analyses examined relationships between caregiver burden (MCSI) and motor symptoms (UPDRS), cognitive impairment (MMSE), and neuropsychiatric symptoms (FrSBe).
**Results:** Using linear regression analyses, cognitive impairment ($R^2$=0.08, $F$(1,41)=4.42, $p$=0.04) and neuropsychiatric symptoms ($R^2$=0.35, $F$(1, 41)=21.0, $p$<0.01) predicted caregiver burden but motor symptoms did not ($R^2$=0.03, $F$(1,41)=1.30, $p$=0.26). Hierarchical linear regression revealed that neuropsychiatric symptoms predicted caregiver burden above and beyond the contribution of cognitive impairment ($\Delta R^2$=0.28, $\Delta F$(1)=12.7, $p$=0.001), accounting for an additional 28% of the variance in caregiver burden. Follow-up linear regression to examine the relationships between caregiver burden and the FrSBe subscales indicated that apathy ($p$<0.001), versus disinhibition ($p$=0.16) and dysexecutive behaviors ($p$=0.80), was the driver of the significant relationship.
**Conclusions:** Consistent with our hypothesis, results revealed that cognitive impairment and neuropsychiatric symptoms (specifically apathy) were independent predictors of caregiver burden, with neuropsychiatric symptoms predicting caregiver burden above and beyond the contribution of cognitive impairment. Somewhat surprisingly, motor symptoms were not a predictor of caregiver burden contrary to some previous research, though findings are mixed. Results highlight the importance of assessing for neuropsychiatric symptoms in PD, which may be overlooked by care providers relative to motor or cognitive symptoms, but which appear stressful to caregivers. Future directions include reexamining results in a larger more heterogenous sample including people living with PD at different disease stages (i.e., everyone in the present sample had severe enough symptoms to be considering DBS). Cognitive measures of executive functioning (which are more specific to PD than measures of global cognition) should also be included in future works. Development of supportive caregiver interventions specifically targeting apathy in PD may be useful. Longitudinal designs would be helpful to reexamine relationships following DBS surgery, as there are some reports of increased neuropsychiatric symptoms following the procedure.

**Categories:** Movement and Movement Disorders
**Keyword 1:** Parkinson's disease
**Keyword 2:** caregiver burden
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## 17 Grit Predicts Lower Cognitive Fatigue in Persons with Parkinson's Disease Independent of Cognitive Status

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**Objective:** Fatigue, which can be classified into physical and cognitive subtypes (Schiehser et al., 2012), is a common non-motor symptom in persons with Parkinson's disease (PD) that has no clear treatment. Cognitive changes, also common in PD (Litvan et al., 2012), may impact how patients perceive fatigue (Kukla et al., 2021). Grit is a personality trait defined as perseverance and passion towards a long-term goal, and is associated with multiple positive outcomes such as lower fatigue levels in healthy individuals (Martínez-Moreno et al., 2021). However, scarce research has examined the relationship between grit and fatigue in persons with PD. Therefore, we aimed to investigate the relationship between fatigue (cognitive and physical) and grit, as well as the impact of cognitive status (i.e., cognitive normal vs. mild cognitive impairment [MCI]) on this relationship in non-demented individuals with PD.
**Participants and Methods:** Participants were 70 non-demented individuals with PD who were diagnosed as either cognitively normal (n=20) or MCI (n=50) based on Level II of the Movement Disorder Society PD-MCI criteria. Participants completed the Modified Fatigue Impact Scale (MFIS), which consists of two subscales (cognitive and physical fatigue) that are combined for a total overall fatigue score. Participants also completed the Grit Scale, which consists of items such as ambition, perseverance, and consistency. ANOVAs were

https://doi.org/10.1017/S1355617723006884 Published online by Cambridge University Press

conducted to determine differences in grit between PD-cognitively normal vs PD-MCI groups. Correlations and multiple hierarchical regressions controlling for significant demographics (i.e., age, education, sex), mood (i.e., depression, anxiety) and disease variables (i.e., disease duration, Levodopa equivalent dosage) with backwards elimination were conducted to evaluate the relationship between grit and fatigue (MFIS total score and MFIS cognitive and physical fatigue subscales). **Results:** There was no significant difference in grit total scores between PD patients who were cognitively normal or MCI ($p = .336$). Higher grit total scores predicted lower MFIS total ($\beta = -.290$, $p = .005$) and lower cognitive fatigue ($\beta = -.336$, $p < .001$) scores in the total sample, above and beyond relevant covariates as well as cognitive status. Grit scores were not significantly associated with physical fatigue ($\beta = -.206$, $p = .066$). Furthermore, cognitive status was not a significant predictor of fatigue scores in any of the models (all p's > .28). **Conclusions:** Findings indicate that higher levels of grit are associated with lower levels of fatigue, specifically cognitive fatigue, in individuals with PD. These results held true for those who were cognitively normal or with MCI, suggesting that grit may impact fatigue in non-demented PD patients regardless of cognitive status. These findings underscore the importance of considering grit when assessing or treating fatigue, particularly cognitive fatigue, in persons with PD.

**Categories:** Movement and Movement Disorders
**Keyword 1:** fatigue
**Keyword 2:** cognitive functioning
**Keyword 3:** personality
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## 18 Language Predicts Verbal Learning in Parkinson's Disease

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**Objective:** Cognitive impairment in Parkinson's disease (CIPD) is present in approximately 40% of patients. Language deficits, evidenced by poor word- retrieval, have historically characterized memory weaknesses in PD. That is, the "retrieval deficit hypothesis," suggests successful memory encoding, but poor retrieval subsequent to language and executive dysfunction, another prominent area of CIPD. However, recent studies suggest that memory impairments in PD are instead at the level of learning. At present, several suggested etiologies to explain learning impairments in PD exist that are not related to language, for example that processing speed deficits (another characteristic of CIPD) impact learning; however, other studies present evidence against this theory. Therefore, we hypothesize that deficits in language continue to be a primary component of memory impairment in PD, but at the level of learning rather than retrieval **Participants and Methods:** 85 adults (age M = 61.54, SD = 10.00; %female = 26.7; Dementia Rating Scale M = 137.77, SD = 5.63) diagnosed with Parkinson's disease according to the UK Brain Bank criteria for idiopathic PD, completed a neuropsychological test battery when "off" levodopa medication. The battery included the Boston Naming Test (BNT), verbal fluency tests (Controlled Oral Word Association [COWA] and category fluency), the California Verbal Learning Test, 2nd Edition (CVLT-II), and the Oral Symbol Digit Modalities Test (SDMT). Separate linear regression models were used to examine BNT, COWA, category fluency, and SDMT performance as predictors of total learning (sum of trials 1-5), short-delay free recall, long-delay free recall, and recognition discriminability on the CVLT-II. Analyses were adjusted for age, sex, education, and disease severity (MDS-Unified Parkinson's Disease Rating Scale, part 3 score). Follow up analyses adjusted for processing speed (oral SDMT). **Results:** Adjusted linear regression models revealed that both verbal fluencies predicted verbal learning (letter: ß = .37, $p < .01$; category: ß = .45, $p < .01$), long-delay free recall (letter: ß = .25, $p = .05$; category: ß = .34, $p = .01$), and recognition discriminability (letter: ß = .36, $p = .02$; category: ß =.33, $p = .03$) on

https://doi.org/10.1017/S1355617723006884 Published online by Cambridge University Press