to potential threat. We further examined whether risk-related decisions would be associated with variations in emotional intelligence and differences in gray matter volume of face responsive regions (i.e., amygdala; fusiform gyrus).

Participants and Methods: 62 participants (31 F, 31 M) ages 18-45 completed a facial threat assessment task requiring them to act as a simulated airport security agent, deciding whether to allow each of 66 pictured individuals displaying neutral expressions to board an airplane during a terrorist threat. Participants also completed the Bar-On Emotional Quotient Inventory (EQ-i) and underwent MRI scanning at 3T. Voxel-based morphometric (VBM) analysis was conducted in SPM8.

Results: Women allowed a higher number of passengers to board than men (p=.02). Men who scored lower in stress management ability allowed fewer passengers, whereas more stress-tolerant men performed comparably to women. Greater leniency was correlated with reduced gray matter volume in a right fusiform gyrus cluster (12 voxels, p<.001). There was a significant interaction with sex; the slope of the association between number allowed and gray matter volume in a left fusiform gyrus cluster was higher in women than in men (14 voxels, p <.001).

Conclusions: Sex differences in decisions in response to emotionally neutral faces were associated with gray matter volume in posterior face-sensitive regions, but not in the amygdala. Sex differences also were related to stress tolerance, with more stress tolerant men behaving comparably to women.

Correspondence: *William D. Killgore, Ph.D., McLean Hospital, 115 Mill Street, Belmont, MA 02478. E-mail: killgore@mclean.harvard.edu*

R.M. MEKOTA, D.A. FITZGERALD, A.E. KENNEDY & L. PHAN. Structural Bain Abnormalities in Combat-Exposed Veterans with Posttraumatic Stress Disorder.

Objective: Prevalence estimates of posttraumatic stress disorder (PTSD) in veterans returning from conflicts in Iraq and Afghanistan are as high as 25%, and the suicide rate of male veterans with PTSD is twice that of the suicide rate found in the general population. As such, improving our understanding of the pathophysiology of PTSD within the veteran population is especially important, and advances in neuroimaging techniques and analysis allow for more accurate elucidation of associated structural changes. While a number of studies have explored neural correlates of PTSD, little research has examined structural differences across the brain using voxel-based morphometry (VBM) in combat-exposed veterans with and without PTSD.

Participants and Methods: Twenty male veterans with combat-related PTSD were compared to 20 sex- and age-matched combat-exposed veterans without PTSD. PTSD symptoms were assessed using the Clinician Administered PTSD Scale (CAPS) and PTSD Checklist – Military Version (PCL-M). Other assessment scales included the Combat Exposure Scale (CES) and Beck Depression Inventory – II (BDI-II).

Results: Compared to healthy combat-exposed veterans, the PTSD group evidenced less gray matter volume in the right hippocampus and larger gray matter volume in the bilateral precuneus, bilateral inferior frontal gyrus, left posterior cingulate gyrus, left anterior cingulate gyrus, right claustrum, and right superior parietal lobule. Within the PTSD group, volume of the left precuneus was negatively correlated with avoidance behavior, and right hippocampal volume was positively correlated with combat exposure.

Conclusions: The data suggest neuroanatomical differences between combat-exposed veterans with and without PTSD, implicating numerous structures involved in the pathogenesis and maintenance of the disorder. Furthermore, the results indicate that a model of PTSD pathophysiology based solely on gray matter reduction may be incomplete.

Correspondence: *Ryan Mekota, Roosevelt University, 4642 Wildflower Drive, Canandaigua, NY 14424. E-mail: rmekota@mail.roosevelt.edu*

A.M. BUTTS, D. COBIA, J. WIENER, A. SMITH, J. CHONG, J. BREFCZYNSKI-LEWIS, B. HOU & M.W. HAUT. Cortical Thickness Changes Following Brief Attention Training.

Objective: Studies suggest the brain undergoes structural changes in response to the acquisition of new functional skills. Previously, we found increases in grey matter volume as a result of brief attention training using tensor-based morphometry. For the current study we investigated whether changes in cortical thickness also resulted from attention training using a longitudinal design.

Participants and Methods: Participants were 16 healthy young adults assigned to either a treatment (n = 9) or control group, which did not differ on critical demographics. All participants completed a brief cognitive assessment and two high-resolution MP-RAGE MR scans at baseline and two-week follow-up. The treatment group completed attention training using an n-back task for 20 minutes per day over 10 days; controls received no training. Changes in cortical thickness were estimated using the FreeSurfer longitudinal processing stream v5.1.0. Rates of change and percent change in cortical thickness were calculated using embedded algorithms and entered into a standard GLM with main effect for group. Cortical change variables were also correlated with behavioral performance.

Results: Significantly increased rate and percent changes were observed in the LH insula and RH precuneus (p < .01) for the treatment group relative to controls. Trend changes emerged in RH lateral temporal and medial frontal regions. Additionally, n-back performance was positively correlated with LH insular cortical thickness.

Conclusions: Following brief attention training, measurable increases in cortical thickness were observed and also correlated with behavior change. These findings provide support for rapid neural plasticity that can occur even after a short trial of cognitive training, and may have important implications for clinical populations, such as those recovering from acquired brain injury or enduring neurodegenerative conditions.

Correspondence: *Alissa M. Butts, Ph.D, Psychiatry and Psychology, Mayo Clinic, 62 Grandeville Rd SW, Unit 1521, Rochester, MN 55902. E-mail: Alissa.m.butts@gmail.com*

M.A. LANCASTER, M. SEIDENBERG, S. DURGERIAN, K.A. NIELSON, J.L. WOODARD, J. SMITH, M.A. MATTHEWS, A.M. BUTTS, N.C. HANTKE, C.D. KAY, C.C. KANDAH, K.E. HAZLETT, C.M. FIGUEROA, S.A. MICHAEL, A.L. NORMAN & S.M. RAO. Longitudinal White Matter Changes across the Alzheimer's Disease Risk Continuum: A Diffusion Tensor Imaging Study.

Objective: Cross-sectional diffusion tensor imaging (DTI) studies examining white matter (WM) microstructure in cognitively intact elders at risk for Alzheimer's disease (AD) and elders without risk factors have produced contradictory findings. Furthermore, no longitudinal DTI studies have investigated the trajectory of WM degeneration over time in relation to AD risk. Here, we compared fractional anistotropy (FA) over 18-months in asymptomatic individuals at high and low risk for AD and individuals with amnestic mild cognitive impairment (aMCI).

Participants and Methods: 62 older adults underwent DTI at baseline and 18 months. Groups were based on degree of AD risk: aMCI (n = 14), At-Risk (n = 23) and Control (n = 25). At-Risk (at least one apolipoprotein E epsilon 4 allele and a family history of AD) and Control groups (neither risk factor) were similar on cognitive testing

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

at baseline and follow-up. The aMCI group showed a greater decline in episodic memory than both high and low risk groups. WM tracts of interest (TOIs) were derived from the ICBM DTI-81 WM atlas (Mori et al., 2008) by parcellating a mean white matter skeleton. Analyses were restricted to association fibers connecting mesial temporal and limbic structures. Repeated Measures ANOVAs were used to examine Time x Group interactions.

Results: aMCI, At-Risk, and Control participants did not differ in age, education or total intracranial volume. The aMCI group had lower baseline WM volume than the At-Risk and Control groups. Lower FA values were found in the MCI group in the cingulum, fornix, and left uncinate fasciculus (UF). Significant Time x Group interactions were found in the right UF ($p = .002$) and the left sagittal striatum ($p = .043$), TOIs with the aMCI group showing a steeper FA decline than the asymptomatic groups.

Conclusions: DTI FA reduction appears to be accelerated in individuals already experiencing cognitive decline but does not discriminate between high and low risk cognitively intact older individuals.

Correspondence: *Melissa Lancaster, M.S., Rosalind Franklin University of Medicine and Science, 3035 W. Jackson Blvd # 2E, Chicago, IL 60612. E-mail: melissa.lancaster@my.rfums.org*

C.D. KAY, M. SEIDENBERG, S. DURGERIAN, J.C. SMITH, J.L. WOODARD, K.A. NIELSON, M.A. LANCASTER, M.A. MATTHEWS, C.C. KANDAH, N.C. HANTKE, K.E. HAZLETT, C.M. FIGUEROA, M.A. SUGARMAN, A.L. NORMAN & S.M. RAO. Motor Timing Intraindividual Variability and Structural Volumes in Healthy Aging and Mild Cognitive Impairment.

Objective: We previously reported that elders at high risk for Alzheimer's disease (AD), evidenced by mild cognitive impairment (MCI) or presence of the ApolipoproteinE-epsilon4 (APOE-ε4) allele, had significantly greater motor timing intraindividual variability (IIV) than elders without the APOE-ε4 allele. Increased IIV in reaction time is associated with less cortical white matter volumes in AD, yet gene risk groups have not been examined. We present the first findings of sub-cortical and cortical total volumes as a function of AD risk in relation to motor timing IIV.

Participants and Methods: One hundred-thirteen elders (Mage=72.7) comprised three AD risk groups: APOE-ε4 non-carriers (n=58), APOE-ε4 carriers (n=40), and MCI (n=15). Subjects completed a repetitive finger-tapping task (rFTT) requiring synchronization to a visual stimulus. Mean and standard deviation (SD) of inter-tap intervals were examined. Freesurfer software was used to obtain brain volumes in motor timing (cerebellum, striatum, superior frontal gyrus) and control (cuneus, precentral gyrus) regions. Analyses were corrected for total intracranial volume and age.

Results: MCI subjects had significantly less total volume in the bilateral striatum and right superior frontal gyrus ($p's<0.05$) compared to APOE-ε4 carriers and non-carriers. No group differences in total volume were found in control regions or the cerebellum. Correlations between motor timing volumes and rFTT mean and SD were non-significant.

Conclusions: Results suggest that structural integrity in motor timing regions underlie behavioral variability for individuals with MCI. While motor timing IIV can also distinguish healthy APOE-ε4 carriers from non-carriers, corresponding structural changes may not yet be distinct at this preclinical stage. These findings lend support for the predictive utility of motor timing IIV in detecting structural compromise in MCI. Functional connectivity of motor timing networks in relation to IIV may be useful to examine.

Correspondence: *Christina Kay, MA, MS, Psychology, Rosalind Franklin University of Medicine and Science, 3333 Green Bay Road, North Chicago, IL 60064. E-mail: christina.kay@my.rfums.org*

S.E. LEE, S.M. DYER, S.A. VADNAIS, J.M. CONSTANCE, A.C. JAGGER, G.A. CASHER & M.Y. KIBBY. An Examination of Memory Performance and Anterior and Posterior Hippocampal Volume in Typically Developing Children and Children with ADHD and/or Developmental Dyslexia.

Objective: Working memory deficits are commonly observed in children with attention-deficit/hyperactivity disorder (ADHD) and developmental dyslexia (DD). Although the hippocampus may play a role in working memory (Olson et al., 2006), limited research has examined hippocampal volume in children with ADHD, DD, and comorbid DD/ADHD.

Participants and Methods: Participants included children with ADHD (n=56), DD (n=26), comorbid DD/ADHD (n=20) and controls (n=42), ages 8 to 12 years. They were assessed on several subtests of the Children's Memory Scale and scanned as part of university-based, NIH/NICHD funded projects (R03 HD048752, R15 HD065627). T-1 weighted MRI scans were collected, and Analyze 11.0 was used to manually trace and segment the hippocampus.

Results: Groups were equated on age, gender, handedness, and socioeconomic status. A MANCOVA examining right anterior, right posterior, left anterior, and left posterior segmentation revealed significant differences between groups after controlling for total brain volume, Wilk's $\lambda = .85$, $F(12,360.11)=1.92$, $p=.03$. Specifically, controls had larger right anterior hippocampal volumes than ADHD ($p=.01$) but not DD ($p=.10$) or the comorbid group ($p=.17$). In addition, controls and ADHD had larger bilateral posterior hippocampal volumes than the comorbid group ($ps<.05$). A MANCOVA examining differences in learning and memory performance while controlling for TONI-3 IQ showed significant differences between groups, Wilk's $\lambda = .61$, $F(30,370.51)=2.28$, $p<.001$. Controls outperformed ADHD on an immediate visuospatial memory measure, and both the control and ADHD groups outperformed the comorbid group on a number of working memory tasks, $ps<.05$.

Conclusions: Differences in right anterior hippocampal volumes were observed between controls and ADHD, suggesting a potential neural structure underlying the visuospatial working memory problems commonly observed in ADHD. The DD/ADHD finding is novel and warrants further research.

Correspondence: *Sylvia E. Lee, M.A., Southern Illinois University, 1000 S. Brehm LN Apt. E2, Carbondale, IL 62901. E-mail: sylvia.lee@siu.edu*

R. BREWSTER, T.Z. KING, T. BURNS, S. BERRY & W.T. MAHLE. Double Dissociation Between Integrity of White Matter Tracts, Attention, and Verbal Memory Skills in Adolescents with Congenital Heart Disease.

Objective: Lower white matter integrity has been identified in infants with congenital heart disease (CHD). However, no relationships between DTI fractional anisotropy (FA) and cognitive function have been established in CHD. Our goal was to identify significant differences in FA of adolescents with CHD using Tract-Based Spatial Statistics (TBSS) and examine theory-driven cognitive function correlates. The current study hypothesized a double dissociation between FA of left uncinate fasciculus (UF) and verbal memory; and middle cerebellar peduncle (MCP) and attention in adolescents with CHD and demographically matched controls.

Participants and Methods: TBSS identified the largest regions of FA difference between groups on diffusion-weighted images of 21 participants with CHD (mean age=17.86, SD=1.38; 40% female) and 18 demographically matched controls (mean age=18.62, SD=1.46; 39% female). CVLT-II Long Delay Free Recall (memory) and WMS-III Longest Digits Forward (attention) were obtained. Bivariate correlations examined the relationships between measures.

Results: TBSS identified the left UF (tract bridging the frontal and temporal lobes theorized to contribute to verbal memory) and the right MCP (tract connecting the cerebellum and pons previously linked to attention); adolescents with CHD evidenced lower FA than controls. As predicted, a significant positive correlation between UF FA and memory in the overall sample was found, $r(39)=.38$, $p=.02$, but not with attention, $r(39)=-.17$, $p=.29$. Additionally, a positive correlation

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

between MCP FA and attention was found, r(39)=.47, p<.01, but not with memory, r(39)=.06, p=.70.
Conclusions: Consistent with the literature on infants, the adolescent CHD group evidenced lower white matter integrity relative to controls. In addition, a double dissociation between verbal memory and attention performance and the white matter integrity of UF and MCP respectively was established. Future directions with DTI and cognitive outcomes with CHD on will be discussed.
Correspondence: *Ryan Brewster, Georgia State University, 1114 Westshire Place NW, Atlanta, GA 30318. E-mail: rbrewst@gmail.com*

A. MURRAY, S. SCRATCH, D. THOMPSON, T. INDER, L. DOYLE, J. ANDERSON & P. ANDERSON. Cerebral Neonatal Pathology Predicts Adverse Attention and Processing Speed Outcomes in Very Preterm/Very Low Birth Weight Children.
Objective: Children born very preterm (VPT; <32 weeks' gestational age) or with a very low birth weight (VLBW; <1500 g) are at increased risk for adverse attention and processing speed outcomes. Brain abnormalities at birth, as measured by neonatal magnetic resonance imaging (MRI), have been proposed to predict long-term cognitive outcomes in the preterm population.
Participants and Methods: 198 VPT/VLBW children and 70 term controls were included in the cohort. Neonatal MRI scans were quantitatively assessed for global, white matter, cortical gray matter, deep gray matter, and cerebellar abnormalities at term equivalent age. Attention and processing speed were assessed at 7 years using standardized neuropsychological tests. Group differences were tested in attention and processing speed, and associations between these cognitive domains and brain abnormalities at birth were investigated.
Results: At 7 years, the VPT/VLBW group performed significantly worse than term controls on all attention and processing speed outcomes. Many associations between adverse attention and processing speed performances at 7 years and higher neonatal brain abnormality scores were found: in particular, white matter and deep gray matter abnormalities appear to be strong predictors of long-term cognitive outcomes.
Conclusions: The cognitive domains of attention and processing speed are significant areas of concern in VPT/VLBW children. This is the first study to show that adverse attention and processing speed outcomes are associated with neonatal brain pathology.
Correspondence: *Andrea Murray, Melbourne School of Psychological Sciences, The University of Melbourne, Redmond Barry Building, University of Melbourne, Melbourne, VIC 3010, Australia. E-mail: a.mcinnes@student.unimelb.edu.au*

K. KRISHNAN, C. BOSWORTH, S. ASLAN, J. GATSON, C. CULLUM, R. DIAZ-ARRASTIA & C. MARQUEZ DE LA PLATA. Longitudinal Analysis of DTI in a Sample of Professional Boxers.
Objective: Repeated blows to the head, such as those endured by professional boxers, may have long-term detrimental consequences to the brain and cognitive abilities. Diffusion Tensor Imaging (DTI) may provide insights into acute structural white matter (WM) change after such insults. This study evaluated WM integrity changes among professional boxers before and after a fight in which they experienced a concussion. This study aimed to detect WM compromise and cognitive change associated with a concussion after a professional boxing match.
Participants and Methods: DTI was acquired on 10 professional boxers using a single 3T magnet. Boxers were scanned and neuropsychological data (imPACT) was collected two weeks prior to a scheduled fight and again 7 days after a boxing-related concussion. White matter histogram and voxel based analyses (VBA) of fractional anisotropy (FA), mean diffusivity (MD), axial diffusivity (AD) and radial diffusivity (RD) were performed and compromised WM regions were identified using John's Hopkins WM Tract Atlas.
Results: No differences in histogram characteristics were observed. VBA detected increased diffusivity in RD (3 clusters) and MD (1 cluster) from pre-fight to post-concussion (p[uncorrected]<0.01, cluster size≥250 mm3) that involved right Anterior Thalamic Radiation (ATR) and forceps major. Increase in RD over time (within the ATR) was associated with slowing of reaction time between baseline and post-concussion. Similarly increase in RD over time within the Forceps major was associated with a decline in memory score between pre- and post-injury .
Conclusions: Global WM integrity did not change after a boxing-related concussion; however, regional compromise in WM was observed and may reflect acute edema. Regional WM compromise may have clinical implications, as compromised structural connectivity measures were associated with decrease in outcome scores.
Correspondence: *Kamini Krishnan, M.S, UT Southwestern Medical Center, 2801 Live Oak St, Apt #2305, Dallas, TX 75204. E-mail: kamini.krishnan@utsouthwestern.edu*

E.A. WILDE, E.D. BIGLER, C. PEDROZA, A. BARNES, T.C. WU & S.R. MCCAULEY. Serial Diffusion Tensor Imaging in Subacute Uncomplicated Mild Traumatic Brain Injury.
Objective: Current diagnosis of mild traumatic brain injury (mTBI) is based on clinical criteria without an objective biomarker to define injury, and guide treatment, return to play decisions, or prognosis. Single occasion imaging studies may not capture the totality of subtle mTBI-related pathological changes and development of post-concussive symptoms (PCS), and the optimal post-injury imaging interval is unknown. The objective of this study was to plot a recovery trajectory in concussed individuals using serial diffusion tensor imaging (DTI) to better capture dynamic changes occuring over a subacute post-injury period.
Participants and Methods: DTI and memory performance using the Hopkins Verbal Learning Test – Revised (HVLT-R) were acquired at 4 time points within the first week (days 1-2, 3-4, 5-6 and 7-8) and at 90 days post-injury in 20 adolescents and young adults (mean age 24.3 years) with uncomplicated mTBI (GCS=15; negative CT). Quantitative tractography was performed in the left cingulum bundle and corpus callosum.
Results: Longitudinal analyses using linear mixed models revealed significant differences between days 1-2 and days 5-6 post-injury in FA (mean=0.448 vs 0.463, p<0.05), with increased fractional anisotropy (FA) at days 5-6. In terms of the relation to later outcome, FA peaks at days 5-6 in the cingulum bundle and corpus callosum correlated with performance on HVLT-R delay T-score (r=-0.47, and -0.61 respectively) at 90 days, whereby the increase in FA (at days 5-6) was associated with later poorer performance on delayed recall.
Conclusions: Transient increases in FA may reflect parenchymal changes secondary to cytotoxic edema and inflammation, presumably resulting from ion homeostasis failure and membrane dysfunction. DTI may provide a diagnostic indicator of mTBI to assist in identifying those at risk for incomplete resolution of PCS. Understanding the extent and duration of initial post-injury changes may be critical in selecting potential therapeutic interventions and their window of application.
Correspondence: *Elisabeth A. Wilde, PhD, Physical Medicine and Rehabilitation, Neurology, and Radiology, Baylor College of Medicine, 1790 Dryden Rd., Ste 1200, Houston, TX 77030. E-mail: ewilde@bcm.edu*

Presidential Address: Traumatic Brain Injury - The Challenge to Improve Outcome (CE Session K)

INS President: Jennie Ponsford

3:15–4:15 p.m.

J. PONSFORD. Traumatic Brain Injury - The Challenge to Improve Outcome.
Traumatic brain injury (TBI) presents a number of unique challenges. It occurs most often in young people who are still establishing their

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

independence and relationships and completing educational or vocational training, and who may have pre-existing social or psychiatric problems. It has diffuse and variable effects on the brain. Outcome studies show good independence in mobility and activities of daily living, but persisting difficulties with complex community-based activities, employment, study and personal and social relationships. Underpinning these difficulties are impairments of memory, attention, executive functions and behavioural control, with fatigue, sleep disturbance, anxiety and depression also associated with poor participation. In order to improve patient outcomes it is essential that we develop evidence-based methods of addressing each of these problems, whilst also focusing on individually meaningful goals and maximising family adjustment. Intervention studies addressing each of these core problems will be discussed. the conclusion of this presentation, attendees will be able to: (1) understand patterns of outcome following traumatic brain injury; (2) understand the major challenges faced by individuals with traumatic brain injury; (3) discuss novel interventions being used to treat the core problems facing individuals with TBI, including impaired attention, memory, executive function, aggression, fatigue, sleep disturbance, anxiety and depression.

Correspondence: *Jennie Ponsford,, VIC, Australia. E-mail: jennie.ponsford@monash.edu*

SATURDAY MORNING, FEBRUARY 15, 2014

CE Workshop 11: Assessment and Enhancement of Decisional Capacity and Informed Consent: Ethical, Methodologic, and Pragmatic Considerations

Presenter: Barton Palmer

7:20–8:50 a.m.

B.W. PALMER. Assessment and Enhancement of Decisional Capacity and Informed Consent: Ethical, Methodologic, and Pragmatic Considerations.

Researchers and clinicians working with neurocognitively impaired patients sometimes feel trapped in an ethical dilemma. Treatment and research are needed to promote individual well-being and advances in treatment methods, but the very nature of some of these conditions may put patients at greater risk of impaired capacity to consent to treatment or research. As there is considerable inter-person heterogeneity in decisional capacity among people with neurocognitive disorders, decisional capacity should generally be considered on an individual basis. Several studies have demonstrated poor interrater reliability in regard to competency determinations by expert clinicians, but use of structured instruments may allow for more consistent, structured, and valid assessment of decisional capacity. There have also been a number of studies of methods to enhance the consent process itself. In this seminar we will review the ethical, methodologic, and pragmatic challenges in regard to identification and assessment of those at risk for impaired decisional capacity. We also consider practical means of fostering a more effective consent process.

At the conclusion of this presentation, participants will have a better understanding of: (1) the key ethical, theoretical, methodological, and pragmatic issues involved in assuring valid informed consent; (2) the strengths and limitations of existing structured instruments for assessing decisional capacity, as well as their use with neuropsychological data; (3) effective means of maximizing the quality of the consent process to maximize the ability for each patient to make meaningful consent (or assent/dissent) decisions about treatment or research participation.

Correspondence: *Barton W. Palmer, PhD, Psychiatry, University of California, San Diego, 8950 Villa La Jolla Drive, Suite B122, La Jolla, CA 92037. E-mail: bpalmer@ucsd.edu*

CE Workshop 12: Individual, Social-environmental, and Treatment-related Influences on Long-term Functional Outcomes of Early Childhood TBI: Implications for Intervention

Presenter: Shari Wade

7:20–8:50 a.m.

S.L. WADE. Individual, Social-environmental, and Treatment-related Influences on Long-term Functional Outcomes of Early Childhood TBI: Implications for Intervention.

Traumatic brain injury (TBI) has a peak in early childhood and emerging evidence suggests that early TBI may result in more persistent and pervasive functional consequences than TBI sustained at later ages. This workshop will examine the evidence regarding development differences in the functional outcomes of childhood TBI. It will also examine factors that influence outcomes following early TBI including acute injury factors, individual characteristics such as pre-morbid status and genetics, and social environmental features such as socioeconomic status, family environment, and parenting practices and interactions. Implications for intervention will be discussed and interventions addressing functional outcomes of early TBI reviewed. Finally, gaps in existing research and directions for further inquiry will be highlighted.

At the conclusion of this presentation, attendees will be able to: (1) Describe differences in outcomes following TBI sustained in early versus later childhood; (2) Identify individual (e.g., premorbid) and social-environmental factors that influence long-term functional outcomes; (3) Describe potential interventions to improve long-term outcomes.

Correspondence: *Shari L. Wade, Ph.D., Pediatrics, Cincinnati Children's Hospital Medical Center, 3333 Burnet Ave., MLC 4009, Oxford, OH 45229-3039. E-mail: shari.wade@cchmc.org*

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

Invited Symposium: Sifting through the Smoke: Uncovering the Impact of Marijuana Use on Neurocognition (CE Session L)

Chair: Raul Gonzalez

Discussant: Igor Grant

9:00–10:30 a.m.

R. GONZALEZ, S.F. TAPERT, K. LISDAHL, R. GONZALEZ, T. MARCOTTE & I. GRANT. Sifting through the Smoke: Uncovering the Impact of Marijuana Use on Neurocognition.

Symposium Description: Marijuana use has been on the rise in recent years, accompanied by a rapidly changing legal landscape. Twenty U.S. states have enacted medical marijuana laws, 15 have passed laws that decriminalize marijuana use, and two (Colorado & Washington) have legalized marijuana for recreational use. Several other states are considering changes to their current marijuana laws. Despite potential wide-ranging public health implications, science has not kept pace, but progress in understanding the neurocognitive impact of marijuana use is being steadily made. It is critically important for clinicians and researchers to understand how marijuana use may affect the neurcogntive functioning of their patients and research participants. This symposium will present cutting-edge findings from several laboratories studying the neurocognitive effects of cannabis use, and will include data collected from adolescents and adults, both when cannabis has been used recreationally or administered in a clinical context (i.e., among persons living with HIV). Dr. Tapert, will present on neurocognitive consequences of chronic marijuana use specifically among adolescents; Dr. Lisdahl will present on various moderators of marijuana's neurocognitive effects, including age of onset, gender, lifestyle, and genetics; Dr. Gonzalez will present on the influences of neurocognitive functioning on symptoms of cannabis addiction and engagement in risky sexual behaviors among emerging adults; Dr. Marcotte will present on the neurocognitive and functional impact (e.g., driving performance) of marijuana use when applied in a medical context. The symposium will end with a discussion from Dr. Igor Grant, which will broach the implications of the emerging evidence and future directions.

Correspondence: *Raul Gonzalez, PhD, Psychology, Florida International University, 11200 SW 8th Street, AHC-4, Room 453, Miami, FL 33199. E-mail: raul.gonzalezjr@fiu.edu*

T.D. MARCOTTE. Cognitive impact of medicinal cannabis.

A review by the United States Institute of Medicine (1999) concluded that cannabinoids may have potential therapeutic effects for a number of medical conditions and that they "should be tested rigorously in clinical trials." A number of recent placebo-controlled clinical trials of medicinal cannabis suggest beneficial effects for pain and spasticity. One of the most common concerns regarding "marijuana as medicine" is the effect that THC may have on cognition and the ability to carry out everyday activities. This session reviews the cognitive effects (e.g., attention, processing speed, learning) of cannabis when administered at doses showing clinical benefit in pain (e.g., neuropathic) and spasticity associated with multiple sclerosis. In addition, data addressing the effects of medicinal cannabis on driving performance, as assessed on a simulator, will be presented. The effects of varying doses and administration methods (smoked, vaporized) will be discussed, as will directions for future research.

Correspondence: *Thomas D. Marcotte, 220 Dickinson Street, Suite B, San Diego, CA 92103. E-mail: tmarcotte@ucsd.edu*

S.F. TAPERT. Consequences of Chronic Adolescent Marijuana Use.

Marijuana use is common in youth. Annual prevalence rates of 12th graders increased over the last decade (22% to 36%), while perceived "great risk" of use decreased (80% to 45%). Few rigorous studies have objectively evaluated neurocognition and brain health in adolescents with chronic use patterns. In a series of studies using monitored abstinence with adolescent marijuana users, single-trial learning and accuracy deficits were seen, even after 4 weeks of abstinence, compared to demographically matched controls. Verbal learning and memory and working memory show improvements with several weeks of abstinence. However, executive functioning and attention do not, suggesting these domains may be deficient prior to the onset of adolescent marijuana use, or recovery may take more than 4 weeks. Earlier initiation of marijuana use (e.g., before age 17) and more frequent use have been associated with poorer outcomes. Brain imaging studies have shown that these cognitive differences in adolescent marijuana users may be due to macrostructural brain alterations, poorer coherence in white matter fibers, and abnormalities of neural functioning (e.g., increased activation, and changes in neurovascular functioning). Group differences may reflect pre-existing brain architecture that leads to risky behaviors, and differences in brain tissue integrity following heavy marijuana use predict future increased drug use and delinquent behaviors. More longitudinal studies are needed to understand pre-existing differences and discrepancies that develop after the initiation of use, and clarify the degree to chronic marijuana use during adolescence contributes to psychiatric and cognitive well being in adulthood.

Correspondence: *Susan F. Tapert, 9500 Gilman Drive, 0603V, San Diego, CA 92093-0603. E-mail: stapert@ucsd.edu*

R. GONZALEZ & R.M. SCHUSTER. Decision-Making as a Moderator of Cannabis Use and Consequences from Use.

Cannabis use has been associated with neurocognitive deficits among adolescents and adults, particularly when use is frequent, of high dose, and with onset in early adolescence. Some deficits appear to recover with abstinence; however, deficits in decision-making (DM) may be longer-lasting. It remains unclear if deficits in DM (the ability to make choices with optimal longer-term outcomes among a set of alternatives) predate or emerge from heavy cannabis use. There are theoretical reasons to suspect both. We present data from a series of studies that examined relationships among DM, cannabis-use, and various outcomes. These are based on a sample of about 65 cannabis-using and 65 matched, non-using young adults (ages 17 – 24) with minimal history of neurological, mental health, or other substance use confounds. We found no significant differences between cannabis users and non-users on several measures of impulsivity, risk-taking, and DM, despite significant differences in their episodic memory performance. However, among cannabis users in the sample, DM performance was associated with more symptoms of cannabis use disorder and greater self-reported problems from cannabis use. Additional studies revealed that DM moderated the relationships between amount of cannabis use and risky sexual behaviors among cannabis-users, such that more cannabis use was associated with more risky sexual behaviors only among those with poorer DM. Of relevance to the growing national trends to legalize marijuana and promotion of medical benefits, we found that amount of cannabis use was positively correlated with self-reported perceived benefits from use, but only among those with poorer DM. Taken together, our data suggest that the DM abilities of cannabis users play an important role in how their use may impact their lives. Supported by K23DA023560, R01DA031176, and DA0331156 (PI: Gonzalez).

Correspondence: *Raul Gonzalez, 11200 SW 8th Street, AHC-4, Room 453, Miami, FL 33199. E-mail: raul.gonzalezjr@fiu.edu*

K. LISDAHL, S. SHOLLENBARGER & K. MAPLE. Potential Moderators of Marijuana Effects: Age of Onset, Gender, Body Mass, and Genetics.

Marijuana (MJ) use is increasing, with 31% of emerging adults reporting MJ use (Johnston et al., 2012). Studies thus far have reported significant neurocognitive consequences of chronic MJ use in youth, although individual differences are also noted. This talk will present

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms.
https://doi.org/10.1017/S1355617714000381

findings from a series of NIDA-funded studies examining moderators of the neurocognitive effects of MJ in youth. Across studies, neuroimaging and neuropsychological data was collected from regular MJ users and matched controls following a minimum of 7 days of abstinence. Exclusionary criteria across analyses included Axis I disorders (one study included ADHD), neurologic or major medical conditions, prenatal drug exposure, developmental delay. Age of onset: Consistent with Meier et al. (2012), we found that regular MJ use before age 16 was significantly associated with poorer executive functioning (ps<.05) and abnormal cortical thickness (ps<.01) in emerging adults with and without a diagnosis of ADHD. Gender: Our lab has found that in teens, gender moderates the effects of MJ on posterior PFC (p<.06) and amygdala (p<.05) volumes, and verbal memory (p<.05). Body Mass Index (BMI): In MJ-using emerging adults, having a high BMI was associated with additional deficits in complex attention (ps<.05). Genetics: Thus far, our lab has found that individuals with the FAAH C/C genotype, linked with reduced cannabinoid signaling, demonstrate increased binge drinking, self-reported executive dysfunction, decreased complex attention (ps<.05), and marginally poorer sleep quality (p=.13). In summary, our research group has found at least four potential moderators of the neurocognitive effects of MJ use: age of onset (earlier age associated with increased deficits), gender (unique findings for each gender), BMI (higher BMI associated with increased cognitive deficits), and genetics (FAAH C/C genotype associated with poorer cognitive functioning). Clinical implications and future directions will be discussed.
Correspondence: *Krista Lisdahl, 2441 East Hartford Ave, Milwaukee, WI 53221. E-mail: krista.medina@gmail.com*

Symposium 8: Big-C, little-c: Brain-Behavior Bases of Exceptional and Everyday Creativity

Chair: Robert Bilder

9:00–10:30 a.m.

R.M. BILDER, S.B. KAUFMAN, R.M. BILDER, O. VARTANIAN & R. JUNG. Big-C, little-c: Brain-Behavior Bases of Exceptional and Everyday Creativity.
Symposium Description: Despite the high global priority now dedicated to understanding creative cognition, knowledge about its biological bases remains fragmentary at best. Outstanding questions center on whether "Big-C" (exceptional) and "little-c" (everyday) creativity reflect quantitative shifts along shared dimensions of brain function, or qualitatively unique categories of ability. This symposium presents breaking research on the fundamental personality, cognitive, neural system, and molecular contributions to creative achievement. Scott Barry Kaufman (NYU) sets the stage by describing his research on dimensions of personality and intellectual ability that are associated with creative achievement, implicating distinctive cognitive processes in artists and scientists, following dual-process theory. Robert Bilder (UCLA) describes specific creative cognitive phenotypes including generation, working memory, and response inhibition functions spanning research in healthy humans and other species, and highlights the molecular and cellular mechanisms underlying system-level dimensions of function. Oshin Vartanian (University of Toronto) next describes results from functional neuroimaging studies that converge on dissociable neural systems involved in human expressions of metaphor and analogy among "little-c" groups, jazz musicians, and other creative artists. Rex Jung (MIND Institute/UNM) then describes his investigations using structural, diffusion, and metabolic neuroimaging, which identify discrete neural networks contributing to creative achievement. Open panel discussion with Q&A will consider the extent to which these diverse data converge on identifiable system-level processes that are critical to creativity, and explore next steps that are indicated to determine if these processes are best understood as dimensional constructs, or if Big-C creativity is manifest preferentially among a unique class of "outliers" in the multidimensional space of brain and behavior.
Correspondence: *Robert M. Bilder, UCLA, 740 Westwood Plz, Los Angeles, CA 90095. E-mail: rbilder@mednet.ucla.edu*

S.B. KAUFMAN. Opening up Openness to Experience.
Within the Big Five, openness to experience is the broadest domain, including a mix of traits relating to intellectual curiosity, perceived intelligence, imagination, artistic and aesthetic interests, emotional richness, and unconventionality. While the unifying theme of this broad personality domain is cognitive exploration, recent converging evidence suggests that the complex problem solving/reasoning (Intellect) and affective/sensory (Openness) aspects of the domain can be separated from each other psychometrically, neurologically, and genetically. In three samples (N = 177; 239; 328), we confirmed the hypothesis that whereas Openness predicts creative achievement in the arts, Intellect predicts creative achievement in the sciences. The association of Intellect with scientific creativity was due to its association with divergent thinking, which was measured with a performance test. All of these effects remained significant, even after taking into account general cognitive ability. Lastly, we found that Extraversion additionally predicted creative achievement in the arts, independently of Openness. Results are discussed in the context of dual-process theory. "Type 1" processes consist of a variety of (not necessarily correlated) processes that operate automatically and are not dependent on input from high-level control systems. Type 1 processes include affect, intuition, implicit learning, latent inhibition, and spreading activation among learned associations. In contrast, "Type 2" processes require limited attentional resources and are associated with general cognitive ability and executive functioning. We propose that artistic creativity draws more heavily on experiential Type 1 processes associated with Openness to Experience (e.g., perceptual, aesthetic, and intuitive processes), whereas scientific creativity relies more heavily on a mix of Type 1 cognitive processes and Type 2 processes associated with Intellect and divergent thinking.
Correspondence: *Scott B. Kaufman, 424 Ballytore Circle, Wynnewood, PA 19096. E-mail: sbk334@nyu.edu*

R.M. BILDER, K. KNUDSEN, A.J. SILVA, S.A. WHITE & J.D. JENTSCH. The Biology of Creativity: Trans-Species Studies of Creative Cognition.
Basic science investigations of mechanisms underlying cognitive performance demand combined strategies that involve human and other species. We report results from a series of investigations in humans, birds, and rodents, that focus on selected cognitive processes – generation, working memory, and response inhibition – that are considered important for creative achievement. Our human studies include both a study of creative achievement and cognitive phenotypes in 300 healthy individuals (the UCLA-300 study) and a linked genetic study of more than 1000 healthy people and 300 patients with schizophrenia, bipolar disorder and ADHD. These studies highlight both personality dimensions (Openness, (dis)Agreeableness), and cognitive traits (working memory, response inhibition/latent inhibition, generation) associated with creative achievement. Studies of song generation in the zebra finch and working memory in the mouse have helped identify the neural system, cellular, and molecular contributions to these phenotypes, and permitted transgenic models to be created to manipulate these phenotypes. Studies of recombinant inbred mouse strains have further defined a genetic locus for inhibiting habitual responding as manifest in reversal learning. These studies converge on selected neural systems involving cortico-cortical, fronto-striatal and fronto-limbic networks, and the role of diverse cellular processes including signal transduction and intra-cellular signaling pathways that promote neuroplasticity. The findings suggest that creative cognition is a product of multiple interacting dimensions of processing, but future research using designs that contrast Big-C and little-c groups are necessary to determine empirically if there

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

is a unique class of Big-C individuals marked by non-linear distinctions in neural processing.
Correspondence: *Robert M. Bilder, 740 Westwood Plz, Los Angeles, CA 90095. E-mail: rbilder@mednet.ucla.edu*

O. VARTANIAN. Neuroimaging of Creativity: A Domain Specific Story.
In the behavioral literature, the question whether creativity is mainly a domain general or domain specific skill or ability has been a major driver of research. In part, neuroimaging evidence can contribute to the resolution of this debate by demonstrating whether creative cognition activates a uniform set of brain structures across studies, or whether the neural systems underlying creativity vary reliably as a function of task and contextual demands. Although certain regions in the brain such as the dorsal and ventral prefrontal cortex (PFC) that subserve working memory and executive function tend to be activated across most studies of creativity, the current evidence suggests that the neural systems that underlie creativity are largely domain specific. For example, meta-analyses of fMRI data have shown that specific cognitive processes related to creativity—such as analogy and metaphor—reliably activate dissociable systems in the brain, although regions of the PFC that underlie working memory are activated in both cases. Similar process-related dissociations have also been reported in fMRI studies in which participants engaged in jazz improvisation, creative writing, or creative drawing. However, it is important to note that studies to date have largely focused on little-c everyday creativity. Whether the pattern observed thus far will characterize the neural bases of Big-C exceptional creativity remains an open question, although ongoing projects focused on teasing apart the specific cognitive differences between little-c and Big-C creativity will have a direct bearing on the quality of answers to this problem generated in the neuroimaging sphere.
Correspondence: *Oshin Vartanian, DRDC Toronto, 1133 Sheppard Avenue West, Toronto, ON M3K 2C9, Canada. E-mail: oshinv1@mac.com*

R.E. JUNG, S.G. RYMAN, A. VAKHTIN, J. CARRASCO, C. WERTZ & R.A. FLORES. Creative Networks: Implications for Big C and little c.
Neuropsychologists are used to thinking about the brain in terms of regions (e.g., cingulate gyrus) or lobes (e.g., temporal); however, the cognitive neurosciences have increasingly supported the notion of large brain networks underlying higher cognitive functioning (Bressler & Menon, 2010). This is a novel and useful (i.e. creative) way to think about both brain structure and function. Over the last number of years, various labs have turned their attention to increasingly complex aspects of cognition, utilizing sophisticated neuroimaging techniques, including some very elusive constructs such as creative cognition. Various neuroimaging techniques were applied to the problem including Positron Emission Tomography (PET), functional Magnetic Resonance Imaging (fMRI), Electroencephalograpy (EEG), structural Magnetic Resonance Imaging (sMRI), Diffusion Tensor Imaging (DTI), Magnetic Resonance Spectroscopy (MRS). However, three major reviews (Dietrich & Kanso, 2010; Arden et al., 2010; Sawyer, 2011) concluded that creativity did not localize to any particular region of the brain (except perhaps the frontal lobes). In this talk, we will focus on structural neuroimaging techniques (e.g., MRS, sMRI, DTI), and lesion analyses, from both our and other laboratories. In addition, we will present new data from our laboratory (N = 105) using analysis techniques (e.g., graph analysis, Independent Component Analysis) that describe discrete networks underlying creative cognition. The implications of this network perspective, as related to Big C and little c individuals, will also be discussed.
Correspondence: *Rex E. Jung, 801 University Blvd SE, Suite 202, Albuquerque, NM 87106. E-mail: rex.jung@gmail.com*

Paper Session 5: Adult TBI

Moderator: Kati Pagulayan

9:00–10:30 a.m.

J. DOUGLAS, L. KNOX & C. MITCHELL. Evaluating the Efficacy of Communication-specific Coping Intervention for Adults with Traumatic Brain Injury (TBI).
Objective: People with TBI frequently experience communication breakdown. Everyday interactions are stressful and close others often judge communication breakdown as one of the most problematic consequences of the injury. Typically, we use communication-specific coping strategies to address communication breakdown. Productive strategies enhance communication; non-productive strategies do little to resolve problems. This research aimed to evaluate the efficacy of a new intervention, Communication-specific Coping Intervention (CommCope-I), that targets coping with communication breakdown.
Participants and Methods: Participants were 8 men and 5 women with severe TBI (GCS scores: 3 - 8). Mean age was 35.2 yrs (SD 9.3) and mean time postinjury was 7.6 yrs (SD 5.2). CommCope-I is a 6-week program that targets productive coping strategies identified collaboratively with the client. The project involved 3 phases: 1) Pre-intervention/control (6 wks), 2) Treatment (6 wks) and 3) Follow-up (12 wks). Repeated measures ANOVA with planned pairwise comparisons were used to test the significance of change over time. Where the assumption of sphericity was violated, Greenhouse-Geisser correction was applied. Effect size was indexed by partial eta squared.
Results: CommCope-I elicited significant improvements in communication-specific coping, functional communication and stress that were maintained up to 3 mths post treatment. Improvements were commensurate with moderate-large effects. Positive changes in interpersonal communication were evident in clinician blind ratings and clients' reports of their own functioning. Clients reported significant reduction in stress at the end of treatment and maintained at 1 and 3 mths. Positive changes were also perceived by close others who reported significant increase in observed use of productive strategies following treatment and at 1 and 3 mths.
Conclusions: CommCope-I provides a promising means of reducing communication dysfunction and its negative consequences for people with TBI.
Correspondence: *Jacinta Douglas, PhD, La Trobe University, Kingsbury Drive, Bundoora, VIC 3086, Australia. E-mail: J.Douglas@latrobe.edu.au*

K.S. CHIOU & F.G. HILLARY. Time Matters: Cohort Performance Differences After Moderate to Severe Traumatic Brain Injury.
Objective: Traumatic brain injury (TBI) results in cognitive, physical, and emotional impairments. Despite documented recovery of cognitive functioning within the first two years following injury, many individuals with TBI still experience persisting functional difficulties indicative of residual impairment. Furthermore, little is known about the trajectory of cognitive functioning in individuals living with chronic injury over 2 years. This study examined cognitive functioning in chronic TBI by comparing performance from 3 subsets of survivors in different post injury states.
Participants and Methods: 33 adults with moderate to severe TBI and 26 healthy adults matched for age and education were recruited. Participants with TBI were divided into 3 groups based upon months since injury: early (2-24 months, n=14), stable (36-120 months, n=12), and chronic (120+ months, n=7). Injury severity and age did not differ significantly between groups. All participants completed identical neuropsychological measures. ANOVA analyses using test scores as dependent variables were conducted to determine the effect of injury chronicity on cognitive functioning.

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

Results: Significant group effects were found on the Stroop Color-Word Interference (p=0.001), Trail Making B (p=0.008), Shipley's Abstraction (p=0.005), and Hopkins Verbal Learning Test-Revised recognition (p<0.001) tasks. Additionally, pairwise comparisons showed significantly worse performance in the chronic TBI group compared to both the stable TBI group and healthy adults on these tests.
Conclusions: The results suggest that despite initial gains, adults with TBI are at risk of persisting cognitive impairment. In particular, deficits in the domains of memory and executive functioning increased that were not better accounted for by age. These findings highlight the chronic nature of cognitive sequelae following TBI and imply benefits from temporally-guided interventions.
Correspondence: *Kathy S. Chiou, PhD, Kessler Foundation, 1199 Pleasant Valley Way, West Orange, NJ 07052. E-mail: kchiou@kesslerfoundation.org*

S. MCDONALD, A. GOWLAND, R. RANDALL, A. FISHER, K. OSBORNE-CROWLEY & C. HONAN. Communication disorders after severe traumatic brain injury: the role of Theory of Mind and executive function.
Objective: Effective communication requires the ability to see things from another's perspective and to tailor conversation accordingly. It also requires the ability to regulate verbal output to meet specific social goals. Traumatic Brain Injuries (TBI) impairs communication abilities but the extent to which problems with theory of mind (ToM) abilities vs executive dysfunction account for these is unclear. In this study our objective was to manipulate executive abilities, specifically flexibility and inhibition separately from ToM demands in three language production tasks to examine their independent contributions.
Participants and Methods: 25 adults (18 males: aged 48.2 years (SD = 12.0) with moderate to severe TBI (post traumatic amnesia = 69.2 (SD = 54.6) days and 28 non-injured adults (19 males: aged 49.0 (SD = 12.2) years) completed three sets of communication tasks that varied in executive demands: low executive demands, high flexibility and high inhibition. Within each, parallel versions had low or high TOM demands.
Results: Performance on the high ToM versions of the low executive and high flexibility tasks was predicted by scores on the low ToM versions, i.e. performance was explained by the executive demands the parallel tasks had in common. The high inhibition task was the exception. Here the speakers with TBI had differential difficulty when the ToM demands were high, i.e. they had specific difficulty inhibiting self-referential thoughts in order to cater for another's perspective.
Conclusions: This study suggests that people with TBI do not have modular ToM deficits but can have specific problems inhibiting the self-perspective when communicating. This accords with descriptive accounts of the egocentric nature of some communication patterns following TBI and points to potential targets for remediation.
Correspondence: *Skye McDonald, PhD, School of Psychology, University of NSW, UNSW, Sydney, NSW 2052, Australia. E-mail: s.mcdonald@unsw.edu.au*

J.D. MEDAGLIA, J. MOTTER, C. DOUGHERTY, E. BRYER & F.G. HILLARY. The Cerebellum Differentially Contributes to Working Memory Function Follow Moderate to Severe Traumatic Brain Injury.
Objective: The cerebellum contributes timing, pattern recognition, and associative learning functions to a distributed working memory (WM) network in the healthy brain via distributed cortico-cerebellar circuits. While the cerebellum may be protected from direct injury in as many as 99% of cases of brain injury, its role in new learning and plasticity during cognitive processing during recovery from traumatic brain injury has not been extensively examined.
Participants and Methods: Participants included 12 individuals with moderate to severe diffuse traumatic brain injury (TBI) and matched controls. Participants underwent fMRI scanning during performance of a WM discrimination task with three load manipulations. Graph theoretical analysis was applied in to examine cerebellar plasticity in a large distributed WM network. The brain was parceled into 28 cerebellar lobules and 114 cortical and subcortical regions using the SUIT cerebellar atlas and WFU Pickatlas. Regional time series were used to construct pairwise correlation matrices which were submitted to graph theoretical analysis using the Brain Connectivity Toolbox.
Results: Graph theoretic parameters revealed that the bilateral neocerebellum 's connectivity strength and betweenness centrality in the whole brain network increased during more difficult task periods in the TBI sample, whereas responsiveness to load was only found in the right neocerebellum in controls. Importantly, a dissociation between TBI and controls was found for the effect of practice on network betweenness centrality, where left neocerebellar regions decreased in centrality in TBI and right regions decreased in centrality in controls.
Conclusions: These results are the first to show the differential importance of the left neocerebellum in the management of task demands and learning following TBI. Specifically, the left neocerebellum is engaged in TBI during challenged network processing efficiency via a circuit that extends to cortical cognitive control and WM manipulation regions.
Correspondence: *John D. Medaglia, M.S., Psychology, Pennsylvania State University, 347 Moore Building, University Park, State College, PA 16802. E-mail: johnmedaglia@gmail.com*

E.W. TWAMLEY, K.R. THOMAS, A.M. GREGORY, A.J. JAK, M.W. BONDI, D.C. DELIS & J.B. LOHR. CogSMART Compensatory Cognitive Training for TBI: Effects in a Randomized Controlled Trial.
Objective: There are very few evidence-based treatments for individuals with mild to moderate traumatic brain injuries (TBIs), the hallmark injury of the wars in Iraq and Afghanistan. We developed and evaluated a 12-week, manualized, compensatory cognitive training intervention called Cognitive Symptom Management and Rehabilitation Therapy (CogSMART), which targeted postconcussive symptom management, prospective memory, attention, learning/memory, and executive functioning. The intervention focused on psychoeducation and compensatory strategies such as calendar use, self-talk, note-taking, and a six-step problem-solving method.
Participants and Methods: In a randomized controlled trial, 50 unemployed Iraq/Afghanistan Veterans with mild to moderate TBI receiving supported employment were randomly assigned to receive either CogSMART or additional supported employment sessions for the first 12 weeks. Assessments of postconcussive symptoms, neuropsychological performance, functional capacity, psychiatric symptom severity, and quality of life were administered at baseline and at 3, 6, and 12 months.
Results: Hierarchical linear modeling analyses using all four time points demonstrated significant CogSMART-associated reductions in postconcussive symptoms (β=-0.12, p=.026) and improvements in prospective memory (β=0.14, p=.031) and quality of life (β=-0.13, p=.009). Effect sizes for these improvements were in the medium to large range (d=.55-1.0).
Conclusions: CogSMART, a brief, low-tech intervention, has the potential to improve not only postconcussive symptoms and cognitive performance, but also self-rated quality of life in Veterans with traumatic brain injuries.
Correspondence: *Elizabeth W. Twamley, PhD, Psychiatry, UCSD, 140 Arbor Drive (0851), San Diego, CA 92103. E-mail: etwamley@ucsd.edu*

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

Poster Session 9: Aging, Behavioral Neurology, Cerebral Asymmetry/ Callosal Disconnection, Cross-cultural

9:30–10:45 a.m.

Aging

K.B. ZAIDI, A.L. FISCHER & W. THORNTON. Agreeable Older Adults Can Read You Better: A Pilot Study on Personality and Theory of Mind.

Objective: Agreeableness is a personality trait associated with warmth, cooperativeness, and altruism that tends to increase with age. Research in younger adults suggests that higher agreeableness is associated with better ability to consider the perspectives of others, or theory of mind (ToM). Despite numerous studies examining ToM in aging, little research has examined links between age, personality, and ToM. Thus, we examined associations between agreeableness and ToM in late life.

Participants and Methods: 50 community-dwelling older adults (aged 60-80) completed measures assessing personality and ToM. Affective ToM was assessed using the Reading the Mind in the Eyes task, which required participants to decode emotional mental states from photographs of human eyes. Cognitive ToM was measured using the Strange Stories task, which required participants to infer cognitive mental states of characters. Agreeableness was assessed using the NEO-FFI-3 Personality Inventory. Neurocognitive abilities were assessed with established measures of processing speed, inhibition, and verbal and working memory. We tested associations between neurocognitive abilities, cognitive ToM, affective ToM, and agreeableness in two regression models.

Results: After controlling for age and neurocognitive abilities, agreeableness predicted affective ToM ($\Delta R2 = .08$, $F = 4.44$, $p = .04$), such that higher agreeableness was associated with better ability to discern emotional mental states ($\beta = .31$). In contrast, cognitive ToM was not predicted by age, verbal knowledge, neurocognitive ability, or agreeableness (Model $R2 = .08$, $p = .45$).

Conclusions: These findings demonstrate that personality factors contribute to social cognitive performance beyond composite neurocognitive abilities. Results suggest that traits reflective of a warm, cooperative, and altruistic personality may aid older adults to accurately recognize emotions in others.

Correspondence: *K. B. Zaidi, Bachelor of Arts candidate, Simon Fraser University, 16075 96 ave, Surrey, BC V4N2E9, Canada. E-mail: kzaidi@sfu.ca*

S.A. ROGERS. The Cognitive Benefits for Older Adults to Be Open to New Experience.

Objective: There has been increased interest in understanding active cognitive and physical methods for promoting cognitive health. However, these methods have seldom included dispositional or attitudinal approaches. The current study examines how openness to new experiences relates to the cognitive functioning of older adults.

Participants and Methods: Seventy-eight older adults (58 women, M age = 76.92, M educ = 15.80) completed the NEO-FFI and a comprehensive neuropsychology battery examining attention, processing speed, learning and memory, and language, visuospatial, and frontal-executive functioning.

Results: Canonical correlations revealed that openness to experience was significantly and positively related to the set of attention, processing speed, language, memory, and frontal-executive measures ($ps < .05$). Bivariate correlational analyses revealed that openness to experience was significantly positively associated with MMSE; FSIQ; DKEFS Color Naming, Word Reading, and Color-Word Inhibition; WMS-III Logical Memory I & II; CVLT-II Trials 1-5 and Long Delay Free Recall; WMS-III Visual Reproduction I; Rey-Osterreith 3'; Boston Naming Test; COWAT FAS & Animals; and WAIS-III Similarities and Picture Completion ($ps < .05$). AnANOVA showed that openness to new experience was significantly lower for those with dementia than those with normal aging, AAMI, or MCI, $p < .03$.

Conclusions: The results of this study reveal that older adults who are more open to new experiences demonstrate better attention, processing speed, language, memory, and frontal-executive functioning, as well as a possibly reduced risk for dementia. Rigidness in one's beliefs and less emotional involvement in experience may therefore be signs of cognitive difficulty, whereas curiosity and the ability to assimilate novel ideas may promote the mental health of older adults.

Correspondence: *Steven A. Rogers, Ph.D., Psychology, Westmont College, 955 La Paz Road, Santa Barbara, CA 93108. E-mail: sarogers@westmont.edu*

J.W. MYHRE, C. WOOLVERTON, R. ROBBINS, A. POLSINELLI & E. GLISKY. Facebook for Seniors: The Effects of Online Social Networking on Cognitive Function in Healthy Older Adults.

Objective: Research suggests older adults who remain socially active and cognitively engaged have better cognitive function than older adults who are socially isolated and disengaged. Using an online social networking website, like Facebook.com, may require simultaneous cognitive and social engagement, thus yielding improvements in both domains. This study examined the efficacy of learning and using Facebook as an intervention to maintain or enhance cognitive function in older adults.

Participants and Methods: Participants were 40 older adults (12 male), with a mean age of 79.4 and 16.5 mean years of education. Participants were assigned to learn how to use Facebook (n=13), an online diary website (active control, n=13), or placed on a waitlist (no treatment control, n=14). Participants assigned to learn a website attended three 2-hour classes over a period of one week, then used the website at home for seven weeks. Tests of memory and executive function were administered before and after this 8-week period.

Results: A 2 x 3 mixed ANOVA of a composite measure of working memory (i.e., updating, Miyake et al., 2000) revealed a significant Time x Group interaction, $F(2,37)=6.48$, $p=.004$. Participants in the Facebook group showed a significant increase in updating performance at post-test compared to no significant change in the control groups: paired samples t-test for Facebook, $t(12)=3.52$, $p=.004$; Active Control, $t(12)=.78$, $p>.05$; and Waitlist, $t(13)=-1.91$,$p>.05$. There were no significant group differences at baseline, $F(2,37)=.30$, $p>.05$. Other composite measures of executive function and memory showed no differential improvement in the Facebook group across the 8-week interval.

Conclusions: Learning and using an online social networking site appeared to provide specific benefits for executive functions associated with working memory in a group of healthy older adults. This may reflect the particular cognitive demands associated with online social networking and/or the benefits of social engagement more generally.

Correspondence: *Janelle W. Myhre, Psychology, University of Arizona, 1503 E. University Blvd., PO Box 210068, Tucson, AZ 85721. E-mail: jjw@email.arizona.edu*

C. CHUNG & A.J. BALDWIN. How do Religious Beliefs and Age Influence Social Partner Choice and Memory?

Objective: The Socioemotional Selectivity Theory (SST; Carstensen, 2006) suggests that individuals become more selective in their social partners and place greater emphasis on remembering positive information as they approach the end of life. SST postulates that older adults' perceived time left to live is the main reason for these emotionally gratifying choices. In the present study, we examined how the belief of eternal life might impact older adults' social partner choices and their memory.

Participants and Methods: Christian and Atheist young adults (18 to 35 years old) and older adults (60-85 years old) participated in the study through in-person group testing or completion of an online survey. All participants were given questionnaires to measure self-reported happiness, religiosity, social support, and social partner choice. Social partner choice was measured in three conditions: actual, extended, and shortened lifespan. In the shortened lifespan condition, participants

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

chose who they would spend time with as they imagined emigrating to Mars in a few weeks, after watching a short video on the new MarsOne colony. They were then asked to recall content of the video and how they felt about the move.
Results: Independent samples t-tests revealed that Christians who believed in life after death were more likely to choose family members/close friends as their social partners than Atheists. Chi-square analyses showed that older adults may not necessarily choose family/close friends more often than young adults, especially when religious beliefs and current goals were taken into account. As for memory, older adults in general used more positive words to recall the content of the video, which is consistent with an age-related positivity effect in memory. Atheists, however, recalled content with more negative words than Christians.
Conclusions: These results highlight the importance of accounting for religious beliefs and age when evaluating one's social choice and cognition.
Correspondence: *Christie Chung, PhD, Psychology, Millls College, 5000 MacArthur Blvd., Oakland, CA 94613. E-mail: cchung@mills.edu*

C.P. MOLDOVAN, I.A. PALMA, C. NORSETH, Y. XU, F. RIVERA, F. LEAF, R. WEISE, A.L. ARÉCHIGA, S. RAJARAM & J. SABATÉ. Impact of Age, Education, and Spirituality on Cognitive Reserve in Healthy Older Adults.
Objective: The US Census Bureau predicts that between 2012 and 2060, the population age 65 and older is expected to increase from 43.1 million to 92.0 million, representing over 20% of the total population. The Bureau projects the labor force participation rates for those 65 years and older will continue to rise emphasizing the importance of health maintenance in older adults.
Researchers have shown that cognitive reserve, the brain's ability to cope with damage, may be a protective factor against neurodegenerative diseases such as Alzheimer's. Previous studies have found that sociocultural factors including spirituality and education may reduce the impact of cognitive decline. However, the link between education and spirituality has not yet been examined. This study tested the impact of age, education, and spirituality on cognitive reserve in healthy older adults.
Participants and Methods: Participants were 129 adults ages 64-75 years (M = 69.01, SD = 3.04) with a high level of education (M = 15.91, SD = 2.65). Cognitive reserve was measured using the Cognitive Reserve Index questionnaire and spirituality was measured using the Spirituality Index of Well-Being. Regression analysis was conducted to test the impact of age, education, and spirituality on cognitive reserve.
Results: Regression analysis revealed that 23% of the variance in cognitive reserve was accounted for by age, education, spirituality, and the interaction between the variables, $F(4, 122) = 9.12$, $p < .001$. Cognitive reserve was significantly predicted by education ($\beta = .42$, $t = 5.18$, $p < .001$) and spirituality ($\beta = .19$, $t = 2.39$, $p < .05$).
Conclusions: Results were consistent with prior findings that show spirituality and education may mitigate the effects of aging-related cognitive deficits. Outcomes from this study have major implications for healthcare providers, suggesting that an integrative approach to healthcare is imperative for a healthy, aging population. Additionally, older adults have options to actively help preserve their intellectual capacity.
Correspondence: *Christina P. Moldovan, Bachelor of Arts, Psychology, Loma Linda University, 11130 Anderson Street, Loma Linda, CA 92350. E-mail: cmoldovan@llu.edu*

H. TAKAHASHI, S. OKAHASHI, M. KOYAMA, K. YAMADA, S. OKUMURA, A. ISHIDA & T. FUTAKI. Relationship between the Resultant Acceleration during Written Task, Cognitive Function and Activities of Daily Living in Older Adults.
Objective: It is important that we provide early evaluation and support on whole activities of daily living (ADL) in older adults. However, there is seldom quantitative, qualitative and simple assessment system of ADL. In this study, we focused on the resultant acceleration of finger movement during written tasks, and clarified relationship between it and cognitive function/ADL.
Participants and Methods: The participants included 22 older adults (2 males; mean age = 79.8 years) and 15 young adults (6 males; mean age = 23.6 years). We measured the resultant acceleration of index finger by using three-axis acceleration sensor (HapLog, Katotech, Japan) during the following three tasks. In Task1, subjects were asked to copy as many words as possible on a word list in 1 min. In Task2, subjects were asked to write down as many words as possible beginning with a specific letter in 1 min. In Task3, subjects were asked to point on the center of circle to the sound 50 times (1 time per sec). Firstly, the measured value was Fourier-transformed, the difference between upper and lower-limit (range: 0.8-4.0 Hz) was then taken and made into Envelope Difference Average (EDA). Larger value of EDA would represent more complex finger movement. In addition, some cognitive/ADL assessments were conducted. Speaman's correlations were used for data analysis.
Results: Mini-Mental State Examination and Trial Making Test were positive correlated significantly with EDA on task2. Frontal Assessment Battery was positive correlated significantly with EDA on Task2/Task3. Barthel Index for ADL was positive correlated significantly with EDA on Task1/Task2. Performance score of Task1/Task2 was positive correlated significantly with EDA on each own task (all $p<0.01$).
Conclusions: Results indicated that the resultant acceleration during written letter fluency task could be an element for the cognitive and ADL screening. We considered that development of a new assessment system using this concept would be useful in geriatric rehabilitation.
Correspondence: *Sayaka Okahashi, Graduate School of Medicine, Kyoto University, 53 Kawahara-cho, Shogoin, Sakyo-ku, Kyoto 606-8507, Japan. E-mail: okahashi.sayaka.7c@kyoto-u.ac.jp*

C.M. SIMON & M. SCHMITTER-EDGECOMBE. Instrumental Activities of Daily Living Among Healthy Older Adults: Discrepancies Between Self-Report, Performance-Based, and Direct Observation.
Objective: Evidence demonstrates that good self-awareness, which facilitates the use of compensatory strategies, may prolong everyday functional independence and delay the diagnosis of dementia. The present study investigated self-awareness of functionality by examining cognitive correlates associated with discrepancies between a participant's self-report and their scores on performance-based and direct observation measures examining instrumental activities of daily living (IADLs).
Participants and Methods: A sample of 151 healthy older adults (Mage= 68, range= 50-94) completed standardized neuropsychological tests and a self-report IADL questionnaire. Participants also completed performance-based everyday problem solving and behavioral simulation measures, as well as performed eight activities of daily living (e.g., fill a medication dispenser) while under direct observation in a campus apartment. For each IADL measure, participants were dichotomized into those who reported or demonstrated IADL difficulties and those who did not.
Results: Forty-two percent of the sample demonstrated a discrepancy between self-report and performance-based IADL assessment (42 under- & 15 overreporting problems) and 35% demonstrated a discrepancy between self-report and the direct observation measure (34 under- and 14 overreporting problems). Participants who self-reported problems and made errors (either on performance-based or direct observation measures) were considered to have good self-awareness (N=53) while those who made errors on the performance-based test but did not self-report problems were considered to have poor awareness (N=23). Better awareness of IADL weaknesses was associated with younger age and significantly higher performance on tests of delayed memory and attention/processing speed.
Conclusions: This is a significant finding because even healthy older adults experiencing difficulties with memory, but are not fully aware of this decline, might fail to request appropriate assistance or accept such assistance when offered.

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

Correspondence: *Christa M. Simon, Psychology, Washington State University, 710 SE Chinook Drive, K52, Pullman, WA 99163. E-mail: christa.simon@wsu.edu*

K. MEYERS, J.L. WOODARD, S. MILLER, P. MARTIN, A. DAVEY & L.W. POON. The Unique Contribution of Depressive Symptoms to Activities of Daily Living in Centenarians.

Objective: Cognitive status and depressive symptoms contribute to an aging individual's ability to perform activities of daily living (ADLs), but little is known about the cumulative contribution of these factors to ADLs (instrumental, IADL and basic, BADL) in centenarians. We hypothesized that beyond cognitive status, depressive symptoms would account for variance in ADLs of centenarians. Octogenarians were examined for comparison.

Participants and Methods: Participants were centenarians (N=181; mean age=100.4 years, SD=2.0) and octogenarians (N=71; mean age=84.2 years, SD=2.8) from the Georgia Centenarian Study. Cognitive status was examined via Mini Mental State Examination (MMSE). Depressive symptoms were assessed via Geriatric Depression Scale-Short Form (GDS-SF). ADLs were evaluated via Older Americans Resources and Services (OARS) self and proxy ADL ratings. Hierarchical multiple regression models determined to what extent cognitive status and depressive symptoms contribute to both self and proxy reported IADLs and BADLs.

Results: In centenarians, MMSE accounted for variance in self IADL and BADL and proxy IADL and BADL ratings, R2's=.04, .04, .43, .28, p's<.006. GDS-SF accounted for variance beyond MMSE for self IADLs and BADLs, R2's>.05, ΔR2's>.02, p's<.052. GDS-SF did not account for additional variance beyond MMSE for proxy IADLs and BADLs, R2's<.43, ΔR2's<.01, p's>.065. For octogenarians, MMSE accounted for variance in self IADL and BADL and proxy IADL and BADL ratings, R2's= .33, .20, .64, .54. GDS-SF accounted for variance in self and proxy IADLs (R2's>.43,ΔR2's>.03, p's<.013), but not in self or proxy BADLs (R2's<.54, ΔR2's<.01, p's>.387).

Conclusions: These findings suggest that the contribution of depressive symptoms to ADLs in centenarians is unique and may depart from what is observed in younger populations. As the GDS-SF did not account for a significant proportion of proxy-reported ADLs in centenarians, proxy ratings of ADLs may be misleading if depressive symptoms are not evaluated in the oldest-old.

Correspondence: *Kortni Meyers, B.A., Wayne State University, 5057 Woodward Ave., Detroit, MI 48202. E-mail: Kortmeye@wayne.edu*

M. BURK, K. MULHAUSER, J.K. PETERSON, A.M. EVERAERTS & B.A. PYYKKONEN. Impact of Mood on Functional Status in Older Adults.

Objective: Existing literature suggests that the relationship between mood and functional status is unclear. This research has emphasized the interaction between depression, anxiety and functional status, but has not examined the predictive variance of mood on functional status in older adults. The current study attempts to identify emotional status as it relates to the functional status of older adults.

Participants and Methods: Participants included community dwelling older adults and individuals placed in various stages of care including residential assisted living, skilled nursing and rehabilitation settings. Bivariate correlational analysis was utilized to rule out collinearity of the two measures of functional status (ILS Health and Safety subtest and the FAST). A series of four hierarchical regression analyses were conducted determining unique and shared variance of anxiety and depression on these measures of functional status.

Results: Bivariate correlation between the two functional status measures was not significant (r = -.48, p = .33). Subsequent hierarchical regression analyses were utilized to identify the unique predictive ability of depression and anxiety for each measure: depression accounted for 10.8% (p = .06) of the unique variance of the FAST, while anxiety accounted for 15% (p = .03). A similar analysis indicated that anxiety accounted for <1% of the unique variance in ILS-Health and Safety scores, while depression accounted for <1%. Neither were significant predictors.

Conclusions: The current hierarchical regression analysis revealed depression and anxiety were not significant predictors of functional status, as measured by ILS: H&S. When utilizing the FAST to assess functional status, the unique variance accounted for by depression approached significance. Anxiety was a significant predictor of functional status above and beyond depression. Overall, anxiety accounted for more variance in functional status than depression in older adults on the FAST.

Correspondence: *Mallory Burk, MA, Wheaton College, 517 W. Oakdale Ave, Apt. 402, Chicago, IL 60657. E-mail: mallory.burk@my.wheaton.edu*

K. PATEL, K. MCINERNEY, P. DEMIREVA, N. BRADY, D. MCAVOY & J. SUHR. Gender Differences in Neuropsychological Predictors of Driving Hazard Perception.

Objective: Research suggests older women are the fastest growing group of drivers and are involved in more driving accidents than men. Older women are also more likely to self-report decline in driving associated skills and are more likely to self-regulate their own driving. However, little attention has been given to potential gender differences in factors related to driving ability in older adults. The present study examined neuropsychological correlates of driving ability for male and female older drivers.

Participants and Methods: Participants were community members who volunteered for a driving and aging study (60-88 years old; mean college education, 41 male, 44 female). None had dementia as determined by interview and overall test results. All participants were given a neuropsychological battery focused on cognitive constructs determined in prior literature to be predictive of driving. Participants also completed 2 hours in a driving simulator. For the present analyses, ability to respond to driving hazards was the driving dependent variable (reaction to a deer and to a pedestrian hazard while driving, as judged by veering; standard deviation of lane deviation while the hazard was presented).

Results: Males and females did not differ in age, driving frequency, or hazard perception skill, but females showed significantly better performance on executive measures. For males, age, driving frequency, and neuropsychological variables were not associated with response to the two hazards. However, for females, visuoconstructonal skills were strongly associated with response to both hazards (ps <.05-.005), and executive functioning and complex visual attention skills were strongly associated with response to the pedestrian hazard (ps < .05-.005).

Conclusions: Results suggest that future studies should examine gender differences in neuropsychological correlates of driving ability, in order to best determine how to make clinical decisions about this important outcome variable in neuropsychological assessments of older adults.

Correspondence: *Julie Suhr, Ph.D., Psychology, Ohio University, 200 Porter Hall, Department of Psychology, Athens, OH 45701. E-mail: suhr@ohio.edu*

S. SELIGMAN, T. GIOVANNETTI, J. SESTITO & D. LIBON. Relations Between Everyday Action Performance and Cognitive Functions in Healthy and Mildly Impaired Older Adults.

Objective: There is growing evidence that mild cognitive impairment impacts everyday functioning in older adults. The cognitive underpinnings of these mild difficulties remain unknown, precluding targeted cognitive intervention. This study examined relations between cognitive functions and everyday action performance in the context of a theoretical model of action disruption in dementia (Omission-Commission Model), which proposes that omissions are predicted by episodic memory and commissions are predicted by executive functions.

Participants and Methods: 45 non-demented older adults (M_{age}=71.31; M_{educ}=13.02) with varying cognitive complaints (M_{MMSE}=27.16) were videotaped performing the Naturalistic Action Test, a performance-based test of everyday activities. Tapes were analyzed using established criteria

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

for overt errors (e.g., omissions - steps never performed; 4 types of commissions - steps performed incorrectly), overt error monitoring (undetected errors), and time to completion (total time). A recently validated error category, "micro-errors," was coded to quantify subtle, non-overt errors deemed inefficient to task completion (e.g., reaching for a distractor object, etc.). Tests of episodic memory and executive functions also were administered. Correlation and regression analyses were conducted to examine both relations among NAT variables and neuropsychological predictors of NAT variables.
Results: Commission errors were significantly related to total time ($r=0.41$, $p<0.01$) and undetected errors ($r=0.73$, $p<0.01$). Contrary to hypotheses, the measure of episodic memory significantly predicted micro-errors ($\beta=-0.38$, $p<0.05$), overt errors ($\beta=-0.37$, $p<0.05$), and overt and micro-errors combined ($\beta=-0.45$, $p<0.01$).
Conclusions: These data do not support the Omission-Commission Model in early functional decline and implicate early episodic memory breakdown as a primary source of subtle functional impairment. Treatments targeting episodic memory may be most effective in preventing or delaying negative outcomes in older age.
Correspondence: *Sarah Seligman, Psychology, Temple University, 1701 N. 13th Street, 6th Floor Weiss Hall, Philadelphia, PA 19122. E-mail: sarah.seligman@temple.edu*

E.A. SCHARAGA & R. HOLTZER. Efficient Assessment of Instrumental Activities of Daily Living Predicts Gait and Upper Extremity Functioning in Community-Dwelling Older Adults.
Objective: Impaired independent activities of daily living (IADL) functioning is an adverse outcome of cognitive and physical declines associated with aging. As the older adult (OA) population continues to grow, their reliance on the healthcare system will increase; further emphasizing the profound need to quickly assess independent functional abilities. The Brief Everyday Activities Measurement (BEAM) was developed to quickly and objectively (< 5 minutes) measure two IADL domains: Medication Management and Finance Management. The BEAM has demonstrated its ability to detect subtle cognitive difficulties within healthy OAs. This study aimed to examine the predictive ability of BEAM performance on physical performance, specifically gait and upper extremity functioning.
Participants and Methods: We examined standardized self-report and performance-based IADL and physical functioning measures in a cross-sectional sample of 181 healthy aging community-dwellers (ages 65 – 95 years).
Results: Total time to complete BEAM ranged 54.16 to 224.94 seconds (104.16 ± 32.70 seconds). Separate hierarchical regressions controlling for demographic variables demonstrated that BEAM performance time significantly predicted gait speed, $F(4, 172) = 3.691$, $p < .01$, $R2 = .079$; step time, $F(4, 171) = 4.027$, $p < .01$, $R2 = .086$; step length, $F(4, 172) = 8.970$, $p < .001$, $R2 = .173$, stride length, $F(4, 172) = 9.696$, $p < .001$, $R2 = .184$, and stance time, $F(4,172) = 2.951$, $p < .05$, $R2 = .064$. BEAM performance time also significantly predicted upper extremity function; assessed via functional reach, $F(4, 151) = 8.462$, $p < .001$, $R2 = .183$.
Conclusions: Overall BEAM performance provides valuable information for predicting decline in quantitative measures of gait and functional reach abilities in a healthy community-dwelling OA population. The BEAM can be implemented in clinical and research settings as a marker of functional and physical status in OA populations.
Correspondence: *Elyssa A. Scharaga, M.A., Clinical Psychology, Yeshiva University, 138 Altessa Blvd., Melville, NY 11747. E-mail: Scharaga@gmail.com*

Y. XU, C. NORSETH, C. MODOVAN, I.A. PALMA, F.O. LEAF, R. WEISE, F. RIVERA, A. ARÉCHIGA, S. RAJARAM & J. SABATÉ. Depressive Symptoms and Their Effect on Attention Among Healthy Older Adults.
Objective: Gradual deficits in cognitive functioning and the diminution of attention are a normal process associated with aging. Consequently, older adults with problems of inattention are often not recognized and left untreated. Studies have suggested that depression was associated with ADHD symptoms in older adults. Despite an association being found between depression and inattention, it has not been previously investigated how depressive mood relates to this progression of inattention, specifically in healthy elder population. The aim of the present study was to evaluate 1) gender differences in reported depressive symptoms and 2) the relationship between depressive symptoms and inattention among healthy aging adults.
Participants and Methods: The study consisted of 124 healthy older adults (Age range = 64-75, M = 69.04, 75.8% Caucasian). CPT-II was used to measure attention. Depressive symptoms were measured using the Hamilton Depression Inventory.
Results: Results of analyses showed that depressive symptoms were significantly positively correlated with detectability ($r = .20$, $p < .05$). Significantly higher rates of depressive symptoms were reported in females ($M = 2.88$, $SD = 3.92$) than males ($M = 1.59$, $SD = 1.92$); $t(122) = 2.44$, $p < .05$). Depressive symptoms significantly predicted detectability scores ($\beta = .20$, $p < .05$) and the model explained 4% of the variance in performance of detectability ($R2 = .04$, $F(1, 121) = 4.86$, $p < .05$).
Conclusions: The findings suggest that even with minimal depressive symptoms, those who endorsed more symptoms showed lower ability to discriminate stimuli. Females also reported more depressive symptoms than males. Assessing early signs of depressive symptoms may help health care providers to identify possible links that may influence older adult's inattention. Implementation of early preventive psychoeducation programs for mood disorders in healthy aging adults may slow the progression of attention decline.
Correspondence: *Yangmu Xu, M.A., Psychology, Loma Linda University, 901 Golden Springs Dr., Unit #A10, Diamond Bar, CA CA. E-mail: jymqx224@gmail.com*

R.T. DALEY & M.K. O'CONNOR. Emotional Perception in Alzheimer's Disease: Contributions to the Caregiving Experience.
Objective: Alzheimer's disease (AD) has been linked with involvement of the amygdala. As a result, symptoms of AD include changes in emotional perception. We are interested in whether patients with AD perform worse on tasks of emotional perception compared to healthy older controls (OC) and how these changes in emotional perception impact the caregiving experience for spousal caregivers.
Participants and Methods: We ran ADs and their spousal caregivers (SC) and OCs.
Emotional perception tasks from the Advanced Clinical Solutions (ACS) test were administered to both the ADs and the OCs: the affect naming task, the prosody-face matching task, the prosody-pair matching task, and the emotion labeling task.
SCs completed a baseline interview along with three measures: a Relationship Satisfaction Scale, the Zarit Burden Interview, and the Neuropsychiatry Inventory (NPI).
Results: Our preliminary results are based upon data collected from 5 OCs and 7 ADs and SCs. Preliminary analyses revealed a significant difference in performance on the ACS for OCs ($M = 35.20$, $SD = 7.259$) compared to ADs ($M = 24.86$, $SD = 4.67$), because ADs performed worse on the task, $F(1,10) = 9.13$, $p = .01$. Correlations were run and as emotional perception decreased so did relationship satisfaction, $r = .23$, $p = .61$. Also, as emotional perception decreased, caregiver burden increased, $r = -.70$, $p = .08$. Last, as emotional perception decreased, neuropsychiatric symptoms severity, as rated by the caregiver, increased, $r = -.42$, $p = .35$. Although these results were non-significant with this small sample, the relationships appeared to be consistent with our hypotheses.
Conclusions: Given the current small sample size, many of these analyses do not reach significance. However, ADs perform worse than OCs on the ACS emotional perception tasks. These changes appear to be related to SCs experience of AD's NPI scores, burden, and relationship satisfaction.

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

Correspondence: *Ryan T. Daley, B.A., Boston Medical Center, 13 Pearson Drive, Byfield, MA 01922. E-mail: ryan.daley06@gmail.com*

J. MEISTER, M. ALOSCO, A. FEDOR, S. GARCIA, J. GUNSTAD & M. SPITZNAGEL. The Role of Mindfulness in Awareness of Cognitive Abilities.

Objective: Deficits in awareness are often observed in dementia, but less frequently explored in healthy older adults. Mindfulness is a construct involving attention to cognitions and sensations. The current study examines accuracy in predicting cognitive ability in healthy older adults and investigates if the relationship between subjective cognitive report and objective cognitive performance is moderated by mindfulness.

Participants and Methods: Thirty-six older adults ages 50-78 with MOCA≥23 completed Trailmaking A/B, Frontal Assessment Battery, Verbal Fluency, Hopkins Verbal Learning, and Rey-Osterrieth Complex Figure tests. A summary composite based on clinically normed t-scores was computed to measure objective cognitive function. The Cognitive Difficulties Scale (CDS) measured subjective cognitive ability and the Five-Factor Mindfulness Questionnaire (FFMQ) assessed mindfulness.

Results: A moderation analysis was conducted using hierarchical regressions. Block 1 with objective cognitive function and FFMQ showed better cognitive performance was related to fewer subjective cognitive complaints (β=-.33, p=.04). There was no association between the FFMQ and CDS (β=-.25, p=.13). An interaction term consisting of the objective cognition/FFMQ cross product did not significantly predict CDS (β=-.20, p=.20). Exploratory analyses revealed an interaction term between objective cognition and the FFMQ subscale, 'Describing,' which involves ability to describe or label sensations, was associated with CDS (β=-.31, p=.04); higher levels on this subscale predicted greater accuracy identifying cognitive ability.

Conclusions: Results indicate healthy older adults are able to predict objective cognitive ability. Global mindfulness did not moderate this relationship, though an FFMQ factor involving ability to describe or label sensations did. This factor should be further explored to determine if it is conceptually different from awareness.

Correspondence: *Jonah Meister, Psychology, Kent State University, 11169 Aquilla Road, Chardon, OH 44024. E-mail: jmeister@kent.edu*

A.L. FISCHER & W. THORNTON. Dissociable Mechanisms for Age Differences in Cognitive and Affective Theory of Mind: A Pilot Study Examining Neurocognitive Performance and Health Status as Modifiers.

Objective: Theory of mind (ToM) has separate cognitive and affective components that both decline in later life. Given evidence for age declines, examining whether underlying mechanisms may differ between ToM components is a key next step. In a pilot study, we addressed the roles of neurocognitive performance and health status as modifiers of age differences in ToM.

Participants and Methods: 35 younger (18–27 years) and 50 older adults (64-80 years) completed measures assessing neurocognitive performance, cognitive ToM, and affective ToM. We took blood pressure readings to assess health status and created composite neurocognitive indicators representing: (1) Memory (verbal learning, delayed recall) and (2) EF/Speed (working memory, inhibition, speed). We examined modifiers of ToM using separate regression-based mediation models.

Results: Older adults had poorer cognitive ToM, t(83)=5.14, p=.000, and affective ToM, t(83)=2.04, p=.044. Further, underlying mechanisms differed between ToM components. First, after controlling for language ability, health status mediated links between age and *cognitive ToM* (Indirect Effect 95% CI [.13, .93]), such that individuals with higher diastolic blood pressure displayed worse cognitive ToM. Second, after controlling for language ability and gender, EF/Speed mediated links between age and *affective ToM* (Indirect Effect 95% CI [-2.35, -.16]), such that individuals with poorer executive functions/speed displayed worse affective ToM.

Conclusions: We expand on past research by demonstrating dissociable mechanisms for age differences in ToM. Results suggest that health status may convey additional risk for poor cognitive ToM, but this risk did not generalize to affective ToM. Instead, individuals with difficulty rapidly processing complex information may be at risk for low affective ToM, though more research is needed. Findings highlight key topics for researchers and clinicians to consider when deciding whether age differences in social cognitive skills may be clinically meaningful.

Correspondence: *Ashley L. Fischer, M.A., Psychology, Simon Fraser University, 8888 University Drive, Simon Fraser University, RCB 5246 Department of Psychology, Burnaby, BC V5A 1S6, Canada. E-mail: alf3@sfu.ca*

A. COOLIN, E. ERDFELDER, D.M. BERNSTEIN, A.E. THORNTON & W.L. THORNTON. Modeling Individual Differences in Cognitive Functions Underlying Hindsight Bias in Older Adults.

Objective: After learning the outcome of an event, people's recollection of their former prediction of that event shifts towards the actual outcome. This hindsight bias phenomenon appears to be more pronounced in older compared to younger adults. Using a multinomial modeling approach (see Erdfelder & Buchner, 1998), researchers have identified recollection bias and reconstruction bias as the two underlying processes contributing to older adults' increased susceptibility to hindsight bias. However, the role of cognitive functioning in these underlying processes remains unclear. We identify the cognitive abilities involved in recollection and reconstruction biases by incorporating individual variation in cognitive functioning into the parameter estimation of the multinomial model.

Participants and Methods: We assessed hindsight bias using a memory judgment task (Hell, Gigerenzer, Gauggel, Mall, & Müller, 1988) in a sample of 60 healthy older adults (M = 72.5, Range = 65-87). Participants completed a battery of neuropsychological tests assessing episodic memory, inhibition, and working memory. We directly incorporated individuals' cognitive ability data into the estimation of the bias parameters using a logistic link function.

Results: Lower working memory capacity was associated with a larger recollection bias (β = -1.30, 95% CI = [-19.75, -0.46], p < .001) and poorer inhibition was associated with a larger reconstruction bias (β = 0.041, 95% CI = [.020, .068] p < .001).

Conclusions: We present a contemporary statistical approach to modeling individual differences in the underlying processes that contribute to hindsight bias. Our findings advance our understanding of hindsight bias in aging by identifying the role of various cognitive abilities in the two primary bias processes contributing to hindsight bias in older adults.

Correspondence: *Alisha Coolin, Simon Fraser Univeristy, 312-3575 Euclid Avenue, Vancouver, BC V5R6H5, Canada. E-mail: acc27@sfu.ca*

C. DE FRIAS. Health, Emotion Regulation, and Mindfulness Differentially Affect Compensatory Strategy Use.

Objective: The current study examined associations between everyday memory compensation strategy use and 3 person-level resources (i.e., health, emotion regulation strategies, and trait mindfulness) in middle-aged and older adults.

Participants and Methods: In this cross-sectional study, 89 community-dwelling adults (62 women and 27 men) were recruited from Dallas, Texas. The participants were 51 to 85 years of age and they were screened for depressive symptoms and severity (using the Patient Health Questionnaire [PHQ-9]). All participants completed the multi-dimensional Memory Compensation Questionnaire, along with measures of self-reported health status (i.e., SF-36v2: mental and physical health composites), emotion regulation strategies (i.e., Emotion Regulation Questionnaire), and trait mindfulness (i.e., Mindful Attention Awareness Scale).

Results: A series of concurrent hierarchical regression analyses showed that poorer mental health (especially for older adults) and physical health functioning were associated with using compensatory strategies

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

(e.g., reliance on others, and investment of time and effort) more frequently. Cognitive reappraisers reported using more internal mnemonic strategies. Conversely, having a more mindful predisposition was associated with less frequent use of several forms of memory compensation strategies, especially for middle-aged adults.
Conclusions: The results suggest that health-related quality of life, adaptive strategies to regulate emotions, and trait mindfulness are additional contexts that determine the degree of engagement in everyday memory compensation and ultimately to successful cognitive aging.
This work was supported by a seed grant and start-up funds from The University of Texas at Dallas to C. de Frias.
Correspondence: *Cindy de Frias, PhD, School of Behavioral and Brain Sciences, The University of Texas at Dallas, 800 West Campbell Road, Richardson, TX 75080. E-mail: cdefrias@utdallas.edu*

S. LEVY, D. MWENDWA & R. SIMS. Blood Pressure, Trait Mindfulness, and Cognitive Function in Middle Aged and Older African Americans.
Objective: The prevalence of cardiovascular disease (CVD) is greater in African Americans in comparison to other ethnic groups due to disproportionate rates of CVD risk factors, such as hypertension. Thus, African Americans are at a greater risk for CVD related cognitive dysfunction and decline. Hypertension is associated with poorer attention, memory, and executive functioning. Stress has been linked to hypertension and the pathogenesis of CVD. Mindfulness is associated with reduced stress, lower blood pressure, and higher levels of subjective well being. The current study examined the association between blood pressure and cognitive function in a community sample of African Americans, and whether this relationship was moderated by trait mindfulness.
Participants and Methods: Participants were 195 African American adults without a history of dementia, stroke, or TBI with a mean age of 58.90 (SD=10.62). The sample was 46% male with a mean education of 13.67 years (SD=3.08). Participants completed a battery of neuropsychological tests that assessed attention/working memory, verbal fluency, inhibition, and mental flexibility. Linear regression analyses were used to analyze the relations between blood pressure, trait mindfulness, and cognitive functioning. The Johnson-Neyman technique was used to probe significant interactions to estimate the effects of blood pressure on cognitive function at specified values of mindfulness.
Results: Results showed no significant associations between blood pressure, trait mindfulness, and performance on any of the neuropsychological tests, after controlling for age, education, and gender. However, there was a significant interaction where higher blood pressure was associated with poorer letter fluency at low levels of trait mindfulness.
Conclusions: These findings add to the growing literature examining mindfulness and cognitive function. The cultivation of mindfulness may serve as an effective intervention strategy to reduce stress and vascular related diseases in this population.
Correspondence: *Shellie-Anne Levy, M.S., Howard University, 2400 6th St NW, Washington, DC 20001. E-mail: shellie.anne.levy@gmail.com*

J.B. WILLIAMSON, V. DRAGO, H. MICHAL, F. ADAM, D. LAMB, B. WARGOVITCH & K. HEILMAN. The Influence of Emotional Valence on the Chronology of Autobiographical Memory Salience.
Objective: Salience of emotional autobiographical memories may have temporal patterns associated with valence. Since survival is paramount and often depends on recall of negative events, older negative autobiographical events may remain more salient than positive events. The purpose of this study was to test this hypothesis.
Participants and Methods: 20 healthy participants, 29 to 63 years old, were asked to freely recall sad and happy emotional memories and estimate the length of time that had passed since the event.
Results: 18 out of 20 subjects volunteered a more remote sad than happy memory ($p<.05$). Older participants' sad memories were more remote ($p<.05$) but the ratio of happy to sad memories was not affected by age.
Conclusions: Self-selected free retrieval of autobiographical emotional memories reveals a time bias. The reason for this temporal dichotomy (happy-recent, sad-remote) is unknown; however, it may be that engaging phylogenetically older systems involved in defense and survival increases salience priority.
Correspondence: *John B. Williamson, PhD, Neurology, University of Florida, 8114 SW 53rd Place, Gainesville, FL 32608. E-mail: john.williamson@neurology.ufl.edu*

C.M. SMART & A. KRAWITZ. Iowa Gambling Task Performance Discriminates Older Adults with Subjective Cognitive Impairment from Healthy Controls.
Objective: Decision-making (DM) is a complex process, integrating cognition and emotion. DM changes with age, and financial DM in particular has been suggested as being sensitive to the earliest signs of pathologic cognitive decline. DM is an iterative process in which prior experiences influence subsequent behavior. However, tasks that rely on absolute performance scores (e.g., averages) can fail to detect subtle impairments manifest in trial-to-trial responses. Reinforcement-learning (RL) models applied to tasks such as the Iowa Gambling Task (IGT) have been shown to provide greater insight into DM deficits in clinical populations. In this study, we applied the Prospect Valence Learning (PVL) model to IGT performance in older adults with subjective cognitive impairment (SCI), proposed as the pre-clinical stage of Alzheimer's disease.
Participants and Methods: We recruited healthy older adults (ages 65-80), classified either as SCI (n = 17) or healthy controls (HC, n = 25), based on self-identification, questionnaires, and neuropsychometric testing. All participants completed the computerized version of the IGT.
Results: Participants did not differ in terms of age, education, premorbid IQ, depression, or neuroticism scores. Based on clinical norms for the IGT, there were no significant differences between the two groups. However, examining trial-to-trial data, there was a significant group by epoch interaction for deck C, $F(4,160) = 3.251$, $p = .01$. Furthermore, the PVL model revealed a significantly lower value for the recency parameter ("A") for the SCI group, indicating steeper discounting or rapid forgetting of past experience than HCs ($A = 0.214$ vs. 0.425, $p <.05$).
Conclusions: Current results suggest that trial-to-trial analysis of DM tasks is more sensitive to pre-clinical changes than focusing on global performance measures. Findings are discussed in the context of early detection of cognitive decline in older adults.
Correspondence: *Colette M. Smart, PhD, Department of Psychology, University of Victoria, PO Box 1700 STN CSC, Victoria, BC V8W 2Y2, Canada. E-mail: csmart@uvic.ca*

L.K. OBERG, J. TIPPETT, C.M. SMART, M.M. COCHRANE & M.A. GARCIA-BARRERA. Exploring the Relationship between Prospective Memory and Anterior Cingulate Cortex Volume in Older Adults With and Without Subjective Cognitive Impairment.
Objective: Subjective cognitive impairment (SCI) has been proposed as the earliest pre-clinical stage of Alzheimer's disease (AD). Much research focuses on episodic memory impairments (a hallmark of AD), but prospective memory (PM) tests may be more sensitive in identifying subtle signs of pre-clinical change. Prospective memory is an ecologically relevant, multifaceted cognitive process including functions like monitoring and conflict detection, both associated with anterior cingulate cortex (ACC). It is unknown how ACC structure may be linked to PM and whether ACC structural changes discriminate healthy controls (HC) from those with SCI. The current study sought to explore relationships between ACC volume and PM performance in older adults at risk of cognitive decline.
Participants and Methods: Thirty older adults self-identifying as SCI or HC received structural magnetic resonance imaging and neuropsychological assessment. ANALYZE 9.0 was used to manually trace ACC volume and the Memory for Intentions Test (MIST) was used as a comprehensive measure of PM function.

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms.
https://doi.org/10.1017/S1355617714000381

Results: The SCI and HC groups did not differ on any demographics or psychological variables associated with cognitive reserve. There was no significant effect of group on ACC volume, $F(1, 27) = .68$, $p < .05$, $\eta 2p = .02$. Significantly more SCI than HC were impaired ($Z \leq -1.5$) on at least one MIST subscale, $V = .58$, $F(8,16) = 2.73$, $p < .05$, $\eta 2p = .58$. Across the sample, regressing the MIST subscales onto ACC volume showed no significant predictors ($R2 = .35$, $p > .10$). When categorized as SCI or HC, the same predictors significantly explained ACC volume variance for the HC group ($R2 = .91$, $p < .03$) but not the SCI group ($R2 = .42$, $p > .10$). Intra- and interrater tracing reliabilities were all above criterion (> .90).
Conclusions: Results from these pilot analyses suggest differential diagnosis of SCI could benefit from evaluating PM changes alongside regional brain volumes in ACC.
Correspondence: *Lara Oberg, Psychology, University of Victoria, P.O. Box 3050, Victoria, BC V8W 3P5, Canada. E-mail: larao@uvic.ca*

D. HAN, B. JAMES, P.A. BOYLE, A. KENT & D.A. BENNETT. Decision Making and Cognition Discrepancies in Older Adults.
Objective: Optimal decision making is aided by, but not completely dependent upon, cognitive abilities. There has been increasing clinical and legal interest in discrepancies between decision making and cognitive abilities in old age when financial and health care decisions may have significant ramifications. We investigated the prevalence and demographics of older adults who showed significant discrepancies between decision making and cognitive abilities in a large community-based cohort.
Participants and Methods: Nondemented older adults (n=717, mean age=81.97, mean education=15.18, 77.3% female and 93.31% white) from the Rush Memory and Aging Project completed a measure of financial and health care decision making and a battery of 19 neuropsychological measures. Performances on the decision making (DM) measure and a cognition (COG) composite were z-transformed and subtracted from one another yielding a discrepancy measure; dummy variables were then created for discrepancies greater than one in either direction (DM<COG and DM>COG). Binomial logistic regression models were next employed to explore the association of age, education, sex, race, and income with discrepancy groups.
Results: Results indicated 25.4% of the sample showed a significant discrepancy between DM and COG abilities. Of these, 13.2% percent showed DM<COG, while 12.1% showed DM>COG. Older age (p=0.010), being non-white (p=0.027), and lower education (p=0.046) was associated with higher odds of being in the DM<COG group. Older age (p=0.010) and being male (p=0.002) was associated with higher odds of being in the DM>COG group. Income was not associated with either type of discrepancy.
Conclusions: A quarter of the sample exhibited significant discrepancies between decision making and cognitive abilities. Discrepancy is associated with age, and discrepancy type is associated with particular factors. These results support the importance of considering cognition and decision making as distinct constructs.
Correspondence: *Duke Han, PhD, Behavioral Sciences, Rush Alzheimer's Disease Center, 600 S. Paulina St., 1022, Chicago, IL 60612. E-mail: Duke_Han@rush.edu*

A. JEZNACH, H.A. TUOKKO, K. STAJDUHAR & M.A. GARCIA-BARRERA. Advance Care Plans Among Cognitively Impaired Older Adults: Findings from the Decedent Questionnaire in the Canadian Study of Health and Aging (CSHA).
Objective: Cognitively impaired older adults appear to engage in advance care plans (ACP) differently than cognitively intact elderly. The aspects of ACP that differ are unclear due to conflicting evidence and should be investigated to guide clinical best practice. This study examines the relations between cognitive status (impaired vs. intact) and aspects of ACP: 1) location of death; 2.a) making arrangements for surrogate decision-making; 2.b) formalizing arrangements in legal documents; 3.a) discussing preferences for end-of-life care; 3.b) formalizing discussions in legal documents; and 4) informant view on whether the decedent's final wishes were respected.
Participants and Methods: Data were collected in the Canadian Study of Health and Aging (CSHA) for participants who died between the second and third point of testing (n = 1454). Information regarding the decedent's cognitive functioning and end-of-life experience was obtained though informant report.
Results: Six separate logistic regression analyses were carried out to correspond to the research questions, all of which included age at death, sex, years of education, and cognitive status as independent variables. Relative to controls, those with cognitive impairment were more likely to die in a nursing or seniors home (relative to a private residence; OR = 5.97). Cognitively impaired older adults were more likely to arrange for a medical proxy (OR = 1.90), to create a legal document regarding this proxy (OR = 2.64), and to create a legal document regarding their end-of-life preferences (OR = 2.00) but were less likely to discuss preferences for end-of-life care with others (OR = 0.62).
Conclusions: This study provides evidence of differences in ACP among older adults with and without cognitive impairment, suggesting this process may be different for persons with cognitive impairment. With increased understanding of the nuances of ACP in this population, even more effective strategies to further enhance quality of end-of-life care in this group can be devised.
Correspondence: *Anna Jeznach, M.Sc., Psychology, University of Victoria, #1008-930 Yates St., Victoria, BC V8V3M2, Canada. E-mail: abraslav@uvic.ca*

H. CANO & V.A. LOPEZ. Correlation between performance in tasks of memory, working activity and years of school in a Mexican sample of elderly health adults.
Objective: Dementia has become an actual concern considering the increasing number of elderly adults. The cost for families and society has become a real problem for the public policies in Mexico, where there is not an effective system of cognitive prevention. The objectives of this investigation were: 1) Recognize if there is a direct relationship between the educational level and the maintenance of memory in different modalities. 2) Determine the presence of relations between the development of different kinds of activity in life of the adult and their influence into memory.
Participants and Methods: a battery of memory tasks (immediate, mediatized, audioverbal, tactile, visual and spatial) was applied to a sample of 80 elderly adults (40 males and 40 females) with different educational level (more than 6 years of education and less than 6 years). All the adults got more than 27 points in Mini Mental State Examination and had less than 10 points in the Geriatric Depression Scale.
Results: the results were analyzed with ANOVA (1 way) showing that education is the principal factor that needs to be considered in the results: pictograms (p=.001), stroop effect (p=.001), visual memory (p=.004). But our proposal is consider the concept that we define as systems of activity, which consists of what the person did during their life, resulting in: pictograms (p=.05), stroop effect (p=.004), visual memory (p=.05).
Conclusions: Education is the principal factor of protection in adults; it has an outcome to compensate the effects of retirement and changing of lifestyle. The systems of activity also have a real effect in the possibility of older adults to pay more attention in usual activities, detect their mistakes and have a better chance to recover information in their different modalities.
Correspondence: *Hugo Cano, BUAP, Juan C Bonilla 108, Los Dicios, San Martin Texmelucan 74080, Mexico. E-mail: hugocr10@gmail.com*

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

J. WALTER, M. KASSEL, R. KAY, E. AVERY, L. RAPPAPORT, L. GABRIEL, A. WELDON, M. MANN, A. LAURENT, E. BRICENO, J. ZUBIETA, S. LANGENECKER & S. WEISENBACH. Middle Aged Adults with MDD Demonstrate More Pronounced Cognitive Deficits than Younger and Older Adults with MDD, Relative to Same-Age Peers.

Objective: Adults with Major Depressive Disorder (MDD) have known cognitive deficits on neuropsychological testing. However, few studies have compared the cognitive functioning of individuals with MDD across the lifespan. The purpose of this study was to examine cognitive functioning in young, middle aged, and older adults with MDD when compared to healthy controls (HC).

Participants and Methods: Seventy younger adults (age 25±4) were compared with 28 middle-aged adults (43±6) and with 53 older adults (n=53) with MDD (67±8). These groups were then compared to 75 young (23±4), 27 middle-aged (45±5), and 73 older (72±9) HC. Participants were administered neuropsychological tests of memory, executive functioning, processing speed, attention, language, and motor abilities.

Results: A 3 (age group) X 2 (disease status) MANOVA was conducted for nine cognitive factors. Results demonstrated a significant interaction of age and disease status on memory, psychomotor speed/coordination, and verbal fluency. Specifically, memory deficits were found to impact middle aged and older aged adults with MDD when compared to HC; however, these deficits were more pronounced in middle-aged participants. Additionally, results demonstrated significant main effects for age on attention, verbal memory, and executive functioning.

Conclusions: Middle-age participants with MDD demonstrated poorer cognitive functioning in memory and executive functioning, relative to their same-age healthy peers, and differences were more pronounced than in younger and older participants with MDD. Middle age is a time when cognition begins to decline as a result of normal aging and may decline at an accelerated rate in depressed adults.

Correspondence: *Jamie Walter, M.A., Jesse Brown VA Medical Center, 958 N. Leavitt St #3, Chicago, IL 60622. E-mail: JamieLD9@yahoo.com*

A. ARJUNAN & E. MOES. Physical Activity as a Predictor of Fluid Intelligence in Older Participants.

Objective: Studies of cognitive reserve have continually demonstrated that individuals with higher vocabulary and education levels are more resistant to the effects of age; that is, crystallized intelligence serves as a protective factor. Less research has focused on identifying factors that may boost the cognitive processes linked to one's fluid intelligence. These are known to be particularly vulnerable to age but are nonetheless crucial to adaptive problem-solving in today's increasingly challenging technological environment. We hypothesized that the fluid intelligence decline might be related to a concomitant decline in dopamine. Because physical activity has been associated with increased dopaminergic transmission, we predicted that higher levels of exercise could enhance fluid cognition, possibly offsetting the effect of age.

Participants and Methods: A sample (N = 51) of healthy adults ages 51 to 97 was administered a questionnaire assessing current physical activity, neuropsychological tests, and a proxy measure of dopamine: the MARS Contrast Sensitivity Test.

Results: A large effect of age was found on fluid intelligence, as measured by the WASI Matrix Reasoning. Physical activity was positively correlated with fluid intelligence. Additionally, dopamine levels estimated by the MARS predicted fluid intelligence after controlling for crystallized intelligence. However, an analysis of moderation to determine whether level of physical activity influenced the effect of age was not significant.

Conclusions: Thus, participants' current level of physical activity did not provide adequate protection against the decline seen with age. However, the amount of exercise reported by this highly educated sample was minimal, leaving open the possibility that more intensive exercise will have a beneficial effect. Intervention studies that produce varying doses of exercise and test dopamine-mediated functions may be most valuable to the understanding of normal aging and how to reduce its impact on everyday cognitive functioning.

Correspondence: *Aparna Arjunan, B.S., Clinical psychology, Suffolk University, 289 Highland Ave, Apt 203, Somerville, MA 02144. E-mail: amarjunan@suffolk.edu*

E. SIEG, J. COHEN, R. CHARLTON & M. LAMAR. Vascular Aging: A Focus On The Impact of Cholesterol On Brain Structure And Function.

Objective: Approximately 50% of adults over 60 have elevated cholesterol levels or are on cholesterol lowering medications; 20% have multiple vascular comorbidities. Despite this, vascular aging studies tend to focus on hypertension and/or diabetes with less research considering the impact of hypercholesterolemia. We explored the cognitive and neuroanatomical profile of cholesterol, including high and low density lipoprotein (HDL/LDL) in non-demented non-depressed older adults.

Participants and Methods: 23 participants (age~67.8+5.9; total cholesterol range=127-309mg/dL; HDL~58.5+18.8; LDL~107.8+32.8) completed vascular, cognitive and neuroimaging assessments. Partial correlations controlling for age and vascular risk were conducted between vascular factors including cholesterol and cognition.

Results: Results did not reveal significant associations between blood pressure, fasting glucose or hemoglobin A1c levels and cognition. In contrast, significant negative correlations existed between total cholesterol and verbal memory (Logical Memory-II; r(22)=-.44,p=.02) driven by LDL (r(22)=-.50,p=.005). Correlations between cholesterol and executive functioning (Matrix Reasoning) and attention (Trail Making Test A) did not survive correction for multiple comparisons. Tract-based spatial statistics of DTI data revealed negative associations between cholesterol, particularly LDL cholesterol, and the inferior fronto-occipital and inferior longitudinal fasciculi on the left. This suggests cholesterol, particularly LDL, negatively impact the coherence of key white matter tracts involved in the priming of medial temporal structures relevant for accurate recall as well as visual speed and cognitive dexterity.

Conclusions: Taken together, our results for cholesterol in older adults suggest increased consideration of this vascular risk – regardless of the presence of hypercholesterolemia – regardless of the presence of other vascular risk factors given its unique contribution to pathological aging in affected individuals.

Correspondence: *Erica Sieg, MA, Clinical Psy.D, The Chicago School of Professional Psychology, 5059 N. Winchester Ave, Apt 3, Chicago, IL 60640. E-mail: eks7967@ego.thechicagoschool.edu*

A.H. COOK, A. MARTERSTECK, D. OHM, M. MESULAM, S. WEINTRAUB & E. ROGALSKI. Maintenance of Cortical Thickness in SuperAgers: A Key to Preserved Cognition in Advanced Age?

Objective: The SuperAging program at Northwestern University has identified a cohort of individuals over age 80 who score at least in the average range for 50-60 year olds on tests of episodic memory and who have at least average performance for their age on the Boston Naming Test, categorical fluency, and digit span tests ("SuperAgers"). Previous neuroimaging results suggest that SuperAgers have less cortical atrophy than their cognitively-average same age peers and display no atrophy compared to average individuals in their 50s and 60s at a single time point. Longitudinal neuropsychological data suggest that SuperAgers are able to maintain their superior memory performance over 18 months. The current study examines the maintenance of cortical integrity of SuperAgers over this 18-month interval.

Participants and Methods: Longitudinal structural neuroimaging data from nine SuperAgers were processed using the automated FreeSurfer pipeline (http://surfer.nmr.mgh.harvard.edu, Version 5.1.0). All images were visually inspected and manually corrected for errors. Normalized whole brain cortical volume, average whole brain cortical thickness, and cortical thickness by hemisphere (right and left) analyses were

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

conducted via paired t-tests to determine if there was significant change over time.
Results: No significant differences in whole brain cortical volume, average cortical thickness, or cortical thickness by hemisphere were found between baseline and 18 month scans (all p's > 0.05).
Conclusions: SuperAgers did not show significant cortical atrophy over an 18-month period, suggesting that maintenance of cortical volume and thickness may contribute to their uniquely preserved cognitive abilities in advanced age.
Correspondence: *Amanda H. Cook, MA, Northwestern University, 320 East Superior St, Searle Building, 11th Floor, Chicago, IL 60611. E-mail: amandacook2017@u.northwestern.edu*

R.F. KAPLAN, A.G. GERTSBERG, N. MOSCUFO, D.B. WAKEFIELD, C.R. GUTTMANN & L. WOLFSON. Magnetic Resonance Imaging Predictors of Processing Speed in the Normal Aging.
Objective: Normal aging includes changes in brain morphology such as increased white matter hyperintensities (WMH), and decreased fractional anisotropy (FA) and hippocampal volume. In previous work our group has shown WMHs and hippocampal volume (HV) loss independently predict lower scores on measures requiring speed of processing and executive functioning (EF). In this study we compare WMH and FA together with HV in predicting speed or processing and executive functioning in the normal elderly.
Participants and Methods: Eighty-one healthy adults aged 75-90 (M=81.71, SD=4.00) completed a neuropsychological test battery and a quantitative brain MRI. Using factor analysis the neuropsychology test measures were reduced to 3 factors with eigenvalues above 1: EF/Processing Speed, Verbal Memory, and Visuospatial Skills. The EF/Processing Speed factor included RBANS Coding, Trails B, Stroop Test and CalCAP. We used a series of hierarchical multiple regressions to predict cognitive change with age, WMH, FA and HV as predictor variables.
Results: Age, WMH and HV combined to predict 40% of variance for the EF/Processing Speed. When WMH was replaced by FA the model factor predicted 42% of the variance with age, FA and HV again independently contributing to the overall model. Combining WMH and FA in the same analysis did not improve prediction EF/Processing speed as they are highly correlated with greater WMH related to lower FA (r= -.62; p< .001).
Conclusions: These results indicate that white matter integrity, whether measured by WMH or diffusion tensor imaging, together with age and hippocampal volume influence cognitive decline independently on tasks involving processing speed and EF in the normal elderly.
Correspondence: *Anna G. Gertsberg, University of Connecticut Health Center, 30 Outlook Ave, #308, West Hartford, CT CT. E-mail: anna.gekker@gmail.com*

I.J. EWALD, K.J. BANGEN, L.R. CLARK, D.A. NATION, C.E. WIERENGA, G.H. WEISSBERGER, S.I. DEV, S.M. JURICK, M.E. SANDERSON-CIMINO & M.W. BONDI. Reduced Cerebral Blood Flow Predicts Subsequent Cognitive Decline in Older Adults: An Arterial Spin Labeling MRI Study.
Objective: Reduced cerebral blood flow (CBF) is a well-established finding in mild cognitive impairment (MCI) and Alzheimer's disease (AD). We aimed to examine the utility of cerebral perfusion as measured by arterial spin labeling (ASL) magnetic resonance imaging (MRI) in predicting future cognitive decline among nondemented older adults.
Participants and Methods: In this prospective longitudinal study, 20 nondemented older adults underwent a baseline neuropsychological assessment and ASL MRI scan followed by a repeat neuropsychological assessment approximately one year later. Eight participants demonstrated cognitive decline (three showed Reliable-Change-Index based significant decline on the Mattis Dementia Rating Scale but retained their baseline cognitive diagnosis, four of the eight more generally progressed from cognitively normal to MCI, and one significantly declined in both DRS and cognitive diagnosis) whereas 12 remained cognitively stable. Whole brain CBF measures at baseline were examined using between-group voxel-wise t-tests to compare the decline and no-decline groups.
Results: The decline and no-decline groups did not differ on age, sex, education, APOE genotype, time interval between neuropsychological exams, or time interval between MRI scan and baseline neuropsychological exam (all ps > .05). At baseline, voxel-wise whole brain analyses (p = .05, alpha = .05, cluster threshold = 20 voxels) revealed significantly decreased CBF in the basal ganglia and medial frontal regions (anterior cingulate, medial frontal gyrus) among older adults who showed subsequent decline relative to those who did not decline.
Conclusions: These preliminary findings suggest that hypoperfusion as measured by ASL MRI can predict subsequent cognitive decline among nondemented older adults. Taken together, though not often considered structures related to the pathogenesis of Alzheimer's disease, reduced CBF in the basal ganglia and medial frontal regions may be useful markers for early detection of incipient cognitive impairment.
Correspondence: *Ivy J. Ewald, B.S., Psychology, VMRF, 7423 Draper Ave, La Jolla, CA 92037. E-mail: ivyewald@gmail.com*

E.T. ZUIDEMA & S.A. ROGERS. Learning to Slow Down, Slowing Down to Learn: How Leisure Activities Relate to Neuropsychological Functioning in Older Adults.
Objective: To parallel recent research on exercise, this study investigates the specific cognitive functions correlated with the leisure activities of older adults.
Participants and Methods: Sixty-one older adults completed a comprehensive battery of neuropsychological tests. On an additional questionnaire, participants indicated how many times they engaged in leisure activities each week.
Results: Canonical correlation analyses revealed significant positive relationships between the number of leisure activities and the set of neuropsychological measures that assess overall learning, visual learning in particular, visuospatial functioning, and frontal-executive abilities (all ps < .05). Bivariate analyses showed that the number of participants' leisure activities was positively correlated with WAIS-III Block Design, WAIS-III Picture Completion, WAIS-III Similarities, WMS-III Visual Reproduction I, CVLT-II Trials 1-5 Total, and RCFT 30' Delay (all ps < .05).
Conclusions: These data suggest that older adults who engage in more leisure activities each week seem to benefit from stronger verbal abstraction, visuospatial construction, and visual perception, as well as from better learning of verbal lists and visual material without time constraints. This prominence of nonverbal rather than verbal aspects of cognition implicates more leisure-related activation of the right relative to left hemisphere. Frontal lobe functions also appear to be activated or potentially strengthened by leisure activity.
These findings have direct implications for the cognitive health of older adults. Recent research on the relationship between exercise and cognitive health has revealed beneficial trends in left hemisphere functions, and leisure seems to mirror those benefits with right hemisphere functions. Exercise and leisure, taken together, may provide a comprehensive program for cognitive well-being. Perhaps there is something to the old adage about all work and no play, with mental acuity heightened by both.
Correspondence: *Eric T. Zuidema, Psychology, Westmont College, 955 La Paz Rd., MS#1649, Santa Barbara, CA 93108. E-mail: ezuidema@westmont.edu*

M.A. MATTHEWS, M. SEIDENBERG, J.L. WOODARD, K.A. NIELSON, J.C. SMITH, S. DURGERIAN, M.A. LANCASTER, C. KANDAH, C. KAY, A.M. BUTTS, N.C. HANTKE, C. FIGUEROA, K. HAZLETT, A. NORMAN, M. SUGARMAN & S.M. RAO. Different Contributions of Family History and Genetic Risk on 5-year Cognitive Changes in Healthy Older Adults.
Objective: Early identification of those most likely to convert to Alzheimer's disease (AD) has become a priority in aging research. The

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

apolipoprotein (APOE) gene and family history (FH) are considered factors that increase AD risk. Although the negative effect of APOE (Gene) on cognition has been repeatedly demonstrated, less is known about the unique FH effects on cognition. In addition, most studies do not separate these two factors when designing studies. The present longitudinal study investigated episodic memory performance for a cohort of healthy older adults at different levels of FH and genetic AD risk over a five year period.
Participants and Methods: 47 cognitively intact participants (mage = 72, SD = 4.6) underwent neuropsychological testing at baseline, 18-months, and 5-years. The sample was divided into 4 groups based on AD risk: FH and Gene (FHG, n = 13), Gene Only (GO, n = 6), FH Only (FHO, n = 10), and No Gene and no FH (NGF, n = 18). Z-scores were calculated for each time point based on the mean performance of the NGF group at baseline on three indices from the Rey Auditory Verbal Learning Test (AVLT); Total Word Recall, Immediate Recall, and Delayed Recall. Group x Time (3x3) mixed design ANOVA examined Rey performance for the three groups at the three time points.
Results: The small sample size reduced the study power and no significant group x time interaction emerged. Nevertheless, a clear pattern of findings was evident. At baseline, the Gene Only group performed lowest, and there was no impact of FH. However, over the course of five years, there was a trend for increased negative impact for combined gene and family group (FHG) to show the most decline.
Conclusions: The literature remains unclear as to the independent and/or additive effects of FH and APOE in the conversion from normal aging to AD. We suggest that additional investigation of gene and FH alone and in combination may prove important in identifying AD risk factors.
Correspondence: *Monica A. Matthews, B.S., Psychology, Rosalind Franklin University of Medicine and Science, 3333 N. Green Bay Road, North Chicago, IL 60064. E-mail: monica.matthews@my.rfums.org*

H.L. COMBS, N.E. GARCIA & S.C. SEGERSTROM. Age and IQ Moderate Practice Effects of Verbal Memory Ability in Older Adults.
Objective: Literature applying longitudinal methods observes stability in verbal memory functioning over time, while similar literature using cross-sectional comparisons suggests significant age differences in verbal memory. This discrepancy highlights the importance of partitioning out effects due to practice and attrition rates versus true aging effects within longitudinal research.
Participants and Methods: The Rey Auditory Verbal Memory Test (RAVLT) was administered to 147 older adults (M=74) once a year for five years. Estimates of practice and attrition effects, as well as estimated change, were derived using equations proposed by Salthouse (2010). Multiple regression analysis was used to derive slopes for observed change and estimated change, test for significant differences and moderation by age or IQ.
Results: Attrition was low in this sample (6%) and the differences between observed and estimated change were heavily weighted on practice effects. Analyses revealed age group (>80) moderated the relationship between type of slope (observed/estimated) and time on Immediate Recall (R2=.88, $F(9,29)=16.20$ $p<.01$), Total Recall (R2=.82, $F(9,29)=10.44$, $p<.01$), Short Delay Recall (R2=.64, $F(9,29)=4.00$, $p<.01$), Long Delay Recall (R2=.70, $F(9,29)=5.25$, $p<.01$) and Learning (R2=.60, $F(9,29)=3.33$, $p<.05$). Additionally, IQ (>115) moderated the relationship between type of change and time on Immediate Recall (R2=.82, $F(6,19)=9.61$, $p<.01$), Total Recall (R2=.89, $F(6,19)=16.62$, $p<.01$), Short Delay Recall (R2=.96, $F(6,19)=57.12$, $p<.01$), Long Delay Recall (R2=.88, $F(6,19)=16.26$, $p<.01$), and Learning (R2=.92, $F(6,19)=24.65$, $p<.01$).
Conclusions: Practice effects inflated verbal memory abilities within the older group (>80) more than in the younger group (<80). Practice effects were also larger in individuals with average IQ than those with above average IQ. These findings suggest there are appreciable declines in verbal memory performance as older adults age and these findings may go unseen with repeated neuropsychological assessment.
Correspondence: *Hannah L. Combs, M.S., Psychology, University of Kentucky, 3900 Crosby Dr. Apt. 2507, Lexington, KY 40515. E-mail: hannahlanecombs@gmail.com*

T. GEFEN, M. PETERSON, G. KIM, S. WEINTRAUB, E.H. BIGIO, E. ROGALSKI, M. MESULAM & C. GEULA. Quantitative Examination of Alzheimer Pathology in the Cingulate Cortex of Cognitive SuperAgers.
Objective: SuperAgers are defined as individuals over age 80 with memory scores at least as good as healthy 50-65 year-olds, and scores in other cognitive domains at least average for their age group. Prior MRI findings found that compared to younger controls, SuperAgers showed greater thickness of the left anterior cingulate cortex. To explore the cellular nature of this finding, we initiated a microscopic evaluation of brain tissue obtained at autopsy from the cingulate gyrus in three subject groups: SuperAgers (N=5), cognitively average elderly subjects (NC, N=5) and subjects with amnestic mild cognitive impairment (aMCI, N=5).
Participants and Methods: Numbers of thioflavin-S-positive neurofibrillary tangles (NFTs) and amyloid plaques (AP) were quantified using unbiased stereology in anterior cingulate regions (Brodmann area [BA] 25/24), and posterior cingulate regions (BA 23/31).
Results: Mean numerical estimates of AP and NFT density were lowest in SuperAgers, followed by NC and aMCI groups across all cingulate regions. Statistical analyses revealed significantly lower NFT density in anterior cingulate regions in SuperAgers compared to NC and aMCI groups ($p<0.05$); no differences were found between groups in posterior regions. AP distributions were highly variable and did not show statistically significant differences in anterior (BA 24/25) or posterior cingulate regions (BA 23/31) between groups ($p>0.05$).
Conclusions: Markers of Alzheimer pathology such as plaques and tangles frequently emerge in the course of average aging and become increasingly more prominent in aMCI and Alzheimer's dementia. Our findings suggest that superior cognitive performance in old age has a putative neurobiological basis that may include resistance to Alzheimer pathology. In particular, the relative absence of NFTs in anterior cingulate regions may constitute a key factor underlying the MRI finding of unusually high cortical thickness in this part of the cerebral cortex in SuperAgers.
Correspondence: *Tamar Gefen, MS, Northwestern University, 320 East Superior St., Searle, 11-447, Chicago, IL 60611. E-mail: tamar.gefen5@gmail.com*

M.J. LARSON, C. PERRY, B. NIELSEN, J. HOLT-LUNSTAD, T.J. FARRER, D.W. HEDGES & V.R. CALL. The Influence of Telomere Length on Cognitive Functioning in Healthy Community-Dwelling Older Adults.
Objective: Studies suggest that telomeres, long strings of nucleotides that shield the ends of chromosomes from weakening and shorten with increasing age, are associated with healthy aging and possibly age-related cognitive decline. Studies of telomere length and aging to date have not included comprehensive assessments of neuropsychological functioning and have produced variable findings. We examined the relationship between telomere length and cognitive functioning as measured by the Repeatable Battery for the Assessment of Neuropsychological Status (RBANS).
Participants and Methods: 129 community-dwelling older adults (68 female; mean age = 71) initially completed the RBANS and provided a saliva sample for telomere analysis. Three participants were excluded due to incomplete RBANS data. Absolute telomere lengths were measured from DNA isolated from salivary samples by quantitative PCR using the single copy human 36B4 gene as the reference standard. Multiple regression analyses with RBANS total score and index scores as dependent variables and gender, age, telomere length, and the age by telomere length interaction, along with zero-order correlations between

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

telomere length and RBANS scores, were used to examine cognitive performance and telomere relationships.
Results: The overall model was not significant for RBANS total score or index scores (R-squared<.07). Age significantly predicted cognitive performance for the RBANS total score (beta=-.20, p=.04). Notably, however, neither telomere length nor the telomere length by age interaction predicted RBANS total score or RBANS index score performance (betas<.07, ps>.34). There were no significant zero-order correlations between telomere length and cognitive functioning.
Conclusions: Current findings fit with a growing body of work showing little or poor relationships between cognitive aging and telomere length. Future research examining gene by telomere interactions will aid in understanding telomere-related aging processes.
Correspondence: *Michael J. Larson, Ph.D., Department of Psychology, Brigham Young University, 244 TLRB, Provo, UT 84602. E-mail: michael_larson@byu.edu*

L.M. BARRERA-MARTINEZ, P. ROBINSON & S.L. WILLIS. Predictors of Longitudinal Change in White Matter Hyperintensities.
Objective: White matter (WM) integrity has been shown to be important both in speed of processing and in cognitively complex domains such as executive functioning. White matter hyperintensities (WMH), as an indicator of WM integrity, have also been related to vascular risk and its impact on cognitive functioning. While concurrent associations between WMH volume, cognition and vascular risk have been studied, there is relatively limited examination of factors associated with short-term longitudinal change in WMH volume in cognitively healthy subjects. We hypothesize steeper increase in WMH with age and for ε4 carriers.
Participants and Methods: In this study we examine 4 occasions of change in WMH volume over a 6-year interval in 87 cognitively normal adults (M age = 66 yr at first scan; range = 51 – 83 yrs; males = 35%). Approximately half the sample had been diagnosed with hypertension, although ε4 carriers did not differ in percent with hypertension.
Results: In a MANCOVA repeated measures design, predictor variables included age (midlife/old age) and APOE ε4 status with education as a covariate. The dependent variables were WMH volume at four occasions.
Conclusions: Mean WMH volume doubled over the 4 occasions of measurement (baseline = 3139mm; Wave 4 = 6352mm; p < .0001) with older subjects having significantly higher WMH volume across occasions (p < .001). Older subjects showed a steeper rate of increase across time (p < .0001), with older ε4 carriers showing the steepest increase in WMH volume, compared to ε4 noncarriers. Carriers and noncarriers did not differ at baseline. This study extends prior findings in examining rate of increase in WMH volume over 4 occasions in healthy, cognitively normal adults, examining change in midlife versus old age. Both age and APOE ε4 status were show to contribute to rate of increase in WMH volume over time.
Correspondence: *Laura M. Barrera-Martinez, University of Washington, 12906 8th Ave WAPTB303, Everett, WA Wa. E-mail: laurab28@uw.edu*

S.L. WILLIS & C. DEFRIAS. Moderating Effects of APOE, Hypertension and Alzheimer Disease on Cognitive Trajectories in Normal Aging.
Objective: The Apolipoprotein APOE ε4 allele increases the risk of Alzheimer's disease (AD), relates to earlier cognitive deficits in preclinical AD, and some studies report cognitive deficits in healthy ε4 carriers. However, wide individual differences exist in ε4 carriers risk of cognitive decline & progression to AD. We retrospectively examined if progression to AD moderated the ε4 allele effect on individual differences in level and change in cognitive functions over 21-yrs, using Seattle Longitudinal Study (SLS) data. We hypothesized steeper preclinical decline on episodic memory for ε4 carriers progressing to AD than non-AD ε4 carriers. We also examined which cognitive abilities exhibited steeper preclinical decline for ε4 carriers not progressing to AD.
Participants and Methods: Sample: 1044 non-demented adults (M=51.1 yrs; Range:32-74 yrs). Cognitive domains: Vocabulary, number, episodic memory, spatial orientation, inductive reasoning, perceptual speed, cognitive flexibility, over 4 occasions of measurement at 7-yr intervals
Results: Multi-level HLM modeling was used to test cross-sectional and longitudinal effects of hypertension, ε4, AD status & their interaction, adjusting for age & education.
Conclusions: APOE ε4 carriers progressing to AD showed steeper preclinical decline on episodic memory than non-AD ε4 (p< .01). For ε4 carriers not progressing to AD, ε4 and hypertension had additive & interactive effects. The additive effect of hypertension on cognitive flexibility level (i.e., lower performance for hypertensives; p<.05) was qualified by a significant ε4 x hypertension interaction on the slope. Hypertension moderated the ε4 effects on the rate of change for cognitive flexibility & perceptual speed, such that the ε4 allele plus hypertension were associated with steeper 21-yr. cognitive decline (p< .05). Combined genetic/vascular risk factors accounts for variation in the slope in normal cognitive aging.
Correspondence: *Sherry L. Willis, PhD, Psychiatry and Behavioral Sciences, University of Washington, 180 Nickerson St Suite 206, Seattle, WA 98109. E-mail: oldage@u.washington.edu*

D.A. NATION, S.R. PREIS, A. BEISER, L. DELANO-WOOD, K.J. BANGEN, M. LAMAR, D.J. LIBON, M.W. BONDI, S. SESHADRI, P.A. WOLF & R. AU. Pulse Pressure and Cognitive Decline by APOE Genotype: Results from the Framingham Heart Study.
Objective: To investigate whether midlife pulse pressure is associated with cognitive decline and whether the association between pulse pressure and cognitive decline is modified by presence of the apolipoprotein-E ε4 allele (APOE-ε4).
Participants and Methods: The sample consisted of 593 stroke- and dementia-free participants (age at examination, mean=59.2±2.9 years, range=53.1-64.9 years; 47.7% men) from the Framingham Offspring Cohort Study who underwent health examination (1991-1995) and neuropsychological testing at baseline (1999-2003) and follow-up ~5-7 years later (2004-2009). Multivariable linear regression examined the association between midlife brachial artery pulse pressure (systolic – diastolic blood pressure; 5mm increment) and cognitive change. Covariates included age, sex, education, time interval between cognitive assessments, prevalent interim stroke, and baseline neuropsychological performance. Interaction between pulse pressure and APOE-ε4 on cognitive change was assessed.
Results: Pulse pressure was associated with decline in executive function, with higher pulse pressure predicting increased time to completion for Trails B–A (β=0.005, p-value=0.03). There was a statistically significant interaction between pulse pressure and possession of the APOE-ε4 allele for change in visuospatial ability (p-interaction=0.01). Pulse pressure was associated with greater decline in Hooper Visual Organization Test score among APOE-ε4 positive participants (β=-0.03, p-value=0.02) but not among APOE-ε4 negative participants (p-value=0.47).
Conclusions: Midlife pulse pressure is associated with subsequent decline in executive functioning in middle-aged adults, and visuospatial ability in those who possess the APOE-ε4 allele only. This suggests that early vascular aging—indexed by higher midlife pulse pressure—may be associated with subsequent cognitive decline, particularly in executive and visuospatial abilities, and that these effects are modified APOE-ε4 status.
Correspondence: *Daniel A. Nation, Ph.D., Psychology, University of Southern California, 3620 South McClintock Ave., Los Angeles, CA 90089-1061. E-mail: danation@usc.edu*

N.T. BOTT, B. BETCHER, N. PATEL, A. KARYDAS, J. YOKOYAMA & J.H. KRAMER. Young at Processing Speed: Anatomic and Genetic evidence in "Superagers".
Objective: There is considerable variability in the degree to which older individuals experience age-associated cognitive decline. Our objective

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

was to examine genetic and neuroanatomical predictors of cognitive aging.
Participants and Methods: Subjects were 70 functionally intact elderly (mean age=71.8) who were followed longitudinally with measures of processing speed. Mean length of follow-up was 2.29 years. Brain MRI and genetic testing were carried out at baseline to determine hippocampal volumes and ApoE genotype. Composite scores for spatial processing speed (PS) were calculated based on norms for 20-30 year-olds. The sample was divided into three groups: "Superagers" (N=13) fell within 1 SD in PS at baseline, and changed less than 1 SD at follow-up; "average agers" (N=40) fell outside 1 SD in PS at baseline, but changed less than 1 SD at follow-up; "Subagers" (N=17) fell outside of 1 SD in PS at baseline, and changed more than 2 SD at follow-up. There were no group differences in age, education, or gender.
Results: A general linear model covarying for intracranial volume was significant (F=5.90, p=.005), with superagers having larger hippocampal volumes than average and subagers. Chi-square analyses examining the distribution of the E2 and E4 alleles of the ApoE gene was significant. E2 was only found in the superager and average groups, with 25% of the superagers having an E2. Fewer than 20% of superager and average subjects had an E4, whereas 47% of the subagers did. Robust and stable processing speed was associated with ApoE-2 and larger baseline hippocampal volume, whereas cognitive decline was associated with higher frequency of ApoE-4.
Conclusions: These findings highlight the relevance of neuroanatomy and genetics in predicting cognitive decline, and suggest that AD-related biomarkers influence cognitive trajectories in asymptomatic subjects.
Correspondence: *Nicholas T. Bott, Psychiatry and Behavioral Sciences, Stanford University School of Medicine, 401 Quarry Rd., MC 5719, Palo Alto, CA 94305. E-mail: nbott@stanford.edu*

S.E. SCOTT, P.R. SCHOFIELD, K. PEIRCE, J.M. HEAPS, E.M. LANE, J.D. BOLZENIUS, S. COOLEY, L.E. SALMINEN, L.M. BAKER & R.H. PAUL. Impact of the Serotonin Transporter Polymorphism on Emotion Identification in Healthy Older Adults.
Objective: The serotonin transporter polymorphism (5HTTLPR) is associated with increased sensitivity to emotional stimuli in carriers of the short (S) allele. This allele is also associated with differences in cognitive ability in older adults. Aging is associated with declines in accuracy and increases in RT for identifying facial emotion expressions. However, it is not clear what genetic and cognitive mechanisms underlie changes in emotion identification performance in older adults or patterns of performance for specific emotions. This study examines the impact of 5HTTLPR status on patterns of accuracy and RT, and relationships between cognitive processing speed and the speed of identifying specific emotions.
Participants and Methods: Forty one healthy older adults ages 51-83 completed an emotion identification task to assess accuracy and RT for identification of facial expressions (fear, anger, disgust, sad, happy, neutral). Subjects were split into two genotype groups: at least 1 S allele and no allele. Choice reaction time (CRT), switching of attention(SOA), and verbal interference (VI) tests were included to examine emotion RT and processing speed relationships.
Results: Analyses indicate a main effect of correct response RT ($p < .05$, observed power =.74). Subsequent analyses indicate longer RTs for S carriers when identifying fear ($p < .01$) and disgust ($p < .01$). CRT is correlated with happy RT (r= .33). VI RT is correlated with neutral and angry RTs (rs= .38). SOA completion and connection time is correlated with angry, happy, and neutral RTs (rs= .34-.42). Processing speed and remaining RTs are not significantly correlated. Effects of genotype on accuracy were not observed in this study (observed power= .30).
Conclusions: Individuals carrying the S allele take longer than non-carriers to correctly identify emotional expressions in faces, particularly for expressions of fear and disgust. This is not explained by slowing of cognitive processing speed and may be reflective of bias in attention to negative emotional stimuli.
Correspondence: *Staci E. Scott, MA, Psychology, University of Missouri Saint Louis, One University Boulevard, Stadler 443B, Saint Louis, MO 63121. E-mail: ses5db@umsl.edu*

P. ROBINSON, L. BARRERA & S. WILLIS. On the Relationship Between the Hippocampus and Default Mode Network Connectivity: Age and Gender Effects.
Objective: The DMN connection between medial prefrontal (PFC) and posterior cingulate cortex (PCC) is considered to be central to the DMN's role in memory. However, there is debate regarding the association of the medial temporal lobe, specifically the hippocampus (HC), to the DMN at rest.
Participants and Methods: We examined factors associated with connectivity strength, as measured by resting state fMRI, between mPFC and PCC in 112 cognitively normal adults (M age = 70 yr at DMN scan; range = 55 – 87 yrs; males = 40%) in a MANCOVA design. Predictor variables included: change in hippocampal volume over a 2-year interval prior to DMN assessment (estimated from anatomical MRI scans and the FreeSurfer analysis suite); sex; age (middle/old age); and APOE e4 status.
Results: Midlife subjects had significantly ($p < .01$) higher connectivity than older adults. Older males had significantly ($p < .007$) lower connectivity than midlife males, while older and midlife females did not differ in connectivity strength. Older adults, who had no reliable decline in hippocampal volume at 2-year follow-up, had significantly ($p < .0002$) lower connectivity than comparable midlife subjects. Midlife subjects who were e4 noncarriers and had no reliable decline in hippocampal volume had twice the connectivity strength of older subjects who also were e4 noncarriers and showed no reliable hippocampal atrophy ($p < .07$ trend).
Conclusions: These findings suggest the importance of including gender in the study of the DMN. While much of the research on DMN has compared demented subjects to healthy controls, our findings show age and gender differences in connectivity strength when examining cognitively normal subjects in midlife vs old age. An age effect (old vs midlife) on connectivity remained, even when comparing subjects at lower risk (e.g. e4 noncarriers, 4-year stability in HC volume).
Correspondence: *Paul Robinson, University of Washington, 2221 N 40th St Apt. #3, Seattle, WA 98103. E-mail: prarobinson@gmail.com*

S.C. SEGERSTROM, P. GEIGER, I. BOGGERO & S.E. SEPHTON. Persistent but not Phasic Cortisol Elevations Correlate with Poorer Verbal Memory in Older Adults.
Objective: Elevated levels of cortisol, an adrenal hormone, can result in hippocampal atrophy and cognitive deficits in older adults. The present study analyzed 10 waves of data on cognitive performance and salivary cortisol to test whether (1) findings linking elevated cortisol and poorer cognitive performance would replicate; (2) phasic (i.e., higher than usual) or persistent (i.e., usually higher than others) cortisol elevations were the stronger predictor of cognitive performance; (3) cortisol effects were stronger for some aspects of cognitive performance.
Participants and Methods: Older adults (N = 132; ages 60-94 at study entry) without major medical illness or exogenous corticosteroids collected saliva samples over 3 days and underwent cognitive testing every six months. Executive functions (Trails A-B) and subjective cognitive complaints were tested every wave (806 person-waves); verbal memory (RAVLT) was tested every other wave (419 person-waves). Cortisol was operationalized as area under the curve averaged across the 3 days of collection.
Results: In multi-level models with waves at level 1 and people at level 2, only the level 2 (persistent) cortisol variable was a significant predictor, and only for verbal memory. Controlling for practice effects, people with persistently high cortisol had poorer primacy recall (first five list items), intermediate recall (middle five), immediate post-interference recall, and delayed recall (all $p \leq .005$). A nonsignificant trend was observed for recency recall (last five; $p < .10$). When individual cortisol

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

collection time points were examined, only persistent evening elevations predicted poorer verbal memory above and beyond morning and afternoon (all $p < .02$). Of demographic and health variables, persistent cortisol elevations were associated with older age and accounted for approximately half of the age variance in verbal memory.
Conclusions: Verbal memory in older age may suffer from the effects of persistently elevated cortisol but be resistant to phasic increases.
Correspondence: *Suzanne C. Segerstrom, PhD, Department of Psychology, University of Kentucky, 125 Kastle Hall, Lexington, KY 40506-0044. E-mail: segerstrom@uky.edu*

R.P. KESSELS & B. VAN GELDORP. Working Memory Binding and Episodic Memory Formation in Aging, MCI and Alzheimer's Dementia.
Objective: Recent neuroimaging and lesion studies indicated that medial temporal lobe (MTL) dysfunction hampers working memory (WM) performance, especially when associations have to be maintained. However, most studies typically do not assess the relationship between WM and episodic memory formation. In the present study, we examined WM and episodic memory formation in normal aging, mild cognitive impairment (MCI) and Alzheimer's dementia (AD).
Participants and Methods: In study 1, 26 young adults (mean age=29.58) were compared to 18 middle aged adults (mean age=52.22) and 25 older adults (mean age=72.84). The associative WM task requires participants to maintain two pairs of faces and houses for short (3 sec) or long (6 sec) delays. After the WM task, an unexpected subsequent memory task was administered. In study 2, 27 patients with AD and 23 MCI were compared to 25 controls, using the same paradigm as in study 1.
Results: Older adults performed worse than both middle aged and young adults. No effect of delay was observed and pairs that were processed during long delays were not better remembered in the subsequent memory task. Both patient groups performed significantly worse than controls on the episodic memory task as well as the associative WM task. No effect of delay was observed.
Conclusions: Aging presents with a decline in WM binding, a finding that extends similar results in episodic memory. Longer delays in the WM task, however, did not facilitate episodic memory formation. Also, MTL dysfunction in MCI and AD patients results in WM deficits, specifically when WM capacity is exceeded (eg, when associative processing is required). These results are discussed in relation to recent evidence stating that WM and LTM may not function as indepedent, dissociated cognitive systems, as is often assumed.
Correspondence: *Roy P. Kessels, PhD, Radboud University Nijmegen, PO Box 9104, Nijmegen 6500 HE, Netherlands. E-mail: r.kessels@donders.ru.nl*

K.M. MCGREGOR, D. VALLIANCOURT, A. SUDHYADHOM, J. NOCERA, A.J. BUTLER & B.A. CROSSON. Visual Gain Modulation in Older Adults - Effects on Movement Tracking.
Objective: We investigated the performance differences between younger and older adults while executing a movement tracking task during fMRI. Across trials, we changed the level of visual gain received by the participant. We hypothesized that older adults would exhibit greater lag to stimulus on the tracking task and more errors in directional changes.
Participants and Methods: We enrolled 24 adults in the current experiment divided by age group (12 older [over 50 years], and 12 younger [18-30 years]). Participants underwent functional magnetic resonance imaging with 3 gradient echo planar imaging runs involving movement tracking with low, medium and high visual gain, respectively. A stimulus (vertical bar) oscillated left and right on screen and the participant's task was to keep pace with a computer cursor controlled with an MRI-compatible touch tablet using the right hand. Visual gain was varied across runs by altering the distance and speed of the moving cursor. The tablet was calibrated with the visual gain condition so that the participant did not alter hand movement (speed or distance) across runs.
Results: The root mean square error (RSME) for older adults was equivalent to younger adults in the high visual gain condition. However, in the low and medium visual gain, younger adults showed significantly lower RMSE and coefficient of variation values as compared to the older group. Older adults recruited more of the right pre-motor, left cerebellum and right primary motor areas in the low and medium visual gain conditions as compared to younger adults. Both younger and older adults showed more activity in the left supplementary and pre-motor areas in the high visual gain condition when compared to the low gain condition.
Conclusions: The present results indicate that aging may be associated with non-specific recruitment of bilateral motor areas, but this recruitment can be modulated by increasing sensory feedback.
Correspondence: *Keith M. McGregor, PhD, Emory University, 2758 REDDING RD, Atlanta, GA 30319. E-mail: kmcgregor123456@gmail.com*

D.T. FRAZIER, B. BETTCHER, N. PATEL, R. GREEN, J. MILLER, S. DUTT & J. KRAMER. Insulin-resistance Is Negatively Associated With Working Memory Performance in Older Normal Adults.
Objective: Insulin-resistance has been shown to be associated with worse memory processing. Few studies have explored the relationship between insulin-resistance and specific components of executive function in elderly persons. This study explored the relationship between insulin-resistance and components of executive function in healthy elderly subjects using homeostatic model assessment insulin-resistance index (HOMA-IR) and latent factors of working memory (WMEM) and cognitive control (CCTRL) derived from confirmatory factor analysis. Hypertension, low-density lipoprotein (LDL) and white matter hypointensity (WMH) were used to control for vascular risk factors and white matter brain injury.
Participants and Methods: The study included 85 elderly subjects recruited from the Healthy Aging project. Subjects underwent neuropsychological assessment and fasting blood draw. Linear regression models were used to investigate the relationship between HOMA-IR and WMEM and CCTRL.
Results: Linear regression adjusting for age, education and gender showed HOMA-IR was negatively associated with WMEM ($r=.351$;$p=0.03$), but not CCTRL ($r=.494$). After adjusting for hypertension, LDL and WMH, the association between HOMA-IR and WMEM remained significant ($r=.422$; $p=0.04$).
Conclusions: Two major findings were produced in this study: first, HOMA-IR was shown to be associated with deficits in working memory, but not cognitive control. Second, the HOMA-IR-working memory relationship remained significant after controlling for vascular risks and white matter damage. These results suggest insulin-resistance measured by HOMA-IR specifically affects the working memory component of executive function in functionally normal older adults. Although insulin-resistance has been an established mechanism of many vascular disorders, controlling for appreciable signs of vascular risk and white matter injury in our model did not affect the study's finding. Alternative mechanisms such as inflammation and microstructural white matter integrity warrant consideration.
Correspondence: *Darvis T. Frazier, Ph.D., Neurology, Memory and Aging Center, University of California, San Francisco, 675 Nelson Rising Lane, Suite 190, San Francisco, CA 94143. E-mail: dfrazier@memory.ucsf.edu*

D. SZELES, H. BEHFORUZI & K. HEILMAN. Diminished Vowel Letter Fluency Not Enhanced with Normal Aging.
Objective: With aging there may be a loss of neuronal connectivity, and this decrement should first induce dysfunction in networks with the weakest connections. According to the Hebbian postulate, less

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

frequently used networks should have weaker neuronal connections. Amongst the letters assessed during letter fluency, "A" can represent more phonemes than the letters "F" and "S." In effect, selection and activation of letter "A" phonemes may not activate as widespread a lexical network, limiting the strength and retention of these associations. We wanted to learn if with aging there would be a greater reduction for vowel relative to consonant word production due to selective declines in vowel connectivity.

Participants and Methods: Twenty-four older (mean age=73.4) and 23 younger (mean age = 26.9) neurologically healthy adults with approximately 16 years of education were assessed with the Controlled Oral Word Association (COWA) test. Participants were given one minute each to produce words starting with the letters "F," "A," and "S." Raw letter and overall totals were determined, in addition to ratios for each consonant-vowel pairing (F-A and S-A).

Results: In support of the Hebbian postulate, normal older and younger participants produced significantly more words beginning with the letters "F" and "S" than the letter "A." However, there were no significant differences in either consonant-vowel ratio calculated between age groups. Further, no group differences were found in total word output across the three letter trials.

Conclusions: In the absence of language disturbance, declines in word output during the letter fluency task are often associated with frontal lobe dysfunction. These results provide evidence that this frontal lexical network, unlike other cognitive networks, does not deteriorate with normal aging.

Correspondence: *Dana Szeles, M.S., University of Florida, 1810 NW 23rd Blvd Unit 226, Gainesville, FL 32605. E-mail: dmszeles@phhp.ufl.edu*

J. SUNG, J. HYUN & J. JEONG. Deficits of case marker assignment in passive sentences for mild cognitive impairment: Evidence from a Subject-Object-Verb language.

Objective: Early detection of cognitive-linguistic impairment for individuals with mild cognitive impairment (MCI) is important. The current study developed a case marker processing task (CMT) to examine syntactic abilities in persons with MCI. Case markers serve as a critical index of the thematic role assignment in Korean. The current study investigated whether individuals with MCI were impaired in processing case makers compared to the normal elderly adults (NEA).

Participants and Methods: Thirty-seven individuals (21 NEA and 16 MCI) participated in the study. Persons with MCI met Petersen (2004)'s criteria. The CMP task consisted of three syntactic structures: 1) active sentences with two-place transitive verbs, 2) active sentences with three-place transitive verbs, and 3) passive sentences, and there were eight items for each syntactic structure, resulting in a total of 24 items. The CMP task was presented on a touch-screen computer with nouns and verbs provided in letters. Participants were asked to fill in the blanks of a sentence describing the picture by choosing relevant case markers.

Results: A two-way mixed ANOVA (Group x Sentence type) revealed that the MCI group performed significantly worse than the control group, $F(1, 35)=20.084$, $p<.001$. The main effect for the sentence type was significant, $F(2, 70)=5.582$, $p<.01$. Bonferroni's post-hoc analyses revealed that there were only significant differences between active sentence with 2-place verbs and passive sentences.

Conclusions: Individuals with MCI were impaired in processing case makers of passive sentences. In the CMP task, differentially greater difficulties emerged in the passive sentences than sentences with 2-place verbs for both groups. Greater computational demands on the passive sentences may account for these findings. The current study suggested that deficits of syntactic abilities were observed even in the early stage of dementia when the controlled case marker processing task was employed.

Correspondence: *Jee Eun Sung, EWHA Womans University, 52 Ewhayeodae-gil, Seoul 160720, Republic of Korea. E-mail: jeesung@ewha.ac.kr*

M. SANDERSON-CIMINO, I.J. EWALD, L.R. CLARK, G.H. WEISSBERGER, S.M. JURICK, S.I. DEV, A. WALDIE & M.W. BONDI. Early Detection of Global Cognitive Decline In Older Adults.

Objective: Early detection of decline in specific cognitive functions in older adults may help identify individuals at greater risk of mild cognitive impairment or Alzheimer's disease. We sought to identify early cognitive changes that would predict significant decline in older adults who have undergone consecutive annual neuropsychological exams.

Participants and Methods: Thirty-two older adults were administered two neuropsychological exams approximately one year apart. Baseline performance on the California Verbal Learning Test (CVLT), Boston Naming Test (BNT), D-KEFS Letter (LF) and Category Fluency (CF), was examined in conjunction with a Reliable-Change-Index based decline in performance on the Dementia Rating Scale (DRS) over the subsequent year (Pedraza et al 2007). Thirteen participants demonstrated significant decline on the DRS, compared to nineteen who showed no decline. The decliner group and the non-decliner group were matched on education, age, initial DRS score, time between tests, and presence of APOE-ε4 allele ($p > .05$). T-tests were used to compare the decliner and non-decliner groups on their baseline test performances to identify predictive measures of global cognitive decline.

Results: In the year prior to decline, the decline group scored significantly lower than the non-decliner group on 3 tests of word generation: the BNT, LF, and CF. Furthermore, the decliners performed significantly worse on recall measures of the CVLT, and produced significantly more false positives and cued recall intrusion errors. Correspondingly, much of the DRS decline on the second exam occurred on two subsections of the DRS, memory and initiation/preservation. The initiation/preservation decline was primarily due to low scores on the supermarket item component of the test, a word generation task.

Conclusions: Findings indicate that poorer performance on the tasks of word generation, verbal recall, and increased error rates on a list-learning task at baseline may predict subsequent global cognitive decline in older adults.

Correspondence: *Mark Sanderson-Cimino, B.S. Psychology, VMRF Psychology, 4347 Hamilton street, San Diego, CA 92104 . E-mail: mesandci@gmail.com*

A. GERSTENECKER & B. MAST. Constructing An Equation To Predict Conversion From Mild Cognitive Impairment To Dementia.

Objective: To analyze the ability of demographic, neurocognitive, and biomarker variables to identify patients that will convert from MCI to dementia over a two-year period. To construct an equation predicting conversion from MCI to dementia.

Participants and Methods: Patients came from the Alzheimer's Disease Neuroimaging Initiative (ADNI) database. Only patients classified as MCI (397) were included. Patients were evaluated at 0, 6, 12, 18, 24, and 36 months. Further details about study procedures can be found online at http://www.adniinfo.org.

Results: A large proportion of variance was accounted for by the equation and area under the curve was good. Optimal cutting scores for predicted values generated by the equation achieved sensitivity of .90 and specificity of .80. For lower equation scores, sensitivity increased at the cost of specificity. For higher equation scores, specificity increased at the cost of sensitivity.

The final equation is as follows: 76.564 - (AVLT Delayed X .392) + (AVLT Intrusions on Trial 2 X 1.006) + (Perseverations Animal Naming X .287) – (BNT Semantic Cues X .26) + (ADAS-Cog X .115) – (WAIS-R Logical Memory Delayed X .052) + (CDR Judgment X 3.136) – (Cumulative Temporal Lobe Atrophy X .079) + (Right Precentral Gray Matter X 32.456) – (Right Frontal Mid Orbital Gray Matter X 26.645) + (Left Frontal Inferior Orbital Gray Matter X 21.584) – (Right Posterior Cingulum Gray Matter X 13.578) – (Left Superior Temporal Gray Matter X 13.125).

Conclusions: These results indicate an equation can be constructed to predict conversion from MCI to dementia with a high degree of accuracy.

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

This equation can be utilized in the clinic to aid in identification of risk of conversion and subsequent treatment planning. To utilize the equation, however, more widespread use of quantitative imaging would need to occur. This equation can also be used in research to help ensure research subjects are representative of the population of interest. By doing so, the generalizability of research findings can be increased.
Correspondence: *Adam Gerstenecker, University of Louisville, 318 Oaks Drive, Birmingham, KY 35209. E-mail: atgers01@louisville.edu*

J. BELSER-EHRLICH, M.J. SHUMAN & R. HOLTZER. Validation of the Brief Fatigue Inventory in Community-Dwelling Older Adults.

Objective: The Brief Fatigue Inventory (BFI) possesses simple, easy-to-understand language and limited administration time, making it ideal for use with older adults. Although previous validation studies have demonstrated it possesses a uni-dimensional structure, the BFI addresses both fatigue severity and interference. The current study was designed to determine the reliability, validity and factor structure of the BFI in community dwelling older adults, as well as evaluate its relationships to relevant physical, sociodemographic and cognitive outcome measures.
Participants and Methods: Participants (N=302) were age 65 and above, non-demented, community-dwelling adults, who were enrolled in the Central Control of Mobility and Aging Study. The BFI, as well as relevant neuropsychological, physical and sociodemographic measures were administered during study visits. Construct validity and scale structure were evaluated using a principal-components analysis (PCA). Reliability was established for two subscales: fatigue severity and interference. Cronbach's α was used to assess internal consistency. Pearson correlation coefficients were calculated to examine the relationship between BFI scores gait, balance, cognitive and demographic variables.
Results: A PCA yielded two factors: fatigue severity and interference. Both factors had excellent reliability, with Cronbach's α values of 0.883 for fatigue interference and 0.819 for fatigue severity. BFI total and subscale scores correlated with physical, sociodemographic and cognitive variables.
Conclusions: The current study provides novel findings in validating and establishing a bi-dimensional structure for the BFI in older adults. Severity and interference capture two separate aspects of the fatigue construct that were differentially related to physical, demographic and neuropsychological measures. The BFI can be successfully incorporated into longitudinal studies, rehabilitation facilities, and neuropsychological assessments.
Correspondence: *Janna Belser-Ehrlich, PhD student, Ferkauf Graduate School of Psychology, 1165 Morris Park Ave, Bronx, NY 10461. E-mail: jbelsere@gmail.com*

M.J. SHUMAN, J. BELSER-EHRLICH, M. BEIER, J. SPAT & R. HOLTZER. Development and Validation of the State Trait Inventory for Cognitive Fatigue (STI-CF).

Objective: Cognitive fatigue is poorly understood in older adults and available subjective measurements have not been able to properly capture this construct. The current study aimed to develop and investigate the psychometric properties of a subjective measure of cognitive fatigue (the State Trait Inventory of Cognitive Fatigue (STI-CF)) in community-dwelling older adults.
Participants and Methods: The STI-CF was developed and administered to participants (N=175) aged 65 and above, non-demented, and community-dwelling, who were enrolled in the Central Control of Mobility in Aging study (CCMA). A principle component analysis (PCA) was performed to establish construct validity. Reliability statistics were utilized to establish internal validity. Pearson correlation coefficients were used for convergent validity and to explore relationships with relevant outcome variables.
Results: A PCA confirmed four theory-driven factors for the state and trait forms: Cognitive Fatigue, Mental Effort, Motivation, and Boredom. All factors had excellent internal consistency. There was good convergent validity, and trait subscale scores were correlated in the expected direction with relevant cognitive variables.
Conclusions: The current study developed and established the psychometric properties of a new instrument for the subjective measurement of cognitive fatigue for use in community-dwelling older adults. This inventory is novel and unique for both the aging and general populations as it captures both state and trait forms of cognitive fatigue, as well as the related constructs of motivation, mental effort, and boredom. This scale's relatively brief administration time and strong psychometric properties allow it to be successfully utilized in research and clinical settings. Future studies should establish the validity of this scale in additional populations.
Correspondence: *Melissa J. Shuman, M.A., Ferkauf Graduate School of Psychology, Yeshiva University, 1165 Morris Park Avenue, Rousso Building, Bronx, NY 10461. E-mail: mjshuman@gmail.com*

S. ENGLAND, J. VERGHESE, J. MAHONEY & R. HOLTZER. The Relationship Between Turn Assessment and Visual Perception Abilities in Older Adults.

Objective: Turning difficulties, often observed in PD, can partially be attributed to basal ganglia and frontal circuit dysfunction, and are associated with greater disease severity and increased falls. Given that falls are very common in older adults and they demonstrate physical and cognitive decline, they may also demonstrate similar declines in these brain regions. Since the mechanisms involved in turns are poorly understood and there is a lack of research on this topic, the current study examined the relationship between the differences between turn entry and exits and cognitive functions in older adults.
Participants and Methods: Non-demented older adults ($N = 19$; $M = 75.40 \pm 5.52$ years of age) participated in the study. Each participant walked three loops on an instrumented walkway and indicated when they entered and exited each turn by pressing a button on a time-stamped device. Concurrently, an algorithm derived from the instrumented walkway and a designated clinician simultaneously marked entry and exit of turns for each participant. Turns were defined as a change in direction while walking. Differences between participant determined turns (PDTs) and the algorithm, as well as between PDTs and the rater were correlated to tests from the Repeatable Battery for the Assessment of Neuropsychological Status (RBANS).
Results: Decreased differences for turn exits between PDTs and the algorithm were correlated with increased line orientation scores $r(19) = .53$, $p < .02$, $R^2 = 0.27$. Similarly, decreased differences between turn exits of PDTs and the rater were correlated with increased line orientation scores $r(19) = .55$, $p < .02$, $R^2 = 0.30$.
Conclusions: The current study presents novel findings investigating turning difficulties in older adults. Individuals with greater visual perception abilities, as evidenced by higher line orientation scores assessed the occurrence of turn exits more similarly to the algorithm and the rater. These findings indicate a relationship between visual perception and the ability to assess turns.
Correspondence: *Sarah England, M.A., Ferkauf Graduate School of Psychology, Yeshiva University, 26 Newell Street, Apt 3L, Brooklyn, NY 11222. E-mail: sarahe.england@gmail.com*

P. BREWSTER, H. TUOKKO, R. DIXON & S. MACDONALD. Sensitivity of norm-referenced measures of reaction time variability to cognitive status in older adults: Evidence from the Victorial Longitudinal Study.

Objective: Research has linked increasing reaction time variability (RTV) to cognitive impairment and biological indicators in older adults. The current study examined whether the documented sensitivity of RTV for predicting cognitive status in older adults can be captured via methods associated with conventional standardized assessment.
Participants and Methods: Data were employed from the Victoria Longitudinal Study, a study of multiple facets (cognitive, neuropsychological, health, and biological) of human aging that includes three

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms.
https://doi.org/10.1017/S1355617714000381

independent cohorts of participants. A normative sample was created by concatenating across Cohort 1, Wave 3 (the first with reaction time data; n=243) and Cohort 2, Wave 1 (n=536). Trial-level reaction time data were used to compute the intraindividual standard deviation (ISD) and coefficient of variation (CoV), two common operationalizations of RTV. Age-and gender-stratified means and standard deviations were then calculated. CoV and ISD values obtained from participants of Cohort 3 (n=577) were standardized against the appropriate stratum of the normative sample and converted to T-scores. Correlations between RTV T-scores and tests of memory, attention, fluency and vocabulary were examined and logistic regression was used to test the association between cognitive performance and low (T=35-45) average (T=45-55) and high (T=55-65) variability.

Results: RTV T-scores shared significant negative associations with tests of memory and attention. Multinomial regression revealed higher cognitive performance of individuals with the lowest level of RTV relative to average RTV. Those with high variability had poorer cognitive performance than those with average variability.

Conclusions: In a healthy sample of older adults, standardization of RTV data against a normative sample resulted in RTV T-scores that predicted cross-sectional cognitive performance. Future research in other samples (e.g., clinical samples) may further elucidate the potential of RTV measures for detecting cognitive impairment.

Correspondence: *Paul Brewster, University of Victoria, 3800 Finnerty Rd, Victoria, BC 90101, Canada. E-mail: pbrew@uvic.ca*

C.B. DUNN, L. LEARY, A. DANIEL, E. KING, C. JANUS & R. BAUER. Spatial Learning in Aging: Search Strategies and their Relationship to Performance.

Objective: Getting lost or having trouble navigating is often seen in early stages of cognitive decline. Although spatial memory/navigation is not routinely evaluated in neuropsychological assessments, older adults have difficulties navigating within laboratory-based virtual environments. We evaluated strategies used by older and younger adults on a virtual Morris Water Maze (MWM) in an effort to help better explain age-related change in spatial navigation.

Participants and Methods: Participants were 23 younger (M=22.8±2.3) and 27 older (M=75.8±7.6) healthy adults. We used a virtual MWM known as the C-G Arena (Jacobs, et al. 1997) and developed a rating protocol designed to classify spatial search strategies used to complete the task. The protocol classified key characteristics of the paths taken by participants from their starting point on each trial enroute to the platform (e.g., direct search, random search etc). All trials were classified using this protocol, and the proportion of strategies that were based on "spatial" vs. "nonspatial" factors was calculated along with a composite standard score index of Arena performance derived from path length, number of platforms found, and percent of time spent proximal to the platform on the probe trial.

Results: Paths were de-identified and rated by two blinded researchers until reaching reliability standards (kappa>0.70). Results showed a significant correlation between the use of spatial strategies and improved performance on the composite index (Kendall's tau=0.721, p<.001). Younger participants were significantly more likely to use spatial strategies (Kruskal-Wallis p<.001).

Conclusions: Using less effective search strategies may be an early indication of age-related brain changes. We are currently evaluating reduction of spatial search as a preclinical neurobehavioral predictor of the future transition from normal aging to MCI or to early dementia and intend to cross validate the rating protocol in a mouse model of AD.

This research was supported in part by a grant from APA.

Correspondence: *Callie B. Dunn, MS, Department of Clinical and Health Psychology, University of Florida, PO Box 100165, Gainesville, FL 32610-0165. E-mail: cbeck@phhp.ufl.edu*

N.E. GARCIA, H.L. COMBS & S.C. SEGERSTROM. Practice Effects and Longitudinal Change in Processing Speed and Executive Functioning Among Older Adults.

Objective: Effects of practice on repeated neuropsychological testing may mask cognitive decline in aging, impacting research conclusions and clinical judgment. The current study compared observed change with adjusted change on the Trail Making Test (TMT) part A and part B among 146 healthy older adults (M age = 75 yrs).

Participants and Methods: Ten administrations of the TMT were given an average of 190 days apart. Adjusted mean performance at each wave was calculated through statistical correction for selective attrition and practice (Salthouse, 2010). To compare observed and adjusted mean performance, score was regressed on wave for each performance type, yielding a slope for that performance type.

Results: There was a significant type by time interaction for both part A, R2= .99, F(3,19)= 178.76, p<.001, and part B, R2= .98, F(3,19)= 117.19, p<.001. Whereas slopes for the observed scores revealed a slight improvement in performance, slopes for adjusted scores (accounting for practice and attrition effects) revealed a gradual decline in performance. Attrition was low in this sample (M= 6%); therefore, this difference was mainly attributed to practice effects. Results suggest a decline in visuomotor speed and set shifting over time in a healthy aging sample, a result which would not be detected without statistical correction for practice and selective attrition. Further analyses revealed age moderated this relationship, R2= .94, F(9, 59)= 85.25, p<.001, with those 80 years old and older predicted to have greater decline in performance than those 60-69 or 70-79 years old.

Conclusions: This improvement in performance with practice may reflect procedural memory for the task, which has been found to be relatively preserved in aging. Practice effects on the TMT in the current study are consistent with past research findings when the TMT is administered more frequently than an annual basis. These robust practice effects highlight the importance of correcting for practice on the TMT in longitudinal study and clinical practice.

Correspondence: *Natasha E. Garcia, B.A., Psychology, University of Miami, University of Kentucky, 111B Kastle Hall, Lexington, KY 40506-0044. E-mail: natasha.garcia@uky.edu*

B.P. MULLIGAN, C.R. TAYLOR, L. OBERG, I. HEWAVITHARANA & C.M. SMART. Quantity and Quality of Trial-to-Trial Performance Fluctuation Predicts Self- and Informant-Ratings of Subjective Cognitive Impairment in Older Adults.

Objective: Traditional neuropsychometric tasks provide an absolute score based on relatively few trials and often do not detect moment-to-moment dysregulation of cognitive control. Computerized laboratory tasks tax basic cognitive processes and allow for accurate and reliable measurement of responses to hundreds of sequential trials over a span of several minutes. The magnitude of trial-to-trial fluctuations, or intra-individual variability (IIV), in reaction time (RT) within a testing session has been used to predict cognitive decline in older adults (Bielak *et al*., 2010). Further, oscillations in RT across hundreds of trials show power-law-form temporal correlations that reflect underlying neurophysiology (Palva *et al*., 2013) and are disrupted in those with impaired attention regulation (Gilden & Hancock, 2007). Descriptors of variability within an RT time series may be useful for detecting subtle signs of cognitive decline in the context of clinically normal neuropsychometric test performance.

Participants and Methods: Multi-Source Interference Task (MSIT; Bush *et al*., 2003), an executive control task, was used to obtain strings of 384 RT records (192 control, 192 interference trials) in a sample (N = 41) of healthy, non-depressed older adults (65 to 77 years) with or without subjective cognitive impairment (SCI).

Results: SCI individuals (n = 16) did not differ from healthy older controls in age, neuropsychological impairment, or mean RT on the MSIT, but were less accurate ($F(1,39) = 7.93$, $P < 0.05$, $\eta^2 = 0.17$) and had more variable RTs ($F(1,39) = 9.97$, $P < 0.05$, $\eta^2 = 0.20$) on this task. Between-person increases in informant-rated (but not self-rated) levels

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

of SCI were also associated with increases in uncorrelated randomness in the RT time series ($r = 0.35$, $P < 0.05$).
Conclusions: Though not related to overt neuropsychological impairment, SCI predicted differences in the magnitude and quality of trial-to-trial RT fluctuations on the MSIT. These results have implications for early diagnosis of pathologic cognitive decline.
Correspondence: *Bryce P. Mulligan, M.Sc., Psychology, University of Victoria, Department of Psychology, P. O. Box 1700, Victoria, BC V8W 2Y2, Canada. E-mail: bpm@uvic.ca*

K. GICAS, D. COX & T. CROWELL. Reduced Primacy and Recency Effects in Older Adults with Cognitive Disorders.
Objective: It is well established that patients with Alzheimer's disease exhibit a reduced primacy effect on word recall tasks compared to healthy controls. Recently, in a group of cognitively intact older adults, a reduced primacy effect on word recall, but not on word learning, was shown to be predictive of global cognitive decline at 1- to 2- year follow-up. The current study aims to investigate differences in serial position effects on word learning and recall in a Canadian geriatric outpatient sample.
Participants and Methods: Archival data from 52 older adults (ages 65-89), from mental health outpatient clinics, were classified into three groups: Alzheimer's disease (AD; n = 16), mild cognitive impairment (MCI; n = 21), mixed psychiatric (MP: depression, anxiety, psychosis; n = 15). Patients completed the list learning and list recall portions of the Repeatable Battery for the Assessment of Neuropsychological Status, which includes 10 semantically unrelated words. The first and last three words comprise the primacy and recency items, respectively. A series of analyses of covariance were conducted to examine differences in primacy and recency effects across groups for word learning and recall, while controlling for age and global cognitive functioning.
Results: The AD and MCI groups exhibited reduced primacy ($F = 3.38$, $p < .05$) and recency ($F = 6.15$, $p < .005$) effects compared to the MP group on list recall. Descriptively, the AD group recalled fewer primacy words on average than the MCI group (.32 vs. .50). No significant differences were found across groups for word learning or recall of middle items.
Conclusions: These findings confirm previous reports and extend them to a Canadian sample with a psychiatric control group. A trend toward a difference in the primacy effect between the AD and MCI groups suggests some degree of specificity that may be useful in early detection of AD. Future research should aim to further delineate the trajectory of the primacy effect longitudinally and associated structural brain changes.
Correspondence: *Kristina Gicas, M.A., Psychology, Simon Fraser University, 8888 University Dr, Burnaby, BC V5A 1S6, Canada. E-mail: kgicas@sfu.ca*

Behavioral Neurology

K. GICAS, M. FRAYN, C. GIESBRECHT, H. BAITZ, W. SU, W. PANENKA, F. VILA-RODRIGUEZ, D. LANG, G. MACEWAN, A. BARR, A. THORNTON & W. HONER. Neurological Validators of Cognitive Profiles in the Marginally Housed.
Objective: Marginally housed persons present with increased rates of substance dependence and psychosis, among other major physical and psychiatric illnesses. Consequently, brain integrity and cognitive functioning are compromised. This study aims to identify subgroups of marginally housed persons with distinct cognitive profiles and demonstrate differentiation on neurological soft signs (NSS; e.g. markers of brain integrity), but not extrapyramidal symptoms (EPS; e.g. neuroleptic side effects).
Participants and Methods: Two hundred and forty-nine participants (194 males, 55 females), recruited from single-room occupancy hotels, completed cognitive tests of premorbid IQ, memory, attention, inhibition, mental flexibility, and decision-making. A neurological exam was conducted to assess NSS (disinhibition, complex sequencing, motor coordination, sensory integration) and EPS (parkinsonism, dystonia, dyskinetic movements). Cluster analysis was employed to identify subgroups with common profiles of cognitive functioning. Non-parametric tests were used to compare groups on number of NSS and EPS.
Results: Three cognitive profiles were identified. Cluster 1(n = 59) is highest functioning across domains. Cluster 2 (n = 103) exhibits cognitive functioning intermediate to the other groups, but with a relative weakness in decision-making. Cluster 3 (n = 87) is lowest functioning overall with a relative strength in decision-making. The latter group demonstrated significantly more NSS compared to the other groups on all subscales (disinhibition: $F = 6.56$, $p < .05$; complex sequencing: $F = 15.47$, $p < .001$; motor coordination: $F = 15.84$, $p < .001$; sensory integration: $F = 16.55$, $p < .001$). No group differences were observed for any of the EPS dimensions.
Conclusions: In this sample, distinct cognitive profiles were identified and differentiated on number of NSS, but not EPS. As NSS are thought to reflect neuroanatomical integrity, this study suggests that these profiles may serve as valid markers for underlying structural brain pathologies.
Correspondence: *Kristina Gicas, M.A., Psychology, Simon Fraser University, 8888 University Dr, Burnaby, BC V5A 1S6, Canada. E-mail: kgicas@sfu.ca*

L.M. BENSON, M. FONG, L. NEWMARK, T. NADER & M. LACY. Executive Dysfunction and Ataxia Severity in Spinocerebellar Ataxia (SCA).
Objective: Spinocerebellar ataxias (SCAs) represent a group of rare, autosomal dominant disorders that result in degeneration of the cerebellum as well as the connections underlying the fronto-subcortical circuitry. Although the phenotypes vary across the 36 classified genotypes, progressive ataxia of gait and limb movements are defining characteristics, with cognitive impairment also being implicated in the majority of cases (Lasek et al., 2006). In a recent study, Klinke et al. (2010) noted that ataxia severity in SCA was partially correlated with both attention and executive tasks. The present study attempted to further explore this relationship in an American sample of SCA patients.
Participants and Methods: This retrospective study examined the relationship between the total score on the Scale for the Assessment and Rating of Ataxia (SARA; Schmitz-Hübsch et al., 2006) and executive functioning, as measured by the Wisconsin Card Sorting Test, Trail Making Test, and Verbal fluency in 11 SCA patients.
Results: Mean age was 63.27 years (SD=10.86), with 14.81 years of education (SD=2.14). The mean SARA total rating was 12.41 (range=7-19, SD=5.37). Premorbid intellect was estimated to be in the average range (WRAT-4 Reading SS=99.27, SD=11.5). Mean MMSE was 27.75 (SD=1.49). SARA total score was correlated with WCST perseverative responses (r=.80, p=.03), WCST perseverative errors (r =.80, p=.02), and semantic fluency (r=-.63, p=.04), but not MMSE (r=.14, p=.75), Trails B (r=-.35, p=.30), or speeded phonemic fluency (r=-.48, p=.14).
Conclusions: Ataxia correlated with key measures of executive dysfunction, but not gross cognition, sustained attention, or processing speed. This is consistent with the prior findings from Germany and suggests that ataxia severity may be a marker for executive dysfunction. It also is consistent with Testa and colleagues' report (2012) of executive tests tapping different mechanisms.
Correspondence: *Laura M. Benson, M.S., Psychiatry & Behavioral Neuroscience, University of Chicago Medical Center, 5841 South Maryland Ave., MC 3077, Chicago, IL 60637-1470. E-mail: lbenson1@yoda.bsd.uchicago.edu*

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

E. HUTCHISON, K. SPENCER, J. LEVERENZ, B. PETER, K. EDWARDS, C. ZABETIAN, T. HALL & K. SNAPPIN. Nature and Laterality of Motor Symptoms in Parkinson's Disease and Relationship to Cognitive Profile.

Objective: The purpose of this study is to determine the relationship between cognitive profile and the nature/laterality of initial motor symptoms in Parkinson's disease (PD). Research suggests that initial onset of tremor is linked to better cognitive performance than initial onset of bradykinesia or rigidity, while studies of the laterality of symptom onset have been inconclusive. Very few investigations have considered the interaction of nature and laterality of symptoms in individuals with PD and the association with cognitive functioning.

Participants and Methods: Participants with PD (N=272) were divided into subgroups based on nature and laterality of symptom onset: left bradykinesia/rigidity onset (L-B/R), left tremor onset (L-Tr), right bradykinesia/rigidity onset (R-B/R), and right tremor onset (R-Tr). Participants completed a neuropsychological test battery assessing memory, attention, visuospatial function, executive functions, and language. Subgroups were equivalent with respect to sex, years of education, disease duration and disease severity. Multimodal, multivariate logistic regression was used to compare the right tremor onset group (R-Tr) to the three other subgroups.

Results: Significant differences between the R-Tr subgroup and the other three subgroups emerged (overall p = .0069). Predictors for R-Tr membership were higher depression scores and later disease onset, compared to the R-B/R group; higher verbal learning scores, compared to the L-Tr group; and lower scores on a general measure of cognitive function, compared to the L-B/R group.

Conclusions: The results of the current study reinforced the findings of Katzen et al. (2006) that laterality and nature must be considered in combination to unveil the link between cognitive profile and initial motor symptoms. However, while Katzen and colleagues reported that the R-Tr subgroup performed better than other subgroups and similarly to healthy controls, the current study found that subgroup predictors varied by cognitive domain.

Correspondence: *Kristie Spencer, Ph.D., Speech & Hearing Sciences, University of Washington, 1417 NE 42nd St., Seattle, WA 98115. E-mail: kas@uw.edu*

E. MARQUES ZILLI & K.M. HEILMAN. Allocentric Neglect with Posterior Cortical Atrophy.

Objective: Spatial neglect can have different frames of reference (e.g., proximal and distal, egocentric or allocentric), and be induced by a variety of diseases (e.g., stroke and neurodegenerative). Whereas there are reports of patients with Posterior Cortical atrophy (PCA) who have egocentric neglect, patients with allocentric neglect have not been reported, and this is the goal of this report.

Participants and Methods: A 64 year-old right-handed woman had a 30-month-history of poor defined visual disturbances, followed by a disorder of episodic memory. She was evaluated with neurological and neuropsychological exams as well as a MRI.

Results: Tests for egocentric neglect revealed that the patient was impaired in detecting right side gaps in squares distributed over sheet of paper. She also omitted elements on the right side of the Ogden-like picture, and was slower reading the right side of compound words. She, however, had normal performance on the line bisection and letter cancellation tasks. She also had decreased learning of a word list, impaired recall and reduced category fluency with slight right arm weakness. Her brain MRI showed atrophy of the left inferior and superior parietal gyri, left pre-cuneus and cuneus, and bilateral occipital gyri.

Conclusions: This report reveals that patients with PCA may have allocentric neglect and this disorder may missed with routine line cancellation and bisection tasks. This disorder may be related to an impairment in the interaction of the of the ventral stream's ("what" system) and the dorsal stream (the "where" system) or to deficient allocation of contralateral focal attention.

Correspondence: *Eduardo Marques Zilli, MD, Neurology, University of Florida, 4455 SW 34th st, apt E26, Gainesville, FL 32608. E-mail: eduardo.zilli@neurology.ufl.edu*

E. HYMEN, R.H. JACOBS, L.M. JENKINS, L.B. GABRIEL, K.A. RYAN, S.L. WEISENBACH, A. PETERS, J. ZUBIETA, K. PHAN, S.A. LANGENECKER & R.C. WELSH. Dysfunctional Connectivity of Default and Emotion Networks are Uniquely Related to a History of Depression and Experience of Childhood Trauma.

Objective: Brain regions with higher activity during rest are labeled the default mode network (DMN). Regions engaged in explicit tasks are divided into emotional and executive networks. Disrupted low frequency connectivity in DMN and emotion networks (EN) have been linked to Major Depressive Disorder (MDD). The majority of research examining network functioning in MDD is conducted with currently depressed individuals where trauma history is not considered. Our study predicts dysfunctional connectivity between the DMN and EN based upon previous history of depression or trauma.

Participants and Methods: The Childhood Trauma Questionnaire (CTQ) and Diagnostic Interview for Genetic Studies (DIGS) evaluated prior trauma and depression, respectively, before a functional connectivity MRI (fc-MRI) scan. We examine functional connectivity among a sample of 53 young adults (ages 18 – 22, mean age = 21.5) with remitted MDD (rMDD; 30 rMDD, 23 HC) using the left posterior cingulate cortex (PCC, -5, -50, 36) and left subgenual anterior cingulate cortex (sgACC, -4, 21, -8) as seeds. These seeds were used in regression analyses of a preliminary subset (10 rMDD, 7 HC) to explore the impact of trauma on network connectivity.

Results: In the left sgACC seed, history of depression was associated with greater connectivity in the bilateral medial thalamus (0, -12, 8; z = 4.01), bilateral dorsolateral prefrontal cortex (DLPFC; Right 42, 24, 54; z = 4.04; Left -48, 22, 48, z = 3.70), and medial and lateral prefrontal regions. History of trauma was associated with increased connectivity in the uncus, ventral anterior insula, left inferior frontal gyrus, bilateral hypothalamus, right ventral striatum, and posterior hippocampus. History of depression was associated with greater connectivity between the PCC, insula (20, -6, 4, z = 3.57), and dorsolateral putamen.

Conclusions: A history of trauma and depression contributed unique information on dysfunctional connectivity in the DMN and EN.

Correspondence: *Erica Hymen, University of Illinois, Chicago, 1851 N. Braymore Dr., Inverness, IL 60010. E-mail: ehymen@psych.uic.edu*

G.J. GERNER, J. BURTON, A. PORETTI, T. BOSEMANI, M. LEPPERT, E.A. CRISTOFALO, M. ALLEN, T. HUISMAN, F.J. NORTHINGTON & M.V. JOHNSTON. Associations between Transcranial Doppler Head Ultrasound Resistive Indices in Asphyxiated Neonates Treated with Hypothermia and Early Childhood Neurodevelopmental Outcomes.

Objective: Objective: Perinatal hypoxic-ischemic encephalopathy (HIE) is associated with long-term neurologic morbidity, however therapeutic hypothermia (cooling) mitigates secondary neuronal injury resulting in a significant reduction in death and disability. Identifying those infants who remain at risk for neurodevelopmental disability after rewarming is important. Transcranial Doppler ultrasound (HUS) is an inexpensive, noninvasive, bedside imaging modality that can measure cerebral perfusion. The objective of this study was to determine if HUS resistive indices (RI) measured in asphyxiated neonates after rewarming could differentiate severity of neurodevelopmental disability at 2 years of age.

Participants and Methods: Participants and method: HUS, including RI, were obtained for 8 male and 5 female neonates (gestational age 35.4 – 41.4 weeks) immediately following the rewarming phase of cooling. All RI values were obtained via the same vessel and at the beginning of each HUS. Neurodevelopmental assessment using the Mullen Scales of Early Learning was conducted with all surviving children between 20 and 32 months. Neurodevelopmental outcomes were categorized as death/severe disability, moderate/mild disability, and no disability and

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

RI values were categorized by range (Low RI < .60, Moderate .60 - .79, High >.79). Neurodevelopmental outcomes by RI value were explored with a Chi Square analysis.
Results: Results: The analysis yielded significant results. All neonates with RI values < .60 following therapeutic hypothermia had an outcome of death or severe disability. Children with either moderate/mild or no developmental disability had neonatal RI values between .60 and .79 following cooling.
Conclusions: Conclusion: RI values may be a useful early prognostic marker for neonates who are at high risk for mortality or later severe neurodevelopmental disability following perinatal asphyxia, even after intervention with cooling. Further investigation of this preliminary work is warranted with a larger sample.
Correspondence: *Gwendolyn J. Gerner, PsyD, Neurology & Developmental Medicine, Kennedy Krieger Institute, 716 N. Broadway, Baltimore, MD 21205. E-mail: gernerg@kennedykrieger.org*

Hemispheric Asymmetry/Laterality/ Callosal Studies

L. VOS, B. ISAAC, R.D. WHITMAN, S. LETANG & J. JUSTICE. Cognitive Inhibition Within And Across Hemispheres: Negative Stroop Priming.

Objective: Several models of inter-hemispheric functioning propose changing patterns of excitation and inhibition across hemispheres. Negative priming tasks, in which responses are slowed because of a previously inhibited stimulus, are often used to measure cognitive inhibition. This study examined the time course of cognitive inhibition within and between hemispheres using a negative priming Stroop task.
Participants and Methods: Eighty-three subjects completed a computerized lateralized Stroop task with three prime-target combinations (a) negative priming: prime word is the ink color of target, (b) facilitation: ink color is the same in prime and target (c) unrelated: colors and word are unrelated in target and prime. Primes and targets appeared in either the RVF or LVF. Following a 25 ms mask and a delay of 50, 100, 500 or 1000ms subjects identified the type color. All conditions were randomized across subjects. Reaction time scores were calculated by subtracting reaction time of the target from reaction time of the prime for each trial.
Results: A 2x4x4 repeated measures ANOVA was used to examine the effects of pair type (Negative Priming vs. Facilitation), SOA (50,100,500, 1000), and hemisphere presentation on reaction time. Main effects were significant ($p < .001$) as was the Pair Type X SOA X Hemisphere interaction ($F(8.27, 620.11) = 19.40$, $p < .001$).
Conclusions: The greatest difference between facilitation and negative priming was at 100 ms, suggesting that the time-course of excitation and inhibition is similar across hemispheric conditions within the 50 to 500 ms range. The time course across hemisphere conditions may vary within the 50 to 500 ms range. Facilitation was faster across all hemispheric combinations. Facilitation was greater for the RH-LH condition, suggesting that the right hemisphere's advantage in color identification and matching may be accompanied by a less effective or slower activation of the semantic network associated with color words.
Correspondence: *Russell D. Whitman, Ph.D., Psychology, Wayne State Univ, 5057 Woodward Ave, 7th Floor, Detroit, MI 48202. E-mail: dwhitman@wayne.edu*

L. VOS, R.D. WHITMAN, L. WURM, J. JUSTICE & S. LETANG. Lateralized Asymmetry And Sex Differences In Threat Appraisal And Detection.

Objective: Research indicates that the right hemisphere (RH) is more vigilant for change, particularly for novel and/or threatening stimuli (Posner et. al 1984; Vos and Whitman, 2013). While research has supported the notion that there is a bias in detection for threatening stimuli, others have found that men and women may process threating words differently; men show more lateralized performance and women process the usefulness of words that might also be threatening. The present study examined lateral differences in vigilance for change detection in threating pictures using a change blindness procedure. Change blindness is the failure to identify physical changes when a visual scene is obscured by a momentary disruption such as a flicker.
Participants and Methods: We presented 64 Ss pictures of real-life scenes containing a threatening stimulus (knife, fire, lion etc.) in which change occurred in either the left or right VF by reversing the orientation of the photograph. Each picture was displayed for 240 ms followed by an 80 ms gray screen, causing a "flickering effect." The pictures were presented in a cyclical pattern until participants indicated change detection by finger press. Participants also completed self-report measure of anxiety symptoms and rated each stimulus on a likert Likert scale for threat content.
Results: Anxiety was shown to have a positive relationship to time to detection. In addition, a four way interaction of sex x hemisphere x threat rating x change location (threating stimulus, near threat, or background) on reaction time was found.
Conclusions: The RH is biased for detecting change and greater lateralization may evident when changes occur in stimuli which are thought to be threatening. In addition, men and women may process threat differently. These findings may impact our understanding of the neuropsychological underpinnings of anxiety disorders such as phobias, OCD, and PTSD.
Correspondence: *Russell D. Whitman, Ph.D., Psychology, Wayne State Univ, 5057 Woodward Ave, 7th Floor, Detroit, MI 48202. E-mail: dwhitman@wayne.edu*

B. ISAAC, L. VOS & R.D. WHITMAN. Negative Priming Stroop Task And Inhibition.

Objective: Inhibitory processing is one of the key components of the attention system. Poor inhibition has been implicated in our understanding of many psychological disorders including schizophrenia, OCD and ADHD. Negative priming tasks are assumed to measure the strength of inhibitory processing (Tipper, 2001) The purpose of this study was to examine inhibitory processing using a novel Negative Priming Stroop task, adapted from the Golden (1978) Color and Word Stroop Test.
Participants and Methods: Eighty-three subjects completed the Golden Color and Word Stroop test, WRAT-4 Reading subtest, Wisconsin Card Sort, and the Negative Priming Stroop (NPS) task. The NPS task is similar to the color-word form; however, the ignored word in the first exemplar becomes the named color stimulus in the second exemplar and so on. To reduce practice effects, the Wisconsin Card Sort was administered between the Golden Stroop and the NPS.
Results: Participants obtained an average of 51 correct responses within the time limit on the NPS task, significantly more than the number of correct responses obtained on the color-word trial, $t(82) = 3.38$, $p = .001$. The number of correct responses on the NPS was significantly correlated to number of correct responses to the color ($r=.51$) and color-word versions ($r = .77$). No significant correlations were found to the WRAT-4 Reading subtest, Stroop word reading trial, or any scores from the Wisconsin Card Sort.
Conclusions: Rather than producing a greater number of errors, as would be expected if the negative priming condition required additional controlled processing, the NPS facilitated correct responses. This finding may indicate that the ignored stimulus is engaged in early automatic processing which facilitates its later retrieval. Thus, the NPS provides a contrast to the Wisconsin Card Sort, which focuses instead on controlled processing, and may provide a clinically useful tool for measuring automatic or pre-controlled attentional processing.
Correspondence: *Russell D. Whitman, Ph.D., Psychology, Wayne State Univ, 5057 Woodward Ave, 7th Floor, Detroit, MI 48202. E-mail: dwhitman@wayne.edu*

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

N.E. SARA, J.M. BUNTING, A.D. STEELE, W.D. JUSTIN, A.K. HOLLAND & D.W. HARRISON. The Effects of Right Lateralized Cognitive and Physiological Stress on Right Brain Activation Using a Dual Concurrent Task Paradigm: A Double-Blind Placebo-Controlled Experiment.

Objective: The current study uses a dual concurrent task approach in which right brain activation is predicted to change upon exposure to right-lateralized stress. Right-lateralized cognitive stress was conceptualized as completion of a design task, the Ruff Figural Fluency Task (RFFT). Physiological stress was conceptualized as ingestion of 450mg of caffeine. Changes in right brain activation were expected to be evidenced by increased heart rate (HR) as well as number of perseverative errors made on the RFFT.

Participants and Methods: Thirty-two right-handed college-aged men and women were administered either 450mg of caffeine or a placebo diluted in 1oz of orange juice in a double-blind experiment setting. After a two-hour digestion period, participants completed the RFFT. Heart rate measurements were taken before and after undergoing cognitive stress.

Results: A main effect for Heart Rate was found ($F(1, 31)=4.07$, $p= 0.05$), indicating that participants experienced an increase in HR after completing the RFFT. This finding supports the use of the RFFT as a right-lateralized cognitive stressor. A main effect for Part was found ($F(4, 124)= 6.67$, $p<0.001$), indicating an increase in perseverative errors throughout the progression of the 5-part design task. This finding provides additional verification of the efficacy of using the RFFT as a right-lateralized cognitive stressor. Furthermore, a Drug x Part interaction was found ($F(1, 31)= 3.89$, $p=0.05$), indicating a greater increase in perseverative errors made between the first and fifth parts of the RFFT by participants who received caffeine in comparison to their control counterparts. This interaction could be interpreted as evidence of the effects of caffeine ingestion on right brain activation.

Conclusions: Taken together, these findings support the use of the RFFT and caffeine consumption as right-lateralized stressors. Moreover, these findings demonstrate a diminished ability to perform right brain tasks concurrent with ingestion of caffeine.

Correspondence: *Alissa K. Holland, Ph.D., Psychology, University of South Carolina Lancaster, 476 Hubbard Drive, Lancaster, SC 29721. E-mail: akhollan@mailbox.sc.edu*

R. MANGUM, L.K. PAUL & W.S. BROWN. Twenty Questions Problem-Solving and Strategy in Individuals with Agenesis of the Corpus Callosum.

Objective: Previous research investigating persons with agenesis of the corpus callosum (ACC) demonstrated that they perform more poorly on tasks requiring complex problem-solving and abstract thinking, especially when these tasks are novel (Schieffer, 1999). This study utilized the Twenty Questions subtest of the Delis-Kaplan Executive Function System to assess problem solving ability in 25 individuals with ACC.

Participants and Methods: Twenty-five individuals with ACC (FSIQ 80 – 129; age 18 – 52) were compared to 15 age and IQ-matched controls (FSIQ 84 – 116; age 20 – 44). Twenty Questions tests an individual's ability to formulate abstract and strategic questions that reduce the breadth of possible target items as efficiently as possible. Groups were compared on Initial Abstraction, Total Questions Asked, and Weighted Achievement scaled scores.

Results: A multivariate ANOVA demonstrated that the ACC group was significantly deficient relative to controls on Initial Abstraction ($\eta p2 = .33$, $F(1, 38) = 18.48$, $p < .001$). Results for Total Questions Asked ($\eta p2 = .00$, $F(1, 38) = 0.00$, $p = .998$) and Weighted Achievement ($\eta p2 = .03$, $F(1, 38) = 1.04$, $p = .315$) were not significant.

Conclusions: These results demonstrate that individuals with ACC struggle to formulate and utilize sufficiently abstract initial questions as a problem-solving strategy. However, in the end, they perform similar to controls. This suggests that ACC is associated with difficulty imagining larger abstract semantic domains that would help to eliminate or include larger categories of potential target items.

Correspondence: *Warren S. Brown, Ph.D., Travis Research Institute, Fuller Grad Sch of Psych, 180 N. Oakland Ave., Pasadena, CA 91101. E-mail: wsbrown@fuller.edu*

L.B. ANDERSON, L.K. PAUL & W.S. BROWN. Problem-Solving in Complete versus Partial Agenesis of the Corpus Callosum: The Iowa Gambling Task.

Objective: Little research has been done examining cognitive differences between persons with complete versus partial agenesis of the corpus callosum (ACC). A previous study using the Iowa Gambling Task (IGT) suggested that individuals with ACC have difficulty inferring game contingencies and forming a coherent selection strategy (Brown et al., 2012). However, this paper did not differentiate complete and partial ACC.

Participants and Methods: Thirty-one individuals with complete ACC (age 11-55; FSIQ 78-116) were compared to nine participants with partial ACC (age 11-49; FSIQ 87-129) on the IGT. A post-hoc computational analysis called the expectancy-valence model (EV; Busemeyer & Stout, 2002) was applied to the IGT data to ascertain differences in characteristics of problem-solving used by each group during the task.

Results: After controlling for FSIQ, the partial ACC group performed significantly better overall than the complete ACC group ($p < .01$; $\eta p2 = .24$). The EV model revealed that the partial ACC group tended to employ a more consistent decision-making strategy than the complete ACC group ($p = .10$; $\eta p2 = .12$). The groups did not differ on the attention to losses or motivation parameters of the EV model.

Conclusions: Participants with partial ACC performed better than those with complete ACC overall on the IGT, suggesting that even partial formation of the corpus callosum may facilitate better complex problem-solving in ACC. The EV model suggested that the difference exist mostly in formulation of a coherent decision-making strategy. Further research is needed to more clearly determine the nature of problem-solving differences between people with partial and complete ACC.

Correspondence: *Warren S. Brown, Ph.D., Travis Research Institute, Fuller Grad Sch of Psych, 180 N. Oakland Ave., Pasadena, CA 91101. E-mail: wsbrown@fuller.edu*

J.L. REHMEL, L.K. PAUL & W.S. BROWN. Comprehension of Proverbs in Individuals with Agenesis of the Corpus Callosum.

Objective: Persons with agenesis of the corpus callosum (ACC) may have normal measured intelligence, yet exhibit deficiencies in interpreting non-literal, second-order meanings of language. A previous study (Paul et al. 2003) suggested that persons with ACC were significantly deficient in comprehension of Gorham Proverbs. This research used the Proverbs subtest of the Delis Kaplan Executive Function System (DKEFS) to assess non-literal language comprehension in persons with ACC.

Participants and Methods: Fifteen adults with ACC (FSIQ 80 – 129; age 18 – 52) were compared to 16 age and IQ-matched neurotypical controls (FSIQ 84 - 116; age 20-45). Groups were compared on overall achievement, abstract, and accuracy scores. Age, education, and the Verbal Comprehension Index (VCI) of the WAIS-III were covariates in secondary analyses to control for general verbal ability and experience.

Results: Three univariate ANOVAs revealed significant between-group differences on the overall achievement ($\eta p2 = .37$, $F(1, 29) = 16.67$, $p = .00$), accuracy ($\eta p2 = .45$, $F(1, 29) = 23.95$, $p = .00$), and abstraction ($\eta p2 = .17$, $F(1, 29) = 5.77$, $p = .02$). Neither age nor education accounted for significant variance on these measures. However VCI significantly impacted findings. When covarying VCI, group differences remained significant, but were diminished, for overall achievement (22% reduction in effect size) and accuracy scores (16% reduction). For the abstraction score, covarying VCI resulted in a nonsignificant group difference (60% reduction).

Conclusions: These results are consistent with the theory that reduced interhemispheric connectivity has a significant impact on ability to

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

comprehend second-order meanings in language as represented in the meaning of proverbs.
Correspondence: *Warren S. Brown, Ph.D., Travis Research Institute, Fuller Grad Sch of Psych, 180 N. Oakland Ave., Pasadena, CA 91101. E-mail: wsbrown@fuller.edu*

Cross Cultural

G. EISMAN, L. MAES, T.L. VICTOR, W.D. LOPEZ, D. GARCIA, M. TURNER, V. MOSS, M.E. COTTINGHAM, D. HARDY & M. WRIGHT. The Relationship Between Time Perspective and Neuropsychological Test Performance.

Objective: Differences in neuropsychological test performance among ethnic groups have been documented (Agranovich et al., 2011). This is important as current neuropsychological practice and interpretation of test results among culturally diverse people raises ethical questions (Manly, 2008). The present study will address the concept of time perspective (TP), a cultural factor that may help explain performance differences, particularly on timed neuropsychological tests. It is predicted that Caucasians will outperform Latino/Hispanic participants on timed tests of neuropsychological functioning, and that differences will be accounted for by TP.

Participants and Methods: Participants were neurologically and psychologically healthy undergraduate students. The participants were divided into two groups based on self-identified ethnicity, including Caucasian and Hispanic. All participants were administered a comprehensive neuropsychological test battery that included a timed measure of processing speed, the Symbol Digit Modality Test.

Results: Groups were equivalent with respect to education and gender; however, they significantly differed in age. An independent samples t-test revealed significant performance differences with Caucasians outscoring Hispanics on the SDMT- oral. There were no significant differences found between the groups with respect to time orientation. TP was not significantly correlated with SDMT performance nor did it predict performance in groups.

Conclusions: The results of this study compel questions of validity using the Zimbardo Time Perspective Inventory as an index for clock vs event time perspective measure. Level of acculturation in the Hispanic group and the influence of other cultural variables may explain the significant difference we found between ethnic groups on the SDMT such as quality of education (Byrd, Sanchez & Manly, 2005). Future studies in this area should concentrate on using multivariate methods of data analysis using large representative samples and measures of acculturation.

Correspondence: *Geraldy Eisman, Cal State University Dominguez Hills, 26015 Cypress St. #39, Lomita, CA 90717. E-mail: geisman1@toromail.csudh.edu*

S. NAMAZI, K. ALEXANDER, S.E. BRAJE & D. KAWAHARA. A Snapshot Of Social Cognition As Measured By Social Skills Among Iranian American Children: The Role Of Parental Acculturation.

Objective: Social cognition, which generally refers to learning, consolidation, and retrieval of social information, is a broad paradigm that encompasses various psychological constructs, such as social skills and empathy (Derntl & Habel, 2011). To a greater or lesser extent, social cognitions are reflected in social behavior (Winner, 2001). Numerous studies show deficient social skills correlate with behavioral difficulties and learning disabilities (Gresham, MacMillan, Bocian, Ward, & Forness, 1998; Kavale & Forness, 1996; Maag, 2006). Unfortunately, little research exists examining social skills among the Iranian immigrant population, despite being a rather large ethnic group in the United States (Hojat et al., 2000; Saedi, 2010). The purpose of the present study was to examine a subset of social cognition, as defined by social skills, and acculturation in Iranian immigrant families.

Participants and Methods: Participants included 51 Iranian mothers and their grade school aged child. Mothers completed an acculturation measure, the Iranian Cultural Lifestyle Inventory (Mendoza, 1989; Mahdavi & Mendoza, 2012), and a social skills measure, the Matson Evaluation of Social Skills for Youngsters (Matson, 1998).

Results: Significant relationships were detected between mother's report of overall social skills, inappropriate social skills, and acculturation (rs = .41, p= .00; rs = .41, p= .00, respectively).

Conclusions: These results suggest that children's social skills may be impacted by mother's acculturation patterns. In other words, mothers' acculturation patterns and cultural behaviors may impact children's social cognition, as measured by their social skills. Implications for these findings are discussed.

Correspondence: *Salya Namazi, MA, Psychology, Alliant International University, 121 W Hamburg, Baltimore, MD 21230. E-mail: salyanamazi@gmail.com*

J. AVILA & J. RAZANI. The Influence of Culture on Performance on Neuropsychological Measures That Require Little Verbal Mediation in English-Speaking and Farsi-Speaking Iranian Individuals.

Objective: The aims of this study were to (1) examine differences in the performance of English-Speaking Iranians, Farsi-Speaking Iranians, and Caucasians on three measures that require very little verbal mediation and are typically regarded as culture-free, and (2) assess the relationship between cultural factors and neuropsychological test performance of the English-Speaking and Farsi-Speaking Iranians.

Participants and Methods: One-hundred-eight healthy adult participants composed three groups in this study: 44 Caucasian, monolingual English-speakers, 28 English-Speaking Iranian, and 36 Farsi-Speaking Iranian. Participants' performance on the Wisconsin Card Sorting Test (WCST), Trail Making Test (TMT), and Color Trails Test (CTT) was assessed.

Results: Results from a MANCOVA, using age as the covariate, indicated that group means were significantly different for the WCST percent conceptual response score, TMT-A, and TMT-B. Specifically, the Farsi-speaking Iranian group had lower conceptual level scores and slower completion times for TMT-A and TMT-B compared to the English-speaking Iranian group and the Caucasian group, who performed the same. Additionally, correlation analyses revealed that the Iranian participants' (Farsi- and English-speaking) level of acculturation and percentage of education obtained inside the US were related to performance on several of the neuropsychological variables.

Conclusions: These findings provide support for the presumption that culture affects performance on neuropsychological measures. Furthermore, it is imperative that clinicians, who administer neuropsychological tests to ethnically diverse individuals, account for the influence of specific cultural factors when interpreting test results.

Correspondence: *Justina Avila, MA, CSU Northridge, 5025 Coldwater Canyon Ave # 21, Sherman Oaks, CA 91423. E-mail: justina.avila.48@my.csun.edu*

J.E. CELESTIAL, V. PALAD, M. HELD & A. WISNIEWSKI. Design Fluency among Filipinas/os & Filipina/o Americans (FFAs).

Objective: Purposes of the study were to examine FFAs' scores on design fluency measures & relations to gender, education, generation level (1st generation & 1.5 generation [immigrated to the US before age 13] & higher), & immigrant status (immigrant & non-immigrant).

Participants and Methods: Participants were 40 healthy, community-dwelling FFAs ages 18 to 76 (M=42.8; SD=17.35); 20 males & 20 females; education from 11 to 20 years (M=15.38; SD=2.25). 58% 1st generation & 42% 1.5 generation & beyond. 60% immigrants; 40% non-immigrants. All participants were fluent in English. 40% had English as first language; 60% had a Filipino language as native language. Participants completed the Delis-Kaplan Executive Functioning System (D-KEFS) Design Fluency (DF) Test Conditions 1-3.

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

Results: FFAs scored in the average range on all DF variables: Filled Dots (Scaled Score [SS] M=9.03, SD=2.71), Empty Dots (SS M=9.05, SD=2.37), Switching (SS M=10.63, SD=2.61), Percent Design Accuracy (SS M=8.6, SD=3.56), Total Set-Loss (SS M=11.6, SD=2.37), Total Repeated Designs (SS=11, SD=3.06), Total Attempted Designs (SS=10.45, SD=3.53). Spearman correlations indicated no significant relations between DF scores and education or generational level on Filled Dots, Empty Dots, or Switching. Generation level was positively correlated with Total Set-Loss (p=.05). No gender differences were found on any DF variable. Significant differences were identified in relation to immigration status on Total Set-Loss (p=.001), Total Repeated Designs (p=.019), & Percent Design Accuracy (p=.009); non-immigrants performed better than immigrants on these scores.
Conclusions: FFAs performed in the average range on all DF variables. The more generations participants have lived in the US, the fewer set-loss errors made. Men & women performed similarly. Non-immigrants performed better than immigrants on: Total Set-Loss, Total Repeated Designs, & Percent Design Accuracy.
Correspondence: *Jeannie E. Celestial, LCSW, MS, Ph.D. in Clinical Psychology, Pacific Graduate School of Psychology at Palo Alto University, 1521 25th Avenue, Oakland, CA 94601-1031. E-mail: jcelestial@paloaltou.edu*

F. MARTINEZ, J. GIBSON, J. BIRATH, W.D. LOPEZ, S. INSUA-RIEGER, C. DALY, E.N. MILLER, M. REINHARD, M.E. COTTINGHAM, D. HARDY, C. COX, S. REYNOLDS, E. MARTIN, J.T. BECKER, O.A. SELNES, J. MANLY & M.J. WRIGHT. The Role of Academic Level and Achievement in Neuropsychological Test Performances of Minorities.
Objective: The present study examined the relationship between educational level, educational achievement, and neuropsychological test performances in ethnic/racial minorities. While minority status has been shown to be associated with poorer educational quality and neuropsychological performances, we expected this effect to be reduced in participants with higher levels of education.
Participants and Methods: Participants included 1,197 healthy male participants from the Multicenter AIDS Cohort Study. Twenty percent of the participants were minorities and 13% had some college education or greater. Participants were divided into high (>12 years) and low (<12 years) education groups. All participants were administered the Vocabulary Subtest of the Shipley Institute for Living Scale (SILS; our proxy for academic achievement),Trail Making Test, Symbol Digit Modalities Test, Stroop Color-Word Interference Test, Rey Auditory Verbal Learning Test, Rey-Osterrieth Complex Figure Test, and the Grooved Pegboard Test.
Results: Regression analyses indicated that minority status significantly predicted performance on most neuropsychological tests for individuals in both education groups. In the lower education group, minority status accounted for about 20% of score variances across tests; this was reduced by ~53% on average with the inclusion of the SILS Vocabulary scores. In the higher education group, minority status accounted for ~4% of score variances across tests; this effect was reduced by roughly ~69% with the inclusion of the SILS Vocabulary scores.
Conclusions: These findings suggest that racial/ethnic differences in neuropsychological test scores are partially due to differences in academic achievement and that this effect is diminished in individuals with college level educations.
Correspondence: *Matthew J. Wright, Ph.D., Psychiatry, Harbor-UCLA Medical Center, 1124 W. Carson St., B-4 South, Rm. 111 (Box 490), Torrance, CA 90502. E-mail: mwright@labiomed.org*

S. COLLIER, M. DIPINTO, R. GORE & G. MUCCI. Intellectual Outcome in Monolingual and Bilingual Pediatric Patients with Medulloblastoma.
Objective: Treatment for medulloblastoma (MB) comes with significant neurocognitive late-effects. Declines in Verbal IQ (VIQ) have been attributed to time since treatment and the patients' inability to acquire new knowledge. While healthy bilingual children consistently score lower than monolingual children on vocabulary tasks, vocabulary development is dependent on knowledge acquisition. Thus the bilingual patient may be vulnerable to declines in VIQ. This may be true if he/she has not mastered his/her first and/or second language. The current study compares the VIQ, measured across two time points, in a group of English/Spanish speaking bilingual patients and English speaking monolingual patients who have undergone similar treatment for MB.
Participants and Methods: 9 patients diagnosed with MB and who had similar treatment (resection, radiation, chemotherapy) were administered the Wechsler Intelligence Scales at 3.1 and 5.4 years after diagnosis. The Barratt Simplified Measure of Social Status was administered to determine social status. Patients were divided into two groups: English-speaking monolingual (n=4) and English/Spanish speaking bilingual (n=5) groups.
Results: No significant differences were found between groups for age at diagnosis, age at Time 1 or Time 2, or time since treatment. Analyses revealed no significant differences between groups and mean VIQ across time points (p =.5). However, main effects revealed the monolingual group had significantly higher VIQ scores than the bilingual group (p = .009). This difference becomes non-significant when the model is adjusted for social status (p = .10).
Conclusions: Bilingual patients had significantly lower Verbal IQ than monolingual patients. While levels of language proficiency have been shown to influence VIQ, this raises questions about the appropriateness of using monolingual norms to evaluate treatment effects for the bilingual child. Social status may also influence VIQ, which has implications for underserved populations that require periodic evaluations.
Correspondence: *Shaleise Collier, M.A., Chilcren's Hospital Colorado, 13123 East 16th Avenue, Aurora, CO 80045. E-mail: shaleise.collier@childrenscolorado.org*

P.A. SUAREZ, X. CAGIGAS, R. HEATON & M. CHERNER. Advantages of bilingualism on test performance persist after accounting for sociodemographic variables among Spanish speakers tested in their native language.
Objective: Studies suggest better test performance in bilinguals across a number of neuropsychological domains. However, particularly among immigrants, these advantages may be the result of higher socioeconomic status (SES) in those who become bilingual compared to those who remain monolingual, rather than representing a true neurocognitive advantage. We, therefore, tested the hypothesis that the advantages of bilingualism on test performance diminish or disappear when controlling for the effects of SES.
Participants and Methods: Participants were 56 healthy adult native Spanish-speakers from the U.S.–Mexico borderland who completed a comprehensive neuropsychological test battery in Spanish. They were classified as bilingual or monolingual based on a ratio of their performances on the COWAT in English (FAS) and BNE in Spanish (PMR). Participants were selected from a larger sample to achieve bilingual and monolingual groups with comparable self-reported SES growing up, years of education, vocabulary scores, and age. The groups also had comparable Spanish language fluency, and all participants expressed a preference to be tested in Spanish.
Results: In this demographically comparable sample, previously found bilingual advantages persisted on tasks of cognitive set-shifting and response inhibition (Trail Making Test-B, Stroop Color-Word), as well as in measures of working memory (WAIS-R Digit Span), and visual processing speed (WAIS-III Symbol Search). Notably, there were no differences between bilingual and monolinguals on tests of language ability, learning, visuospatial, or motor skills.
Conclusions: Findings suggest reliable advantages of bilingualism above and beyond the effects of education, vocabulary scores, and SES. As such, bilingual status may need to be accounted for when interpreting test performance, and should not be conflated with SES and other common demographic corrections in normative samples.

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

Correspondence: *Paola A. Suarez, PhD, Psychiatry, UCSD, 220 Dickinson St., 3rd Floor, San Diego, CA 92103. E-mail: pasuarez@ucsd.edu*

M. CHERNER, M. MARQUINE, P. SUAREZ, A. UMLAUF, A. SAINZ CORT, L. ARTIOLA I FORTUNY & R. HEATON. Halstead Category Test Norms for Native Spanish Speakers from the US-Mexico Border Region.

Objective: Competent neuropsychological assessment of Spanish speakers living in the U.S. requires appropriate interpretive standards. As part of a larger normative effort, we generated Halstead Category Test (HCT) norms applicable to Spanish speakers from the U.S. - Mexico border region.

Participants and Methods: The HCT was administered to 255 healthy native Spanish speakers from the Mexico border regions of Arizona and California. Participants were 59% women, ranged in age from 19 to 76 years (mean=37.5, SD=10.6) and in education from 0 to 20 years (10.6, 4.4). The contribution of age, education, and sex to HCT scaled scores was examined using fractional polynomial regression to generate demographically adjusted, normally distributed T-scores. We verified that these demographic variables were unrelated to the resulting T-scores. Rates of impairment were compared to those obtained using published English language norms.

Results: Lower education, older age, and female gender independently predicted worse HCT raw scores. Based on the normal distribution, a -1 SD (T-sc < 40) cut-point with the new Spanish language norms classifies 16% of cases as impaired. By contrast, 48% were classified as impaired using the existing English language norms, which did not adjust adequately for effects of sex and education. Misclassification was evident across the education range, but was especially salient in those with low education. The mean difference in T-score between the Spanish and English language norms was 9.3 (3.6) points, ranging from 8.3 (3.8) in those who completed college or higher, to 14.4 (2.7) in those with fewer than 4 years of education.

Conclusions: Demographically adjusted, population-specific norms result in many fewer classification errors and contribute to the armamentarium of available assessment tools for U.S. Spanish speakers.

Correspondence: *Mariana Cherner, PhD, Psychiatry, University of California San Diego, 9500 Gilman Drive, Mail Code 0847, La Jolla, CA 92093. E-mail: mcherner@ucsd.edu*

M.D. WILSON, A. GIUDICESSI, C. DROUMBAKIS, R. ORBACH, L. TARTAGLIA, M. BARSOUM, G. MCDONNELL & R. ANNUNZIATO. Neurocognitive Impact of Race-Based Stress.

Objective: Despite advances in race relations in the post-civil rights era, racial discrimination is still frequently reported by racial/ethnic minorities. The present study merges the existing literature on perceived racial discrimination; racial discrimination as a significant source of stress for Blacks; and links between stress and compromised cognitive functioning. The aim of the present study is to elucidate the role of racial discrimination in the poor academic outcomes observed among Blacks in the U.S.

Participants and Methods: A community sample of 50 Blacks, ages 18-30, from the New York City area completed the Everyday Discrimination Scale (EDS; Williams, Yu, Jackson, & Anderson, 1997), BVMT-R, HVLT-R, and a digital two-back n-back task. Subjects were placed in either control or experimental condition. Those in the experimental condition were exposed to discriminatory statement prior to testing. It was hypothesized that those in the experimental condition would perform less well than those in the control condition.

Results: A correlation matrix between the data generated from cognitive measures, BVMT-R; HVLT-R; and n-back task, and the self-report measure, EDS, was assessed in order to detect any associations between these data.

Conclusions: Several correlations were observed between the cognitive measures and individual items on the EDS such that as endorsement of EDS items increased cognitive performance decreased. Specifically, verbal and visual recall decreased and recognition error increased and processing speed decreased. These data support the hypothesis that perceived discrimination, especially when elicited, has a negative impact on certain cognitive processes.

Correspondence: *Monique D. Wilson, M.A., Clinical Psychology, Fordham University, 611 Park Ave, Apt. # 1108, Baltimore, MD 21201. E-mail: mdw279@gmail.com*

S.P. VERNEY, J. BENNETT & J.M. HAMILTON. Cultural Considerations in the Neuropsychological Assessment of American Indian/Alaska Native Adults.

Objective: American Indian/Alaska Native (AI/AN) cultural values and experiences may differ considerably from the U.S. mainstream population for which most neuropsychological assessments were developed and normed. The lack of proper validation in AI/AN populations may result in artificially lower cognitive test scores for this group and lead to misdiagnoses of cognitive impairment or deficits. Indeed, AI/AN suffer disproportionate mental and physical disparities compared to the general U.S. population. The purpose of this study is to review the literature of neuropsychological studies with AI/AN adults and to examine sociocultural factors that may be associated with test performance.

Participants and Methods: A literature search was conducted using PsychINFO and PsychArticles databases using the following keywords: American Indian, Alaska Native, Native American, neuropsychological testing or assessment, cognitive ability, intelligence testing, and executive functioning.

Results: Thirteen studies were identified as presenting neuropsychological research with AI/AN adults. The majority of the studies reported relatively small sample sizes, used a narrow scope of neuropsychological measures, are geographically confined, conducted with either a single or a select few tribes, and reported only cursory sociocultural factors.

Conclusions: Given the vast geographic and cultural diversity of AI/AN populations, the AI/AN studies available offer only a limited glimpse of conducting neuropsychological assessments with this population. Further, studies have not included a comprehensive assessment of the various combinations of cultural factors above or within group variations of the collective AI/AN populations. AI/ANs require more careful and complex testing in order to create appropriate assessments; thus, keen awareness to these issues is needed when working with this population. Recommendations for conducting assessments with AI/AN clients and future directions for research will be discussed.

Correspondence: *Steven P. Verney, Ph.D., Psychology, Univ New Mexico, MSC03-2220, Albuquerque, NM 87131-0001. E-mail: sverney@unm.edu*

J. BENNETT & S.P. VERNEY. Wechsler Assessment Tools and American Indian Children: A Review & Future Directions.

Objective: Wechsler assessment tools are considered the standard cognitive assessment tools in US educational settings for children referred for a gifted or special education program. Such assessments are conducted even for underserved and culturally diverse populations including American Indians (AIs). The purpose of this study is to examine available research regarding AI children's performance when assessed with Wechsler tools, and to better understand how sociocultural factors may influence their performance.

Participants and Methods: A literature search was conducted with PsychINFO and PsychArticles using the following keywords: American Indian, Alaska Native, Native American, neuropsychological testing, neuropsychological assessment, cognitive ability, intelligence testing, executive functioning, and WISC for years 1980 to present.

Results: Sixteen studies using Wechsler assessment tools (WISC, WISC-R, and WPPSI) performed during the 80s and 90s showed a consistent Performance-Verbal (P-V) IQ split, with AI children scoring significantly higher on the Performance scale than the Verbal. In studies that included sociocultural factors, methodological issues leave

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

in question the extent that such factors influence AI children's performance. If cultural factors including acculturation, quality of education, and language use are not considered, the P-V pattern could be erroneously interpreted as a learning disability or other psychopathology. No studies were found using WISC-4, the most current edition published in 2003.
Conclusions: Cultural and linguistic factors need to be integrated into clinical interpretation of AI children's cognitive ability performance for a valid assessment. More research is needed using the most up-to-date assessment tools with this diverse population. Further, assessment tools that rely less on language ability, such as Raven's Standard Progressive Matrices and Kaufman Assessment Battery for Children, should be considered when assessing AI children to obtain a more accurate cognitive assessment.
Correspondence: *Jennifer Bennett, PH.D. Psychology, Psychology, Univ New Mexico, 1 University of New Mexico, MSC03-2220, Albuquerque, NM 87131-1161. E-mail: jenben@unm.edu*

P. SAYEGH. The Role of Neuropsychological Language Tests in Clinician-Rated Dementia Severity across Hispanics and Non-Hispanic Whites.
Objective: Neuropsychological language tests may lack validity for Hispanics (e.g., due to unrepresentative norms and limited English proficiency), and clinicians are likely aware of this limitation. It was hypothesized that language tests would be significantly weaker predictors of clinician-rated dementia severity in Hispanics versus non-Hispanic Whites (NHWs).
Participants and Methods: Participants included 436 Hispanic and 436 NHW outpatients assessed in English and classified with normal cognition or dementia at initial Alzheimer's Disease Centers evaluations nationwide. Dementia severity was measured by the 5-point Clinical Dementia Rating scale (CDR), with scores ranging from "no cognitive impairment" to "severe impairment."
Results: When covarying for age, sex, education, and functional abilities, multinomial logistic regression showed that animal fluency was a significant predictor of CDR scores in Hispanics (odds ratio [OR] = 0.92, 95% confidence interval (CI) [0.86-0.99], p = .02). The Boston Naming Test (BNT) was also significant in Hispanics (OR = 0.96, 95% CI [0.94-0.99], p = .00) and the only significant predictor in NHWs (OR = 0.92, 95% CI [0.87-0.97], p = .00). Interaction tests revealed that none of the ORs was significantly different across ethnicities. Overall results remained similar when covarying for primary language in Hispanics.
Conclusions: Verbal fluency was relatively unimportant in clinician-rated dementia severity for NHWs as opposed to confrontation naming perhaps due to increased sensitivity of BNT regarding dementia severity in this group. Animal but not vegetable fluency was significant for Hispanics possibly due to cultural effects on the familiarity, prominence, and relevance of this category's items. In addition, clinicians may have informally adjusted Hispanics' BNT and animal fluency scores and discounted vegetable fluency to account for their limitations. BNT may be a preferable language test for assessing dementia severity across these groups, as it may be rather ethnically-neutral.
Correspondence: *Philip Sayegh, PhD, MPH, Semel Institute for Neuroscience & Human Behavior and Resnick Neuropsychiatric Hospital, University of California, Los Angeles, 760 Westwood Plaza, Los Angeles, CA 90095. E-mail: psayegh@gmail.com*

C.K. PETRANOVICH, N.C. WALZ, S.L. WADE, P. CHIU, M. STAAT & H. MACPHERSON. The relationship of a lab-based measure of social information processing and parent-reported social competence in internationally adopted girls.
Objective: International adoptees often experience poor pre-adoption conditions that have been posited to contribute to atypical neural development and deficits in social functioning. Lab-based measures of social information processing (SIP) have been suggested to offer information about the process that underlies social competence, although these measures have yet to be used in studies of international adoption.
Participants and Methods: Participants included girls between the ages of 6-12 years old with a history of institutionalization who were adopted from China (n = 31) or Eastern-Europe (n = 23) and a demographically-matched control group of American-born, never institutionalized girls (n =15). Participants completed the Dodge Video Vignettes (DVV), a lab-based measure of SIP, and the WASI 2-scale estimate of IQ. Parents completed the Home and Community Social Behavior Scale (HCSBS), a standardized measure of social competence in everyday behavior.
Results: The Eastern European girls evidenced greater deficits in HCSBS social competence compared to the control group and greater deficits in IQ compared to both the control group and the Chinese adoptees ($p < .05$, Bonferroni corrected). DVV hostile response generation did not significantly differ between groups ($p > .05$). Controlling for group and IQ, DVV hostile response generation was a significant predictor of HCSBS social competence ($\beta = -.26$, $t = -2.24$, $p = .02$); children who generated more hostile responses evidenced lower social competence.
Conclusions: International adoptees with a history of institutionalization may be vulnerable to negative social outcomes. This relationship between SIP and social competence replicates findings in other neurocognitively at-risk pediatric populations, such as TBI. The use of measures of SIP may contribute to our understanding of the influence of early institutionalization on neurocognitive and social development, offering clinicians greater insight into the specific needs of international adoptees.
Correspondence: *Christine K. Petranovich, Dept. of Psychology, University of Cincinnati, 1 Edwards Center ML 0376, Cincinnati, OH 45221. E-mail: karvercl@mail.uc.edu*

L.B. ZAHODNE, C.J. NOWINSKI, R.C. GERSHON & J.J. MANLY. Depressive Symptoms Are More Strongly Related to Cognitive Performance among African American Elders.
Objective: The reserve capacity model posits that individuals of lower socioeconomic status are more vulnerable to negative health effects of depression because important psychological resources (e.g., self-esteem) are diminished by negative life events and chronic stressors. Given that African Americans are exposed to unique chronic stressors (e.g., discrimination), they, too, may be more vulnerable to the negative effects of depression. This study explored whether the reserve capacity model can be extended to cognitive outcomes among African Americans.
Participants and Methods: Data from 482 healthy individuals 55 and older were drawn from the normative sample for the NIH Toolbox for the Assessment of Neurological and Behavioral Function. Depressive symptoms, executive functioning, working memory, processing speed, and episodic memory were measured with the NIH Toolbox Emotion and Cognition modules. Multigroup path analysis was used to characterize relationships between depressive symptoms and cognition separately by race.
Results: African Americans exhibited fewer depressive symptoms and slower processing speed than Whites. Associations between depressive symptoms and cognitive scores differed by race. Among Whites, depressive symptoms were only associated with slowed processing speed. Among African Americans, depressive symptoms were associated with worse task-switching, inhibition, and episodic memory. Results were not explained by differences in education, recruitment site, income, general health, or self-reported perceived stress or self-efficacy.
Conclusions: While African American elders reported fewer depressive symptoms than Whites, depressive symptoms were associated with worse performance in more cognitive domains when present. Future research is needed to determine whether African Americans are more vulnerable to the negative cognitive effects of depression due to specific stressors (e.g., discrimination) in line with the reserve capacity model.

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

Correspondence: *Laura B. Zahodne, PhD, Columbia University, 630 West 168th Street, P & S Box 16, New York, NY 10032. E-mail: lbz2105@columbia.edu*

L.D. MEDINA, P. SEEWALD, D.C. BECERRA CUELLAR, M.S. SADLER, J. FILOTEO & P.E. GILBERT. Self-Construal as a Predictor of Cognitive Abilities in Healthy Aging.

Objective: Cultural differences in psychological processes have been demonstrated in various domains. One of the most basic of these, how people perceive the self, has been central to how many other differences are explained. Described as self-construals that are individualistic or collectivistic, this perception has implications for social roles and interactions, emotions, and cognition. However, cognitive processes are not well understood in the context of self-construal and no research to date has examined the effect of aging on this association. This study explored the impact of self-construal on cognition using a cross-sectional aging design.

Participants and Methods: A total of 178 healthy participants were recruited: 95 young adults (YA; Mean age 19±1.5, 51% Caucasian); 83 older adults (OA; Mean age 67±5.7, 73% Caucasian). Self-construal was measured using the IndCol, a self-report measure commonly used for this purpose. Participants were administered a cognitive battery to assess verbal and non-verbal abilities. Relevant demographic, health, and mood information also was collected.

Results: A four-step hierarchical regression was used to determine the incremental effect of self-construal on cognition beyond the effects of age, gender, education, and depression. In OA, collectivism significantly contributed to the model and explained an additional 5% of variance in cognitive performance in Caucasians, $F(1,55)=4.17$, $p=.046$, but not in non-Caucasians, $F(1,17)=.118$, $p>.05$. Higher collectivism scores were associated with higher cognitive scores. This relationship was not observed in YA (all $ps>.05$).

Conclusions: These results suggest self-construal may provide additional information on underlying cultural differences in cognition. Given uneven distribution of race between groups, interpretations of these data should be made with caution and future studies are needed to examine their ecological validity. Nonetheless, self-construal may provide a key demographic factor for diverse samples in neuropsychological research.

Correspondence: *Luis D. Medina, MS, Clinical Psychology, SDSU/UCSD Joint Doctoral Program in Clinical Psychology, 6363 Alvarado Court, Suite 103, San Diego, CA 92120. E-mail: medinal@rohan.sdsu.edu*

Symposium 9: Vascular mechanisms contributing to the pathogenesis and clinical expression of Alzheimer's disease

Chair: Angela Jefferson

10:45 a.m.–12:15 p.m.

A.L. JEFFERSON, M. BONDI, A.M. BRICKMAN, D. LIBON, R. AU & A. JEFFERSON. Vascular mechanisms contributing to the pathogenesis and clinical expression of Alzheimer's disease.

Symposium Description: Traditional views of Alzheimer's disease (AD) pathogenesis suggest that β-amyloid accumulates in the brain parenchyma and triggers a cascade of neurodegenerative changes leading to the clinical neuropsychological presentation of AD (i.e., the "amyloid hypothesis"). However, accumulating evidence supports a parallel "vascular hypothesis" proposing vascular pathology and AD pathology may develop independently, but compromised cerebrovascular health may propagate amyloid deposition, contributing to faster clinical manifestation and trajectory of cognitive decline. The goal of this symposium is to highlight recent research advances in understanding how vascular mechanisms contribute to the pathogenesis and clinical expression of AD and to showcase evolving methods to understand how vascular mechanisms contribute to abnormal brain and cognitive aging. Dr. Mark Bondi will open the symposium by focusing on the need for better recognition of the contribution of multiple pathologies to clinical AD and its trajectory. Dr. Adam Brickman will address the role of white matter hyperintensities (WMH) in cognitive aging and AD, reviewing recent community-based cross-sectional and longitudinal findings implicating a posterior distribution of WMH. Dr. David Libon will build on Dr. Brickman's presentation by connecting neuropsychological errors to radiological evidence of WMH. Next, Dr. Rhoda Au will discuss neuropathological contributions of vascular burden on clinical profiles, including advances in quantifying cerebrovascular burden on autopsy. Finally, Dr. Angela Jefferson will describe methodological advancements in assessing and quantifying hemodynamic factors to better understand vascular contributions to cognitive aging and AD. The panel will discuss insights and the need for integrating vascular health into the conceptualization of the pathogenesis of AD.

Correspondence: *Angela L. Jefferson, PhD, Vanderbilt University, 2525 West End Ave, 12-th Floor, Suite 1200, Nashville, TN 37203. E-mail: angela.jefferson@vanderbilt.edu*

M.W. BONDI. The Need for Better Recognition of Multiple Pathologies in Alzheimer's Disease.

The prevailing pathophysiologic model of AD (Jack et al 2013) suggests that amyloid deposition initiates a cascade that drives AD pathogenesis and secondarily induces the formation of abnormal tau protein, tau-mediated neural injury and neurodegeneration, metabolic and structural brain changes, and culminates with cognitive and functional impairments. However, recent studies show that memory changes often precede these purported antecedent biomarker changes, markers of neurodegeneration (eg, metabolic or default network abnormalities) can precede Aβ changes, and that Aβ is not required to develop neurodegeneration within AD-affected regions. Jack et al's (2012) own work shows neurodegenerative biomarker positivity in the face of normal amyloid levels in 23% of their sample - all of which suggests possible modifications to this temporal sequence and need for other biomarkers not suggested by Jack et al. It is widely recognized that most cases of AD have mixed vascular pathology (Zlokovic 2011); Schneider et al (2009) have found in probable AD that infarction at autopsy is nearly as common as pure AD pathology; and occult cerebrovascular disease (CVD) pathology (eg, atherosclerosis of the circle of Willis) is present in nearly 80% of AD cases. Despite these findings, considerably less attention has been paid to CVD biomarkers in preclinical AD. Our preliminary work shows that regionally-specific vascular changes contribute to AD cognitive declines and that associations between vascular and AD biomarkers in cognitively normal older adults suggest that the addition of vascular biomarkers will be useful in the investigation of preclinical AD. Improving our ability to detect underlying vascular changes responsible for tissue damage before it occurs could advance early protective treatments and prevent cognitive declines due to vascular disease. Development of such methods would also represent a major advancement in detection and treatment opportunities in preclinical AD.

Correspondence: *Mark W. Bondi, VASDHS (116B), 3350 La Jolla Village Dr, San Diego, CA 92161. E-mail: mbondi@ucsd.edu*

A.M. BRICKMAN. Considering the contribution of white matter hyperintensities to cognitive aging and Alzheimer's disease.

The prevailing hypothesis about the pathogenesis of Alzheimer's disease (AD) suggests a cascade of biological events that leads to dementia. According to the model, abnormal β-amyloid processing leads to brain amyloidosis, precipitating tau-related neuronal and synaptic dysfunction, and neurodegeneration, which manifest ultimately as cognitive decline and dementia. However, despite fairly consistent observations showing a relationship of vascular risk factors and frank vascular disease with AD, vascular factors have not been incorporated formally into the proposed theoretical model of AD pathogenesis or newly proposed

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

research criteria for AD and its antecedent conditions. The gradual accumulation of vascular risk factors manifest in the brain as small vessel cerebrovascular disease, visualized as hyperintense signal, or white matter hyperintensities (WMH), on T2-weighted magnetic resonance imaging (MRI). The current presentation will focus on the role of WMH in cognitive aging and AD, reviewing recent cross-sectional and longitudinal findings from our community-based study of aging and dementia, which systematically collected high resolution MRI scans on over 750 participants. Findings implicate a posterior distribution of WMH in amnestic syndrome and in prediction of future AD. Recent research from our laboratory will also be discussed that seeks to understand the pathological basis of regionally-distributed WMH and AD. White matter hyperintensities comprise a variety of histopathological changes, may interact with primary AD pathologies, and appear to be associated with neurodegenerative changes in medial temporal lobe.

Correspondence: *Adam M. Brickman, Columbia University, PS Box 16, 630 West 168th Street, New York, NY 10032. E-mail: amb2139@columbia.edu*

D.J. LIBON, D.A. DRABICK, T. GIOVANNETTI, J. EPPIG, G. WICAS, L. BRENNAN, L. DELAN-WOOD, D.A. NATION, M.W. BONDI, R. AU & R. SWENSON. Defining Alzheimer's/Vascular Spectrum Syndromes: An Error Analysis.

Alzheimer's disease (AD) and vascular dementia (VaD) are viewed as separate dementia syndromes. Yet, at autopsy most dementia patients present with mixed gray matter/vascular lesions. Latent class analysis classified 223 AD/ VaD patients into amnesic (n=29, 13%), dysexecutive (n=49, 22%) mild/mixed (n=91; 41%) and moderate/mixed groups (n=54; 24%). MRI measurements of hippocampal volume and white matter disease were available for some patients. When executive tests were assessed as a function of time, dysexecutive patients presented with a precipitous negative slope compared to other groups ($p<.001$). On lexical access tests moderate /mixed patients generated fewer shared fewer semantic attributes ($p<.011$) and more prototypic responses than other groups ($p<.001$), suggesting disrupted semantic knowledge. Memory test performance revealed equal amnesia for moderate/mixed and amnesic patients compared to other groups ($p<.001$). Moderate/ mixed and amnesic patients produced more cued recall intrusion errors (CRIs) than other groups ($p<.026$) with CRIs more prototypic compared to other groups ($p<.030$). Dysexecutive patients endorsed more recognition interference foils than other errors ($p<.001$) suggesting a source recall problem. Moderate/mixed patients presented with smaller hippocampal volume; dysexecutive patients presented with significant white matter disease. In sum, amnestic patients presented with a circumscribed amnesia suggesting AD pathology confined to the medial temporal lobe; the moderate/mixed group presented both amnesia/disrupted semantic knowledge suggesting diffuse AD pathology. Dysexecutive patients presented with gross white matter involvement/striking executive dysfunction suggesting small vessel VaD. Mild/mixed patients presented with broad but less severe cognitive deficits suggesting diffuse but less AD pathology. Error analysis of statistically-determined neuropsychological groups provides a means to identify AD/ VaD spectrum dementia syndromes.

Correspondence: *David J. Libon, Department of Neurology, Drexel University, College of Medicine, Philadelphia, PA 19102. E-mail: dlibon@drexelmed.edu*

R. AU, J.J. HIMALI, J. YUAN, A. BEISER, A. MCKEE, P.A. WOLF & S. SESHADRI. Novel Vascular Brain Injury Score: Framingham Heart Study.

Background: This presentation will introduce an aggregate neuropathologic atherosclerotic brain injury score (AIS) and relate it to a measure of cardiovascular risk and to Alzheimer's disease pathology in persons free of clinical stroke and dementia. The Framingham Heart Study developed a novel neuropathologic measure, the Atherosclerotic Injury Score (AIS) that captures the presence and severity of vascular injury on a continuous scale. The measures comprising the AIS include silent macroscopic infarcts, lacunes, microinfarcts, atherosclerosis, arteriolosclerosis, and white matter integrity in brain regions.

Methods: Between 1997-2011, 148 subjects came to autopsy,60 of whom were free of clinical stroke and dementia at the time of death. Multivariable linear regression assessed the relationship of AIS scores with the Framingham Stroke Risk Profiles (FSRP), a composite score of cardiovascular risk factors measured at midlife and within five years of death. AIS and its components were also related to AD pathology.

Results: AIS was positively associated with the FSRP measured within five years of death, even after adjusting for ApoE ($p<0.01$), but not with midlife FSRP. AIS was also significantly related to total neuritic plaques (NP) ($p<0.05$), although not after adjusting for ApoE. AIS components, microinfarcts ($p<0.05$) and arteriosclerosis ($p<0.05$) were also linked to total NP, but again not after adjusting for ApoE. AIS and its components were not associated with either diffuse plaques or neurofibrillary tangles.

Discussion: In a community sample of clinical stroke- and dementia-free persons, the FSRP was correlated with a semi-quantitative measure of aggregate vascular brain injury, providing tissue validation of this simple clinical measure. Further, increasing vascular burden was associated with increased fibrillar amyloid plaque; this may be attributable to the impact of an APOE e4 genotype on both pathologies or a synergistic interaction between the two.

Correspondence: *Rhoda Au, 72 E. Concord Street, Boston, MA 02118. E-mail: rhodaau@bu.edu*

A.L. JEFFERSON. Methodological advances for assessing vascular contributions to Alzheimer's disease.

A poorly understood aspect of cognitive aging is the association between hemodynamics and Alzheimer's disease (AD) pathogenesis. Clinical and epidemiological data from my laboratory suggest that, independent of vascular risk factors, very modest reductions in systemic hemodynamics are associated with clinically detectable cognitive impairment, reduced gray matter volume, increased white matter hyperintensities (WMH), and reduced normative cerebral perfusion values. Such observations may be due to subclinical systemic blood flow disruption altering cerebral blood flow (CBF) homeostasis. Such CBF alterations are especially likely among older adults with compromised cerebral circulation control mechanisms, placing the brain at greater risk for cerebrovascular disease and AD pathogenesis. That is, while vascular pathology and AD pathology may develop independently, compromised cerebrovascular health has been shown to propagate amyloid deposition, is associated with compromised β-amyloid clearance, and contributes to faster clinical manifestation and trajectory of AD. Thus, systemic hemodynamics may affect cerebral hemodynamics in older adults with compromised cerebral circulation control mechanisms, contributing to the pathogenesis or exacerbation of amyloid deposition and subsequent neuronal injury. The purpose of this presentation is to review essential and cutting-edge methods for assessing systemic and central hemodynamic factors in understanding vascular contributions to cognitive aging and AD. Methods assessing both systemic factors (e.g., ambulatory blood pressure monitoring, cardiac MRI methods) and cerebral factors (e.g., cerebrovascular reactivity, vessel encoded blood flow, cerebrovascular architecture, and high-throughput quantitative neuropathological markers) will be reviewed. Implementation of such methods is necessary to advance research in understanding the relation between hemodynamics and AD risk.

Correspondence: *Angela L. Jefferson, 2525 West End Avenue, 12th Floor - Suite 1200, Nashville, TN 37203. E-mail: angela.jefferson@vanderbilt.edu*

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

Paper Session 6: Psychopathology, Emotion and Motivation

Moderator: Michael Basso

10:45 a.m.–12:15 p.m.

J.G. KEILP, S.R. BEERS, A.K. BURKE, N.M. MELHEM, M.A. OQUENDO, D.A. BRENT & J. MANN. Neuropsychological Deficits in Past Suicide Attempters with Varying Levels of Depression Severity.

Objective: Our previous work identified deficits in interference processing and learning/memory in two cohorts of past suicide attempters (Keilp et al., 2001; Keilp et al., 2013) who were currently depressed and medication-free. In this study, we extend this work to a third independent sample studied at various stages of illness and treatment (mild symptoms, on average) to determine if these deficits in past suicide attempters are evident during a less severe clinical state and to identify potential intermediate phenotypes for familial aggregation studies.

Participants and Methods: Eighty individuals with a past history of major depression and suicide attempt were compared to eighty-one individuals with a history of major depression and no life-time suicide attempts on a battery of neurocognitive measures assessing attention, memory, abstract/contingent learning, working memory, language fluency, and impulse control.

Results: Past attempters performed more poorly in attention, memory, and working memory domains, but also in an estimate of premorbid intelligence. After correction for this estimate, tests that had previously distinguished past attempters – a computerized Stroop task and the Buschke Selective Reminding Test – remained significantly worse in attempters. In a secondary analysis, similar differences were found among those with the lowest levels of depression (HDRS<10) suggesting that these deficits may be trait markers independent of current symptomatology.

Conclusions: Deficits in interference processing and learning/memory constitute an enduring defect in information processing, that may contribute to poor adaptation, other higher-order cognitive impairments, and risk for suicidal behavior in the context of depression. Data on the offspring of these patients has been collected and preliminary analyses will be presented.

Correspondence: *John G. Keilp, Ph.D., Psychiatry, NYSPI/Columbia University, Box 42, NYSPI, 1051 Riverside Drive, New York, NY 10032. E-mail: jgk13@columbia.edu*

J. SCOTT, G.E. MATT, K.M. WROCKLAGE, C. CRNICH, J. JORDAN, S.M. SOUTHWICK, J.H. KRYSTAL & B.C. SCHWEINSBURG. A Quantitative Meta-analysis of Neurocognitive Functioning in Posttraumatic Stress Disorder (PTSD).

Objective: The purpose of this study is to conduct a systematic meta-analysis of cognitive deficits associated with PTSD and describe the profile of cognitive deficits and potential moderating factors.

Participants and Methods: Forty-nine studies were analyzed, totaling 1,236 participants with PTSD, 896 trauma-exposed comparison subjects, and 724 healthy subjects without trauma exposure. Effect size estimates were calculated using a mixed-effects meta-analysis.

Results: Analyses of funnel plot asymmetry revealed potential small study biases, such that studies with small samples evidenced larger effect sizes than those with larger samples. Potential explanations for these effects included study exclusion criteria and publication bias. Even after accounting for these effects, a significant overall effect size remained, although magnitudes significantly varied by cognitive domain. The largest effect sizes were evident in verbal learning (d=.67), speed of information processing (d=.64), attention/working memory (d=.63), and verbal memory (d=.56), with small-to-medium deficits in executive functions, language, visual learning and memory, and visuospatial abilities. The magnitude of effect size estimates were significantly larger in treatment-seeking versus community samples but were not affected by study head injury exclusion criteria or type of inciting trauma. Effect size estimates were also significantly affected by IQ discrepancies between PTSD and comparison groups and ADHD exclusion criteria.

Conclusions: Findings from this meta-analysis, the first to examine a broad range of cognitive domains in PTSD, suggest that PTSD is associated with generally small-to-medium adverse effects on cognitive functioning that vary by cognitive domain and are consistent with dysfunction in fronto-limbic networks. However, results also highlight the methodological limitations in this literature, including potential small study bias, variability in psychiatric exclusion criteria, and between-group discrepancies in premorbid intelligence.

Correspondence: *J. Cobb Scott, Ph.D., Psychiatry, Perelman School of Medicine at the University of Pennsylvania, 3400 Spruce Street, 10th Floor, Gates Building, Philadelphia, PA 19104. E-mail: cobb.scott@yale.edu*

M. CALAMIA, K. MARKON & D. TRANEL. Apathy in a Neuropsychological Patient Sample: Factor Structure and Clinical Correlates.

Objective: The term "apathy" is used to refer to decreases in purposeful or goal-directed behavior. Apathy is hypothesized to include separate cognitive (i.e., decreased interest), behavioral (i.e., decreased action), and emotional (i.e., decreased emotional expression) symptoms. However, these three types of symptoms are not comprehensively assessed in existing apathy questionnaires. We aimed to develop a novel informant report measure of apathy symptoms, investigate the factor structure of apathy symptoms, and examine the relationship of different types of apathy symptoms to several clinically relevant variables.

Participants and Methods: 200 participants, including patients undergoing assessments at a neuropsychology clinic and patients with a history of focal brain damage, were each evaluated by an informant who knew them well. Informant report measures included a novel apathy symptom measure and measures of activities of daily living, depression, and positive and negative affect. Informants also completed a measure of their own caregiver distress. Additionally, a subset of patients completed a variety of neuropsychological measures as part of a clinical or research evaluation.

Results: Using confirmatory factor analysis to compare models, the best fitting model of apathy symptoms included two factors: 1) cognitive and behavioral symptoms and 2) emotional symptoms and alogia, or lack of speech. Both factors were significantly associated with caregiver distress, functional impairment, and a number of neuropsychological measures, including measures of memory, executive functioning, and processing speed.

Conclusions: This two factor structure of apathy symptoms resembles the two factor structure commonly found for negative symptoms of psychosis (i.e., amotivation and diminished expression). The similar symptom structure suggests research on the treatment of negative symptoms may be relevant to apathy. The results also highlight the utility of assessing apathy as part of a neuropsychological evaluation.

Correspondence: *Matthew Calamia, MA, Psychology, University of Iowa, E11 Seashore Hall, University of Iowa, Iowa City, IA 52242. E-mail: matthew-calamia@uiowa.edu*

S. TERZYAN, D. ROSENBLATT, A. MARTINEZ & P. HAERICH. Anxiety and fear drive specific perceptual level shifts: Global vs. Local Processing.

Objective: The purpose of this study was to identify how specific emotions (amusement, fear, anxiety, etc) can lead to different shifts in perceptual attention. Previous studies have suggested that anxiety and fear facilitate the localization of perceptual attention, while positive emotions facilitate the globalization of perceptual attention. However, other studies have found the opposite, with anxiety/fear inducing globalized attention and positive emotional states inducing localized attention. The current study predicts that anxious and fearful states, though both are negative, produce different attentional shifts. Fear and anxiety have

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

been shown to represent qualitatively distinct emotional states. Fear functions as an immediate alarm system while anxiety acts as a future-oriented state of hypervigilance. These negative as well as positive and neutral emotions were evoked in this study using film clips and IAPS (International Affective Picture System) images. Specifically, negative IAPS images have been shown by previous studies to induce acute threat (fear) while the film clips induce a context of potential harm (anxiety).
Participants and Methods: In the current study, 32 students performed a cognitive task in which, following each film clip or IAPS image, they were presented with a Navon figure with large letters composed of smaller letters (e.g., a large L made up of smaller H's) and asked to quickly but accurately indicate if a target letter was present.
Results: We found a three-way interaction involving Medium (IAPS, Film clips) X Target Level (Global, Local) X Valence (Positive, Negative, Neutral). Responding after negative film clips was faster for global stimuli but responding after negative IAPS images was faster for local stimuli ($F = 4.18$, $p = .05$).
Conclusions: These data suggest that acute fear (measured by negative IAPS images) localizes attention while anxiety (measured by negative film clips) globalizes attention, suggesting potential clinical implications for distinguishing among anxiety disorders.
Correspondence: *Seda Terzyan, MA, Loma Linda University, 11559 Cantlay St, North Hollywood, CA 91605. E-mail: Sterzyan@gmail.com*

Y. NONIYEVA, N. BOTT, P. PRESSMAN, S. DUTT, B.L. MILLER, V. STRUM & J.H. KRAMER. Dissociable age-related changes in Neuroanatomical Regions for Emotion and Cognition.
Objective: Research has shown that while aging is associated with general cognitive decline, emotional processing remains stable or in some cases may improve. Our goal was to determine if these different age-related trajectories had a neuroanatomical basis. We hypothesized that, in contrast to age-related volume decreases in brain regions that support cognition, there would be preservation of volume in regions that subserve emotion.
Participants and Methods: Brain MRIs were obtained for 381 cognitively healthy older adults with a mean age of 67.3 (SD=8.9. Of those, 139 underwent a second MRI (mean interval=1.9 years). Gray matter volumes for structures that support cognition (bilateral midfrontal and lateral frontal gyrii, lateral parietal and temporal cortex, and medial temporal lobes) and emotion (bilateral amygdala, rostral anterior cingulate, insula, orbito-frontal cortex and nucleus accumbens) were obtained using FreeSurfer.
Results: Cross-sectional analyses showed that age was negatively correlated with regions associated with cognition($r= -0.36$, $p<.001$) but not emotion($r=- 0.06$, $p=0.22$). Longitudinal analyses yielded a significant region X time interaction ($F (1, 138) = 32.33$ $p<.001$), with cognitive regions exhibiting greater volume loss (1.5%) than emotion regions (0.62%).
Conclusions: Both cross-sectional and longitudinal analyses showed that, compared with declining volume in brain regions that support cognition, there is preservation in the neural systems that support emotion in healthy aging. These findings are consistent with previous models of emotional aging and suggest that there is a neuroanatomical basis for enhanced affective functioning in healthy older adults.
Correspondence: *Yuliana Noniyeva, UCSF, 2818 22nd St, San Francisco, CA 94110. E-mail: yuliana.noniyeva@gmail.com*

E. DOBRYAKOVA, H. GENOVA, N. CHIARAVALLOTI, J. DELUCA & G.R. WYLIE. The Influence of Motivation on Cognitive Fatigue in Individuals with Multiple Sclerosis: a Theoretical Proposal with Functional Neuroimaging Support.
Objective: Up to 90% of people with multiple sclerosis (MS) experience cognitive fatigue (Walker et al., 2012) that has been proposed to be associated with impairment of the striatum and the ventromedial prefrontal cortex (VMPFC). These regions have been shown to be involved in affective and cognitive processes, such as effort calculation and reward valuation, suggesting a possible link between cognitive fatigue and reward processes. The functioning of these regions and motivational tendencies in individuals with MS who experience cognitive fatigue have yet to be explored.
We propose that an inflated perception of effort requirements to perform an action and underestimation of the reward value leads to cognitive fatigue that arises when the functioning of the these regions is disrupted (Dobryakova et al., 2013). Hence, manipulating motivational salience during a task may modulate the expression of cognitive fatigue in individuals with MS.
Participants and Methods: To test our theory we recruited individuals with MS who experience cognitive fatigue and healthy subjects (HC). While performing a task in an MRI scanner they were presented with a reward and a no reward condition where they were able to win a monetary reward or were not presented with such opportunity. Self-reported fatigue ratings were also acquired during the scan.
Results: Data showed that striatal activity in MS group is less robust relative to HCs, who showed significantly increased striatal activation when winning money. Also, MS subjects reported a 20% decrease in cognitive fatigue during the task when switching from the motivating reward to a no reward condition.
Conclusions: This suggests that MS subjects who experience fatigue may judge a given amount of reward differently from HCs and that motivation can modulate the expression of fatigue in MS. The current study is the 1st to examine whether reward presentation modulates cognitive fatigue and activity of the reward network in individuals with MS and cognitive fatigue.
Correspondence: *Ekaterina Dobryakova, Ph.D, Kessler Foundation, 300 Executive dr, West Orange, NJ NJ. E-mail: edobryakova@kesslerfoundation.org*

Paper Session 7: Executive Functions

Moderator: Robert Thoma

10:45 a.m.–12:15 p.m.

M. FEIGON, L. PIPER, M. VERNALE, A. POPA, M. GOWHARI, R. MOLOKIE, J. HASSAN, N. PLISKIN & D. NYNEHUIS. Cognitive Variables Predicting Activities of Daily Living in African-Americans with Sickle Cell Disease.
Objective: Functional assessment is an important part of examining older adults at risk for vascular dementia. Yet, little is known about activities of daily living in non-elderly medical populations. Patients with sickle cell disease (SCD) are at risk for ischemic attacks at an early age, which may result in cognitive and functional impairment. Thus more literature is needed to investigate the capacity of these patients to live independently. It is therefore critical to understand cognitive factors that predict activities of daily living in individuals with SCD. The present study examined cognitive variables predicting health and safety knowledge and instrumental activities of daily living in a sample of patients with SCD.
Participants and Methods: Participants (N = 62, ages 18 to 65) had a diagnosis of SCD, and completed the Independent Living Scales (ILS) Health and Safety subtest (Loeb, 1996), Instrumental Activities of Daily Living (Lawton & Brody, 1969), 60 Minute VCI Neuropsychological Protocol (Hachinski et al., 2006) as well as a measure of depressive symptoms (CES-D: Radloff & Teri, 1977).
Results: The results demonstrated that broad executive functioning (processing speed, attention, working memory, and mental flexibility) predicted performance on ILS Health and Safety ($p < .05$, $R2 = 0.26$) even after controlling for the effects of key demographics. Memory did not significantly contribute to the overall model. Neither memory nor executive domains were predictive of performance on the IADL.

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

Conclusions: It has been hypothesized that executive dysfunction is a significant factor in individuals with SCD. It is important to document empirical support for the relationship between this neurocognitive domain and activities of daily living as ADLs in adults with SCD have been rarely studied in relation to cognitive impairment. Future studies will examine specific subdomains that contribute to health and safety knowledge in individuals with SCD.
Correspondence: *Maia Feigon, M.A., Illinois Institute of Technology, 1922 W. Bradley Pl., Chicago, IL 60613. E-mail: mfeigon@iit.edu*

N.T. BOTT, M. SAGGAR, E. QUINTIN, E. KIENITZ, G. HAWTHORNE, A. ROYALTY & A.L. REISS. Strategy Use on the D-KEFS Design Fluency Test: Relationships with Cognitive Functioning, Executive Functioning, and Working Memory.
Objective: Interpretation of performance on executive functioning (EF) tests is based on quantification of responses, and often supplemented by qualitative appraisal of strategy. However, use of strategies has yet to be extensively quantified. We tested the hypothesis that strategy use would be related to measures of global cognitive and EF. We assessed strategy use on the Delis Kaplan Executive Function System (D-KEFS) Design Fluency (DF), a commonly used assessment of EF for which strategy use has not been examined.
Participants and Methods: Thirty-six healthy participants took part in the study (Mean-age(S.D)=28.9years(5.9); 17F). We measured cognitive functioning with the WASI-II, EF with the D-KEFS Color Word Interference Test (CWIT), and working memory (WM) with the WAIS-IV digit span test. Strategy use was defined as a string of two or more consecutive designs, with subsequent designs modified to create a unique design. Three types of strategies were quantified: Gestalt (rotation or translation of design), Variation (change in one of the four lines), and Hybrid (combination of Gestalt and Variation strategies).
Results: Pearson's r correlations revealed significant relationships between the number of strategy-based designs controlling for total unique designs on the switching condition and VIQ (r=.592, p<.001), FSIQ (r=.545, p=.001), and digit span scaled score (r=.361, p=.036). Participants were divided into two groups: those who did vs. did not use a strategy. MANOVA revealed group differences on VIQ (F=6.590, p=.015), PIQ (F=4.297, p=.046), CWIT inhibition (F=7.564, p=.010), and CWIT inhibition/switching (F=5.688, p=.023).
Conclusions: Results indicate that individuals who use a greater number of strategies on EF tasks perform better on EF and WM tasks, and exhibit higher cognitive functioning. These findings suggest that quantifying use of strategies holds promise for identifying cognitive deficits and assets, over and above purely qualitative appraisal of performance and supplements quantification of responses.
Correspondence: *Nicholas T. Bott, Psychiatry and Behavioral Sciences, Stanford University School of Medicine, 401 Quarry Rd., MC 5719, Palo Alto, CA 94305. E-mail: nbott@stanford.edu*

D. WHITESIDE, T. KEALEY, M. VOGLER, S. PARIKH, L. RICE, M. BASSO & B. ROPER. Verbal Fluency: Language or Executive Functioning Measure?
Objective: Measures of phonetic and semantic fluency, the Controlled Oral Word Association Test (COWAT; Benton & Hamsher, 1989) and Animal Fluency are often thought to be measures of executive functioning (EF). However, some studies have noted there is also a language component to these tasks. Henry & Crawford (2004) reported that phonemic and semantic fluency were related to frontal structures, but semantic fluency was also related to temporal structures. However, no studies examined what cognitive abilities are measured by verbal fluency tasks. Thus, the current factor analytic study examined the underlying cognitive structure of verbal fluency.
Participants and Methods: Participants were 318 consecutive patients (55% female, mean age= 45.1 [SD=13.4], mean education =13.3 [SD=2.3]) referred for neuropsychological evaluation who completed the language and EF measures, including COWAT (FAS version), Animal Fluency, Boston Naming Test (BNT), Vocabulary (Wechsler Adult Intelligence Scale-III,WAIS-III), Wisconsin Card Sorting Test (WCST, perseverative responses), and Trailmaking Test, Part B (TMT-B).
Results: A factor analysis was calculated and a two factor solution was found. A varimax rotation indicated that the first factor had significant loadings for BNT and Vocabulary, and was labeled a Language factor. The second factor was labeled the EF factor because of significant loading from measures like the WCST and TMT-B. In particular, results indicated that FAS loaded approximately equally on both factors (factor loadings = .54 for Language and = .51 for EF), while Animal Fluency loaded more heavily on the EF factor (.57), and to a lesser extent on Language (.44).
Conclusions: These results generally supported the hypothesis that verbal fluency measures both language and EF. Results indicated that phonemic fluency (FAS) semantic fluency (Animal Fluency) are likely related to both frontal and temporal structures. These results are generally consistent with the findings of Henry and Crawford (2004) in PD patients.
Correspondence: *Douglas Whiteside, Ph.D., Adler School of Professional Psychology, 17 N. Dearborn Street, Chicago, IL 60611. E-mail: dwhiteside@adler.edu*

K. CARBINE, K. HILL, T. MASTERSON, E. CHRISTENSON, N. KILLPACK, R. LECHEMINANT, J. LECHEMINANT & M.J. LARSON. The Influence of Treadmill Walking on Response Inhibition and Conflict Interference: Neuropsychological Implications.
Objective: An increasing trend in the workplace is for employees to walk on treadmills while working in order to attain known health benefits, such as decreasing back pain, alleviating stress, and reducing weight gain. However, the effect of treadmill walking on cognitive performance, such as response inhibition, is not well known and may affect productivity. Our objective was to determine if there are significant behavioral differences in response inhibition and conflict-related interference between participants walking on a treadmill and sitting controls.
Participants and Methods: Seventy-six healthy individuals were randomly assigned to sitting (n = 39; 17 female) or treadmill walking (n = 37; 23 female) conditions. All participants completed a computerized Go-No/Go and a computerized Eriksen Flanker task. Accuracy and response time data were analyzed using repeated measures analysis of variance (ANOVA).
Results: Participant groups did not differ in body mass index or overall fitness levels (ps > .20). Separate ANOVAs on response time (RT) and accuracy data showed the expected effects of task condition (longer RTs and more errors to No-Go than Go trials on the Go/No-Go and to incongruent than congruent trials on the flanker task; ps < .001). There were no significant main effects or interactions by group (ps > .24).
Conclusions: Results show no significant between-groups differences for those walking on a treadmill versus sitting on indices of response inhibition and conflict-related interference. The results suggest that walking on a treadmill does not decrease efficiency in these cognitive tasks and may not impact workplace performance.
Correspondence: *Michael J. Larson, Ph.D., Department of Psychology, Brigham Young University, 244 TLRB, Provo, UT 84602. E-mail: michael_larson@byu.edu*

K.F. HOTH, K.L. MOREAU, H.D. WEINBERGER, K. MESCHEDE, J.D. CRAPO, D.J. MOSER, E. KOZORA, B.J. MAKE, R. BOWLER, K.E. HOLM & F.S. WAMBOLDT. Arterial Stiffening is Associated with Reduced Executive Function and Processing Speed in COPD.
Objective: Cognitive impairment is present in 30-75% of patients with chronic obstructive pulmonary disease (COPD). Airflow obstruction and hypoxemia explain a significant but modest amount of the variance in cognition suggesting that other comorbidities also influence cognition in COPD. The aim of this study was to examine arterial stiffening as a risk factor for reduced cognition in COPD. We hypothesized that arterial

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

stiffening would be associated with worse performance on measures of executive functioning and psychomotor speed after adjusting for demographic and pulmonary measures.

Participants and Methods: Fifty-eight former smokers with COPD (mean age=70.3, SD=6.8; 41% female) completed questionnaires, neuropsychological testing, spirometry, 6 minute walk test, and carotid artery ultrasonography (beta stiffness index). Neuropsychological tasks were grouped into five domains (executive-psychomotor-speed, immediate memory, delayed memory, visuospatial skills, language). Five regression models were carried out (one for each cognitive domain) including the following predictors: age, sex, premorbid intellectual functioning (WRAT-4 Reading), airflow obstruction (FEV1), hypoxemia (SpO2), exercise capacity (6MWT), and beta stiffness index.

Results: The regression model predicting executive-psychomotor speed was significant (F= 2.32, p=.036). Higher beta stiffness index was associated with worse performance in the executive-psychomotor speed domain (Beta stiffness index β = -1.50, p=.011). Beta stiffness index was not significantly associated with performance in the other cognitive domains.

Conclusions: Arterial stiffening is associated with reductions in executive functioning and psychomotor speed in patients with COPD. This initial study suggests that comorbid cardiovascular disease has an adverse impact on brain function in COPD. Maximizing treatment of cardiovascular comorbidity in COPD could have beneficial effects on cognition in this population.

Correspondence: *Karin F. Hoth, Ph.D., University of Iowa, University of Iowa- Psychiatry, 200 Hawkins Drive, W278GH, Iowa City, IA 52242. E-mail: karin-hoth@uiowa.edu*

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

Author Index
Forty Second Annual Meeting
International Neuropsychological Society

February 12-15, 2014
Seattle, Washington, USA

Abeare C., 137, 173
Ablitz B., 54
Abrams G., 53
Abuyo T., 43
Acevedo M., 225
Acker M.A., 171
Acosta L., 178
Acosta V., 64, 65
Adam F., 246
Adam S., 43
Adams T.J., 144
Adams W.V., 85
Adler Werner M., 207
Agarwal R., 194
Agbayani K.A., 225
Ahern D., 30
Ahmed F.S., 138
Ahmed M., 82
Ailion A., 6, 8
Aitken M.E., 20
Ajilore O., 192
Al-Haj M., 77
Alameddine L.R., 53
Albasha H., 204
Albert M., 122
Albert M.L., 66
Alberty J., 79
Alexander A., 207
Alexander K., 57, 202, 261
Alexander M., 45
Alhassoon O., 45
Allart A., 99
Allen B.L., 193
Allen J.B., 182
Allen M., 258
Allen N., 59, 135
Almendarez C., 37
Almendarez C.Y., 37
Almklov E., 116
Alonso-Sánchez B., 105
Alosco M., 170, 171, 245
Alosco M.A., 172
Altmann L., 168, 191
Altmann L.J., 63, 65, 94, 95
Alty J., 81
Alverson W.A., 159
Amador R., 37
Amanda H., 136
Amaya S., 28, 29
Amaya-Hodges M., 22, 150
Amidi A., 169
Amory J., 52
Amsbaugh H., 201
An K., 128
Ances B., 110, 111
Ances B.M., 112
Andersen J.W., 200
Anderson A., 131
Anderson A.J., 119, 166
Anderson J., 62, 106, 194, 235
Anderson J.S., 207
Anderson L.B., 260
Anderson P., 235
Anderson V., 24
Andresen E., 177
Andresen E.N., 129
Andrew B., 182
Andrews A.P., 176
Andrews B., 177
Ang J., 144, 218
Angers K., 196, 197
Angers K.A., 197
Angkustsiri K., 118
Annett R.D., 12, 147, 228
Annunziato R., 36, 263
Anthony L., 202, 207
Anthony L.G., 57
Antonini T.N., 97, 103
Antonucci S.M., 34
Apostolova L., 75, 153
Apostolova L.G., 158, 159
Appleman E.R., 62
Arbess G., 107, 114
Archer C., 196
Archibald S., 111
Aréchiga A., 220, 244
Aréchiga A.L., 242
Arenivas A., 150
Ares K., 214
Areshenkoff C.N., 223, 227
Arevalo I., 91
Arjunan A., 248
Armistead-Jehle P., 125
Armour A.C., 212
Armstrong C.L., 10
Armstrong G., 121
Armstrong G.T., 120
Arnett A.B., 96, 101
Arnett P., 72, 133
Arnett P.A., 25, 71, 133, 134
Arnold S., 55
Arnold S.E., 158
Aronsson M., 56
Arora J., 179
Arslanagic E., 142
Artiola i Fortuny L., 263
Artnak M., 212
Artz A., 5
Asemota B., 29
Ashford J.M., 58, 120, 121
Aslan S., 26, 235
Assuras S., 191
Atkins J.E., 22, 101
Atkins K., 14
Atkinson J., 108
Atkinson M., 107
Au A., 112
Au R., 43, 156, 164, 251, 265, 266
Aune E., 100
Avery E., 186, 248
Avila J., 75, 261
Axelrad M., 175
Axelrod B.N., 129

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

Ayaz H., 72, 189
Ayaz S.I., 31
Aylward S., 23
Aznar A., 141
Babcock-Parziale J., 38
Babiak M., 35
Bacon B.A., 27
Badiee J., 108
Baek R., 175, 180
Bailey J.N., 120
Bailey R.L., 193
Baitz H., 257
Baitz H.A., 84
Baker A., 196, 197
Baker A.M., 197
Baker B., 55, 56
Baker D.A., 25
Baker L., 62, 75, 110, 111
Baker L.M., 112, 252
Bal E., 202
Baldassarre M., 175, 180
Baldwin A.J., 241
Baldwin S., 204
Ball K., 48
Balldin V., 138
Balldin V.H., 74
Banerjee P., 7
Bangen K.J., 43, 188, 249, 251
Bangen K.L., 180
Barghi A., 70
Bark J.S., 190, 232, 233
Barlow K.M., 104
Barnes A., 235
Barnes L., 210, 211
Barnett S., 30
Baron-Cohen S., 149
Barr A., 257
Barr A.M., 84
Barrera K., 29, 64, 138
Barrera L., 252
Barrera-Martinez L.M., 251
Barrett A., 32
Barrett A.M., 67
Barrett L., 177
Barrett M.J., 81
Barrio J., 153
Barsoum M., 263
Bartel T.A., 153
Barton M., 206
Basco B., 111, 112
Basso M., 14, 15, 92, 132, 220, 269
Basso M.R., 130, 139, 195, 196
Battapady H., 171
Batton D., 13
Bauer R., 256
Bauer R.M., 67, 80, 167, 182
Baum K.T., 96
Beall E., 36
Bearden C.E., 200
Bearden D.J., 17
Beaton E.A., 118
Beattie A., 47
Beauchamp M., 93
Beauchamp M.H., 215, 217
Beaulieu C., 231
Becerra Cuellar D.C., 265
Beck A., 131
Beck A.N., 131
Becker J.T., 262
Becker S.P., 103
Beebe D.W., 96
Beene K., 139
Beers S.R., 267
Beeson P.M., 35
Begyn E., 12, 19
Behforuzi H., 34, 253
Behrendt J., 155
Beier M., 255
Beiser A., 251, 266
Bekele T., 107, 114
Belanger H.G., 39, 44
Bell B.D., 178
Bell K., 209
Bell K.R., 207
Bell R., 29
Bell S.P., 160
Bellows A., 12, 103
Belser-Ehrlich J., 255
Benbadis S.R., 179
Benedetto A., 183
Bengoetxea E., 198
Benjamin M., 86
Bennett D., 211
Bennett D.A., 247
Bennett J., 263
Bennett L., 200
Bennett M., 201
Benson L., 116
Benson L.M., 257
Bentler P., 61
Berard J., 69
Berger J.T., 161
Berger S., 21
Berggren K., 106
Berkner P.D., 22, 101
Berl M., 212
Berl M.M., 177
Bermudez C.I., 176, 216
Bernier A., 215
Bernier F.P., 104
Bernier R.A., 189
Bernstein D.M., 61, 245
Bernstein I.H., 79, 142
Bernstein L.J., 3
Berrigan L., 69
Berry D., 38, 126
Berry S., 18, 234
Bertone A., 204
Beseler C., 83
Betcher B., 251
Bettcher B., 253
Bettcher B.M., 90
Beyes L.A., 63
Bharij A., 229
Bhaumik R., 224
Bickel K., 60, 194, 228, 231
Bickel K.D., 232
Biddle C., 132
Bieliauskas L.A., 193
Bigio E.H., 66, 250
Bigler E., 43, 151, 205, 209
Bigler E.D., 19, 20, 154, 194, 207, 209, 235
Bilder R.M., 51, 61, 200, 238
Bilello M., 171
Billings N., 47
Binder A., 181
Binder D., 53
Birath J., 26, 28, 29, 262
Bischoff-Grethe A., 111
Bisen V., 170
Bishop J.R., 201
Bjorn D., 61
Bjornn D., 154
Bjornn D.K., 53
Black G., 23
Black J.M., 94
Black L., 12
Blackhurst Z., 98
Blackstone K., 107, 108, 110, 113, 135, 144
Blaha R.Z., 22
Blaine A., 217
Blasco P.M., 14
Blinkoff D., 79
Blinkoff D.C., 224
Bloch E.L., 200
Block N., 35
Blommaert K., 84
Blum A., 178
Bodapati A.S., 200
Boettcher A., 84
Bogdanova Y., 169
Boggero I., 252
Bolden K., 109
Bolinger E., 105, 133
Bollweg G., 83
Bolzenius J., 62, 75

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

Bolzenius J.D., 252
Bombardier C., 207
Bonacquisti A., 55
Bondi M., 128, 265
Bondi M.W., 42, 43, 76, 77, 78, 89, 156, 180, 240, 249, 251, 254, 265, 266
Bonner M., 10
Bonner S., 179
Bonner-Jackson A., 155
Boogerd W., 4, 189
Bookheimer S., 2
Bookheimer S.Y., 7
Booth J.E., 131
Borghammer P., 169
Borod J., 191
Bosemani T., 258
Bosworth C., 26, 235
Bott N., 268
Bott N.T., 81, 178, 222, 251, 269
Bourassa M.C., 231
Bourdeau T., 14, 15
Bourgeois B., 176
Bourgeois C., 107
Boutzoukas A.E., 182
Bovi J., 9
Bowers D., 60, 67, 80, 166, 167, 168, 231
Bowler R., 174, 269
Bowler R.M., 83
Boyer K., 176, 177
Boyle P., 210, 211
Boyle P.A., 247
Boyle R., 10
Bozgunov K., 85
Bozorg A.M., 179
Bradley M.M., 231
Bradstreet L., 206
Brady N., 243
Braje S.E., 261
Brandimore A.E., 191
Breen E., 78
Brefczynski-Lewis J., 233
Brei N., 117
Brekke J.S., 87
Breland M., 226
Brennan L., 43, 266
Brenner L., 176
Brent A., 68
Brent D.A., 267
Brew B.J., 110
Brewer J., 155
Brewster P., 211, 255
Brewster R., 150, 234
Briceno E., 186, 248
Briceno E.M., 193
Brickman A., 32, 156, 171
Brickman A.M., 89, 171, 226, 265
Brinckman D., 143
Briner T., 156
Brinkman T., 11, 121
Brinkman T.M., 4, 120
Brisson B., 231
Britz G.W., 225
Broggi M., 138
Broglio S.P., 44
Bromley E., 87
Brommelhoff J., 63
Brown C., 17
Brown D., 151
Brown D.S., 79
Brown G., 109, 111
Brown G.G., 153
Brown G.S., 187
Brown T., 122
Brown T.M., 22
Brown W.S., 260
Bruce J., 55, 56
Brunell A., 218
Brunetta J., 107, 114
Bryant K., 178
Bryer E., 240
Buchholz A., 201
Budding D.E., 28
Budson A., 162
Buelow M.T., 135, 217, 218
Bugescu N., 94
Bujarksi K., 180
Bujarski K., 175
Bunge S., 217
Bunner M., 98, 106
Bunting J.M., 260
Buonocore M.H., 118
Burch M., 65
Burchell A., 107, 114
Burk M., 243
Burk M.M., 160
Burke A., 59
Burke A.K., 267
Burke K.M., 229
Burke M.M., 80
Burns K.M., 39, 44
Burns T., 17, 234
Burns T.G., 18, 23, 150
Burton C.Z., 142, 200
Burton J., 258
Busch R., 129, 177
Bushnik T.L., 47
Butler A.J., 253
Butler J.S., 229
Butterfield L., 79
Butts A., 155
Butts A.M., 185, 233, 249
Byars J.A., 67
Bylsma F.W., 115
Cabeen R., 75
Cacace A.T., 38
Cagigas X., 262
Cahana-Amitay D., 66
Cahn-Weiner D., 178
Cairós M., 176
Calamia M., 192, 267
Call V., 230
Call V.R., 250
Calvo D., 73, 172
Campbell C., 59
Canas A., 68, 69
Cannon L., 57, 202
Cano H., 247
Cantu R., 26, 28, 29
Capon L.M., 11
Carbine K., 227, 269
Carey M., 185
Cariello A.N., 207
Carlitz A., 144
Carmichael J.A., 94
Caro Y., 161
Carper R., 206
Carr A., 110
Carrasco J., 239
Carrathers T., 199
Carson A.M., 202
Carter A., 195, 196
Carter K., 140, 159
Carter S., 100
Carvalhal A., 107, 114
Cary M., 168
Casey J.E., 102
Casher G.A., 63, 103, 234
Casnar C., 15, 117
Castellanos N.P., 189
Castellanos X., 226
Casto B., 94
Castro Couch M., 74
Castro M., 74
Catroppa C., 24
Cattie J., 86
Catton P.A., 3
Celestial J.E., 261
Challener D.M., 78
Chalmers L., 14, 15
Chamard E., 27
Chambers P., 202
Chan I., 112
Chandler Greenaway M., 3
Chang M., 106
Chang Y., 78, 86
Chapieski M.L., 10

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

Chapman S., 45, 52, 175
Charlton R., 248
Chaudhary A., 31
Chen A., 53, 209
Chen A.J., 210
Chen C., 206
Chen D., 180
Chen Y., 224
Chenji S., 68
Cherner M., 113, 262, 263
Cherrier M., 52
Chiaravalloti N., 48, 49, 72, 268
Chiaravalloti N.D., 73
Chiasson V., 217
Chin J., 34
Chiou K.S., 49, 239
Chiu D., 225
Chiu P., 264
Cho Y., 49
Choi H., 33
Choi L., 72
Choi S., 114
Choi T., 56
Chong J., 233
Christenson E., 227, 269
Christiansen L., 100
Christopher G.B., 16
Christopher H.C., 8
Chu K., 81
Chu Z.D., 20
Chung C., 241
Cimino C., 79, 184, 224
Cines S., 156, 157
Cirino P., 214
Cirino P.T., 92, 93, 216
Clark A., 42
Clark A.L., 40, 41, 128
Clark B., 27
Clark C.A., 33, 34, 146
Clark K.N., 58, 120, 121
Clark L.R., 78, 156, 249, 254
Clark U.S., 108
Clawson A., 195, 204
Clayson P., 43
Clayson P.E., 194, 195, 204
Cleveland M., 171
Clifford D., 113
Clifton W.E., 179
Climent G., 105
Cline C., 76
Cloughesy T.F., 7
Clouston S., 149
Coalson D.L., 147
Cobia D., 233
Cochrane M.M., 246
Cohen A., 54
Cohen J., 221, 248
Cohen M.L., 222
Cohen R., 170, 171
Cohen R.A., 108
Cohen S., 77
Cohen Sherman J., 155
Colcombe S., 226
Cole M.A., 53
Colledge M., 83
Collier A., 113
Collier S., 25, 262
Collignon O., 229
Collins E., 107
Collins N., 192
Collins R., 180
Combs D., 130, 195, 196
Combs H.L., 38, 126, 250, 256
Comi G., 68
Conklin H.M., 5, 58, 120, 121
Connery A.K., 25
Considine C.M., 173
Constable R., 179
Constance J.M., 63, 103, 186, 234
Constantine C., 178
Conturo T., 62, 75
Conway T., 86
Cook A., 82
Cook A.H., 248
Cook C., 105
Cook J., 131
Cool D., 57
Cool D.L., 16
Cooley S., 75, 252
Coolin A., 245
Cooper D., 37
Cooper D.B., 37
Cooperrider J.R., 207
Copeland J.N., 76
Cordella C., 155
Corey-Bloom J., 78
Cornett B., 186
Corona M., 26, 28, 29
Coronado N., 168
Correia S., 30, 154
Correll D., 183
Cosentino S., 156, 157, 162
Cottingham M.E., 261, 262
Covassin T.M., 44
Cox C., 262
Cox D., 257
Cox L.E., 58
Coxe S., 108
Coyne J., 54
Craddock C., 226
Crane N.A., 192, 224
Crane P.K., 152
Crapo J.D., 174, 269
Crawford S.G., 104
Creighton J., 191
Crevier-Quintin E., 223, 227
Crigler F., 176
Cristofalo E.A., 258
Crnich C., 267
Cronenwett S., 71
Cronin-Golomb A., 62, 169
Crosson B., 86
Crosson B.A., 253
Crouse E.M., 139
Crowell T., 257
Crucian G.P., 139
Cullum C., 26, 79, 140, 142, 159, 235
Cullum M., 159, 209, 210
Culotta V., 99
Culotta V.P., 91
Cummings S., 30
Cummock J., 154
Cunnion R., 120
Cuny N., 170
Cyrulnik S., 118, 119
Cysique L.A., 110
D'esposito M., 53
D'Orio V., 69
Dabbs K., 178
Dahm J., 49
Daley R.T., 244
Daly C., 29, 262
Damholdt M.F., 169
Damjanac G., 161
Dampier W., 112
Daniel A., 256
Daniel M., 139
Datko M., 206
Davey A., 243
Davey K., 14
Davey M., 14
David B.L., 125
David D., 52
Davis J., 178
Davis K.C., 22
Davis L.C., 30
Davis R., 45, 164, 221
Dawson D.R., 87
De Beaumont L., 27, 231
de Frias C., 245
de Jong D.M., 146
de Ruiter M.B., 4, 189
De Sanctis V., 173
DeBrois G., 162
deBros G.B., 163
DeFrias C., 251
DeFries J.C., 96
deGail N.M., 124

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms.
https://doi.org/10.1017/S1355617714000381

DeGutis J., 54
Del Prince C., 30
Delan-Wood L., 266
Delano-Wood L., 40, 41, 43, 76, 77, 128, 156, 164, 180, 251
Delano-Wood L.M., 42, 45
Delgaty L., 98, 106
Delgaty L.E., 98
Delis D.C., 40, 41, 240
DeLuca J., 54, 68, 72, 268
Demers L., 232, 233
Demers L.A., 190, 232
Demers S.C., 232
Demian M., 174
Demireva P., 243
Deng Y., 118
Denney D., 70
Denney R.L., 126, 129, 132
Dennis M., 19, 151
Dennis N.A., 51
Denny K., 191
Denny K.G., 50
Deoni S., 154
Depp C.A., 37
Desai P.N., 225
DeTore N., 200
Deutsch G., 76
Deutsch R., 113, 135
Dev S.I., 78, 153, 198, 249, 254
Devanand D., 156
Devine S., 164
Devlin K.N., 108, 112
Devous M., 122
Dewey D., 104, 105
Dewey R., 79, 142
Dhar A., 173
Diaz-Arrastia R., 26, 235
Diaz-Orueta U., 105
Diaz-Santos M., 169
Dietz Renfroe J., 231
Dikmen S., 44, 207
Dikmen S.S., 207, 208
Dinces S.M., 12
Dionne-Dostie E., 229
DiPinto M., 262
DiQuattro M.E., 215
Direnfeld E., 223
Divatia S., 233
Divatia S.C., 190, 232
Dixon R., 255
Dobryakova E., 70, 268
Dolan B., 202
Dolansky M.A., 140, 170
Dolata J., 14
Dominguez A., 102
Donnelly S., 225
Donofrio M., 212
Donoghue N., 153
Donohue J., 76
Doody R.S., 159
Doong A., 76
Dorflinger J., 23
Dorfman A., 129, 177
Dote S., 184
Dotson V.M., 184
Dougherty C., 240
Douglas J., 239
Douglas R. M., 10
Douglas-Escobar M.V., 14
Dowling S., 112
Doyle K.L., 107, 110, 183
Doyle L., 235
Drabick D.A., 171, 266
Drago V., 246
Drapeau C., 12
Drollete E.S., 229
Drossner D., 18
Drotar D., 24
Droumbakis C., 263
Du F.G., 83
Dudley K., 202
Duffield T., 205
Duffield T.C., 207
Dufour C.A., 109
Duggan E.C., 216, 226
Dulay M.F., 225
Dumas K., 205
Dunham K.J., 126, 129
Dunn C.B., 256
Dunn K., 16, 57
Duple B., 100
Duran V., 223, 226
Durgerian S., 36, 155, 160, 187, 188, 233, 234, 249
Dutt S., 253, 268
Duvall S., 14, 206, 216
Dyer S.M., 103, 234
Eagan D., 106
Eagan D.E., 172
Early D.R., 210
Edden R.A., 203
Edelmann M.N., 9
Edmonds E.C., 156
Edmonds L., 65
Edmundson M., 126
Edwards K., 258
Edwards M., 157
Efanov S., 30
Ehde D., 207
Ehde D.M., 208
Eichstaedt K.E., 179
Eickhoff C., 136, 220
Eickhoff C.J., 60
Eid B., 65
Eisman G., 261
El-Saden S., 63
Elgendy H., 29
Elias J., 92
Eliassen C., 77
Elizabeth W., 8
Ellingson B.M., 7
Elliott C.S., 224
Elliott K., 79
Ellis C., 106
Ellis R., 109, 113
Ellis R.J., 113
Elrod J.M., 63
Embree L., 153
Embry L., 147
Emery Thompson M., 12
England H.B., 73
England S., 255
Ennok M., 145, 163
Enriquez J., 118
Ensley M., 45
Eppig J., 72, 76, 221, 266
Epstein J., 97
Epstein J.N., 103
Ercoli L., 153, 195
Erdfelder E., 245
Erdodi L., 175, 180
Eren S., 24
Erickson S., 216
Erickson S.J., 12
Ersek M., 52
Esinhart T., 21
Espy K.A., 33, 34, 146
Estevis E., 130, 196
Eulau R., 207
Evangelista N., 180
Evans D., 211
Evans S., 81
Everaerts A.M., 243
Everhart D.E., 232
Everhart E., 194, 228
Everhart E.D., 60, 231
Everson-Rose S., 211
Evins A.E., 199
Ewald I.J., 249, 254
Ewing-Cobbs L., 20, 21
Eyler L.T., 198
Faber J., 43
Fair J.E., 53
Falkowski J., 140, 159
Falkowski J.A., 140
Fama R., 111
Fann J., 207
Fann J.R., 208

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

Fanning M., 171
Farias S., 162, 211
Farias S.T., 161
Farley K.L., 142
Farrell M., 156, 157, 162
Farrer T., 43
Farrer T.J., 19, 194, 230, 250
Faulkner M., 154
Fayad A., 12, 68
Fayad A.D., 69
Faytell M.P., 49, 50
Fazeli P., 144
Fazeli P.L., 107, 109
Fazio R.L., 126, 132
Fedio A.A., 30
Fedio P., 30
Fedor A., 245
Fee R., 117, 118, 119
Fee R.J., 118
Feigon M., 116, 166, 268
Fein D., 203, 206
Fellows R.P., 75
Fennema-Notestine C., 111
Fergestrom N., 139
Ferguson L., 177
Fernandez N., 3
Fernando H., 101
Ferrand J., 12
Fields J., 3, 74
Fields K., 142
Fields K.N., 141
Fieo D., 140
Figueroa C., 155, 249
Figueroa C.M., 233, 234
Filippi M., 68
Filoteo J., 78, 265
Filoteo J.V., 80
Filoteo V.J., 45
Findlay A.M., 178
Fineman A., 165
Finik J., 14
Fink J.W., 125
Fink S., 206
Finnamore D., 226
Finuf C., 154
Fischer A.L., 241, 245
Fischer B.L., 36
Fisher A., 240
Fisher E.L., 115
Fisher M., 201
Fishman I., 206
Fisk J.D., 71
Fitzer K.R., 94
Fitzgerald D.A., 233
FitzGerald D.B., 182
Fladby T., 77
Flanagan A., 164
Flashman L.A., 116
Fletcher A., 24
Fletcher L., 55, 56
Flora K.D., 106
Flores R.A., 239
Flowers A.T., 75
Floyd T.F., 171
Flynn S., 155
Foldi N., 191
Foldi N.S., 109, 161
Foley F., 69
Folkers A.M., 108
Folsom D., 142
Fombonne E., 206
Fonda J.R., 41
Fong M., 57, 257
Fong M.W., 5, 16, 116
Foote K.D., 80
Ford A., 182
Ford J.C., 116
Forte M., 68, 138
Fortier C.B., 41
Foxe J., 205
Foxe J.J., 229
Franccaro R., 92
Franchow E., 98, 219
Franchow E.I., 220
Franczak M., 9
Frank L.R., 128
Franklin D., 113
Franks R., 180
Frasnelli J., 27
Frayn M., 84, 257
Frazier D.T., 253
Freedman M., 69
Freer B., 96, 99
Frey H., 205
Frijters J., 96
Frim D., 16, 57
Fritz C., 96
Froehlich A., 207
Froming K., 193
Fry T., 62
Fuchs K., 81
Fuchs L.S., 93
Fujii T., 205
Fukatsu R., 205
Fulcher K., 165, 171
Fulcher K.K., 171
Fuller B., 106
Furda M., 20
Futaki T., 181, 242
Gabriel L., 248
Gabriel L.B., 192, 258
Gabrieli J., 187
Gaillard W.D., 177
Gair J., 155
Gajjar A., 10, 120
Galasko D., 82, 89, 155, 180
Galasko D.R., 43
Gale S., 151, 213
Gale S.D., 23
Galifianakis N., 81, 222
Galioto R., 172
Gallemore E., 147
Galvin J.E., 80
Gans J.J., 53
Gansler D.A., 199
Garant A., 173
Garcia A., 198
Garcia D., 261
Garcia J., 24
Garcia N.E., 250, 256
Garcia S., 171, 245
Garcia-Barrera M.A., 216, 223, 226, 227, 246, 247
Garrett K., 164
Garza J.P., 33
Gathright E.C., 140, 170
Gatson J., 26, 235
Gavett B.E., 163
Gavett R., 138
Gavin K.J., 99
Gavron L., 201
Gefen T., 66, 250
Geiger P., 252
Geldmacher D.S., 141
Gelman B., 113
Genova H., 49, 70, 72, 268
Genova H.M., 73
George E., 25
Gerhardt C., 19, 151
Germain-Lee E., 16
Gerner G.J., 258
Gershon R.C., 264
Gerst E., 216
Gerst E.H., 214
Gerstenecker A., 254
Gertsberg A.G., 249
Geula C., 66, 250
Ghelani A., 3
Gibbons L., 152
Gibbons L.E., 152
Gibson J., 26, 28, 262
Gicas K., 257
Gicas K.M., 84
Giesbrecht C., 257
Giesbrecht C.J., 84
Gifford K., 161
Gifford K.A., 90
Gilbert C.D., 200

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

Gilbert P.E., 78, 265
Giles K.J., 167
Gilgenbach A., 146
Gill J., 107, 114
Gillis M., 50, 73
Gilmartin M., 154
Gioia A., 8
Gioia A.R., 11
Gioia G., 20, 22, 24, 25, 150
Gioia G.A., 21
Giordani B., 76
Giovannetti T., 17, 76, 112, 143, 144, 171, 221, 224, 243, 266
Girard J.M., 177
Giudicessi A., 263
Glasier P.C., 12
Glass Umfleet L., 137, 179
Gleeson L.D., 35
Glenn M., 158
Glickman E., 73
Glisky E., 241
Glisky E.L., 58
Glubo H.N., 47
Gluhm S., 78
Glushakova O., 14
Gocheva V., 83
Godrey C., 24
Goedert K.M., 67
Goeggel Simonetti B., 21
Gogel H., 139, 190, 232, 233
Gold J.M., 201
Golden S., 30
Goldman S., 11
Goldstein C.M., 140, 170
Goldstein D.S., 132
Goldsworthy R., 139, 219
Golla M., 57
Gollan T.H., 89, 180
Golub S.A., 109
Gongvatana A., 111
Gontkovsky S., 137
Gonzales M., 172
Gonzales M.M., 106
González D.A., 74
Gonzalez M., 212
González M.G., 79
Gonzalez P., 74
Gonzalez R., 86, 108, 237
González-Pérez P., 102
Goodrich-Hunsaker N.J., 118
Goodyear B.G., 105
Gordon B., 56, 150, 202
Gordon D.J., 47
Gore R., 262
Gorlyn M., 59
Gorno-Tempini M., 35
Gouaux B., 110, 135
Goverover Y., 48, 72
Govind V., 50, 191
Gowhari M., 116, 166, 268
Gowland A., 240
Goykhman J., 70
Grabie M., 14
Grabyan J.M., 159
Gracies J., 191
Graefe A.C., 219
Granader Y., 207
Granite L., 132
Granite L.C., 220
Grant I., 86, 107, 109, 110, 111, 113, 135, 143, 237
Gravano J., 60
Gravano J.T., 46, 78
Graves B., 189
Graves D., 12, 68, 69
Gray J., 81
Green B., 124
Green C., 217
Green I., 95
Green R., 90, 253
Greenberg B., 12, 68, 69
Greenberg S.M., 226
Greene H.A., 47
Greene Welch J., 5
Greenfield F., 55
Greenspahn E., 7
Greer N., 196
Gregory A.M., 240
Greif S., 15
Gretencord A., 23
Grieco J., 47
Griffin J., 193
Griffith E., 156
Griffith E.Y., 171
Grilli M.D., 58
Grills C., 125
Grosch M.C., 6
Gross A., 162
Gross A.L., 149
Gross A.M., 97
Grouzet F.M., 54
Gruen J.R., 93
Grunebaum M., 59
Gu Y., 226
Guller L., 119
Gullett J.M., 182
Gunstad J., 73, 140, 165, 170, 171, 172, 245
Gur R.C., 153
Gurnani A., 163
Guskiewicz K., 26, 28, 29
Gustafson E., 213, 214
Gustafson E.L., 213
Gutierrez M., 198
Gutmann D.H., 13
Guttmann C.R., 249
Gutz S., 155
Guzman V.A., 89, 226
Ha J., 56
Haaland K., 143
Haaland K.Y., 143
Haarbauer-Krupa J., 151
Haase E., 24
Habak C., 204
Habeck C., 156
Habeck C.G., 66
Haddad M.M., 70
Haerich P., 192, 267
Haggerty K., 48
Hahn-Ketter A., 92
Haisley L.D., 203
Hajek C., 11
Halbig T., 191
Hale J., 134
Hale J.B., 92, 94
Haley A.P., 106, 172
Hall A., 154
Hall S., 27
Hall T., 258
Hamberger M.J., 66
Hamilton J., 193
Hamilton J.M., 263
Hammond J., 27
Hampstead B.M., 50, 73, 187
Hamrick E., 42
Han D., 78, 247
Han D.Y., 119, 166
Hancock L., 55, 56
Handel R., 59, 135
Hanks R.A., 47
Hanley S., 20
Hanna S., 74
Hannay H., 50
Hannay H.J., 49
Hansen L.A., 89
Hanson K.L., 40, 41, 42, 45, 128
Hanten G., 20
Hanten G.R., 26
Hantke N., 155, 188
Hantke N.C., 233, 234, 249
Harciarek M., 178
Harder L., 12, 68, 69
Hardy D., 261, 262
Hardy D.J., 114
Hardy K.K., 7, 11, 58, 121, 147
Harel B., 147
Harel B.T., 7
Hargrave D.D., 178

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

Harikumar A., 195, 196
Harp J.P., 119, 126
Harrington D.L., 187
Harris R.J., 7
Harrison D.W., 260
Harrison M.B., 81
Harrow M., 200
Hart T., 1
Hartenberger C., 228
Hartman E.R., 154
Harvey D., 161
Hashimoto Y., 191
Hass C., 166, 168
Hass C.J., 63, 65
Hassan J., 116, 166, 268
Haut J., 177
Haut M.W., 185, 222, 233
Hawthorne G., 222, 269
Hayashi K., 205
Hayashi T., 181
Hayes L., 150
Hayes R.L., 14
Hays C., 52, 153
Hays C.C., 37, 41
Hayward E., 225
Hayward M., 211
Hazamy A.A., 65, 168, 191
Hazlett K., 155, 249
Hazlett K.E., 233, 234
He A., 159
Heaps J., 62, 75, 111
Heaps J.M., 110, 112, 252
Heaton R., 109, 113, 262, 263
Heaton R.K., 110, 113
Heaton S.C., 14, 15, 152, 185
Hedges D.W., 230, 250
Heeringa S., 153
Heilman K., 34, 222, 246, 253
Heilman K.M., 35, 67, 178, 258
Heinks T., 21
Heinrichs R., 165
Heitzer A., 13
Held M., 261
Held Z., 97
Hellemann G.S., 200
Henderson C., 155
Hendren R., 94
Hendrix C.L., 151
Hendrix T., 143
Henning D.A., 231
Henrich C., 10
Henriquez S.M., 213
Henry M.L., 35
Henson H.K., 40, 128
Herbener E.S., 200
Hergenrather K., 24
Herlihy L., 203, 206
Hermann B.P., 178
Hernández A., 65
Hernández Exposito S., 102
Hernandez J., 56
Hernandez L., 14
Hernández S., 64, 65, 176
Hertza J., 94, 123, 185
Hessen E., 77
Heverly-Fitt S., 151
Hewavitharana I., 256
Hickey J.M., 194
HIcks K.R., 94
Higginson C.I., 142, 161
High W.M., 38
Highley E., 19
Highsmith J., 60, 194, 228
Highsmith J.M., 231, 232
Hile S.N., 12
Hill B.D., 84, 95, 141, 142
Hill H.M., 91
Hill K., 227, 269
Hill S.K., 199, 201
Hill-Briggs F., 173
Hill-Jarrett T.G., 46, 60
Hillary F.G., 31, 51, 189, 239, 240
Hillman C.H., 44, 229
Hilsabeck R., 138
Himali J.J., 266
Hinkle C.D., 103
Hinkley L., 178
Hinton V.J., 117, 118, 119
Hirsch J., 66
Hoadley R., 95
Hodel A.S., 100
Hodges J.R., 35
Hoeft F., 94
Hofer S.M., 149
Hohman T., 161
Holcombe B.D., 91
Holden H.M., 78
Holland A., 5
Holland A.K., 260
Holland S.C., 92
Hollister E., 22
Holm K.E., 174, 269
Holmbeck G., 17
Holroyd C.B., 229
Holt-Lunstad J., 230, 250
Holtzer R., 69, 244, 255
Homer B., 225
Honan C., 240
Honer W., 257
Honer W.G., 84
Hoon C., 35
Horner M.D., 125
Hoshino T., 61
Hostetter S.A., 7, 147
Hoth K.F., 174, 269
Hou B., 233
Howarth R.A., 16
Howe S.R., 179
Hsu Y., 183
Hua M., 183, 224
Huang C., 161
Huang L., 10, 58
Huang-Pollock C.L., 104
Huang-Storms L., 206
Huckans M., 106
Hudson M., 121
Hudson M.M., 4, 120
Huey D., 140
Huey E., 157
Huey T., 156
Hughes C., 154
Hughes J., 170, 171
Hughes J.W., 140, 170
Hughes S., 68
Huisman T., 258
Hull A., 59, 60, 220
Hung J., 65
Hunt I., 43, 204
Hunt I.J., 61, 194
Hunter J.V., 20
Hunter S., 15, 117, 215
Hunter S.J., 103, 213, 214, 215
Husain M., 79
Husain M.M., 142
Huston-Warren E.A., 13
Hutchison E., 258
Hwang Y., 56
Hwu H., 224
Hymen E., 258
Hymen E.A., 192
Hynan L., 140, 159
Hynan L.S., 140
Hyun J., 254
Hyunh N., 14
Iampietro M., 17
Ibanez-Carrasco F., 107
Ibarretxe N., 141, 198
Ichiya Y., 205
Im B.S., 47
Inder T., 235
Insua-Rieger S., 262
Irwin J., 146
Isaac B., 259
Isenberg J.C., 13
Ishida A., 242
Isquith P., 219
Ito H., 205
Iudicello J.E., 107, 110, 113

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms.
https://doi.org/10.1017/S1355617714000381

Ivanisevic M., 18
Iverson G., 134
Iverson G.L., 22, 101
Izaguirre B., 158, 159
Jackson D.C., 178
Jacobs R.H., 192, 258
Jacobson A., 186
Jacobson J.M., 112
Jacobson L.A., 10, 18, 92, 93
Jacobus J., 86
Jacola L.M., 120
Jaehnert S., 106
Jagger A.C., 63, 103, 234
Jak A., 52, 128
Jak A.J., 37, 40, 41, 42, 43, 156, 188, 240
Jakimczyk J., 145
James B., 247
Janes A.C., 199
Jang K., 228
Janke K., 15
Jantz P.B., 19
Jantz T., 45
Janulewicz-lloyd P., 165
Janus C., 256
Jasmin V., 85
Jayakar R., 10
Jayatillake R., 56
Jazairy R., 216
Jeffay E., 127, 128
Jefferson A., 161, 265
Jefferson A.L., 36, 90, 160, 265, 266
Jeha S., 58, 121
Jenkins L.M., 192, 258
Jensen C., 213
Jensen J.E., 199
Jentsch J.D., 238
Jeong D., 199
Jeong J., 254
Jerard T., 82
Jeznach A., 247
Jimenez A.M., 63
Jimenez D., 157
Jimenez F., 79
Jivani S., 61, 151, 194
Jobst B., 175, 180
Joeris A., 21
Johnson A., 202
Johnson C.P., 21
Johnson E., 222
Johnson E.T., 81
Johnson H.J., 187
Johnson J., 162
Johnson K.N., 75
Johnson P., 79
Johnson R., 143
Johnson S., 121
Johnston H., 134
Johnston H.N., 92, 94
Johnston K., 94, 95
Johnston M.V., 258
Johnston O., 204
Jolicoeur P., 231
Jollie R.G., 161
Jones A., 84
Jones J., 80, 166, 167
Jones J.D., 67
Jones J.E., 178
Jones K.E., 17
Jones M.M., 121
Jones R., 17, 43, 194
Jordan J., 267
Jordan L.L., 152, 185
Joschko M., 146
Joseph R., 202
Josephson R., 170, 171
Juengling J., 29
Juliano A., 220
Jung R., 238
Jung R.E., 239
Jurick S.M., 41, 78, 249, 254
Justice A., 114
Justice J., 259
Justin W.D., 260
Kaemmerer T., 57
Kaizar E., 11
Kaldis T., 225
Kales H., 186
Kalra S., 68
Kamali M., 196, 197, 224
Kamat R., 109
Kamijo K., 231
Kaminetskaya M., 94
Kamradt J., 98
Kandah C., 155, 160, 249
Kandah C.C., 233, 234
Kane R., 209
Kang B., 199
Kao Y., 183
Kaplan J., 29
Kaplan L.R., 161
Kaplan R.F., 249
Karanouh-Schuler E., 165
Karantzoulis S., 80
Karidas S., 64
Karimian A., 114
Karlawash J., 168
Karlawish J., 156, 157
Karnik N., 214
Karnik N.S., 213, 214
Karr J.E., 223, 226, 227
Karst J.S., 202
Karydas A., 251
Kassel M., 186, 248
Kassel M.T., 192, 193, 224
Kaszynski K., 214
Kaszynski K.L., 214
Katagiri M., 61
Katz M., 76
Katzen H., 68, 191
Katzen H.L., 138
Katzenstein J., 19
Katzenstein J.M., 12
Kaufman D., 13, 60
Kaufman D.A., 168
Kaufman J., 16
Kaufman M.J., 199
Kaufman N.K., 92, 94
Kaufman S.B., 238
Kaufmann H., 191
Kaur S., 172
Kauwe J.S., 230
Kavanaugh B., 5
Kawahara D., 261
Kay C., 155, 249
Kay C.D., 233, 234
Kay R., 248
Kealey T., 92, 269
Keatley E., 36
Kee K., 193
Keebler M., 52
Keen L.D., 225
Keifer E., 222
Keilp J., 59
Keilp J.G., 267
Keith Y.O., 10
Kellogg E., 79
Kelly D., 29
Kelly D.F., 26, 28, 29
Kelly M., 59
Kendall D., 86
Kennedy A.E., 233
Kennedy J., 37
Kennedy J.E., 37
Kennedy K., 122
Kennedy R.E., 76
Kent A., 247
Kenworthy L., 57, 202, 207
Keown C.L., 206
Kepe V., 153
Kerce V., 132
Kernan C., 29
Kernan C.C., 26, 28
Kernan M., 65
Kerns K., 84
Kerns K.A., 57, 102, 146
Kerr D.L., 153
Keshavan M.S., 201

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

Keshavarzian N., 193
Kessels R.P., 137, 253
Kessler R.C., 153
Ketelle R., 162
Khan A., 21
Khera A., 159
Kibby M.Y., 63, 103, 186, 214, 234
Kiefel J., 118
Kielb S., 82
Kiely T., 81, 222
Kienitz E., 222, 269
Killgore W.D., 139, 190, 232, 233
Killpack M., 154
Killpack N., 227, 269
Kim E., 170
Kim G., 66, 250
Kim H., 116
Kim M., 199, 228
Kim R.T., 41, 45
Kim S., 199, 228
Kimberg C., 4, 120, 121
Kimpton T., 27
King E., 256
King T., 6, 206
King T.Z., 8, 10, 18, 120, 150, 151, 234
Kingery K.M., 97, 103
Kingsley K., 56
Kinsinger D., 136
Kipman M., 190, 232, 233
Kirk J.W., 124
Kirkwood M.W., 22, 25
Kirsch H.E., 178
Kirton J.W., 184
Kirwan B., 23
Klaas P., 177
Klas P., 127
Klaver J., 63
Klein-Tasman B., 15, 117
Kleman V., 165
Kliegel M., 183
Kline J.S., 84
Kline T., 12
Klinge P.M., 138
Knecht Fulcher K., 172
Knight A., 86
Knight A.J., 76
Knight S., 10
Knoble N., 206
Knoch K., 203, 206
Knox L., 239
Knudsen K., 238
Knudsen K.S., 61
Koch A., 200
Koenig K., 36, 187
Kogan J., 132
Kolessar M., 106
Koriakin T., 92, 93, 103, 203
Koriakin T.A., 18
Korman B., 176
Kornblith E.S., 83
Kort N.S., 178
Kou Z., 31
Kovacs C., 114
Koven N., 219
Kowalczyk W.J., 109
Koyama M., 242
Kozicky J.M., 197
Kozlowski A.J., 124
Kozora E., 174, 269
Kramer J., 81, 82, 222, 253
Kramer J.H., 90, 162, 251, 268
Krawczyk D., 45, 52
Krawiecki N., 6, 8
Krawitz A., 134, 246
Krengel M., 165
Krengel M.H., 169
Kretzmer T.S., 44
Krishnan K., 26, 140, 159, 235
Krivitzky L., 212
Kriz D., 106
Krull K.R., 4, 9, 11, 120, 121
Kruus M., 145
Krystal J.H., 267
Kubas H.A., 92, 94, 134
Kueider A., 82
Kueider A.M., 150
Kuhn T., 182
Kumar A., 221
Kunemund A., 62
Kunkes I., 99
Kunkes I.B., 91
Kvaal S., 215
Kwan S., 110
Lacritz L., 140, 142, 159
Lacritz L.H., 70, 79
Lacy M., 5, 16, 57, 116, 257
Lacy S., 81
Lafo J., 80, 166, 167
Lafo J.A., 67
Lahti A.C., 76
Lai J., 11
Lai J.M., 225
Laidlaw D., 75
Lainhart J.E., 207
Lalonde G., 215
Lam J., 189
Lamar M., 164, 221, 248, 251
Lamb D., 246
Lameira D., 20
Lancaster M., 155
Lancaster M.A., 233, 234, 249
Lane E., 62, 75
Lane E.M., 160, 252
Lang D., 257
Lang D.J., 84
Lang P.J., 231
Lange N., 207
Langenecker S., 186, 196, 197, 248
Langenecker S.A., 192, 193, 197, 224, 258
Langenkamp M.M., 124
Langevin L., 104, 105
Lanni E.B., 45
Lansing A.E., 131
Lantrip C., 219
Lara-Ruiz J., 28, 29
Larsen L., 169
Larsen P.L., 169
Larson E., 42
Larson M., 43, 204
Larson M.J., 53, 61, 194, 195, 204, 227, 230, 250, 269
Larson S.W., 186
Larson-Dupuis C., 27
Lassonde M., 27, 229
LaTocha C., 76
Lau K., 161
Lau L., 130
Laurent A., 248
Lavin K., 197
Lavretsky H., 195
Lawrence I.O., 144
Le Berre A., 188
Le J., 123
Leaf F., 220, 242
Leaf F.O., 244
Leafer E., 118
Leaffer E.B., 118
Leal F., 37
Leary L., 256
Leavitt V.M., 68, 189
Lebel C., 104
LeCheminant J., 227, 269
LeCheminant R., 227, 269
Leckliter I., 118
Lee A., 154
Lee R.C., 125
Lee S.E., 63, 103, 234
LeFauve M., 84
Lefrançois M., 229
Lehockey K., 60, 194, 228
Lehockey K.A., 231, 232
Leitner D., 135, 136
Lemay J., 104
LeMonda B.C., 15, 167
Lenartowicz A., 2
Lengen M., 36

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

Lengenfelder J., 48, 73
Leo P., 9
Leonard G., 93
Leopoulos W.S., 194
Lepore F., 204
Leppert M., 258
Lessig S.L., 80
Letang S., 259
Letendre S., 107, 109, 113, 143
Letendre S.L., 110, 113
Levan A., 23
Leventhal B., 226
Leverenz J., 258
Levin B.E., 50, 68, 138, 191
Levin H., 36, 43
Levin H.S., 20, 26, 40, 128
Levy D.L., 200
Levy I., 86
Levy K., 144
Levy S., 246
Lewis J., 37
Leyton C., 35
Li P., 112
Li S.T., 95, 145, 185
Li X., 20, 26, 43
Liao K., 45
Liau L.M., 7
Libon D., 221, 243, 265
Libon D.J., 72, 76, 77, 112, 144, 156, 164, 221, 251, 266
Liebel S.W., 53
Lieval A., 226
Lim R., 223
Linck J., 38, 125, 127
Linck J.F., 131
Lindbergh C.A., 81
Lindgren K., 48
Lindner O.C., 9
Linnamägi A., 163
Lipkin P.H., 93
Lippa C., 112
Lippa C.F., 72, 76
Lippa S.M., 41
Lipton R., 76
Lisdahl K., 237
Little S., 110
Litvan I., 80
Liu C., 224
Liu D., 90, 160, 161
Livney M., 55
Llamas V., 192
Lo T.T., 3
Lo W., 11
Lobdell D., 83
Locke D., 3, 74
Lockwood C., 59, 60, 220
Lockwood C.A., 135, 136
Loftis J.M., 106
Logan D., 227
Lohr J., 42
Lohr J.B., 40, 41, 128, 240
Lones M., 81
Long E., 176
Long E.A., 124
Long J., 102
Long J.D., 187
Longo T., 22
Lopes Costa S.M., 70
López E., 114
Lopez L., 141
Lopez V.A., 247
Lopez W.D., 26, 28, 29, 261, 262
Losinski G., 36
Loughan A.R., 94, 123, 185
Loveless J., 60, 194, 228
Lovell M., 146
Lovell M.R., 101, 175
Lovett M., 96
Low C., 74, 145
Low K., 99
Lowe J., 216
Lowe M., 36
Lowe M.J., 187
Loya F., 53
Lu L., 215
Lu Y., 122
Luc N., 42, 128
Luchsinger J.A., 89, 226
Ludwig N., 17, 206
Lukie C.N., 229
Lumley M.A., 47
Lunde A., 74
Luong-Tran C., 202, 207
Lust B., 155
Luu H., 125, 132
Luxton J., 4, 11, 121
Ly J., 14
Ly J.J., 109, 161
Lynch S., 55, 56
Mabbott D., 10
MacAllister W., 101
Macaulay C., 164
MacDonald S., 255
Mace L., 170
Mace L.C., 168
MacEwan G., 257
Machamer J., 44
Macina L.O., 161
MacIntyre P., 227
Mackala S., 197
MacKay-Brandt A., 211, 226
MacKillop J., 81
MacLean P., 216
MacMaster F., 104
Macoun S.J., 57
MacPherson H., 264
Madigan N., 45
Madsen J., 176
Maes L., 261
Magnotta V.A., 187
Magnuson S.A., 182
Magrys S., 218
Mahendra N., 170
Mahle W.T., 18, 234
Mahone E., 6, 9, 12, 16, 124
Mahone E.M., 93, 203
Mahone M., 6, 10
Mahoney J., 255
Make B.J., 174, 269
Malloy P., 154
Malloy P.F., 138
Mambwe C., 117
Mamedova K., 3
Mangal P., 67, 80, 166, 167
Mangum R., 260
Maniscalco J.S., 138
Manly J., 2, 162, 262
Manly J.J., 89, 211, 226, 264
Manly P., 192
Mann J., 267
Mann J.J., 59
Mann M., 186, 248
Mann S.H., 54
Männamaa M., 145
Manning C.A., 81
Manning J., 187
Mannino C., 28, 29
Maple K., 237
Mar D., 158
Marceaux J., 138
Marceaux J.C., 74
Marchand M., 93
Marcotte T., 87, 107, 109, 114, 143, 237
Marcotte T.D., 237
Maria S.T., 143
Mark V.W., 70
Markon K., 267
Marques Zilli E., 258
Marquez de la Plata C., 26, 235
Marquine M., 263
Marquine M.J., 109, 113, 211
Marra C., 113
Marrero-Abrante R., 176
Marshall D., 197
Marshall D.F., 197, 224
Marsiske M., 55, 167
Marson D.C., 76, 153

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

Martersteck A., 66, 248
Martin E., 262
Martin P., 243
Martin R., 30
Martin T., 27
Martin-Elbahesh K., 58, 120, 121
Martin-Elbahesh K.M., 58
Martinez A., 267
Martinez F., 28, 262
Martinez J., 153
Martinez-Ramirez S., 226
Maruishi M., 191
Mason L.H., 126, 166
Massman P.J., 92, 158, 159
Mast B., 254
Masterson T., 227, 269
Matevosyan A., 41, 45
Matsui M., 61
Matt G.E., 267
Matte-Gagné C., 215
Matthews M., 155, 160
Matthews M.A., 233, 234, 249
Mattingly M., 179
Maudsley A., 191
Maudsley A.A., 50
May P.E., 38
Mayes A., 9
Mayeux R., 89, 226
Mazerolle E.L., 71
McAleavey A., 31
McAlister C., 46, 184
McAllister T.W., 116
McArthur J., 113
McAvoy D., 243
McCabe M.G., 9
McCarron K., 59, 135
McCarthy M., 30
McCauley S., 43
McCauley S.R., 26, 194, 235
McClintock S.M., 79, 142
McCombe J., 107, 114
McConnell J.M., 74
McCoy K., 138
McCoy K.J., 74
McCrea Jones L.A., 85
McCrea M., 64
McCue K.A., 215
McCulloch B., 54
McCulloch K., 127
McCurdy M.D., 12, 92
McCutchan A., 113
McDermott H.W., 47
McDonald B.C., 12, 120
McDonald C.R., 156
McDonald S., 240
McDonnell G., 263
McDonnell Z., 154
McFarland C.P., 58
McGeary J., 108
McGee F., 107
McGee J., 55, 56
McGill C., 25
McGlinchey R., 54
McGlinchey R.E., 41
McGregor K.M., 253
McHugh-Grant S., 168, 170
McInerney K., 243
Mcinnis M., 196, 197
McInnis M.G., 197, 224
McIntosh E., 186
McKee A., 266
McKeever J.D., 70
McKenna B.S., 198
McKenzie T., 136
McKinley E., 76
McKittrick K.J., 145
McKnight M., 99
McKnight M.E., 91
McLaren D.G., 153
McLaughlin P.M., 158, 159
McLean R., 202
McLeod K.R., 105
McManus S., 23
McManus S.M., 150
McMynn C., 226
McNeill V., 27
McPhee P., 107
Meachen S., 47
Meagher H., 207
Mechanic-Hamilton D., 55
Medaglia J.D., 31, 51, 240
Medina L.D., 265
Meier I.B., 226
Meister J., 73, 172, 245
Mekota R.M., 233
Melhem N.M., 267
Mellott E., 14, 15
Melrose R., 162, 210
Melrose R.J., 63, 211
Meltzer E., 191
Mendel A., 26, 29
Mendes de Leon C., 211
Mendoza R., 200
Menefee D.S., 194
Menna R., 213
Menning S., 4
Mercado R., 54
Merchant T.E., 5, 58, 121
Merens H., 66
Merkley T.L., 20
Mermelstein R., 86
Merritt V., 25, 133
Merritt V.C., 134
Meschede K., 174, 269
Mesulam M., 66, 82, 248, 250
Meyer J., 133
Meyer R., 143
Meyers K., 243
Michael S.A., 233
Michael W., 89
Michal H., 246
Michalak E.E., 197
Miciak J., 216
Mickey D., 47
Mietchen J.J., 213
Miguel G., 198
Mikesell L., 87
Milano N., 35
Milberg W., 54
Milberg W.P., 41
Milham M., 226
Miller A., 130, 195, 196
Miller B., 38, 81, 82, 125, 126, 127
Miller B.I., 127, 131
Miller B.L., 35, 90, 162, 268
Miller E.N., 262
Miller H., 136
Miller H.B., 135
Miller J., 115, 253
Miller J.B., 51
Miller J.W., 90
Miller K., 153
Miller L., 178
Miller L.S., 81
Miller M., 122
Miller S., 243
Miller S.A., 83
Millis S.R., 152
Minich N., 24
Mion A., 23
Mirkovic N., 162
Mitchell C., 239
Mitchell E.H., 132
Mitsuto R., 191
Mizuiri D., 178
Moberg P., 55
Modarres M., 30
Modovan C., 244
Moelter S., 158, 168
Moelter S.T., 170
Moes E., 97, 248
Mohammed S., 128
Moldovan C., 220
Moldovan C.P., 242
Molholm S., 205, 229
Molina A.F., 25
Molnar A.E., 214
Molokie R., 116, 166, 268

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms.
https://doi.org/10.1017/S1355617714000381

Monahan K., 24
Moncreif G., 40
Montague E., 124
Montague E.Q., 176
Montazer-Hojat S., 229
Montoya J., 110
Mooney S., 42
Moore C., 3, 138
Moore D., 110, 113
Moore D.J., 107, 108, 109, 110, 135, 144
Moore M., 206
Moore R.D., 44, 229
Moore T.M., 153
Moore W.R., 216
Morales W., 228
Moreau K.L., 174, 269
Morgan E., 111
Morgan E.E., 86, 107, 108, 110, 113
Morgello S., 113
Mori S., 122
Morris R., 6, 8, 10, 96
Morris S., 110
Morris-Berry C., 12
Morrow E.M., 202
Morse C., 143, 144
Moscovitch M., 77
Moscufo N., 249
Moser D.J., 174, 269
Moss V., 261
Mostofsky S.H., 203
Motter J., 240
Mottron L., 204
Mourany L., 36, 187
Mowrer S., 100
Moyer K.H., 97
Mucci G., 262
Mueller W.M., 179
Muir J., 53
Mulhauser K., 160, 243
Mullane A.A., 201
Muller R., 206
Muller-Oehring E., 188
Mulligan B., 84
Mulligan B.P., 256
Mullins S., 20
Munesawa T., 191
Mungas D., 90, 210, 211
Muniz G., 149
Murai T., 184
Murphy C., 162, 186
Murphy M., 53
Murray A., 235
Muscara F., 24
Musil S., 139
Musso M., 95
Mwendwa D., 246
Myers L., 29
Myerscough C., 165
Myerson C., 191
Myhre J.W., 241
Na D., 34
Na S., 120
Nader T., 116, 257
Nagarajan S.S., 178
Nagel B.J., 185
Naifeh J.A., 153
Naiman D., 202
Nair A., 206
Nakagawa M., 61
Nakase-Richardson R., 30
Namazi S., 261
Nan K., 112
Narad M.E., 97, 103
Narkhede A., 89, 171
Narvaez T., 63
Nassehi K., 61
Natelson Love M.C., 141
Nation D.A., 43, 77, 89, 180, 249, 251, 266
Natta L., 63
Naugle R.I., 129
Neargarder S., 169
Needham V., 20
Negash S., 55
Nelson J., 100
Nelson J.M., 33, 34
Nelson Schmitt S.S., 154
Nemeth D., 193
Nemeth D.G., 166, 203
Netson K., 165
Neugnot-Cerioli M., 58, 116
Neuhaus J., 90
Newmark L., 257
Newsome M., 36
Nguyen A., 82
Nguyen P., 168
Nguyen-Louie T.T., 86
Nicoll D.R., 78
Nielsen B., 230, 250
Nielsen B.L., 230
Nielsen J.A., 207
Nielson K., 160
Nielson K.A., 155, 188, 233, 234, 249
Niemeyer M., 29
Nikelshpur O.M., 161
Nikolas M., 98
Nirschl K., 30
Niswender K.D., 160
Noble L., 20
Nocera J., 253
Nock M.K., 153
Noll R.B., 147
Nomura Y., 14, 161
Noniyeva Y., 268
Nonnemacher M.R., 112
Nordlund A., 77, 83
Norlien J., 42
Norman A., 249
Norman A.L., 31, 38, 155, 233, 234
Norris T., 7
Norseth C., 220, 242, 244
Northington F.J., 258
Norton M.C., 154
Noullet C.J., 142
Novack T., 48
Novack T.A., 30
Novakovic-Agopian T., 53
Novitski J., 42
Nowinski C.J., 264
Nussbaum N.L., 175
Nyenhuis D., 116
Nynehuis D., 166, 268
O' Shea D.M., 140, 192
O'Brien L., 16
O'Bryant S., 157
O'Connor M.K., 244
O'Dell K.M., 49, 50
O'neil B.J., 31
O'Neil M., 45
O'Neil M.E., 40
O'Neil R., 52, 139, 219
Oberg L., 256
Oberg L.K., 246
Obermeit L.C., 107
Obler L.K., 66
Obtera K.M., 80
Odland A., 30
Oelke L., 184
Ofen N., 13
Ogaryan V., 200
Ogbeide S.A., 129
Ogg R.J., 58, 121
Oh-Park M., 67
Ohm D., 248
Ojeda N., 141, 198
Ojo E.A., 66
Okahashi S., 181, 242
Okdie B.M., 217, 218
Okonkwo O., 121
Okonkwo O.C., 121, 123
Okumura S., 242
Okun M.S., 60, 67, 80, 166, 167, 168, 231
Olanow C., 191
Olavarria H., 106
Oleson D., 154
Oliver B., 71

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

Olmstead M.C., 218
Olson C.R., 146
Olson E., 190, 232
Olson E.A., 190, 232, 233
Olson R.K., 96
Omisade A., 71
Ono K.E., 17
Onyike C., 82
Oquendo M., 59
Oquendo M.A., 267
Orbach R., 263
Orff H., 52
Orff H.J., 37, 41
Ortega M.R., 68
Ortiz K., 92
Osborne-Crowley K., 240
Osipowicz K., 88, 89, 147
Osmon D.C., 91, 124
Østergaard K., 169
Ostrosky F., 79
Ottemiller D., 17, 224
Oveis A.C., 66
Overbeek A., 137
Pa J., 162
Padden E., 18, 103
Pagulayan K., 39
Painter K.N., 185
Pajardo C., 206
Palad V., 261
Palma I., 220
Palma I.A., 242, 244
Palmer B.W., 236
Palmer S.L., 10
Pandit P., 76
Panek L., 226
Panenka W., 257
Panenka W.J., 84
Pantazatos S.P., 66
Papademetris X., 179
Pape T.L., 38
Paquet K., 84
Parikh M., 159
Parikh S., 269
Park D., 122
Park L.Q., 162
Park M., 199
Park P., 184
Park S.E., 91
Parks A.C., 44, 231
Parmenter B., 39
Parsons M., 36
Parsons T., 87, 209
Parsons T.D., 87, 209
Partridge T., 13
Pasternak M., 134
Pastorek N., 126, 127
Pastorek N.J., 38, 40, 125, 127, 128, 131
Patel K., 243
Patel N., 90, 251, 253
Patel P., 7
Patel S.K., 3, 138
Patrick K., 70, 89, 147
Patrick K.E., 88, 89, 219
Patten C., 169
Patterson T.H., 72
Paul L.K., 260
Paul R., 62, 75, 110
Paul R.H., 111, 112, 252
Paulsen J.S., 187
Paulson D., 125
Paulson J., 201
Pazienza S., 173
Pearlson G.D., 201
Peck C.P., 167, 174
Pedersen H., 130
Pedersen H.A., 139
Pedroza C., 235
Peechatka A.L., 199
Peirce K., 252
Peña J., 141, 198
Peng C., 224
Penn M., 171
Penney D.L., 164, 221
Pennington B.F., 96
Perez R., 5
Perlstein W.M., 46, 60, 168
Perna R., 94, 123, 185
Perreault A., 204
Perrine K., 25
Perry C., 230, 250
Perry C.E., 230
Persad C., 76
Persaud A.D., 96
Peskind E., 39
Pester B., 196, 197
Pester B.D., 197
Peter B., 258
Peters A., 258
Peters B., 13
Peters B.N., 13
Peters J.B., 229
Petersen N.J., 40, 128
Peterson J., 160
Peterson J.K., 243
Peterson M., 66, 250
Peterson R.L., 25, 96
Petranovich C.K., 264
Petrauskas V.M., 102
Petrides M., 93
Pettigrew C., 121, 122
Pettit C., 61
Pfefferbaum A., 111, 188
Phan K., 258
Phan L., 233
Piccinin A.M., 149
Piccolini G., 20
Pickwith K.M., 131
Pierce K., 62
Piercy J., 13
Piercy J.C., 92, 134, 135, 136
Pierpont R., 117
Piguet O., 35
Pillai J., 221
Pina M.J., 108
Pineda D.A., 223
Pineda J.A., 51
Piper L., 116, 166, 268
Pirogovsky E., 78, 80
Pirrone V., 112
Piryatinsky I., 138
Plasencia M., 180
Pliskin N., 116, 166, 268
Pliskin N.H., 125
Poirier J., 27
Pollock J.L., 81
Polsinelli A., 241
Ponsford J., 49, 235
Pontifex M.B., 44, 231
Poon L.W., 243
Popa A., 166, 268
Popa A.M., 116
Poppert K.M., 146
Poquette A., 110
Poretti A., 258
Porter J.B., 109
Posada C., 135
Possin K., 222
Possin K.L., 81
Potts G., 224
Powell S.K., 145
Pramataris P., 225
Pratson L., 20, 21, 24, 25, 150
Prechotko C., 84
Preer L., 190, 232, 233
Preis S.R., 251
Presnell P., 196, 197
Presnell P.M., 197
Pressman P., 268
Price C., 164, 222
Price C.C., 168, 174
Price C.E., 67, 167
Prigge M.B., 207
Prince C., 106
Pritchard A., 103
Privitera M., 179
Procyshyn R., 84
Prost J.H., 204

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

Proto D., 125, 127
Provenzano F.A., 89
Puente A., 81
Pui C., 4, 9
Pulsipher D.T., 124, 143, 176
Purdie R., 130, 196
Purohit M., 54
Puts N.A., 203
Pyun S., 56
Pyykkonen B.A., 160, 243
Quinn C., 80
Quintero I., 64, 65
Quintin E., 222, 269
Raak J., 139, 219
Rabin L., 76
Rabinowitz A., 133
Rabinowitz A.R., 25, 26, 133
Raboud J., 107, 114
Rachlis A., 107, 114
Rademaker A., 82
Radke A., 82
Rafael M.C., 220
Raghavan M., 179
Raghubar K.P., 9
Rahman-Filipiak A., 31
Raiford S.E., 147
Raintree J., 42
Rajagopal M., 158
Rajaram S., 220, 242, 244
Rajkumar W., 173
Rajtmajer S.M., 51, 189
Rakic J., 45
Ramanathan D., 133
Rambo P., 222
Ramírez G., 102
Rammohan K.W., 68
Ramos V., 16
Randall R., 240
Randolph J., 116
Randolph J.S., 71
Rane S., 18, 19
Ransom D.M., 20
Ranson R., 29
Rao J., 154
Rao J.A., 186, 187
Rao R., 115
Rao S., 36, 160
Rao S.M., 155, 187, 188, 233, 234, 249
Rappaport L., 248
Rapport L.J., 47, 193
Raskin S., 183
Ratnanather T., 122
Ravdin L.D., 138
Raz N., 170, 171
Raz S., 13
Razani J., 75, 261
Ready R., 181
Reamer M., 91
Redle J., 140, 170
Reece C., 36, 187
Reed B., 90, 210, 211
Reed B.R., 210
Reedy A., 179
Rees L., 69
Reese C., 133
Reesman J., 19, 24, 147
Rehmel J.L., 260
Reid M., 37
Reilly J., 65
Reilly J.L., 201
Reinhard M., 60, 136, 220, 262
Reinhard R., 107, 114
Reinlieb M., 153, 195
Reinvang I., 77
Reiss A., 222
Reiss A.L., 269
Relkin N.R., 138
Renbarger J.L., 120
Reneman L., 4, 189
Rentz D., 121, 122
Rey G., 176
Reynolds M., 27, 136
Reynolds M.K., 135
Reynolds S., 207, 262
Rhodes E., 221
Rhodewalt L., 219
Riccitelli G., 68
Rice L., 132, 220, 269
Rice L.L., 92
Rich J.B., 3
Richards I., 86
Richardson S., 154
Riegel B., 170
Riesgo V.J., 68
Ringe W., 159
Ringman J., 75, 153
Ringman J.M., 158, 159
Ringrose R., 196
Ris M., 6, 9
Risen S., 24
Riskin-Jones H., 63
Rivera F., 220, 242, 244
Robbins R., 241
Roberg B., 55, 56
Roberts A., 117
Roberts K., 173
Robertson K., 46, 184
Robin K.J., 109
Robins D., 206
Robinson J., 126, 180
Robinson K.E., 6
Robinson P., 251, 252
Robison L., 121
Robison L.L., 120
Rocca M.A., 68
Rocio D., 141
Rodgers-Neame N., 179
Rodrigo A., 189
Rodrigue K., 121, 122
Rodriguez G.B., 68
Rodriguez-Larrain G., 52
Roe C., 121, 122
Roebers C.M., 21
Roels H.A., 83
Rogalski E., 66, 82, 248, 250
Rogers S.A., 193, 241, 249
Rogg J., 30
Rohlfing T., 111
Rohling M., 84
Rohling M.L., 142
Rolin S.N., 129
Rollins K., 147
Rollins N., 12
Roman C.A., 51
Romero E., 28, 29
Romero L.L., 228
Romesser J., 38, 125, 127
Romesser J.M., 131
Romski M., 115
Rooney A., 110
Rooney A.S., 108
Roopchansingh V., 177
Roper B., 92, 130, 132, 195, 196, 220, 269
Roper B.L., 139
Rosado D., 160
Rosario D., 113
Roseberry J.E., 199
Rosema S., 24
Rosen J.W., 41
Rosenberg S., 65
Rosenblatt A.S., 54
Rosenblatt D., 267
Rosenbloom M.J., 111
Rosenes R., 107, 114
Rosenfeld B., 36
Rosneck J., 170, 171
Ross J.M., 108
Ross S.L., 54
Rossetti H., 140, 159
Rossetti M., 50, 138
Rossetti M.A., 68, 191
Rossi A., 53
Rostami S., 31
Rotblatt L.J., 78
Roth R., 175, 180, 219
Roth R.M., 116
Rourke S., 114

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

Rourke S.B., 107
Rowell L.N., 12
Roy H., 91
Royalty A., 222, 269
Rubin J., 125
Rubin K., 19, 151
Ruocco A.C., 189
Russ K., 141, 142
Rutecki P., 178
Ryan J.J., 137
Ryan K., 197
Ryan K.A., 196, 197, 224, 258
Ryan P., 201
Ryman S.G., 239
Sabaté J., 220, 242, 244
Sabsevitz D., 9, 66, 179
Sadek J.R., 143
Sadler M.S., 265
Sady M., 25
Saggar M., 222, 269
Sainz Cort A., 263
Sakata L., 180
Salazar R., 62
Salim G., 191
Salloway S., 138, 154
Salminen L., 62, 75
Salminen L.E., 252
Salmon D.P., 43, 82, 89, 155, 156, 180
Salzbank J., 14
Sanchez-Ramos J., 79, 184
Sanchis B., 141
Sandel N.K., 101, 146, 175
Sanders C., 143, 145
Sanders C.J., 74
Sanderson-Cimino M., 254
Sanderson-Cimino M.E., 249
Sandoval L., 79
Sano M., 205
Santa Maria M., 84
Santiago C., 226
Santos O.A., 124
Sanyal R., 194
Sanz J.H., 212
Sara N.E., 260
Sarafoglou K., 212
Sasaki A.W., 106
Sassoon S.A., 111
Saunders E., 197
Saunders E.F., 197, 224
Savich R.D., 228
Savjani R., 151
Sawada K., 191
Saxton S.N., 14
Sayegh P., 264
Sayers J.T., 66
Saykin A.J., 120, 181
Scala S., 164
Scardamalia K., 7
Schagen S.B., 4, 189
Scharaga E.A., 244
Schatz P., 101, 134, 146, 147, 175
Scheibel R., 36, 127
Scheibel R.S., 40, 128
Scheiner D., 36
Scheinost D., 179
Schiehser D., 52
Schiehser D.M., 40, 41, 42, 45, 78, 80, 128
Schleenbaker R.E., 38
Schmitt L., 136
Schmitter-Edgecombe M., 2, 28, 46, 74, 75, 87, 145, 157, 184, 242
Schneider H., 124
Schnicter C., 72
Schoenberg M.R., 51, 179
Schofield P., 62
Schofield P.R., 252
Schohl K., 202
Schreiber J.E., 10
Schretlen C., 198
Schretlen D., 82
Schretlen D.J., 56, 149, 150, 202
Schroeder R., 165
Schuett M., 15
Schuff N., 81, 222
Schulte T., 188
Schultheis M., 70, 144, 148
Schultheis M.T., 143, 218, 219
Schultz L., 130
Schupf N., 89, 226
Schuster R.M., 86, 108, 237
Schutte A.R., 33, 34
Schwab N., 168, 222
Schwartz B., 59, 60, 135, 136, 220
Schwartz D., 175
Schwartz D.J., 30
Schweinsburg B.C., 267
Schwent Shultz L.A., 139
Scoggins M.A., 121
Scott C., 143
Scott J., 107, 267
Scott J.C., 144
Scott S., 75
Scott S.E., 252
Scott S.G., 39
Scratch S., 235
Scudder M.R., 229
Scull L., 72
Seats E., 42
Seewald P., 265
Segerstrom S.C., 250, 252, 256
Seguin A., 137
Seichepine D.R., 165, 169
Seidel G.A., 171
Seidenberg M., 132, 155, 160, 178, 188, 233, 234, 249
Seligman S., 243
Seligman S.C., 144
Selke G., 5
Selnes O., 122
Selnes O.A., 262
Semerjian C., 118
Semerjian C.H., 7, 11
Semrud-Clikeman M., 212
Sepeta L., 177
Sephton S.E., 252
Seshadri S., 164, 251, 266
Sesma A., 100
Sesma H., 100
Sestito J., 243
Sestito N., 127
Sevcik R., 96, 115
Sexton J., 30
Shadi S., 126
Shah B.B., 81
Shaked D., 156
Shapiro R.J., 174
Sharifan T., 95
Sharp C., 92
Shaw L.M., 158
Shear P.K., 179
Sheffield T.D., 33, 34
Sheldon S., 77
Shen D., 52
Sheppard D.P., 78
Sherman D., 28
Shewokis P., 72
Shields M., 165, 172
Shih S., 177
Shin D., 153
Shollenbarger S., 237
Shuman M.J., 255
Shuman Paretsky M., 69
Sibson J.M., 129
Siddarth P., 153, 195
Siebenmorgen M., 14, 15
Sieg E., 115, 248
Sigvardt K.A., 161
Sikora I., 28
Silva A.J., 238
Silva L.M., 125
Silva M.A., 44
Silverbrook M., 107
Sim A., 38, 125, 127
Sim A.H., 127, 131
Simon C.M., 242
Simon T.J., 118
Simpson D., 113

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

Sims R., 246
Singer H.S., 12
Skeel R., 52, 139, 219
Skelton R.W., 54
Skiles D., 154
Skillicorn K.N., 145
Skinner J.S., 90
Skolasky R., 56
Slattery T.J., 141
Slinn K., 61
Slocomb J., 31
Slomine B., 19, 22, 24
Slonena E.E., 168
Small G., 153
Smart C.M., 84, 246, 256
Smith A., 233
Smith B.M., 38
Smith C., 188
Smith D.M., 110
Smith G., 3, 32, 74
Smith J., 155, 160, 233
Smith J.C., 234, 249
Smith K., 6, 114
Smith M.M., 71
Smith S.L., 81
Snappin K., 258
Soble J.R., 30
Sofko C., 95, 126
Sohlberg M., 49
Soldan A., 122
Solomon G., 146
Solomon G.S., 101, 175
Solomon P., 162, 182
Solomon T., 162, 182
Solomon T.M., 163
Song D.D., 80
Song W., 76
Songy C., 166, 203
Sorg S., 42
Sorg S.F., 128
South M., 204
Southwick S.M., 267
Sozda C.N., 46, 60, 184
Spader H., 30
Spat J., 69, 255
Spencer D.D., 179
Spencer K., 258
Sperling S.A., 81
Spiers M., 221
Spiro A., 66
Spitznagel M., 73, 165, 170, 171, 172, 245
Squeglia L.M., 86
Srivastava D., 120
Srnka K., 160
St N., 195
Staat M., 264
Stafford R., 191
Stajduhar K., 247
Stamps J., 34
Stancin T., 19, 22, 24, 151
Stanford L.D., 124, 176
Starr C., 42
Stavinoha P.L., 5
Stavitsky K., 62
Steed D., 83
Steele A.D., 260
Stefanatos A.K., 175
Stefanatos G., 65
Steffen P., 61
Stegemöller E., 168
Stegemoller E., 65
Stein M.B., 153
Steinberg L., 148
Steiner A., 114
Steiner A.J., 114
Steinlin M., 21
Stelmokas J., 100
Stephen J.M., 228
Stephens E., 228
Stephenson A., 231
Sterling C., 70
Stern M.K., 96
Stern P., 192
Stern Y., 89, 156, 162, 211, 226
Sterns A., 170
Stevens M., 206
Stevens S., 202
Steward K., 98, 106
Stewart D., 4
Stewart G., 29
Stickans L.K., 120
Stinson J.M., 38
Stokes R., 193
Storzbach D., 40, 45
Stouten-Kemperman M., 189
Strang J., 57, 202
Stringer A.Y., 30
Stringer D., 196, 197
Stringer D.M., 197
Strober L., 72, 73
Strum V., 268
Studaway A., 121
Studer M., 21
Sturm V., 82
Su W., 257
Suarez P., 263
Suarez P.A., 262
Subas T., 162
Suchy Y., 98, 219, 220
Sudhyadhom A., 253
Sugarman M., 249
Sugarman M.A., 38, 129, 155, 188, 234
Suhr J., 99, 105, 133, 243
Suhr J.A., 135
Sullivan C., 82, 150
Sullivan E., 188
Sullivan E.V., 111
Sullivan K., 165
Sullivan P., 60, 136, 220
Sullo E., 156, 157
Sultzer D.L., 63
Sumowski J.F., 54, 68, 189
Sun B., 17, 150
Sun-Suslow N., 77
Sunderaraman P., 48, 218
Sung A., 57
Sung J., 254
Supelana C., 36
Suskauer S., 19, 22, 24
Sutherland A.N., 198
Sutton K.A., 223
Swain M., 10
Swan N., 45
Swanson J., 1
Swanson S.J., 179
Sweeney J.A., 201
Sweet L., 81, 171
Sweet L.H., 108, 170
Swenson N., 39
Swenson R., 164, 221, 266
Swerdloff R., 26, 28, 29
Sylvester P., 218
Szeles D., 34, 86, 253
Szmyglewski M., 184
Szymkowicz S.M., 184
Taba P., 163
Tabby D., 72
Takahashi H., 205, 242
Takahashi R., 184
Takeoka M., 177
Talbot K.S., 102
Tallman E., 4
Talmi D., 9
Tam J.W., 75
Tameze-Rivas F., 216
Tamm L., 103
Tamme E., 163
Tamminga C.A., 201
Tan A., 98, 106
Tang A.C., 12
Taniguchi A., 155
Tapert S., 148
Tapert S.F., 86, 237
Tapsak S.E., 95
Tarazi R., 17
Tarazi R.A., 17

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

Tart-Zelvin A., 88, 89, 147, 221
Tartaglia L., 263
Tashima K.T., 108
Tate D., 37, 62
Tate D.F., 37
Taub E., 70
Taylor C.R., 256
Taylor H., 19, 24, 151
Taylor H.G., 22
Telmet Harper K., 47
Temkin N., 44, 207
Terwilliger V., 20
Terzyan S., 267
Thelen J., 55, 56
Theodore W.H., 177
Theoret H., 27
Thieme B., 139
Thomas K.M., 100
Thomas K.R., 55, 240
Thomas M., 152
Thomas M.L., 153
Thompson D., 235
Thompson L., 103
Thornton A., 257
Thornton A.E., 61, 84, 245
Thornton W., 241, 245
Thornton W.L., 174, 245
Thulborn K., 125
Tiersky L., 96, 99
Tingus K.D., 159
Tippett J., 246
Tkachenko O., 190, 232, 233
Tlustos S.J., 22
Tobe R., 226
Toichi M., 181
Tolar T.D., 93
Tomassilli J.C., 109
Tomaszewski Farias S., 2, 210
Tommerdahl M., 203
Tong S., 147
Torkelson J., 212
Torres I.J., 197
Torres J., 22
Touradji P., 173
Towns S.J., 39, 44
Tran J.K., 194
Tranel D., 157, 267
Trask C.L., 5
Travers B.G., 207
Travis Seidl J.N., 158
Treadwell K., 206
Treble-Barna A., 175
Tremblay J., 229
Tremont G., 178
Triebel K.L., 76
Troche M., 191
Trojanowski J.Q., 158
Trontel H., 205, 207
Trost Z., 218
Tröster A., 79
Troyanskaya M., 36, 40, 127, 128
Troyb E., 203, 206
Tsai J., 170
Tschanz J.T., 154
Tse W., 191
Tsikis J., 216
Tsui Y.H., 154
Tsukiura T., 184
Tsutamori E., 205
Tun S., 40, 45
Tuokko H., 255
Tuokko H.A., 247
Turner M., 261
Twamley E., 40, 52
Twamley E.W., 37, 41, 142, 200, 240
Tworog-Dube E., 117
Tyner C.E., 152, 185
Tyson B., 71, 175, 180
Ubukata S., 184
Ukueberuwa D.M., 133
Ullsperger J., 98
Umlauf A., 263
Updegraff J., 172
Ursano R.J., 153
Ustinova K., 52
Uswatte G., 70
Vadnais S., 63
Vadnais S.A., 103, 234
Vahter L., 163
Vaida F., 183
Vakhtin A., 239
Vale F.L., 179
Valliancourt D., 253
Vallorani A.M., 13
Valmas M., 169
Van Den Heuvel S.E., 100
van der Fluit F., 117
Van Dyk K., 109
van Geldorp B., 253
Van Hecke A.V., 202
van Patten R., 168
van Steenburgh J., 56
van Steenburgh J.J., 202
Vanderburg N., 212
Vandermorris S., 77
Vanderploeg R.D., 30, 39, 44
Vannasing P., 229
Vannatta K., 19, 151
Vannorsdall T.D., 56, 202
Vargas G., 72, 133
Vartanian O., 238, 239
Varvaris M., 56, 202
Vas A., 45, 52
Vasilev G., 85
Vasserman M., 101
Vassileva J., 85
Vaughan C., 20, 21, 24, 25, 150
Vega C., 176, 177
Vekaria P., 101
Vella L., 142, 200
Velozo C.A., 152
Veltman D.J., 4
Venkatesan U.M., 51, 189
Venter J., 204
Verche E., 64, 65, 176
Verges A., 192
Verghese J., 255
Vernale M., 116, 166, 268
Verney S.P., 263
Victor T.L., 261
Vila-Rodriguez F., 84, 257
Villa M., 216
Vinogradov S., 201
Viswanathan A., 226
Vogler M., 269
Vogt G., 36
Volpi J.J., 225
Von Ah D., 4
Vos L., 259
Voustianiouk A., 191
Waber D., 176
Waber D.P., 177
Wade S.L., 22, 24, 236, 264
Wadsworth H., 27
Wadsworth S.J., 96
Wakefield D.B., 249
Wakschlag L.S., 146
Wald D., 165
Walder D., 191
Waldie A., 254
Waldron S., 117
Walker L., 69
Wallin A., 77
Walsh C.M., 90
Walsh K., 8, 118
Walsh K.S., 7, 11, 147
Walter J., 248
Walz N.C., 264
Wamboldt F.S., 174, 269
Wang C., 26, 28, 29, 76
Wang M., 122
Wanner J.L., 194
Ward A., 157
Wardin L., 132
Wargovitch B., 246
Warschausky S., 16
Wasserman R., 17
Watson C.L., 90

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

Watson E., 60, 194, 228, 231
Watson E.M., 232
Weakley A.M., 157
Weber E., 107, 108, 113, 183
Weber M., 190, 232, 233
Webster J., 38
Wei C., 99
Weigard A., 104
Weinberger H.D., 174, 269
Weiner M., 140, 159
Weiner M.F., 140
Weintraub D., 168
Weintraub S., 66, 82, 248, 250
Weise R., 242, 244
Weise R.M., 220
Weisenbach S., 186, 248
Weisenbach S.L., 193, 258
Weiss B., 36
Weiss M.D., 14
Weissberger G., 89, 180
Weissberger G.H., 78, 249, 254
Weitner B., 82
Welch R.D., 31
Weldon A., 186, 248
Weldon A.L., 193, 224
Weller J.A., 204
Welsh J., 147
Welsh J.L., 18
Welsh K., 219
Welsh R., 186
Welsh R.C., 192, 193, 258
Werhane M., 39
Werner M., 202
Werner M.A., 57
Wertz C., 239
West J.D., 120
Westerhaus E., 110, 111
Westerhaus E.T., 112
Westfall D.R., 120
Wheaton V., 106
Whipple E., 143, 144
White S.A., 238
Whiteside D., 130, 195, 196, 269
Whiteside D.M., 92, 132, 139, 220
Whitfield-Gabrieli S., 187
Whitman R.D., 259
Whitmore S., 155
Whittington T., 193
Whyte J., 1, 31, 119
Wicas G., 72, 76, 221, 266
Widmann G., 92, 132, 220
Wiebe S.A., 33
Wiegand L.A., 49, 50
Wiegman A.F., 226
Wieneke C., 82
Wiener J., 233
Wiener J.R., 222
Wierenga C.E., 78, 153, 188, 249
Wigdahl B., 112
Wiik K.L., 100
Wilcox J., 72
Wilde E., 36
Wilde E.A., 20, 26, 151, 194, 235
Wilkins S., 63
Willard V.W., 5
Willcutt E., 96
Williams A.C., 66
Williams J., 88, 89, 147, 221
Williams M., 88
Williams S., 111, 112
Williamson J.B., 178, 246
Williamson K.D., 126
Willis S., 252
Willis S.L., 251
Wilson J.P., 63, 65, 168
Wilson M.D., 263
Wilson M.J., 85
Wilson R., 125, 211
Winick N., 12, 147
Winocur G., 77
Winstanley F., 179
Wisdom N., 131
Wisdom N.M., 127
Wise J., 151
Wiseheart R., 94
Wishart H.A., 71, 116
Wisniewski A., 261
Witkin G.A., 225
Wochos G., 8
Wodka E., 203
Wojtowicz M., 71
Wolf M., 96
Wolf P.A., 251, 266
Wolfe K.R., 6
Wolfson L., 249
Wolk D.A., 158
Womble M., 142
Wong A., 3
Wong A.L., 138
Wong C.G., 47
Wong D., 29
Woo E., 26, 28, 29, 75, 158, 159
Wood K., 82
Woodard J., 160
Woodard J.L., 31, 38, 155, 188, 233, 234, 243, 249
Woods S., 78, 108, 109, 111, 112
Woods S.E., 213
Woods S.P., 86, 107, 110, 113, 144, 183
Woodward A., 103
Woolverton C., 241
Wooten G., 81
Worden M., 30
Worsham W., 204
Worthy G., 91
Wright M., 261
Wright M.J., 26, 28, 29, 158, 159, 262
Wrocklage K.M., 267
Wu S., 5
Wu T.C., 235
Wurm L., 259
Wylie G., 49, 70
Wylie G.R., 51, 268
Wyman-Chick K., 139
Xie S.S., 140
Xu B., 177
Xu M., 90, 160
Xu Y., 220, 242, 244
Yael G., 72
Yaffe K., 90
Yamada K., 242
Yamada S., 181
Yamakado H., 184
Yang G., 179
Yatham L.N., 197
Yeates K., 6, 11
Yeates K.O., 6, 9, 19, 24, 151
Yee M., 165
Yee M.K., 169
Yehyawi N.T., 74
Yochim B., 29, 64
Yokoyama J., 251
York G., 37
Yoshida H., 191
Yosick R., 18
You S.C., 162
Younes L., 122
Young C., 16
Young J.C., 173
Yuan J., 266
Yutsis M., 29, 64, 74
Zabel A., 10
Zabel T., 92
Zabetian C., 258
Zafonte R., 22, 101
Zahodne L., 162, 210
Zahodne L.B., 89, 211, 264
Zaidi K.B., 241
Zakzanis K., 127, 128
Zamor T., 15
Zamzow J., 48, 88, 89, 147
Zaringhalam S., 7
Zehler D., 28
Zelko F., 11
Zhang H., 10, 58
Zhang Y., 225
Zielinski B.A., 207

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms.
https://doi.org/10.1017/S1355617714000381

Zilberfayn I., 194
Zimak E., 202
Zlatar Z.Z., 188
Zobel H., 65
Zubieta J., 186, 193, 248, 258
Zuidema E.T., 249

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms.
https://doi.org/10.1017/S1355617714000381

Keyword Index
Forty Second Annual Meeting
International Neuropsychological Society

February 12-15, 2014
Seattle, Washington, USA

academic achievement, 20, 22, 91, 92, 93, 95, 96, 103, 215, 216, 230, 262
acculturation, 261
activities of daily living / adaptive functioning, 6, 15, 38, 48, 55, 72, 73, 75, 76, 78, 80, 107, 110, 113, 115, 128, 142, 143, 144, 152, 153, 162, 174, 183, 184, 203, 242, 243, 244, 247, 269
adolescence, 15, 23, 24, 58, 69, 85, 86, 96, 100, 101, 112, 116, 131, 176, 185, 202, 213, 214, 219, 237, 238
affective processing disorders, 72, 192, 196
affective processing, normal, 60, 135, 179, 182, 219, 220, 232, 246, 268
aggression, 146, 213
aging disorders, 43, 64, 77, 78, 81, 90, 107, 109, 122, 123, 125, 129, 138, 140, 153, 156, 168, 172, 183, 188, 210, 211, 223, 241, 246, 247, 250, 251, 257, 258, 266
aging, normal, 55, 56, 62, 66, 90, 108, 149, 150, 155, 161, 163, 164, 172, 182, 187, 188, 193, 211, 212, 220, 222, 223, 226, 227, 230, 231, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 265, 268
alcohol, 40, 61, 86, 218
amyotrophic lateral sclerosis, 68, 191
anomia, 64
anosognosia, 166, 199
anterior cingulate, 6, 228, 247, 250
anxiety, 15, 60, 118, 133, 187, 193, 195, 221, 243, 260, 268
apathy, 109, 167, 168, 267
apolipoprotein E, 108, 122, 123, 154, 156, 161, 188, 230, 234, 251, 252
apraxia, 57, 164
assessment, 22, 28, 29, 87, 91, 99, 101, 105, 114, 115, 133, 135, 136, 137, 138, 140, 141, 145, 146, 147, 150, 152, 163, 164, 201, 209, 210, 215, 223, 227, 242, 256, 263, 264
asymmetry, 168
attention deficit hyperactivity disorder, 17, 22, 33, 34, 92, 93, 95, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 124, 126, 186, 203, 212, 214, 215, 216, 223, 228, 234
attention, 9, 10, 12, 13, 15, 21, 30, 44, 46, 54, 60, 61, 63, 67, 69, 71, 94, 97, 100, 102, 106, 117, 120, 131, 145, 146, 152, 161, 185, 192, 204, 218, 227, 231, 233, 244, 259, 267, 268
auditory processing disorder, 131
autism spectrum disorders, 57, 194, 202, 203, 204, 205, 206, 207, 216
autism, 202, 205, 206
awareness, 27, 156, 157, 162, 228, 243, 245
basal ganglia, 165, 187, 222
bilingualism, 216, 225
bipolar disorder, 108, 110, 197, 198, 225
brain damage, 217
brain development, 14, 88, 89, 205, 207, 264
brain disorder, 16, 168
brain function, 221, 226, 229, 239
brain injury, 10, 19, 25, 30, 31, 40, 42, 43, 53, 54, 55, 140, 210
brain plasticity, 56, 210
brain structure, 90, 104, 171
brain tumor, 5, 6, 7, 8, 9, 10, 11, 66, 120, 175, 222, 262
breast cancer, 3, 4, 189
cancer, 3, 4, 5, 7, 8, 10, 11, 19, 52, 58, 59, 121, 148, 262
cardiovascular disease, 18, 90, 113, 140, 159, 170, 171, 172, 181, 197, 246, 266, 270
caregiver stress/burden, 74, 76, 245
cerebellum, 226, 240, 257
cerebral blood flow, 154, 171, 188, 198, 216, 249, 266
cerebral palsy, 17
cerebrevascular accident/stroke, 11, 182, 226
cerebrovascular disease, 83, 89, 235, 248, 265, 266
chemotherapy, 3, 4, 9, 11, 52
child brain injury, 20, 21, 24, 151, 152
child development disorders, 13, 14, 65, 102, 104, 105, 115, 116, 118, 119, 203
child development, normal, 11, 33, 34, 88, 147, 193, 211, 213, 215, 229
chronic pain, 39, 71, 208
chronic stress, 263
clinical trials, 52, 182, 208, 237

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

cognitive control, 60, 61, 195, 204, 227, 228, 229, 231, 253, 267, 269
cognitive course, 16, 79, 80, 85, 113, 122, 123, 178, 210, 211, 240, 268
cognitive functioning, 3, 4, 5, 9, 16, 28, 29, 30, 37, 41, 45, 48, 49, 52, 58, 59, 62, 68, 71, 72, 73, 84, 91, 99, 105, 107, 108, 110, 112, 117, 119, 144, 157, 159, 160, 166, 167, 169, 170, 171, 172, 174, 178, 181, 185, 192, 193, 195, 197, 198, 204, 220, 221, 225, 226, 230, 231, 235, 237, 240, 242, 245, 246, 247, 248, 251, 256, 262, 267, 270
cognitive neuroscience, 60, 63, 88, 181, 189, 225, 238, 239, 251
cognitive processing, 60, 73, 93, 95, 187, 198, 263, 268
cognitive rehabilitation, 3, 8, 47, 48, 49, 52, 53, 54, 55, 56, 57, 58, 59, 72, 85, 143, 144, 166, 173, 181, 210, 239, 240
cognitive reserve, 4, 6, 29, 54, 68, 72, 80, 90, 122, 161, 190, 192, 199, 210, 211, 242, 248
cognitive screening, 4, 7, 57, 68, 79, 81, 138, 141, 142, 163, 169, 170
cognitive style, 198, 238
cognitive, 11, 28, 87, 90, 116, 136, 147, 160, 177, 178, 180, 205, 206, 211, 212, 219, 242, 250, 251, 252
computerized neuropsychological testing, 7, 39, 87, 101, 106, 134, 142, 146, 148, 173, 175, 209
concussion, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 37, 44, 45, 125, 133, 134, 142, 146, 147, 150, 151, 152, 175, 227, 235
conduct disorder, 101, 109
congential disorders, 18, 213, 260, 261
corpus callosum, 43, 90, 260, 261
creativity, 62, 223, 238, 239
cross-cultural issues, 90, 113, 141, 149, 150, 181, 261, 262, 263, 264, 265
decision-making, 82, 84, 85, 108, 109, 111, 135, 156, 199, 217, 218, 219, 220, 228, 237, 246, 247
deep brain stimulation, 170
dementia, Alzheimer's disease, 43, 51, 67, 74, 80, 81, 82, 83, 89, 90, 122, 123, 126, 137, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 183, 188, 189, 210, 245, 250, 253, 254, 265, 266
dementia, other cortical, 35, 75, 82, 83, 258
demential, subcortical, 79, 80, 83
demographic effects on test performance, 82, 96, 143, 173, 256
depression, 5, 24, 29, 48, 52, 59, 72, 125, 130, 131, 157, 161, 171, 173, 186, 187, 191, 192, 193, 195, 196, 204, 208, 244, 248, 258, 265, 267
diabetes, 15, 114, 160, 173
driving, 48, 76, 96, 122, 143, 171, 219, 243
dyslexia, 94, 96, 214, 234
eating disorders, 67
ecological validity, 37, 75, 86, 87, 143, 145
effort, 38, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 142, 175, 180, 201
electrical injury, 125
electroencephalography, 43, 61, 143, 202, 204, 205, 229, 230, 231, 232
ethnicity, 55, 113, 211, 213, 263
event related potentials, 44, 61, 168, 194, 195, 204, 228, 229, 230, 231, 232
executive abilities, abnormal, 10, 17, 28, 38, 41, 48, 53, 57, 63, 65, 77, 85, 92, 98, 99, 102, 104, 106, 117, 118, 121, 135, 168, 171, 184, 196, 199, 202, 203, 207, 212, 213, 214, 215, 216, 217, 221, 222, 223, 227, 240, 246, 257, 260, 269
executive abilities, normal, 33, 34, 63, 89, 95, 96, 98, 141, 150, 169, 173, 195, 213, 214, 215, 216, 219, 220, 222, 223, 224, 225, 226, 227, 229, 249, 256, 262, 263, 269
face processing, 60, 193, 194, 233
facial affect, 60, 73, 136, 184, 191, 193, 219
fatigue, 255
fetal alcohol syndrome, 85
fluency, 34, 77, 111, 130, 137, 157, 159, 169, 174, 254, 264
fluid intelligence, 248
forensic neuropsychology, 128, 129, 131, 132
frontal lobes, 23, 35, 50, 61, 63, 72, 82, 103, 140, 189, 196, 217, 222, 226, 233
genetic neuropsychology, 26, 28, 62, 115, 116, 117, 118, 119, 231, 239, 251, 252, 257
geriatric depression, 243
head injury, closed, 26
hippocampus, 66, 118, 177, 232, 234, 252
HIV/AIDS, 107, 108, 109, 110, 111, 112, 113, 114, 115, 144, 237
hormones, 3, 12, 29, 253
Huntington's disease, 78, 79, 116, 170, 187
hydrocephalus, 138
hypertension, 123, 251
hypoxia, 14, 185, 259
information processing speed, 47, 69, 70, 95, 109, 194, 225, 249, 252
inhibitory control, 13, 58, 86, 172, 173, 187, 198, 218, 225, 232, 259, 269
intellecutal functioning, 58, 106, 147, 269
intelligence, 117, 132, 137, 142, 238, 239
language, 7, 34, 65, 66, 117, 142, 155, 170, 179, 191, 254, 264, 269
language: aphasia, 35, 64, 65, 67, 83
language: development, 14, 89, 119, 147, 215
laterality, 46, 87, 180, 259, 260
learning disabilities, 22, 91, 92, 93, 94, 95, 97, 99, 101, 215
learning, 20, 102, 104, 107, 135, 186, 200, 229, 231, 237
leukemia, 12, 120, 121
low birth weight, 14
magnetic resonance imaging, diffusion tensor, 31, 37, 51, 72, 75, 88, 109, 118, 151, 154, 182, 235, 248
magnetic resonance imaging, functional, 26, 36, 50, 63, 78, 87, 105, 120, 172, 177, 179, 187, 189, 200, 202, 206, 252, 253

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

magnetic resonance imaging, structural, 20, 23, 42, 74, 76, 88, 103, 111, 153, 155, 171, 233, 234, 235, 249, 266
magnetic resonance spectroscopy, 200
magnetoencephalography, 179
malingering, 38, 124, 126, 127, 128, 129, 130, 131
mathematics ability, 93, 230
mathematics disability, 92
medical illness, 12, 136, 166, 170, 171, 173, 174, 212
memory complaints, 46, 127, 173, 179, 182, 186, 257
memory disorders, 21, 35, 54, 65, 67, 74, 76, 78, 83, 125, 139, 141, 144, 155, 166, 173, 180, 184, 250, 257
memory training, 8, 50, 74, 241, 249
memory, implicit, 185, 196
memory, normal, 11, 158, 179, 181, 182, 183, 184, 186, 207, 224, 246, 247, 250, 252, 253
memory, prospective, 40, 70, 79, 102, 108, 112, 113, 135, 182, 183, 200, 247
mental retardation, 116
metacognition, 78, 144, 158
metamemory, 79, 156, 183, 189
methamphetamine, 86, 111, 113
mild cognitive impairment, 55, 63, 68, 73, 74, 75, 76, 77, 78, 80, 81, 83, 87, 144, 145, 153, 154, 156, 158, 159, 161, 162, 163, 164, 165, 167, 184, 234, 244, 249, 254, 255
mild traumatic brain injury, 24, 26, 31, 38, 39, 41, 42, 44, 45, 126, 127, 128, 134
minority issues, 47, 90, 225, 246, 262
motivation, 128, 231, 268
motor function, 13, 71, 94, 104, 132, 138, 205, 206, 222, 234, 244, 253, 255
motor speed, 63, 81, 95, 132, 220
multiple sclerosis, 12, 56, 68, 69, 70, 71, 72, 73, 133, 138, 144, 189, 190, 208, 268
muscular dystrophy, 117, 119
naming, 35, 64, 66, 80
neglect, 68, 100, 258
neural circuitry, 175, 187, 189, 239
neurocognition, 29, 62, 101, 110, 166, 168, 175, 194, 199, 245, 257, 259, 266
neurofibromatosis, 13, 16, 117
neuroimaging, functional, 4, 31, 51, 61, 66, 70, 72, 89, 94, 108, 116, 121, 150, 156, 186, 188, 189, 190, 193, 209, 210, 239, 240, 268
neuroimaging, structural, 7, 9, 11, 19, 67, 71, 88, 89, 116, 125, 128, 172, 178, 210, 226, 232, 233, 235, 238, 265
neuropsychological assessment, 4, 9, 12, 16, 18, 36, 37, 50, 68, 69, 70, 76, 79, 81, 85, 87, 89, 94, 98, 99, 103, 107, 111, 112, 124, 126, 127, 128, 129, 133, 135, 136, 137, 138, 139, 140, 149, 150, 152, 154, 156, 158, 162, 163, 164, 165, 168, 170, 175, 189, 199, 209, 210, 214, 220, 221, 222, 224, 225, 249, 257, 261, 262, 267
neuropsychological outcome, 6, 8, 11, 12, 14, 16, 20, 39, 40, 47, 52, 56, 69, 79, 106, 107, 108, 114, 166, 197, 258, 260
neurotoxicity, 83, 84, 165
neurotransmitter systems, 56
normative data, 110, 133, 143, 226, 261, 263
olfaction, 28, 157
outcome, 18, 24, 26, 41, 46, 49, 201, 206
Parkinson's disease, 61, 62, 65, 67, 79, 80, 81, 119, 142, 161, 167, 168, 169, 170, 184, 191, 192, 222, 231, 258
pediatric neuropsychology, 5, 6, 7, 11, 12, 15, 16, 17, 18, 19, 20, 22, 25, 58, 59, 69, 85, 88, 92, 93, 103, 118, 121, 124, 145, 148, 151, 176, 177, 185, 186, 193, 206, 212, 217, 235
perinatal factors, 14
perseveration, 221, 222
personality, 47, 71, 73, 91, 129, 190, 197, 218, 219, 223, 238, 241
phonology, 35
planning, 75, 78, 145, 224
positron emission tomography, 188
post traumatic stress disorder, 23, 36, 38, 39, 40, 41, 42, 43, 45, 54, 60, 131, 136, 233, 267
prematurity, 13, 14, 100, 217, 229, 235
premorbid functioning, 6, 151
prosody, 245
psychometric constructs, 82, 132, 138, 139, 140, 146, 152, 153, 224, 255, 269
psychopathology, other, 25, 41, 83, 85, 92, 129, 175, 176, 190, 194, 195, 196, 200, 257
psychopharmacology, 59, 195
psychosis, 199, 201
pulmonary disorders, 174, 270
quality of life, 5, 30, 48, 55, 97, 99, 114, 133, 162, 167, 170, 180, 198, 213
radiotherapy, 8, 9, 10, 11, 120, 121
reaction time, 46, 97, 166, 192, 256
reading disorders, 6, 92, 93, 94, 96, 103, 106, 176, 186
reading, normal, 95, 96
schizophrenia, 88, 199, 200, 201
schizotypy, 199
seizure disorders / epilepsy, 175, 176, 177, 178, 179, 180, 182
seizure disorders / epilepsy, surgical treatment, 176, 177, 179
seizures, psychogenic, 175, 180
self-esteem, 30, 218
self-monitoring, 216
self-report, 25, 38, 42, 49, 106, 127, 139, 214
semantic processing, 26, 35, 63, 64, 66, 157, 188, 261
sensory integration, 204
sickle cell disease, 17, 117, 166, 216, 269
sleep disorders, 31, 174, 213
sleep, 17, 43, 44, 60, 96, 190, 194, 197
social cognition, 13, 17, 23, 59, 60, 61, 73, 82, 97, 98, 118, 120, 136, 201, 207, 242, 245, 261, 264
spina bifida, 18
sports-related neuropsychology, 22, 23, 24, 25, 26, 28, 101, 142, 147
stimulants, 63, 99
strategic processing, 223, 269
stroke recovery, 57, 68, 87, 117, 212

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381

subcortical, 111
substance abuse, 84, 85, 97, 109, 237, 238
temporal lobes, 65, 178, 179
test development, 21, 64, 134, 139, 142, 152, 256
test reliability, 137, 138, 140, 141
test theory, 140
test validity, 25, 41, 42, 105, 138, 146, 147, 160
thalamus, 206
theory of mind, 61, 86, 240, 241, 245
traumatic brain injury, 19, 21, 22, 23, 24, 25, 27, 28, 29, 30, 31, 36, 37, 38, 39, 40, 41, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 59, 60, 124, 127, 128, 130, 137, 151, 153, 183, 189, 191, 194, 208, 209, 235, 239, 240
treatment outcome, 10, 21, 38, 52, 54, 74, 100, 160, 177, 202, 208, 209, 239
vascular dementia, 30, 265, 266
verbal abilities, 34, 35, 63, 65, 70, 83, 115, 137, 157, 166
verbal auditory agnosia, 65
visual imagery, 58
visuospatial, 67, 68, 78, 100, 114, 139, 143, 169, 205, 255, 256
vocation, 144, 200
working memory, 14, 31, 36, 50, 57, 58, 63, 81, 86, 94, 120, 137, 150, 153, 185, 201, 202, 207, 220, 221, 224, 228, 241, 253
writing, 102

Downloaded from https://www.cambridge.org/core. IP address: 18.97.9.174, on 13 Sep 2026 at 14:15:30, subject to the Cambridge Core terms of use, available at https://www.cambridge.org/core/terms. https://doi.org/10.1017/S1355617714000381