NASPSPA 2020, Vancouver, CA

Preliminary validation of the Dot Task for measuring cognitive and physical functioning

John F. Adamek[1], Daniel Palac[1], Arthur F. Kramer[2], Edward McAuley[1,2], & Sean P. Mullen[1,2]

[1]University of Illinois at Urbana-Champaign
[2]Northeastern University, Boston, MS

Mobility assessments are valued for their robust associations with physical activity behavior and health outcomes. However, such assessments often fail to capture dynamic and asymmetric movements required in recreational and leisure-time activities and fall prevention. Dynamic motor tasks vary in difficulty according to the degree of cognitive engagement and agility skills required, and greater measurement variability and precision may enhance utility. The purpose of this study was to evaluate the reliability and validity of a novel "Dot Task" (DT; a timed mobility task involving pre-defined stepping patterns on a 5-dot floor mat) in middle-aged adults (N=119; M_{age} = 53.87, 14 of 133 removed due to reported pain/ injury) across a 5-month exercise trial. Test-retest intraclass correlation coefficient (ICC) and bivariate correlations were tested with other established measures. DT and a battery of cognitive tests (*Digit Symbol Substitution Task* [DSST], *Trail Making Test* [T-A,B]) and mobility assessments (*Four Square Step Test* [FSST], *Timed Up & Go* [TUGO], and 30*s One-Leg Balance* [OLB]) were repeatedly administered. Baseline to 5-month ICC was. 73 for DT (baseline M = 3.21*s* $\pm$ .74*s*). Low correlations (p<.05) between the DT and DSST (r=-.37) and T-A, B (r=.36, .23) were found. A moderately high correlation was found between DT and FSST (r = .73) and low to moderate correlations were found with OLB (r=-.34) and TUGO (r=.47), respectively. Additionally, DT showed no and low correlations with age (r=.18) and body fat % (r=.23). As expected, DT correlations were higher for FSST for cognitive tasks. The opposite was found for mobility tasks. In brief, shorter task times were associated with more favorable outcomes, and the pattern of correlations reflected stronger associations with tasks involving similar cognitive-motor skills. Our preliminary evidence supports the reliability and construct validity of a brief tool for assessing mobility. Future studies should explore the degree to which DT performance is sensitive to motor learning and control in other populations.