Development of a Symbol Cancellation Test (SCT) for use in pediatric clinical trials in Sub-Saharan countries.

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SUBMISSION DETAILS

What is the Methodological Question Being Addressed? In Sub-Saharan developing countries, the progress in diagnosing and therapeutic intervention for cognitive health has been critically slowed down by the paucity of tools for pediatric cognitive assessment. Current clinical trial psychometric practices rely on a limited number of instruments developed in other countries (i.e., USA). There is a compelling need for culturally appropriate assessment tools which are sensitive to the local (i.e., Sub-Saharan) context of use.

Introduction SCT is a method under development to detect impairment of selective attention in a school-aged pediatric population in a context of a severely under-resourced healthcare system. SCT is designed for use in clinical research settings. A cancellation task was selected based on consensus reached by expert review. The panel of experts included Zambian healthcare professionals (three pediatricians, two psychologists, a pediatric neurologist), and two other experts in methodology of cognitive test development. A cancellation task was selected as test behavior as particularly relevant to a Zambian child's everyday life experiences and activities (i.e., cognitive tasks usually carried out during social interactions, or demanded in an academic or educational environment).

Methods SCT psychometric properties were assessed in a field trial, approved by Zambian Regulatory Authorities. Participants (children, aged 5-17 years-old, 50% male) were recruited at multiple clinical facilities and schools in Zambia, and 450 completed the SCT assessment. SCT reliability was estimated as stability after test-retest (24-48 hours) using intra-class correlations, two-way random-effects model, absolute agreement. Clinical utility was evaluated on a sub-sample of study participants by comparing three clinical groups - neurological and behavioral disorders (NEU), medical non-neurological (MED), chronic psychosocial stress and deprivation (CPSD) - to Healthy Controls (HC). Effect of age on SCT outcomes was assessed using a simple regression model.

Results SCT provides a summary measure of selective attention: Visuo-Motor Processing Speed Index (VMPSI) calculated as ratio of sum of correct hits/test execution time (expressed in seconds). Hits ranges between 0 and 108. Maximum allowed execution time is 180 seconds. Higher values indicate higher ability. Reliability estimate was acceptable (n = 95, ICC CI 95% = 0.68-0.86). As expected, visuo-motor processing speed increased over age. A one-way ANOVA showed a significant effect of the type of chronic health condition on visuo-motor processing speed at the $p < .05$ level, $F(3, 182) = 23.99$, $p=0.000$. Post-hoc pairwise comparisons (Bonferroni's post-criterion test) indicated that HC mean score (n = 85, M = 0.96, SD = 0.3) was significantly different from the other three disease conditions: NEU (n = 29, M = 0.54, SD = 0.3, p=.000), CPSD (n = 46, M = 0.59,

SD = 0.23, p=.000), and MED (n = 26, M = 0.71, SD = 0.29, p=.003); there was no significant difference between NEU, MED, and CPSD groups.

Conclusion The results of the study demonstrate SCT's potential as a reliable, valid, and cost-effective solution for child's cognitive health assessment in Sub-Saharan clinical trial settings.

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Keywords

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Guidelines I have read and understand the Poster Guidelines

Disclosures if applicable Leoben Research was the sponsor of the study.

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