

Adaptation and Validation of a Computerized Neurocognitive Battery in the Xhosa of South Africa

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Objective: Large-scale studies have revolutionized biomedical research, and neurocognitive tests can help elucidate the biological basis of neuropsychiatric diseases. However, studies have predominantly been conducted in Western settings. We describe the development and validation of a computerized battery (PennCNB) with the Xhosa population of South Africa. **Method:** Individuals with schizophrenia ($n = 525$) and a normative comparison group ($n = 744$) were balanced for age, sex, education, and region. Participants provided blood samples, were assessed psychiatrically, and were administered a PennCNB translation to isiXhosa, including measures of executive functions, episodic memory, complex cognition, social cognition, and sensorimotor speed. Feasibility was examined with test completion rates and input from administrators, and psychometric structural validity and associations with clinical and demographic characteristics were examined. **Results:** Tests were well tolerated by participants, as >87% had one (or fewer) test missing. Results suggested a similar factor structure to prior PennCNB studies in Western contexts, and expected age and sex effects were apparent. Furthermore, a similar profile of schizophrenia was observed, with neurocognitive deficits most pronounced for executive functions, especially attention, as well as memory, social cognition, and motor speed relative to complex cognition and sensorimotor speed. **Conclusions:** Results support the feasibility of implementing a culturally adapted computerized neurocognitive battery in sub-Saharan African settings and provide evidence supporting the concurrent validity of the translated instrument. Thus, the PennCNB is implementable on a large scale in non-Western contexts, shows expected factor structure, and can detect cognitive deficits associated with neuropsychiatric disorders. Obtaining valid measures of cognition by nonspecialized proctors is especially suitable in resource-limited settings where traditional testing is prohibitive. Future work should establish normative standards, test-retest reliability, and sensitivity to treatment.

Key Points

Question: Can a computerized neurocognitive battery be feasible and valid for using in resource-limited settings such as sub-Saharan Africa so as to incorporate such assessments into large-scale research and clinical care? **Findings:** Administering a culturally adapted computerized neurocognitive battery to South African Xhosa individuals with schizophrenia and healthy individuals is feasible within the context of a large-scale genomic study and yields a factor structure and results comparable to Western samples. **Importance:** As neuroscience and genomics increasingly include non-Western samples and especially sub-Saharan African samples, it is important to know that valid assessments of

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