Translation and cultural adaptation of NIH Toolbox cognitive tests into Swahili and Dholuo languages for use in children in western Kenya

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BACKGROUND

- Cognitive development in childhood lays the foundation for a lifetime of academic achievement and economic potential[1,2]
- Nearly all available cognitive tests were developed in resource-rich settings and require substantial training and monitoring
- Tablet-based assessments may be a scalable option for use in low-resourced settings
- The NIH Toolbox is a set of tablet-based standardized, validated, normed cognitive tests validated in ages 3-85 years that may be useful in low-resourced settings

OBJECTIVE

- The aim of this study was to culturally adapt fluid cognition tests within the NIH Toolbox for use in Swahili and Dholuo languages

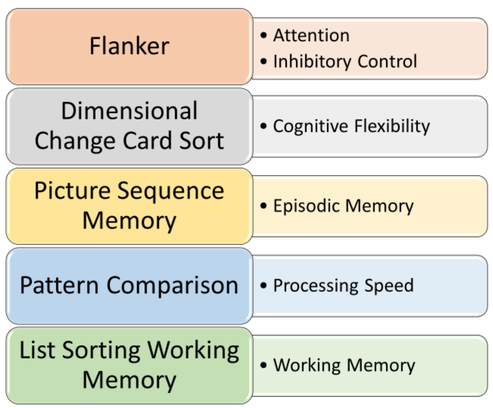

Figure 1. Selected NIH Toolbox® Fluid Cognition Tests: Dimensional Change Card Sort (DCCS); Picture Sequence Memory (PSQ); Pattern Comparison (PC); and List Sorting Working Memory (LSWM)

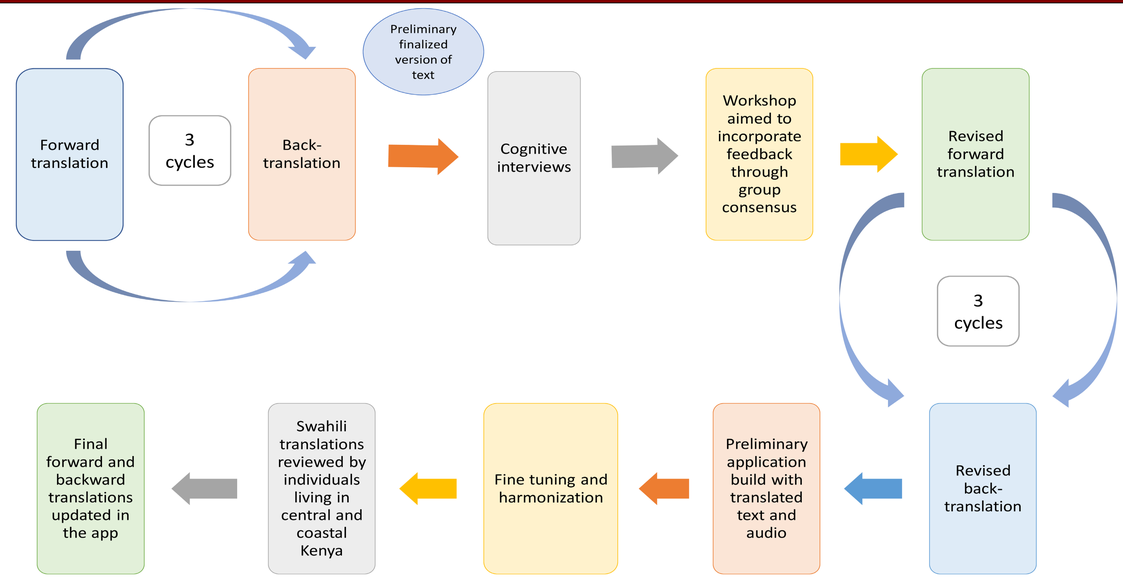

Figure 2. Flowchart of the translation and cultural adaptation process

METHODS

- The selected tests (shown at left) measure fluid cognitive abilities, which are more subject to change with biological function
- Study performed in Eldoret (Swahili version) and Ajigo (Dholuo version) in western Kenya
- Three participants per age (in years) were enrolled
- Cognitive interviews were used to understand how language was interpreted among testing subjects
- Abridged tests were used during cognitive interviews
- Qualitative results were discussed multiple times as revisions were made by iterative process and by group consensus

RESULTS

	Ajigo site (%)	Eldoret site (%)	Combined sites (%)
Female	17 (47)	16 (44)	33 (46)
Male	19 (53)	20 (56)	39 (54)
Right-handed	35 (97)	36 (100)	71 (99)
Left-handed	1 (3)	0 (0)	1 (1)
Total	36	36	72

Table 1. Demographic data of cognitive interview population

- Home base – Translated to “shelter” or ”home” in Swahili/ “starting point” in Dholuo
- DCCS –Challenges interpreting the word “shape”
- PSM –Understood by children over age 7, some alterations of descriptions of images, without changing images themselves
- PC and Flanker – Well understood and no changes made
- LSWM – Issues with item recognition; some images were altered. Selected images changed noted in Figure 3

RESULTS (CONT)

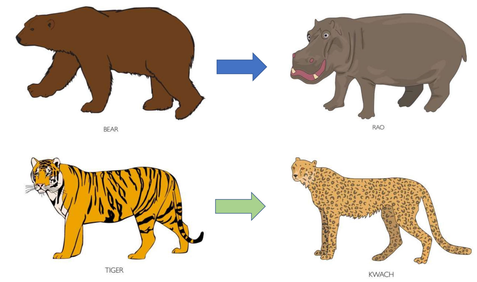

Figure 3. Select items from the NIH Toolbox List Sorting Working Memory Test (Working Memory), used with permission NIH Toolbox © 2021, National Institutes of Health, and Northwestern University. The practice images “bear” and “tiger” were replaced with “hippo” and “cheetah,” respectively.

DISCUSSION & CONCLUSIONS

- We are the first to describe the process by which NIH Toolbox tests were translated and culturally adapted for use outside of the US
- We recommend using these tests only for children aged 7+ and should only be used to compare participants within the same region
- The linguistic validation and face validity of these translations were strengthened by cognitive interviews
- These tests are now available to use in future studies, including ongoing study regarding psychometric properties

REFERENCES

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