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What Do Working Memory Tests Measure? The Relationship Between the *n*-Back, Digit Span and Symbol Span Tests

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Abstract

Working memory is critical for important cognitive functions, including learning and decision-making. Although the *n*-Back task has been widely used as a measure of working memory, it is not clear whether this task is in fact tapping the same (or similar) constructs as other established working memory tests. This study therefore investigated performance of 47 multilingual South African university students on three working memory measures, namely the *n*-Back task, the Digit Span subtest, and the Symbol Span subtest, in order to assess the relationships between these tasks. Additionally, there was interest in evaluating the extent to which demographic factors influence working memory performance. This study thus examined the extent to which number of languages spoken, proficiency (in speaking, comprehension and reading), biological sex and socioeconomic status affects test scores. Kendall's Tau correlation analysis revealed a significant correlation between specific Digit Span conditions and 3-Back Accuracy scores, while regression analyses indicated that performance on Digit Span Sequencing significantly predicted 3-Back Accuracy scores. In terms of the demographic variables, several of the proficiency scores significantly predicted performance on the Digit Span Sequencing and 3-Back Accuracy scores. These results are interpreted within the theoretical and empirical frameworks guiding this study. Through describing the relationships (or lack thereof) between these variables, this study contributes to a greater understanding of the *n*-Back task, and, perhaps more importantly, to those aspects that remain to be explored and explained.

Keywords: working memory, *n*-Back task, Digit Span, Symbol Span, multilingualism, proficiency, sex-effects, socioeconomic status