

Sydney Y. Schaefer^{1,2}, Alexi M. Reed^{1,2}, Andrew Hooyman³, Lee Ryan^{2,4}, Megan Johnson⁵, Matthew D. De Both⁵, Saurabh Sharma⁵, Darian Chambers⁵, Matthew Calamia⁶, Matthew J. Huentelman^{2,5}

¹School of Biological and Health Systems Engineering, Arizona State University; ²Arizona Alzheimer's Consortium; ³Department of Physical Therapy, Chapman University; ⁴Department of Psychology, University of Arizona; ⁵Translational Genomics Research Institute; ⁶Department of Psychology, Louisiana State University

Introduction

Problem Demographic corrections (e.g., for sex, education, race, ethnicity) are often applied when assessing cognition in older adults.

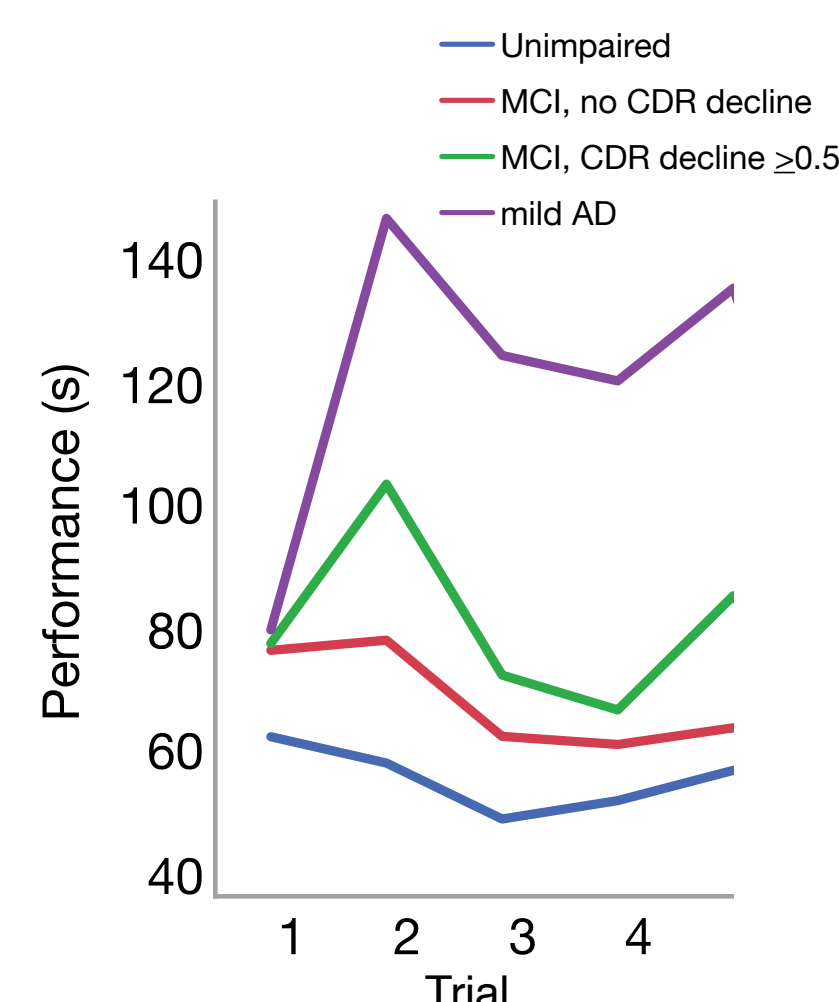
Need Assessment options that are less susceptible to demographic factors, while still being quick and easy to administer.

Proposed solution: Performance-based test



Scan to learn more

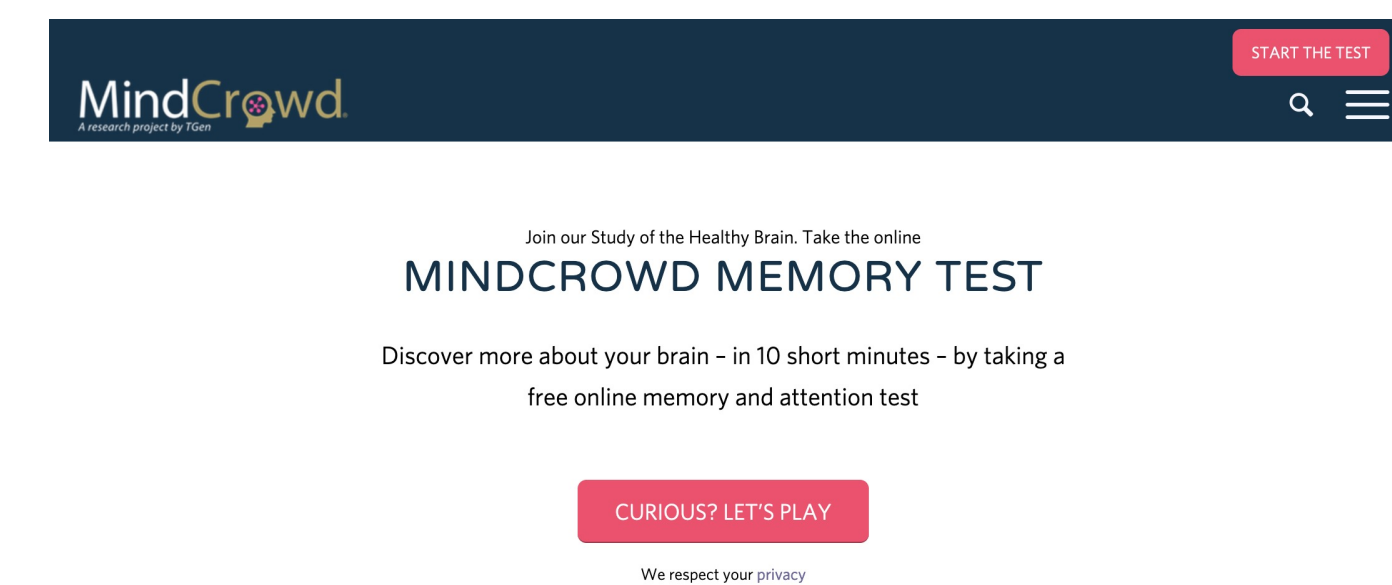
- Provides objective score that is resistant to floor/ceiling effects
- Tracks with dementia staging and cognitive status
- Predicts cognitive and functional decline
- Requires no informant or formal training
- Easy-to-administer
- Resistant to effects of sex and education



Purpose To compare demographic effects on an established (paired associates learning) and our performance-based test in older adults.

Hypothesis Performance-based test would be less susceptible to demographic factors than paired associates learning.

Methods



Total sample	N = 1,326
Age	61.9 (10.9)
Sex	
Female	1,066 (80%)
Male	260 (20%)
Race	
American Indian or Alaska Native	3 (0.2%)
Asian	22 (1.7%)
Black or African American	18 (1.4%)
I prefer not to answer	8 (0.6%)
More than one	28 (2.1%)
White	1,247 (94%)
Hispanic/Latino ethnicity (Yes)	109 (8.2%)
Highest level of education	
High school diploma	82 (6.2%)
Some college	245 (18%)
College degree (University graduate)	504 (38%)
Post-graduate degree (Masters or Doctorate)	495 (37%)
Self-reported memory problems ^a	191 (14%)
Paired Associates Learning (total pairs correct) ^b	21 (8)
Motor-based test score ^c	6.8 (4.5)

Mean (SD) or n (%)

^aAnswered "yes" to the survey question "Have you personally experienced or are you currently experiencing memory problems?"

^bout of 36 possible correct pairs

^cscored as the intra-individual standard deviation in trial time across four consecutive timed trials, where lower is considered better.

Paired associates learning (PAL) is a classic memory paradigm from the Wechsler Memory Scale:

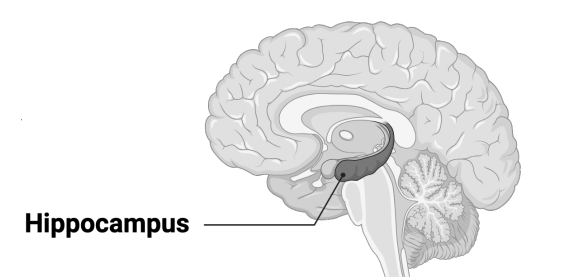
- **Learning phase** 12 word-pairs total, one word-pair at a time (2 seconds/word-pair) shown on computer screen.

public | hard

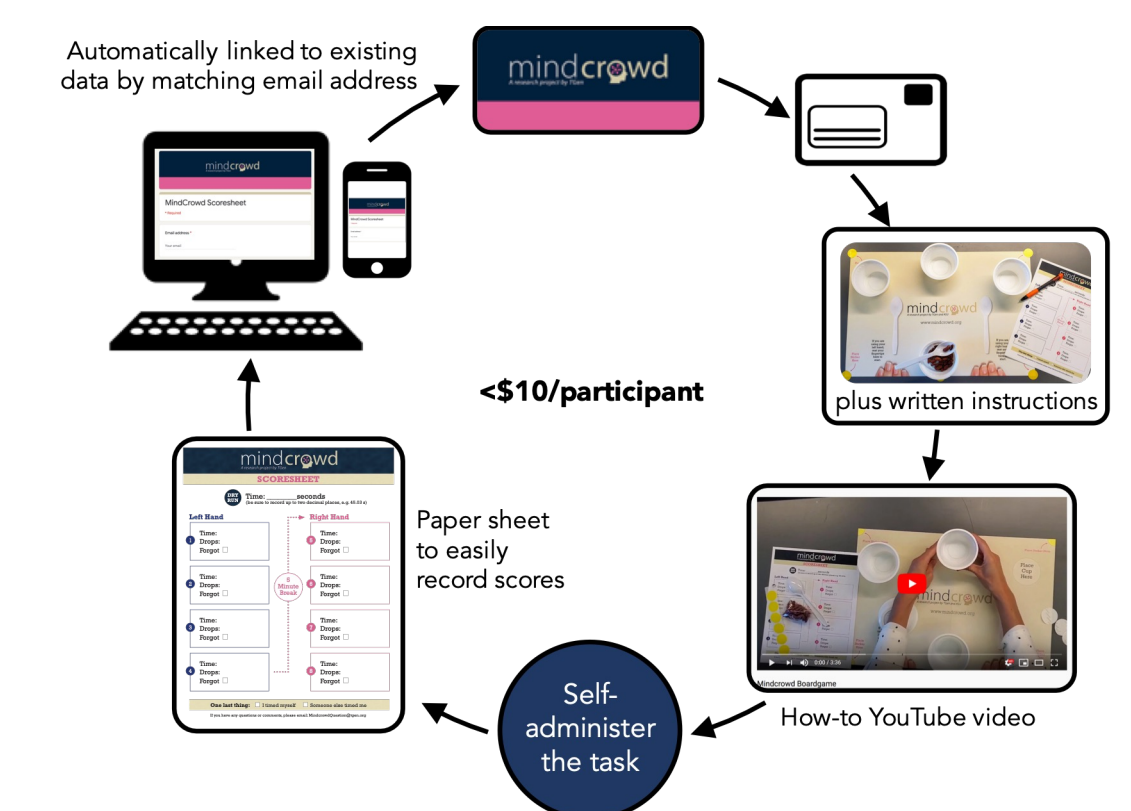
- **Recall phase** First word of each pair is shown; participants type (i.e., recall) in the missing word, for 12 pairs per trial

name | ENTER

Score = total number of correct word pairs entered across the three 12-pair trials (i.e., $12 \times 3 = 36$, a perfect score)



Performance-based test measures learning and memory. Score = SD in trial time across four trials (higher = worse).



Results

Outcome	Term	Df	Sum Sq	F value	Pr(>F)
Performance-based test ('Bean game')	Age	1	1.59	4.15	0.04
	Sex	1	1.8	4.70	0.03
	Hispanic/Latino	1	0.07	0.18	0.67
	Race	5	1.42	0.74	0.60
	Education	3	0.29	0.25	0.86
PAL	Age	1	3592.34	65.79	<0.001
	Sex	1	3717.32	68.08	<0.001
	Hispanic/Latino	1	820.32	15.02	<0.001
	Race	5	682.50	2.50	0.03
	Education	3	2741.51	16.74	<0.001

Overall R^2 for the bean game was 0.002, compared to 0.13 for PAL, indicating the above demographic variables accounted for much more variance in PAL performance.

Participants who identified as White had scores 6.14 points better than those who identified as Black or African American (*adjusted* $p = .007$, Cohen's $d = -0.83$).

All other pairwise comparisons were not statistically significant.

Discussion

Replication This large convenience sample replicates and expands prior work showing **minimal** demographic effects for the performance-based test.

Clinical utility This study complements promising results related to the performance-based test's clinical utility (e.g., associations with putative biomarkers, diagnostic criteria, everyday functioning, cognition), **offering a new approach for screening and monitoring cognitive and functional status in a wider range of older adults without needing to apply or consider demographic corrections.**

In particular, this assessment could be used in teleneuropsychology to easily and affordably pre-screen for biomarker testing, predict cognitive decline (e.g., prognosis), and/or monitor treatment outcomes.

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