Mobile Toolbox ICAR Validation Study: Final Report

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Complementary Funding Source: National Institute on Aging grant "The Mobile Toolbox for Monitoring Cognitive and Behavioral Function (MTB2)" (5U2CAG060426)
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Project Overview

Funding from the Woodcock Institute supported the successful completion of a comprehensive validation study of four International Cognitive Ability Resource (ICAR) cognitive assessment measures adapted for smartphone administration within the Mobile Toolbox (MTB) platform. The study addressed critical gaps in the validation of individual ICAR subtests, particularly examining the psychometric properties and construct validity of the computer adaptive test (CAT) versions against established "gold standard" measures using the Cattell-Horn-Carroll (CHC) theoretical framework.

Methods and Sample

We recruited 100 adults aged 18-90 years through an external market research firm. Participants were 54% female, 46% male; 54% iOS users, 46% Android users; racially 64% White, 20% Black, 2% Asian/Multiracial, and 14% Other/unspecified; 42% identified as Hispanic/Latino; education levels ranged from less than high school (2%) to graduate degree (14%), with 26% holding a bachelor's degree.

The study employed a comprehensive testing protocol where participants completed MTB ICAR measures on their personal smartphones alongside examiner-administered gold standard assessments in controlled laboratory conditions. A randomized counterbalanced design controlled for administration order effects, with follow-up assessments conducted at home to evaluate test-retest reliability.

The validation focused on convergent validity through correlations with established measures, including subtests from the Woodcock-Johnson IV Tests of Cognitive Abilities (WJ-IV), Raven's Progressive Matrices, Mental Rotation Test, and the Peabody Picture Vocabulary Test, Fifth Edition

Impact and Dissemination

This validation study provides researchers with critically needed psychometric evidence supporting the use of MTB ICAR subtests in cognitive assessment research. The smartphone-optimized format with computer adaptive testing demonstrated evidence of validity while reducing participant burden—a significant advancement for mobile cognitive assessment. A manuscript submitted to Journal of Intelligence documents the findings from this work. Data and analysis code will be made available to researchers upon request to support replication and extension studies