

Introduction

The use of neuropsychological screening in corrections contributes immeasurably to care planning and service delivery. Paper and pencil neuropsychological screening tests are the gold standard but the deployment of those tests is not always practical (e.g., corrections) so computerized testing offers several advantages. For example, computerized testing offers millisecond timing and those tests are often more portable (Witt, Alpherts, & Helmstaedter, 2013). Despite those advantages, there is a body of research to suggest that performance on computerized testing differs from performance on traditional paper and pencil tests. For example, on tests of reading comprehension, students who read text in print performed significantly better than students who read text on a screen (Mangen, Walgermo, & Bronnick, 2013). The purpose of the present study is to examine performance differences in the common domains of attention, spatial working memory, memory and response consistency as measured by a traditional paper and pencil neuropsychological screening test (Neuropsychological Assessment Battery, Screening Module [NAB-SM]) and a computerized screening assessment (Automated Neuropsychological Assessment Metrics [ANAM] Core Battery).

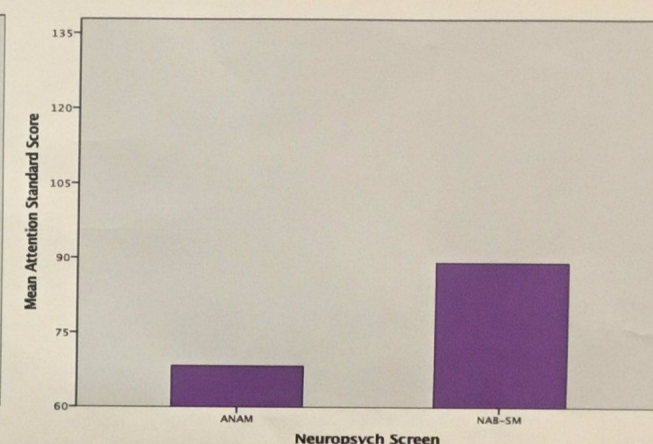
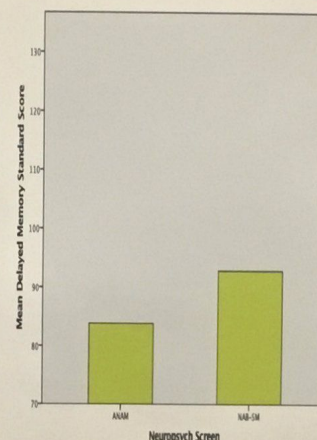
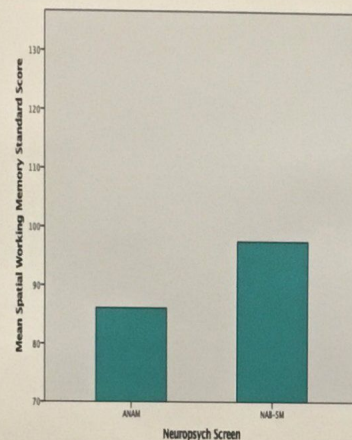
Methods

Individuals were screened by jail and probation staff using a revised version of the Ohio State University Traumatic Brain Injury Identification Method (OSU TBI ID). Those persons with OSU TBI ID results indicating a positive lifetime history of TBI then participated in a neuropsychological screening battery including effort tests, a clinical interview and either the ANAM or the NAB-SM. The protocol is approved by the IRB at the University of Denver (#674894-2). Study data were collected and managed using REDCap electronic data capture tools hosted at the University of Denver. REDCap (Research Electronic Data Capture) is a secure, web-based application designed to support data capture for research studies, providing 1) an intuitive interface for validated data entry; 2) audit trails for tracking data manipulation and export procedures; 3) automated export procedures for seamless data downloads to common statistical packages; and 4) procedures for importing data from external sources.

Results

702 persons had completed the ANAM Core Battery and 58 completed the NAB-SM. Independent samples t-tests were used to compare the means of standard scores of each functional domain to determine if scores were significantly different. 44.59% of ANAM performance or effort test scores suggested response inconsistencies compared to 37.93% of effort tests scores of persons completing the NAB-SM. Mean standard scores for spatial working memory, delayed memory, and attention were significantly different, $p < .001$, $p < .05$, $p < .001$. See graphs for depictions of mean differences for all domains.

Results (continued)



Discussion

The present study aimed to investigate performance on two different neuropsychological screening methods. Performance across three domains of neuropsychological functioning were analyzed. Results suggest that, in the same clinical population, scores are higher across all domains on the NAB-SM relative to the ANAM. Results also suggest that NAB-SM screens had lower rates of effort test failure compared to ANAM screens. There are several possible explanations. Unlike paper and pencil tasks, administrators of computerized assessments may be less engaged which may affect participant's willingness to provide optimal performance (Letz, 2003). Performance on computerized testing may be artificially lowered by people's inexperience with computers (Iverson, Brooks, Lynn Ashton, Johnson, & Gualtieri, 2009). Computerized assessments are regarded to require more sustained effort by the participant and that may be prohibitive for persons with significant impairments (Noyes, Garland, and Robbins, 2004).

There may be a greater rate of false positives (impaired scores) on the ANAM. Screening measures typically have a higher rate of false positives. There is a cost to those false positives. In a resource-limited environment, systems are invested in delivering care to the people who need it most. Conversely, the NAB-SM may artificially inflate performance, or false negatives. There is a similar cost to false negatives. In this case, individuals would be denied access to necessary services. It is unclear which neuropsychological screening tool more accurately reflects cognitive function. Future research on the positive and negative predictive value of these instruments is warranted.

References

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