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Objective: Accurately interpreting cognitive change is an essential aspect of clinical care for older adults. Several approaches to identifying 'true' cognitive change in a single cognitive measure are available (e.g., reliable change methods, regression-based norms); however, neuropsychologists in clinical settings often rely on simple score differences rather than advanced statistics, especially since multiple scores compose a typical battery. This study sought to establish quick-reference normative criteria to help neuropsychologists identify how frequently significant change occurs across multiple measures in cognitively normal older adults.
Participants and Methods: Data were obtained from the National Alzheimer's Coordinating Center (NACC). Participants were 845 older adults who were classified as cognitively normal at baseline and at 24-month follow-up. In NACC, these clinical classifications are made separately from the assessment of cognitive performance, including cognitive change. The sample was 34.9% female, 83.5% White, 13.1% Black 2.3% Asian, and 1.1% other race with a mean age of 70.7 years (SD=10.2). Of the sample, 95.5% identified as non-Hispanic. Mean education was 16.1 years (SD=2.8). The cognitive battery entailed: Craft Story Immediate and Delayed Recall, Benson Copy and Delayed Recall, Number Span (Forward & Backward), Category Fluency (Animals & Vegetables), Trails A&B, Multilingual Naming Test, and Verbal Fluency (F&L). Change scores between baseline performance and follow-up were calculated for each measure. The natural distribution of change scores was examined for each measure and cut points representing the 5th and 10th percentile were applied to each distribution to classify participants who exhibited substantial declines in performance on each measure. We then examined the multivariate frequency of statistically rare change scores for each individual.
Results: As expected in a normal sample, overall cognitive performance was generally stable between baseline and 24-month follow-up. Across cognitive measures, 81.9% of participants had at least one change score fall below the 10th percentile in the distribution of change scores, and 55.7% had at least one score below the 5th percentile, 49.3% of participants had two or more change scores that fell below the 10th percentile and 21.1% with two or more below the 5th percentile. There were 26.7% participants that had three or more change scores below the 10th percentile, and 6.4% of participants had three change scores below the 5th percentile.
Conclusions: Among cognitively normal older adults assessed twice at a 24-month interval with a battery of 13 measures, it was not uncommon for an individual to have at least one score fall below the 10th percentile (82% of the sample) or even the 5th percentile (56%) in the natural distribution of change scores. There were 27% participants that had three or more declines in test performance below the 10th percentile; in comparison, only 6% of the sample had three or more change scores at the 5th percentile. This suggests that individuals who exhibit more multivariate changes in performance than these standards are likely experiencing an abnormal rate of cognitive decline. Our findings provide a preliminary quick-reference approach to identifying clinically significant cognitive change. Future studies will explore additional batteries and examine multivariate frequencies of change in clinical populations.

Categories: Aging
Keyword 1: aging (normal)
Keyword 2: neuropsychological assessment
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4 Impact of APOE-ε Alleles on Brain Structure and Function in Healthy Older Adults: A VBM and DTI Replication Study

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Objective: The Apolipoprotein E (APOE) gene has been established in the Alzheimer's disease (AD) literature to impact brain structure and function and may also show congruent effects in healthy older adults, although findings in this population are much less consistent. Magnetic Resonance Imaging (MRI), Diffusion Tensor Imaging (DTI), and neuropsychological measures present as useful, non-invasive tools to investigate the impact of APOE-ε allele status on grey matter structure, white matter integrity, and cognitive functioning, respectively. Nonetheless, studies to date have revealed mix findings and few studies have taken a multimodal approach to investigating APOE's effects. Thus, the objective of the current study was to replicate and expand upon the multimodal neuroimaging study conducted by Honea et al. (2009), that examined the impact of APOE-ε4 presence on brain structure and cognitive function in healthy older adults, with the addition of APOE-ε2 carriers and cognitive composite measures. The aim of the current replication study was to identify reliable changes to grey matter volume and white matter integrity in healthy older adults as it relates to APOE-ε allele presence and cognitive performance. This represents one of the first studies to investigate both the risk and protective effects of APOE-ε alleles (ε4 and ε2 respectively) on measures of cognitive performance, GMV and white matter integrity in healthy older adults.
Participants and Methods: Data were obtained from the Alzheimer's Disease Initiative phase 3 (ADNI3) database. Baseline MRI, DTI and cognitive composite scores for memory (ADNI-Mem) and executive function (ADNI-EF) were acquired from 116 healthy controls. Participants were grouped according to APOE allele presence (APOE-ε2+ N= 17, APOE-ε3ε3 N= 64, APOE-ε4+ N=35). Voxel-based morphometry (VBM) and tract based spatial statistics (TBSS) were used to compare grey matter volume (GMV) and white matter integrity respectively between APOE-ε2+ and APOE-ε3ε3 controls, and again between APOE-ε4+ and APOE-ε3ε3 controls. Multivariate analysis of covariance (MANCOVA) was used to examine the effects of APOE polymorphism on memory and EF across all APOE groups with covariates of age, sex, education, and cognitive scores were correlated with imaging metrics within groups (Pearson r) to examine associations between cognitive performance and brain structure.
Results: Consistent with findings from Honea et al. (2009), no significant differences were seen across APOE groups, within-groups in MRI metrics, or cognitive performance ($p>0.05$, corrected for multiple comparisons). Taking a similar approach to Honea and company, non-significant, trend-level results were examined ($p<0.2$, corrected for multiple comparisons) and suggested: 1) Decreased GMV and increased mean diffusivity (MD) were present in APOE-ε4+ compared to APOE-ε3ε3 and 2) Increased GMV and fractional anisotropy (FA) were present in APOE-ε2+ compared to APOE-ε3ε3.
Conclusions: The current study replicated and extended previous findings. Trend-level findings across both the current and replicated study suggests there may be subtle neurostructural differences in healthy aging as a function of APOE-ε4 status. The current study additionally found potential subtle differences in GMV and white matter integrity in APOE-ε2 carriers at the trend-level, consistent with previous reports of APOE-ε2 's protective effects against neurodegeneration. Although these findings should be interpreted with caution, trend-level effects seen in the current study are consistent with previous research and may hold important implications for APOE neuromechanisms.

Categories: Aging
Keyword 1: apolipoprotein E
Keyword 2: neuroimaging: structural
Keyword 3: cognitive functioning
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5 Cross-cultural Diagnostic Validity of the Multilingual Naming Test (MINT) in a Sample of Older Adults.

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Objective: The current study aimed to evaluate the psychometric properties and diagnostic accuracy of the 32-item version of the Multilingual Naming Test (MINT) in a sample of

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