65 Mayo Test Drive raw composite criterion validity: a brief remote self-administered digital cognitive composite shows similar ability to differentiate PET-defined biomarker groups as a global composite from a person-administered neuropsychological battery in cognitively unimpaired individuals on the Alzheimer's continuum

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Objective: Mayo Test Drive (MTD): Test Development through Rapid Iteration, Validation and Expansion, is a web-based multi-device (smartphone, tablet, personal computer) platform optimized for remote self-administered cognitive assessment that includes a computer-adaptive word list memory test (Stricker Learning Span; SLS; Stricker et al., 2022; Stricker et al., in press) and a measure of processing speed (Symbols Test: Wilks et al., 2021). Study aims were to determine criterion validity of MTD by comparing the ability of the MTD raw composite and in-person administered cognitive measures to differentiate biomarker-defined groups in cognitively unimpaired (CU) individuals on the Alzheimer's continuum.
Participants and Methods: Mayo Clinic Study of Aging CU participants (N=319; mean age=71, SD=11, range=37-94; mean education=16, SD=2, range=6-20; 47% female) completed a brief remote cognitive assessment (~0.5 months from in-person visit). Brain amyloid and brain tau PET scans were available within 3 years. Overlapping groups were formed for 1) those on the Alzheimer's disease (AD) continuum (A+, n=110) or not (A-, n=209), and for 2) those with biological AD (A+T+, n=43) or with no evidence of AD pathology (A-T-, n=181). Primary outcome variables were MTD raw composite (SLS sum of trials + an accuracy-weighted Symbols response time measure), Global-z (average of 9 in-person neuropsychological measures) and an in-person screening measure (Kokmen Short Test of Mental Status, STMS; which is like the MMSE). Linear model ANOVAs were used to investigate biomarker subgroup differences and Hedge's G effect sizes were derived, with and without adjusting for demographic variables (age, education, sex).
Results: Remotely administered MTD raw composite showed comparable to slightly larger effect sizes compared to Global-z. Unadjusted effect sizes for MTD raw composite for differentiating A+ vs. A- and A+T+ vs. A-T- groups, respectively, were -0.57 and -0.84 and effect sizes for Global-z were -0.54 and -0.73 (all p's<.05). Because biomarker positive groups were significantly older than biomarker negative groups, group differences were attenuated after adjusting for demographic variables, but MTD raw composite remained significant for A+T+ vs A-T- (adjusted effect size -0.35, p=.007); Global-z did not reach significance for A+T+ vs A-T- (adjusted effect size -0.19, p=.08). Neither composite reached significance for adjusted analyses for the A+ vs A- comparison (MTD raw composite adjusted effect size= -.22, p=.06; Global-z adjusted effect size= -.08, p=.47). Results were the same for an alternative MTD composite using traditional z-score averaging methods, but the raw score method is preferred for comparability to other screening measures. The STMS screening measure did not differentiate biomarker groups in any analyses (unadjusted and adjusted p's>.05; d's -0.23 to 0.05).
Conclusions: Remotely administered MTD raw composite shows at least similar ability to separate biomarker-defined groups in CU individuals as a Global-z for person-administered measures within a neuropsychological battery, providing evidence of criterion validity. Both the MTD raw composite and Global-z showed greater ability to separate biomarker positive from negative CU groups compared to a typical screening measure (STMS) that was unable to differentiate these groups. MTD may be useful as a screening measure to aid early detection of Alzheimer's pathological changes.

Categories: Teleneuropsychology/ Technology
Keyword 1: dementia - Alzheimer's disease
Keyword 2: cognitive screening
Keyword 3: computerized neuropsychological testing

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66 Omega-3 Fatty Acids, Cognition, and Brain Volume in Healthy Elderly Adults

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Objective: One common concern amongst the aging population is that of worsening memory. Speed of processing and executive functions are also areas of age-related decline that affect daily living. Lifestyle modifications such as diet, exercise, and sleep have garnered intense interest as potential methods to prevent or delay cognitive decline. Among dietary factors, omega-3 fatty acids (FAs) have been documented as containing a myriad of health benefits, including neuroprotective effects. The aim of this study is to examine the associations between omega-3 FAs, cognitive function, and neuroanatomical regions of interest in a healthy aging population.
Participants and Methods: Adults aged 65 and older (n=40, 48.9% Female) were recruited for the Loma Linda University Adventist Health Study-2 Cognitive and Neuroimaging Substudy. Participants had a mean age of 76.25 years (SD=8.29), 16.78 years of education (SD=2.53), and were predominantly White (85.0%). Participants received a two-hour neurocognitive battery, including measures of immediate and delayed memory (Rey Auditory Verbal Learning Test, RAVLT; WMS-IV Logical Memory, LM), processing speed (Stroop), and executive functions (Stroop Color/Word). Participants underwent brain imaging on a 3T Siemens MRI, including a 3D T1-weighted MPRAGE sequence. Cortical reconstruction and volumetric segmentation were performed using FreeSurfer software. Blood samples were collected for fatty acid analysis. Individual FAs were expressed as a percent of total FAs. An omega-3 index was constructed as the sum of eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA) FAs. Correlational analyses, controlling for age, sex, and education, investigated relationships between omega-3 levels (individual and index) and (a) cognitive function (immediate and delayed memory, processing speed, executive functions), and (b) brain volumes in specific regions of interest (hippocampus, entorhinal cortex, frontal pole, white matter).
Results: EPA was significantly positively correlated with Stroop Color (r=.34, p=.048). Although not statistically significant, trends were observed between the omega-3 index and Stroop Color (r=.30, p=.08), and between both DHA and the omega-3 index with RAVLT – delayed recall (r=.29, p=.095; r=.30, p=.08, respectively). With regards to regional brain volumes, EPA and the omega-3 index were both significantly positively correlated with the entorhinal cortex (r=.34, p=.041; r=.41, p=.01, respectively) and white matter volume (r=.36, p=.028; r=.34, p=.038, respectively). DHA was significantly positively correlated with white matter volume (r=.34, p=.044).
Conclusions: Blood levels of EPA were positively correlated with a measure of processing speed, and trends were observed between DHA, the omega-3 index and[GN1] verbal memory, and between the omega-3 index and processing speed. We also found that omega-3 FA values were associated with greater brain volume in the entorhinal cortex and white matter in our sample of healthy older adults. Atrophy of the entorhinal cortex has been associated with pathological processes. Additionally, white matter is known to effect processing speed. These findings may offer support for the idea that omega-3 FAs exert their neuroprotective effects by fortifying areas of the brain, specifically the entorhinal cortex and white matter, that promote maintenance of cognitive function in late life.

Categories: Aging
Keyword 1: aging (normal)
Keyword 2: cognitive functioning
Keyword 3: neuroimaging: structural
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67 Cognitive Reserve, Depressive Symptoms, and Functional Ability in Older Adults

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