Comparison of the Cognivue® quantitative assessment tool and SLUMS to classify the risk of cognitive impairment

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ABSTRACT
Background: Cognivue® was developed based on clinical experience and NIH-funded laboratory research into the neural mechanisms of functional impairment in aging and dementia. The computerized testing tool provides an automated brain functional assessment tool not tied to traditional question & answer testing. Cognivue® consists of 3 sub-batteries of 10 separately scored sub-tests presented in a 10-minute automated sequence. These include basic motor & visual ability (visuo-motor and visual salience), perceptual processing (letter, word, shape, and motion discrimination), and memory processing (letter, word, shape, and motion memory).

Objective: To determine the Cognivue® cut-off scores corresponding to the St. Louis University Mental Status (SLUMS) 3-level classification for risk of cognitive impairment.

Methods: Adults (age 55–95 y) at risk for age-related cognitive decline or dementia, were invited via posters and email to complete the SLUMS and Cognivue® tests. Optimization analyses by positive percent agreement (PPA) and negative percent agreement (NPA), as well as by accuracy and error bias were conducted.

Results: 92 subjects, at 5 sites, completed SLUMS (reference standard) and Cognivue® tests. Based on SLUMS score, 50% were not impaired (>26), 38% were intermediate (26–21), and 12% were impaired (<21). Analyses using 2 measures of objective function (accuracy and error bias), showed that a SLUMS cut-off score of <21 (impaired) corresponded to a Cognivue® score of 54.5 (NPA = 0.92; PPA = 0.64), The Cognivue® cut-off score (no impairment) corresponded to a Cognivue® score of 78.5 (NPA = 0.5; PPA = 0.79). Based on the results of 2 separate analysis techniques, results showed that Cognivue® scores between 55–64 corresponded to SLUMS scores for impairment, and Cognivue® scores between 74–79 corresponded to SLUMS scores for no impairment.

Conclusions: Cognivue® scores ≤50 provide a conservative standard consistent with cognitive impairment that will avoid misclassification of an individual that is impaired. Cognivue® scores ≥75 provide a conservative cut-off consistent with no impairment that will avoid misclassification of an individual that is not impaired.

BACKGROUND
Many tools for assessing cognitive function decline are limited by issues of measurement efficacy, testing bias, or lack of uptake by clinicians.

Cognivue® was developed based on clinical experience and NIH-funded laboratory research into neural mechanisms of functional impairment in aging and dementia.

Cognivue® is a computerized testing tool that provides an automated brain functional assessment tool not tied to traditional question & answer testing. It only takes 10 minutes to complete.

Cognivue® is FDA-cleared for use as an adjunctive tool to aid in assessing cognitive impairment risk in those 55–95 years of age.

Not intended to be used alone for diagnostic purposes.

Basic research (neuropsychological studies) created the scientific foundation for Cognivue® technology.

Learning & memory in development & aging

Cortical information processing

Influences of multi-stimulus interactions on cortical signal processing (focus on attentional & task effects on cortical neurons)

Clinical research on aging & dementia contributed to the experimental foundations of Cognivue® technology.

21 published studies, conducted predominantly at University of Rochester Medical Center with NIH funding or at the company (Cognivue, Inc.).

METHODS
Purpose: Compare Cognivue® quantitative assessment tool & SLUMS to determine cut-off scores to classify risk of cognitive impairment

Subjects: Adults (55–95 y) from assisted & independent living communities, at risk for age-related cognitive decline or dementia, invited via posters and email to complete SLUMS and Cognivue® tests.

Tests: Cognivue® quantitative assessment tool includes (Table 1):

- 3 sub-batteries (visuo-motor ability, perceptual processing, & memory processing) presented in automated sequence over 10 minutes

RESULTS
92 subjects total, at 5 sites, completed both SLUMS & Cognivue® tests. For participants shown in Figure 1, and based on SLUMS score:

- 50% not impaired (≥75)
- 36% intermediate (26–21)
- 12% impaired (<21)

1st analysis:

- SLUMS impairment cut-off score (≥21) minimized to 0.297 at Cognivue® cut-off score of 63.5 (NPA = 0.80; PPA = 0.78)

2nd analysis:

- SLUMS impairment cut-off score (≥26) minimized to 0.324 at Cognivue® cut-off score of 73.5 (NPA = 0.68; PPA = 0.67)

CONCLUSIONS
Cognivue® scores ≤50 and ≥75 consistent with conservative standards for impairment and no impairment, respectively.

Cognivue® is an easy to use, computerized cognitive assessment aid, which provides a useful adjunctive part of a full medical work-up for cognitive impairment.

INDICATIONS FOR USE: Cognivue® testing is indicated as an adjunctive tool for evaluating perceptual and memory function in individuals aged 55–95 y. It is not to be intended as a stand-alone device to identify the presence or absence of clinical diagnosis.

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