Comparability of Computer- Versus Tablet-Based Administration Of A Functional Capacity Measure: Implications For Transitioning To Cloud-Based Assessments

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The Methodological Issue **Being Addressed**

Do conventional device-resident and contemporary cloud-based versions of a functional capacity measure yield comparable performance data?

Introduction

- Decentralized trials are leading to rapid changes in assessment technology, including a focus on remote assessments.
- As technology is updated, some of the changes can include use of smaller screen sizes for stimulus presentation, fully cloud based software and administration, and modifications in the level of tester engagement.
- We present comparative data on two successive generations of a widely used assessment, the Virtual Reality Functional Capacity Assessment Tool (VRFCAT)¹, a performance-based measure of skills in the areas of meal preparation, using money, using transportation, and shopping
- Generation 1 was device resident and computer administered; generation 2 is cloud-based and delivered on an iPad.



Methods

- Sample 1 (computer-based VRFCAT using mouse) included 325 healthy older adults (aged 55-94) selected for being representative of the US population demographics.
- Sample 2 (iPad tablet-based VRFCAT using touch screen) included 67 healthy older adults (aged 55-94) that served as a healthy control sample for a study of wearable devices.
- We compared the samples on VRFCAT performance (total adjusted time to completion [primary outcome variable], errors, forced progressions) and on correlations between VRFCAT performance and age.

Demographic Breakdown by Sample

	Sample 1 (computer)	Sample 2 (tablet)
Age	68.7 (8.4)	67.5 (7.2)
Gender (% Female)	52%	55%
Race (% White)	77%	72%

Results

VRFCAT Performance by Sample

	Sample 1 (computer)		Sample 2 (tablet)	
	Mean	SD	Mean	SD
Adjusted	889.6	217.4	832.2	213.1
time Errors	2 51	2 43	2.37	2 2 3
Forced progressions	.50	.79	.39	.67

- There were no significant between-sample differences for scores or variances on the three three VRFCAT outcome variables.
- There was a trend (p= .05) for faster (i.e., better) adjusted time in Sample 2 (tablet) than in Sample 1 (computer), reflecting a 5% difference.
- There were no significant between-sample differences when the samples were broken down by decade, gender, or ethnicity.







Correlation between VRFCAT and Age

	Sample 1	Sample 2	
Adjusted Time	46.**	.43**	
Errors	.23**	.30**	
orced Progressions	.36**	.38**	

 Correlations between VRFCAT performance and age were highly similar in both samples.



 Adjustment strategies explored whether minor linear transformations of scores lead to equivalence in distributions in terms of variance and cutoff scores.



 When a 5% transformation was applied to the tablet VRFCAT data (or vice versa), completion times were very similar for tablet vs. computer at the 75th, 50th, and 25th percentile cutoffs, as well as one SD below the normative mean (17th percentile; 1008 vs 1011).

Conclusion

- year.

 Cloud-based measures offer many technical, operational, and cost advantages, particularly for remote and mobile assessments, but their comparability to original computerbased versions can not be assumed.

 Adapting the original version of the VRFCAT to a cloud-based platform led to performance that was very similar in healthy older adults.

• While accuracy (i.e., errors and forced progressions) was essentially identical, a relatively small 5% transformation on adjusted time for the tablet version generated highly similar characteristics as the computer version.

 The 5% difference in adjusted time may be completely accounted for by technological differences (resolution of response times; mouse vs. touch input device). Older adults have been found to perform more quickly on cognitive tasks like the VRFCAT that involve registering responses by pointing on a touch screen vs. mouse driven interface².

• Clearly, having participants tested with both versions would provide a more rigorous cross-modality comparison. At the same time, the similarity across modalities suggests that normative standards developed for the computer version may have applicability for the tablet versionc

References: Keefe et al. (2016). Validation of a Computerized test of Functional Capacity. Schizophrenia Research;175(1-3):90-96. PMID: 27091656 Kim et al (2020). A Comparison of Touchscreen and Mouse for Real-World and Abstract Tasks in Older Adults. ACM Transactions on Accessible Computing; 13(4), 1-26.

• WPH, HSK, MW, DS are full-time employees of WCG Clinical Endpoint Solutions. • KWB has received consulting fees from WCG Clinical Endpoint Solutions in the past

• PDH has received consulting fees or travel reimbursements from Alkermes, Bio Excel, Boehringer Ingelheim, Karuna Pharma, Merck Pharma, Minerva Pharma, and Sunovion (DSP), and WCG Clinical Endpoint Solutions in the past year. He receives royalties from the Brief Assessment of Cognition in Schizophrenia (Owned by WCG Clinical Endpoint Solutions and contained in the MCCB). He is chief scientific officer of i-Function, Inc and Scientific Consultant to EMA Wellness, Inc.

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