remained significant after modeling covariates including age, self-reported gender, education, and APOE e4 status. Compared to nights with the most sleep, memory was worse after the nights with the poorest sleep.
Conclusions: When considering AD biomarkers in these analyses, participants with elevated AD biomarkers, including neurofilament light chain (NfL) and phosphorylated-tau181 (p-tau181), demonstrated more impacts of poor sleep on cogntion, such that the nights with the least sleep tended to impact cognition more than in those with normal biomarker levels, suggesting an important role for sleep in maintaining cognition in preclinical and early symptomatic AD. Interestingly, self-reported sleep quality was not associated with ARC cognitive tests, consistent with studies emphasizing the need for more quantitative assessments of sleep quality. In addition to these sleep data, we will review publications using the ARC platform, including a recently accepted manuscript in JINS (Nicosia et al., 2022).

Categories: Teleneuropsychology/ Technology
Keyword 1: sleep
Keyword 2: brain function
Keyword 3: cognitive functioning
Correspondence: Jason Hassenstab Associate Professor, Neurology and Psychological & Brain Sciences, Washington University in St. Louis hassenstabj@wustl.edu

2 Computerized Cognitive Practice Effects in Relation to Amyloid and Tau in Preclinical Alzheimer's Disease: Results from a Multi-Site Cohort

Christina B Young[1], Elizabeth C Mormino[1], Kathleen L Poston[1], Keith A Johnson[2], Dorene M Rentz[2], Reisa A Sperling[2], Kathryn V Papp[2]
[1]Stanford University School of Medicine, Stanford, CA, USA. [2]Harvard Medical School, Boston, MA, USA

Objective: There is a need to identify scalable cognitive paradigms that are sensitive enough to relate to Alzheimer's disease biomarkers (amyloid and tau) in the preclinical stage. Here, we determine whether initial performance and practice effects on the memory-focused Computerized Cognitive Composite (C3) relate to demographic variables, amyloid status [abnormal (A+), normal (A-)], and regional tau in clinically unimpaired (CU) older adults.
Participants and Methods: We examined pre-randomization data from CU older adults screened for the Anti-Amyloid Treatment in Asymptomatic Alzheimer's Disease (A4) study. We focused on participants who completed the C3 (n=3287), most of whom completed an alternate version of the C3 again approximately 51 days later (n=4141), as well as a subset of preclinical AD participants (i.e., A+ CU) who completed the C3 and tau PET imaging with [18]F-flortaucipir (initial C3: n=354; repeat C3: n=343). C3 initial performance and practice effects were examined in relation to amyloid status (A+, A-) and continuous regional tau burden.
Results: Initial C3 performance was associated with amyloid status [B(SE) = -0.075 (0.021), $p < 0.001$] across all participants, as well as tau burden in the medial temporal lobe (MTL) [B (SE) = -0.728 (0.220), $p = 0.001$], inferior temporal (IT) cortex [B (SE) = -0.782 (0.264), $p = 0.003$], and inferior parietal (IP) cortex [B (SE) = -0.721 (0.281), $p = 0.011$] amongst preclinical AD individuals. Short-term practice effects were also associated with reduced tau burden in MTL [B (SE) = -0.471 (0.202), $p = 0.020$], IT [B (SE) = -0.640 (0.240), $p = 0.008$], and IP [B(SE) = -0.584 (0.255), $p = 0.023$] amongst preclinical AD participants, but were not associated with amyloid status [B (SE) = -0.018 (0.020), $p = 0.348$]. Critically, these effects with tau were only detected when baseline performance was accounted for presumably due to opposing influence from both practice effects and regression to the mean effects.
Conclusions: This is the first study to show that performance on a brief cognitive battery administered in a multisite context is associated with both amyloid and tau among CU older adults. These findings suggest that computerized assessments may be a cost-effective and scalable approach for early detection efforts. Further, diminished practice effects on memory-based measures are associated with elevated tau burden in preclinical AD, suggesting that high-frequency cognitive testing collected over a short follow-up period may provide additional insights regarding early disease processes than single assessments.

Categories: Teleneuropsychology/ Technology

https://doi.org/10.1017/S1355617723003120 Published online by Cambridge University Press

Keyword 1: computerized neuropsychological testing
Keyword 2: dementia - Alzheimer's disease
Keyword 3: positron emission tomography
Correspondence: Christina B. Young, Department of Neurology and Neurological Science, Stanford University School of Medicine, Stanford CA, USA 94305, cbyoung@stanford.edu

3 Smartphone Digital Phenotyping for Unobtrusive and Continuous Assessment of Everyday Cognition and Movement Trajectories in Older Adults

Katherine Hackett[1], Shiyun Xu[2], Moira McKniff[1], Emma Pinsky[1], Sophia Holmqvist[1], Giuliana Vallecorsa[1], Ian Barnett[2], Tania Giovannetti[1]
[1]Temple University, Philadelphia, PA, USA. [2]University of Pennsylvania, Philadelphia, PA, USA

Objective: To evaluate the feasibility, usability, and preliminary validity of a digital phenotyping protocol to capture everyday cognition and activities in vivo among older adults.
Participants and Methods: Eight participants (M age=69.1 $\pm$ 2.6; M education=18.0 $\pm$ 1.4; 50% female; 88% non-Hispanic White) with normal cognition or mild cognitive impairment used an open-source smartphone application (mindLAMP) to passively and continuously capture sensor data including global positioning system (GPS) trajectories for a 4-week study period. Baseline neuropsychological tests and measures of depression, self-reported cognitive decline and mobility patterns were collected as external validators for digital data. Participants downloaded mindLAMP onto their smartphones and resumed their daily routines for 4 weeks before removing mindLAMP and completing a debriefing questionnaire. A cognitive composite was derived by averaging T-scores across domains of attention, executive functioning, processing speed, memory, and language. GPS raw data were processed to generate monthly average and standard deviation mobility metrics for each participant, including time spent at home, distance travelled, radius of gyration, flight length, and circadian routine. Feasibility and usability findings are presented along with correlation coefficients $\geq$.4 between GPS metrics and external validators.
Results: 100% of enrolled participants completed the 4-week study without requesting to withdraw. Usability ratings ranged from poor to excellent. 75% of participants agreed that mindLAMP was easy to use, whereas only 1 participant enjoyed using mindLAMP. 100% of participants were satisfied with the study team's explanation of procedures, privacy safeguards, data encryption methods and risks/benefits, reflected in an average score of 98.8% on the comprehension of consent quiz. No participants reported feeling uncomfortable, suspicious, or paranoid due to the study application running on their smartphone. No participants endorsed new problems using their smartphone, though 75% reported charging it more frequently during the study period. On average each day, participants spent 1121 $\pm$ 227 minutes at home, travelled 38727 $\pm$ 36210 geodesic units, and had 201 $\pm$ 149 minutes of missing GPS data. Overall, greater amounts of activity (monthly average) and higher variability (monthly standard deviation) in GPS metrics were associated with better outcomes. Specifically, less time spent at home, greater distance travelled, larger radius of gyration, greater flight length, and greater variability in home time, distance travelled, radius of gyration and flight length were associated with less depression, less self-reported cognitive decline, better cognition, and greater self-reported mobility ($.40 < |r| < .69$). On the other hand, greater circadian routine was associated with more self-reported cognitive decline (r=.66) and less self-reported mobility (r=-.43).
Conclusions: Smartphone digital phenotyping is a feasible and acceptable method to capture everyday activities in older adults. Continuous collection of data from personal devices warrants caution; however, participants denied privacy concerns and expressed an overall positive experience. High frequency GPS data collection impacts battery life and should be considered among relative risks and confounds to naturalistic assessment. Patterns of behavior from passive smartphone data show promise as an unobtrusive method to identify cognitive risk and resilience in older adults. Subsequent analyses will evaluate additional sensor metrics across a larger and more heterogeneous cohort.

Categories: Teleneuropsychology/ Technology
Keyword 1: technology
Keyword 2: assessment
Keyword 3: aging disorders

https://doi.org/10.1017/S1355617723003120 Published online by Cambridge University Press