analysis was utilized to explore the relationship between number of vascular comorbidities, disease duration, and CR, as measured by a composite of formal education and literacy level, with executive functioning performance on neuropsychological testing for this sample.
Results: The model explains 12.1% of the variance of executive functioning performance (F (3, 66) = 2.883, p = 0.043). A significant positive relationship was found between CR and executive functioning (b = .335, p = 0.008). No significant relationships were found between vascular comorbidities or disease duration with executive functioning. The relationship between CR and each neuropsychological measure was explored independently using Pearson correlation (2-tailed). Significant positive correlations were found between CR and WAIS-IV or WASI-II Similarities (r = .49, p < .001), CR and WAIS-IV or WASI-II Matrix Reasoning (r = .46, p = .001), and CR and FAS (r = .26, p = .037). No significant relationships were found between CR and TMT-B (r = .07, p = .565) or CR and Stroop Color and Word Interference (r = .17, p = .240).
Conclusions: Results suggest that CR may be a better predictor of executive functioning in patients with PD than number of vascular comorbidities or disease duration. Stronger premorbid cognitive functioning and better cognitive efficiency may be neuroprotective and stave off cognitive decline in Parkinson's disease.

Categories: Neurodegenerative Disorders
Keyword 1: Parkinson's disease
Keyword 2: executive functions
Keyword 3: cognitive reserve
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62 Prediction of Mild Cognitive Impairment Conversion Using Cox Model in Parkinson's Disease

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Objective: Mild cognitive impairment (MCI) in Parkinson's disease (PD) is a critical state to consider. In fact, PD patients with MCI are more likely to develop dementia than the general population. Thus, identifying the risk factors for developing MCI in patients with PD could help with disease prevention. We aim to use the Cox regression model to identify the variables involved in the development of MCI in healthy controls (HC) and in a PD cohort.
Participants and Methods: The Parkinson's Progressive Markers Initiative (PPMI) database was used to analyze data from 166 HC and 365 patients with PD. They were analyzed longitudinally, at baseline and at 3-year follow up. Both HC and PD were further divided in 2 groups based on the presence or absence of MCI. Conversion to MCI was defined as the first detection of MCI. For all participants, we extracted the (1) Neuropsychiatric symptoms (anxiety, impulsive-compulsive disorders and sleep impairment), (2) 3T MRI-based data (cortical and subcortical brain volumes based on the Desikan atlas, using FreeSurfer 7.1.1) and (3) genetic markers (MAPT and APOE ε4 genes). We used Python 3.9 to perform three Cox proportional hazard models (PD-HC, HC only and PD only) and to model the risk of conversion to MCI, attributable to neuropsychiatric symptoms and cortical brain parameters. We included as covariates: age, sex, education, and disease duration (for the PD group). Hazard ratios (HRs) along with their 95% confidence intervals (CIs) are reported.
Results: When including both HC and PD in the model, Cox regression analyses showed that age of onset, diagnosis, the State-Trait Anxiety Inventory (STAI) and sleep impairment are variables that are associated with a greater risk of conversion to MCI (p<.005). For HC, only the STAI and the genetic marker MAPT were significantly associated with a risk of cognitive decline (p<.05). These results further indicated that a greater anxiety score at the STAI leads to a greater chance of developing a MCI whereas being a carrier of the MAPT gene reduces the risk of MCI. Regarding analysis on PD, results revealed that the STAI and the cortical volumes of the frontal dorsolateral and temporal regions are involved with a greater risk of developing a MCI (p<.05).
Conclusions: These analyses show that the neuropsychiatric symptom of anxiety seem to play an important role in the development of a MCI (significant in all three analyses). For patients with PD, cortical volumes of the frontal dorsolateral and temporal regions are significantly related to risk of MCI. This study

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highlights the importance of considering neuropsychiatric symptoms as well as cerebral volumes as key factors in the development of MCI in PD.

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63 Examining TOPF Performance in a Neurodegenerative Population

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Objective: Cognitive tests on which performance is unrelated to brain pathology are considered "hold" tests and are often used to estimate cognitive abilities prior to injury or disease. Amongst the most commonly used "hold" tests are measures of irregular word reading, such as the Test of Premorbid Functioning (TOPF). Measures of irregular word reading assess ability to accurately pronounce phonetic irregularities based on prior experience and word knowledge, and tend to be insensitive to most forms of brain pathology (Lezak, 2012). However, research examining whether a relationship exists between neurodegenerative diseases and decline in irregular word reading is limited. The few studies completed have demonstrated a decline in irregular word reading in neurodegenerative disease in general (Berg, Durant, Banks, & Miller, 2016) and Alzheimer's dementia specifically (McFarlane, Welch, & Rodgers, 2006). However, no known research has been published examining whether irregular word reading and TOPF scores differ depending on cognitive classifications commensurate with DSM-V diagnoses (i.e., mild or major neurocognitive disorder, etc.), or presumed neurological etiology.
Participants and Methods: Patients were enrolled from the University of Colorado Hospital Neuropsychology Clinic. This study was a retrospective review of consecutive referrals over the age of 65 to the University of Colorado Hospital Neuropsychology Clinic from 2019 to present. The TOPF was administered along with a full neuropsychological battery and patients were clinically classified by severity of cognitive impairment (e.g., Normal, Mild Neurocognitive Disorder, Major Neurocognitive Disorder) and presumed neurologic etiology (e.g., Alzheimer's disease (AD), Parkinson's disease (PD), vascular cognitive impairment (VCI), and mixed dementia (AD and VCI). TOPF Raw scores were used for all analyses. Correlation analysis was conducted to determine significant relationships between various demographic variables and TOPF performance. ANCOVA analyses were conducted to examine differences on TOPF performance by diagnostic classification and differences on TOPF performance by presumed neurologic etiology.
Results: Correlation determined a significant relationship between TOPF performance and education ($r = .51$, $p < .001$), but not age ($p = .092$) or gender ($p = .680$). ANCOVA revealed a significant effect of TOPF performance on diagnostic group classification after controlling for education, $F(2, 504)= 26.45$, $p < .001$. Post hoc analysis revealed that those diagnosed with Major Neurocognitive Disorder performed the worst on the TOPF ($M=39.801 \pm .958$), followed by those diagnosed with Mild Neurocognitive Disorder ($M= 45.371 \pm .767$), while those diagnosed as cognitively normal performed the best ($M= 49.826 \pm .993$). Additional ANCOVA analysis revealed a significant effect of TOPF performance on presumed neurologic etiology after controlling for education, $F(3,148)=6.07$, $p = .001$. Post hoc analyses revealed that participants with suspected AD ($M= 40.728 \pm 1.613$) and those with suspected VCI ($M= 32.804 \pm 3.480$) performed worse on the TOPF compared to those with suspected PD ($M=46.964 \pm 1.506$), ($p=.042$ and $p = .004$, respectively).
Conclusions: Results suggest that TOPF performance in older individuals is sensitive to cognitive impairment. Furthermore, these results suggest that this sensitivity may be further influenced by presumed neurologic etiology. These findings are consistent with prior studies which demonstrated a decline in irregular word reading in individuals with neurodegenerative diseases.

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