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## 76 Baseline Frontoparietal Gray Matter Volume Predicts Executive Function Performance at 24-Months in Early and Late Mild Cognitive Impairment

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**Objective:** To examine the relationships between baseline gray matter volumes, diagnostic status, and executive function performance at 24-month follow-up, and the relative importance of predictors of executive function in a cohort of non-demented older adults.
**Participants and Methods:** The study sample included 147 participants from the Alzheimer's Disease Neuroimaging Initiative (mean age = 70.6, SD = 6.4; mean education = 17 years, SD = 2.4). At baseline, 49 participants were diagnosed as cognitively normal (CN), 60 as early mild cognitive impairment (EMCI), and 38 as late mild cognitive impairment (LMCI). Magnetic resonance imaging (MRI) data were collected at baseline. A composite score of executive function and FreeSurfer-derived gray matter regions-of-interest (ROI; whole brain, superior frontal gyrus, middle frontal gyrus, inferior frontal gyrus, orbitofrontal cortex, anterior cingulate cortex, superior parietal lobule, inferior parietal lobule, hippocampus) were examined. Hierarchical linear regression models were employed to assess whether brain volume predicted executive function at 24-month follow-up and interaction effects between baseline ROI volume and diagnostic status. Age, gender, education, Mini-Mental State Examination scores, and APOE-e4 allele status were included as control variables in each model. Relative importance metrics, which quantifies an individual regressor's contribution to a multiple regression model, were computed using the Lindemen, Merenda, and Gold (lmg) method to assess the relative contribution of each variable in predicting executive function performance.
**Results:** Across all participants, baseline gray matter ROI volume accounted for a significant amount of variance in executive function at 24-months after accounting for control variables. Specifically, anterior cingulate cortex and superior parietal lobule accounted for an additional 7% and 6% of variance in executive function at 24-months. Significant brain region X diagnostic status interaction effects were observed in executive function performance at 24-months. Relative importance metrics within each group indicated that age is the most important predictor of executive function at 24-months for CN, anterior cingulate cortex is most important for EMCI, and Mini-Mental Examination score is most important for LMCI.
**Conclusions:** Our findings implicate frontoparietal gray matter regions as significant predictors of executive function performance at 24-months, and that this relationship is moderated by diagnostic status. Our results indicate that the value of specific variables to predict executive function performance varies based on diagnostic status. Specifically, anterior cingulate cortex was a significant predictor of executive function performance across all participants and was the most important variable in predicting performance in the earliest stage of mild cognitive impairment. These results support previous studies examining gray matter correlates of executive function and extend the literature by exploring predictors of executive function in early and late stages of mild cognitive impairment.

**Categories:** MCI (Mild Cognitive Impairment)
**Keyword 1:** executive functions
**Keyword 2:** mild cognitive impairment
**Keyword 3:** neuroimaging: structural
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## 77 Differentiating Amnestic Versus Non-Amnestic Mild Cognitive Impairment Using the NIH Toolbox Cognition Battery

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**Objective:** In research, and particularly clinical trials, it is important to identify persons at high risk for developing Alzheimer's Disease (AD), such as those with Mild Cognitive Impairment (MCI). However, not all persons with this diagnosis have a high risk of AD as MCI can be broken down further into amnestic MCI (aMCI), who have a high risk specifically for AD, and non-amnestic MCI (naMCI), who are predominantly at risk for other dementias. People with aMCI largely differ from healthy controls and naMCI on memory tasks as it is the hallmark criteria for an amnestic diagnosis. Given the growing use of the NIH Toolbox Cognition battery in research trials, this project investigated which Toolbox Cognition measures best differentiated aMCI from naMCI and in comparison to persons with normal cognition.
**Participants and Methods:** A retrospective data analysis was conducted investigating performance on NIH Toolbox Cognition tasks among 199 participants enrolled in the Michigan Alzheimer's Disease Research Center. All participants were over age 50 (51-89 years, M=70.64) and had a diagnosis of aMCI (N=74), naMCI (N=24), or Normal Cognition (N=101). Potential demographic differences were investigated using chi-square and ANOVAs. Repeated measure general linear model was used to look at potential group differences in Toolbox Cognition performance, covarying for age which was statistically different in aMCI versus Normal participants. Linear regression was used to determine which cognitive abilities, as measured by the Uniform Data Set-3 (UDS3), might contribute to Toolbox differences noted in naMCI versus aMCI groups.
**Results:** As expected, aMCI had lower Toolbox memory scores compared to naMCI ($p=0.007$) and Normals ($p<0.001$). Interestingly, naMCI had lower Oral Reading scores than both aMCI ($p=0.008$) and Normals ($p<0.001$). There were no other Toolbox performance differences between the MCI groups. 19.4% of the variance in Oral Reading scores was explained by performance on the following UDS3 measures: Benson delayed recall (inverse relationship) and backward digit span and phonemic fluency (positive relationship).
**Conclusions:** In this study, Toolbox Picture Sequence Memory and Oral Reading scores differentiated aMCI and naMCI groups. While the difference in memory was expected, it was surprising that the naMCI group performed worse than the aMCI and normal groups on the Toolbox Oral Reading task, a task presumed to reflect Crystalized abilities resistive to cognitive decline. Results suggest that Oral Reading is primarily positively associated with working memory and executive tasks from the UDS3, but negatively associated with visual memory. It is possible that the Oral Reading subtest is sensitive to domains of deficit aside from memory that can best distinguish aMCI from naMCI. A better understanding of the underlying features in the Oral Reading task will assist in better characterizing deficit patterns seen in naMCI, making selection of aMCI participants more effective in clinical trials.

**Categories:** MCI (Mild Cognitive Impairment)
**Keyword 1:** aging disorders
**Keyword 2:** computerized neuropsychological testing
**Keyword 3:** neuropsychological assessment
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## 78 Remotely monitored in-home IADLs can discriminate between normal cognition and mild cognitive impairment

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**Objective:** Approximately 6.5 million Americans ages 65 and older have Alzheimer's disease and related dementias, a prevalence projected to triple by 2060. While subtle impairment in cognition and instrumental activities of daily living (IADLs) arises in the mild cognitive impairment (MCI) phase, early detection of these insidious changes is difficult to capture given limitations. Traditional IADL assessments administered infrequently are less sensitive to early MCI and not conducive to tracking subtle changes that precede significant declines. Continuous passive monitoring of IADLs using sensors and software in home environments is a promising alternative. The purpose of this study was to determine which remotely monitored

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