Objective: Anxiety is very common in Parkinson's disease (PD) where according to a systematic review, the average prevalence is 31%, surprisingly higher than the average 17% of depressive disorders found in PD. Only a few studies have investigated the impact of anxiety on cognitive performance and brain morphology in PD. They demonstrated anxiety to be a significant predictor of cognitive impairment, where PD patients with anxiety have shown to be twice more likely to have deficits in the memory domain compared to those without anxiety. Furthermore, poorer cognitive performance in all cognitive domains was reported to be a significant risk factor for increased anxiety the following year. Anxiety in PD has also shown reduced volume/thinning in the fronto-cingulate, anterior cingulate cortex, left parietal cortices and the precuneus, despite the scant number of studies on this topic. Hence, the objective of this study aims to determine the evolution of cognitive performance and brain morphology in PD patients with and without anxiety over a three-year span.
Participants and Methods: We analyzed the baseline and three-year follow-up Parkinson's Progression Markers Initiative (PPMI) data of 58 PD patients. MRI 3T was processed with FreeSurfer 7.1.1 on the Compute Canada cluster "Cedar" and we extracted cortical (Desikan-atlas-based volumes, thickness, area, folding index, curvature) and volumes of subcortical structures. Additionally, anxiety subscores from the State-trait anxiety inventory as well as neuropsychological tests were analyzed. PD patients were classified in two groups: PD-no-anxiety (n=46) and PD-anxiety (n=12) (subscore of ≥ 40 on the State anxiety scale). Two-way mixed ANOVA models were established with presence/absence of anxiety as a between-subjects factor, time (baseline and three year) as a within-subjects factor and neuropsychological and MRI data were regarded as dependent variables.
Results: Mixed ANOVA revealed that PD-anxiety saw a significantly greater decline in performance on the Montreal Cognitive Assessment test compared to PD-no-anxiety. In addition, PD-anxiety saw their performance decline over time in the Hopkins Verbal Learning test (HVLT) immediate recall, HVLT retention and HVLT delayed recall while PD-no-anxiety saw an increase in performance. In terms of brain morphology, over the three years, PD-anxiety had a greater decrease in the frontal precentral thickness, cingulate isthmus area and thickness, and temporal regions (transverse area and inferior folding) all in the left hemisphere compared to PD-no-anxiety. In subcortical regions, PD-anxiety had a greater decrease in volume of the hippocampal cornu ammonis-1 and pallidum compared to PD-no-anxiety. By contrast, PD-anxiety showed a greater increase in curvature of the frontal middle rostral, frontal pole, parietal supramarginal, and insula cortex as well as in the folding of the parietal superior and occipital pericalcarine of the right hemisphere in comparison to PD-no-anxiety.
Conclusions: This study highlights the importance of taking into consideration anxiety symptoms in PD, as they contribute to poorer cognitive performance and frontal, parietal and temporal differences over time. More studies with a larger sample size are needed in order to confirm these results.

Categories: Neurodegenerative Disorders
Keyword 1: Parkinson's disease
Keyword 2: anxiety
Keyword 3: neuroimaging: structural
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49 Adaptive Functioning in a Mixed Clinical Sample of Older Adults: The Importance of Processing Speed

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Objective: The presence of cognitive impairment corresponds with declines in adaptive functioning (Cahn-Weiner, Ready, & Malloy, 2003). Although memory loss is often highlighted as a key deficit in neurodegenerative diseases (Arvanitakis et al., 2018), research indicates that processing speed may be equally important when predicting functional outcomes in atypical cognitive decline (Roye et al., 2022). Additionally, the development of performance-based measures of adaptive functioning offers a quantifiable depiction of functional deficits within

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a clinical setting. This study investigated the degree to which processing speed explains the relationship between immediate/delayed memory and adaptive functioning in patients diagnosed with mild and major neurocognitive disorders using an objective measure of adaptive functioning.
Participants and Methods: Participants (N = 115) were selected from a clinical database of neuropsychological evaluations. Included participants were ages 65+ (M = 74.7, SD = 5.15), completed all relevant study measures, and were diagnosed with Mild Neurocognitive Disorder (NCD; N = 69) or Major NCD (N = 46). They were majority white (87.8%) women (53.0%). The Texas Functional Living Scale was used as a performance-based measure of adaptive functioning. The Coding subtest from the Repeatable Battery for the Assessment of Neuropsychological Status (RBANS-CD) was used to measure information processing speed. Composite memory measures for Immediate Recall and Delayed Recall were created from subtests of the RBANS (List Learning, Story Memory, and Figure Recall) and the Wechsler Memory Scale-IV (Logical Memory and Visual Reproduction). Multiple regressions were conducted to evaluate the importance of memory and information processing speed in understanding adaptive functioning. Age and years of education were added as covariates in regression analyses.
Results: Significant correlations ($p < .001$) were found between adaptive functioning and processing speed (PS; $r = .52$), immediate memory (IM; $r = .43$), and delayed memory (DM; $r = .32$). In a regression model with IM and DM predicting daily functioning, only IM significantly explained daily functioning (rsp = .24, $p = .009$). A multiple regression revealed daily functioning was significantly and uniquely associated with IM (rsp = .28, $p < .001$) and PS (rsp = .41, $p < .001$). This was qualified by a significant interaction effect (rsp = -.29, $p = .001$), revealing that IM was only associated with adaptive functioning at PS scores lower than the RBANS normative 20th percentile.
Conclusions: Results suggest that processing speed may be a more sensitive predictor of functional decline than memory among older adults with cognitive disorders. These findings support further investigation into the clinical utility of processing speed tests for predicting functional decline in older adults.

Categories: Neurodegenerative Disorders

Keyword 1: adaptive functioning
Keyword 2: information processing speed
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50 Effects of Cerebrovascular Risk Factors and Alzheimer's Disease Pathology on Executive Function and Memory Changes: Analysis of the National Alzheimer's Coordinating Center Cohort

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Objective: A common assumption in clinical neuropsychology is that cerebrovascular risk is adversely associated with executive function, while Alzheimer's disease (AD) primarily targets episodic memory. The goal of the present study was to determine the cross-sectional and longitudinal validity of these assumptions using validated markers of cerebrovascular and AD burden.
Participants and Methods: 19271 longitudinally-followed participants from the National Alzheimer Coordinating Center (NACC) database (Mean age= 72.25; SD age= 10.42; 58% women; 51.6% CDR= 0, 33.7% CDR= 0.5, 14.7% CDR≥ 1) were included. Cognitive outcomes were a composite memory score and an executive function composite score (UDS3-EF; Staffaroni et al., 2020). Baseline presence of cerebrovascular disease was indexed by the presence of moderate to severe white matter hyperintensities or lacunar infarct on brain MRI (yes/no), while baseline AD pathology was indexed by the presence of a positive amyloid PET scan or elevated CSF AD biomarkers (yes/no). We used linear mixed effect models to assess the effects of baseline cerebrovascular disease, baseline AD pathology, and their interactions with time in study (years post baseline) controlling for baseline age, sex, education, and baseline MoCA score.
Results: Baseline cerebrovascular disease was significantly associated with a lower intercept on

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