

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 amnesic MCI (aMCI), who have a high risk specifically for AD, and non-amnesic 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 amnesic 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 Crystallized 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

IADLs best distinguish between MCI and normal cognition.

Participants and Methods: Participants were 65 years or older, independently community-dwelling, and had at least one daily medication and home internet access. Clinical assessments were performed at baseline. Electronic pillboxes (MedTracker) and computer software (Worktime) measured daily medication and computer habits using the Oregon Center for Aging and Technology (ORCATECH) platform. The Survey for Memory, Attention, and Reaction Time (SMART; Trail A, Trail B, and Stroop Tests) is a self-administered digital cognitive assessment that was deployed monthly. IADL data was aggregated for each participant at baseline (first 90 days) in each domain and various features developed for each. The receiver operating characteristic area under the curve (ROC-AUC) was calculated for each feature.

Results: Traditional IADL Questionnaires.

At baseline, 103 participants (normal $n = 59$, $M_{age} = 73.6 \pm 5.5$; MCI $n = 44$, $M_{age} = 76.0 \pm 6.1$) completed three functional questionnaires (Functional Activities Questionnaire; Measurement of Everyday Cognition (ECog), both self-report and informant). The Informant ECog demonstrated the highest AUC (72% AUC, $p = <.001$).

Remotely monitored in-home IADLs and self-administered brief online cognitive test performance.

Eighty-four had medication data (normal $n = 48$, $M_{age} = 73.2 \pm 5.4$; MCI $n = 36$, $M_{age} = 75.6 \pm 6.9$). Four features related to pillbox-use frequency (73% AUC) and four features related to pillbox-use time (62% AUC) were developed. The discrepancy between self-reported frequency of use versus actual use was the most discriminating (67% AUC, $p = .03$).

Sixty-six had computer data (normal $n = 38$, $M_{age} = 73.6 \pm 6.1$; MCI $n = 28$, $M_{age} = 76.6 \pm 6.8$). Average usage time showed 64% AUC ($p = .048$) and usage variability showed 60% AUC ($p = .18$).

One hundred and two completed the SMART (normal $n = 59$, $M_{age} = 73.6 \pm 5.5$; MCI $n = 43$, $M_{age} = 75.9 \pm 6.2$). Eleven features related to survey completion time demonstrated 80% AUC in discriminating cognition. Eleven features related to the number of clicks during the survey demonstrated 70% AUC. Lastly, seven mouse movement features demonstrated 71% AUC.

Conclusions: Pillbox use frequency combined features and self-administered brief online

cognitive test combined features (e.g., completion times, mouse cursor movements) have acceptable to excellent ability to discriminate between normal cognition and MCI and are relatively comparable to informant rated IADL questionnaires. General computer usage habits demonstrated lower discriminatory ability. Our approach has applied implications for detecting and tracking older adults' declining cognition and function in real world contexts.

Categories: MCI (Mild Cognitive Impairment)

Keyword 1: activities of daily living

Keyword 2: mild cognitive impairment

Keyword 3: everyday functioning

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79 Brief Subjective Memory Screener Predicts Memory Dysfunction

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Objective: Alzheimer's disease (AD) is expected to affect over 7 million older Americans by 2025. Development of fast and inexpensive screening measures for routine screening is critical for identifying those suffering from the earliest stages of AD including Mild Cognitive Impairment (MCI) and Subjective Cognitive Decline (SCD). Here we assess the validity and utility of a brief, 5-item SCD screener and its associations with neuropsychological performance as compared to an existing objective cognitive screener, the Mini Mental Status Exam (MMSE).

Participants and Methods: Development: A brief, 5-item SCD questionnaire was developed based on a more extensive 20-item version previously validated (Chapman et al. 2021). Participants: 27 cognitively diverse (MCI and cognitively normal) community dwelling older adults were recruited for this study. Mean age: 71.9 ± 7 . Inclusion criteria include memory concerns. Exclusion criteria include no previous diagnoses of neurodegenerative diseases and/or major stroke. Administration: Participants