

Tablet Application for Administration and Scoring the Brief International Cognitive Assessment for MS (BICAMS) Meghan Beier, PhD, Kevin Alschuler, PhD, Dagmar Amtmann, PhD, and Dawn Ehde, PhD

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INTRODUCTION

Approximately 50% of individuals with multiple sclerosis (MS) develop cognitive impairment. Early detection of cognitive difficulties may lead to improved outcomes. Self-report is often used to screen for cognitive dysfunction, but metacognition is often impaired. Thus, objective tests are the best way to diagnose and track cognitive change over time. However, neuropsychological evaluations are expensive, time consuming, and require neuropsychologists for interpretation. Therefore the BICAMS, a truncated battery with strong psychometrics (sensitivity 94% and specificity 86%), was developed as a way for MS medical personnel, without training in neuropsychology, to track cognition over time.

Despite the strengths of the BICAMS, there are barriers preventing providers from adopting this recommended assessment. Although the original intent of the BICAMS was to create an intuitive assessment for nonneuropsychologists, the scoring and interpretation require precious clinic time and necessitate an understanding of psychometric information such as zscores and percentiles. The increasing emphasis on paperless systems (EMRs) may also render paper administration of the BICAMS obsolete. Given that tablet computers (e.g., iPad) are common in numerous medical facilities, this technology will potentially increase accessibility of the BICAMS to all providers caring for individuals with MS.

PURPOSE OF CURRENT STUDY

 To test the reliability of a BICAMS "app" against the traditional paper version.

•We hope the app will reduce administration time, allow for quick easy scoring, and provide interpretation of test scores.

		* Images hav	Application /e been edited to pro
		SETUP	
		PATIENT ID	
		2763617	
		AGE	
		58	
		GENDER	
		Male	
		YEARS OF EDUCATION	
		6	
		DATE	
		02/26/14	
			NEXT
		CVLT-II INSTRUCTIONS 8	A TEST
	(TRIAL 1 TRIAL 2 TRIAL 3 TRIAL 4	TRIAL 5
Im going to read th	e same list again. Like before, tell	me as many of the words as you can, in any order, including words from the lis	st youve said before.
Record all responses ve	erbatim, in the order recalled. Promt only	once (e.g., Anything else?) at the end of each free and cued recall trial (i.e., after 15 seconds	with no response or when the examinee says he/she cannot remember more words).
List A		Resp ty	
		2	12
		3	
		5	
		6	16
		7	17
		8 9	18
		10	20
		Total	Correct 6 Total Repetitions 6 Total Intrusions 6
PREVIOUS			NEXT >

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Screen Shots

tect the integrity of test materials

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				STAR		2	26:4	6		STOP				
							KEY							
			1.0	-	100	-	1.00	-	100	1	100			
			1	2	3	4	5	6	7	8	9			
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9	5	8	3	6	7	4	5	2	3	7	9	2	8	1
6	9	7	2	3	6	4	9	1	7	2	5	6	8	4
	-	100	-	100	10	-	-	-	100	-	100	100	100	100
2	8	7	9	3	7	8	5	1	9	2	1	4	3	6
100		100		100		-	-		100	100		-	-	1000
5	2	1	6	4	2	1	6	9	7	3	5	4	8	9

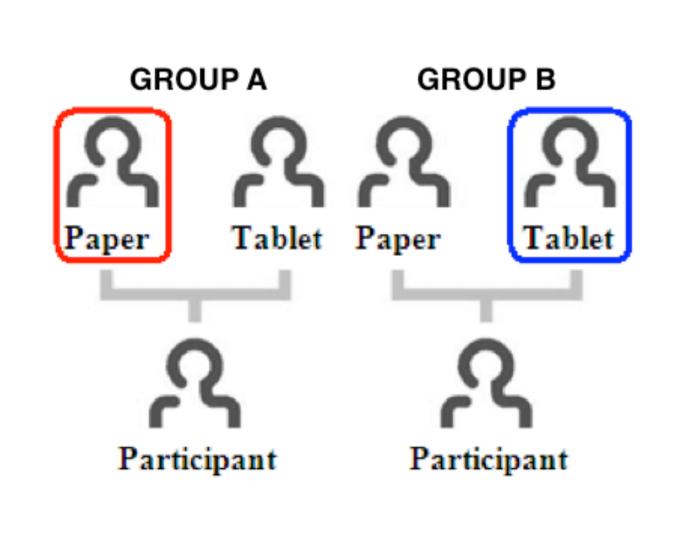
Administration Instructions:	Results
I will show you a sheet that has six figures on it. I want you to study the figures so that you can remember as many of them as possible. You will have just 10 seconds to study the entire display. I will present the figures right here (16" from eye level of respondent). After I take the display away, try to draw each figure exactly as it appeared and in its correct location on the page. Display stimulus for 10 seconds, do not start timing until subject begins scanning. Now draw as many of the figures as you can in their correct location on the page. START TRIAL 1	6
After they complete their drawings: That was fine. Now I would like to see whether you can remember more of the figures if you have another chance. I will present the display again for 10 seconds. Try to remember as many of the figures as you can this time, including the ones you remembered on your last attempt. Try to draw each figure precisely and in its correct location. START TRIAL 2	
For subsequent trials: That was fine. Now I would like to see whether you can remember more of the figures if you have another chance. I will present the display again for 10 seconds. Try to remember as many of the figures as you can this time, including the ones you remembered on your last attempt. Try to draw each figure precisely and in its correct location. START TRIAL 3	

METHODS

 This CMSC-funded pilot study will enroll 100 participants with MS (2 groups, N=50).

 Inter-rater and parallel forms reliability is assessed using 2 test administrators scoring participant responses simultaneously – one on the paper BICAMS and the other on the BICAMS app. Half of the testing sessions are led by the paper administrator (Group A) and half by the app administrator (Group B).

 Concurrent validity is assessed using an analogous design.
 Although only exposed to the material once, participant responses are recorded on both administration methods.



STATISTICS

Intraclass correlations will be used to examine the agreement between scores from Group A and B. A Bland-Altman plot will be used to examine difference across the continuum of cognitive function (i.e., whether the agreement is consistent across cognitive function).

CONCLUSIONS

This study is a work in progress; data collection is underway.

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