Title: Examining Working Memory as a Predictor of Performance

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Abstract

Background/Objective: This proposed study aims to add to the research regarding the use of working memory as a predictor of performance. This body of research has potential implications in personnel selection if working memory is shown to be an unbiased predictor of job performance. While cognitive ability is widely known as the single best predictor of job performance, the literature has shown there are large discrepancies along racial lines. As working memory and cognitive ability are highly correlated, additional research is needed to understand if working memory can be used as an unbiased replacement for cognitive ability. Race and task demands are examined as potential moderators. **Proposed Methods:** Undergraduate students in the capstone NASA FOCUS lab simulation course of the Aerospace program at Middle Tennessee State University will be given two general intelligence tests and two types of working memory tests. These results will be compared to measures of individual performance to determine if working memory is a predictor of performance.

There is relatively limited research on working memory and personnel selection. While intelligence is widely known to be the single best predictor of job performance, the literature has shown there are large discrepancies, as much as an entire standard deviation, between white and black individuals (Verive & McDaniel, 1996). As working memory and cognitive ability are highly correlated (Dolph, 2012; Colom et. al, 2010), additional research is needed to understand if working memory can be used as an unbiased replacement for cognitive ability.

A repeated measure study will be conducted with subjects consisting of volunteers from a pool of 120 undergraduate students in the capstone NASA FOCUS lab simulation course of the Aerospace major program at Middle Tennessee State University. Students participate in three high fidelity flight simulations in specialized roles such as: pilots, flight dispatch, aerospace administration, maintenance management, and aerospace technology (Littlepage et. al, 2016). Laboratory assistants evaluate individual performance after each simulation using position-specific behaviorally anchored rating scales. Team members also evaluate each other's individual performance after each simulation for effectiveness and contribution using the peer rating scales, the Comprehensive Assessment of Team Member Effectiveness developed by Ohland et. al (2012). In addition to these performance ratings, volunteers will be asked to complete two measures of general intelligence, the Wonderlic and Raven's Progressive Matrices, and two measures of working memory. Working memory will be measured with a set of performance based measures: the Complex Span task, the Operation Span Task (Kane et. al, 2004), and the Rotation Span Task (Shah & Miyake, 1996), as well as the BRIEF-A which is a self-report measure of executive function and working memory. A limitation of the study may be a lack of racial diversity within the Aerospace program.

H1: Working memory will predict performance.

H2: Working memory will predict general intelligence.

H3: Race differences will be smaller on working memory test than general intelligence tests

Data will be analyzed via t-tests to compare mean differences and via regression to determine relationships between working memory, intelligence and performance. Because the data are nested, due to students being on the same team, individual performance may be tied to overall team performance. Additional steps will be required to determine if the independence assumption is violated. If so, the standard error will be adjusted to compensate for lack of independence caused by the nested data (McCoach & Adelson, 2010).