

OVERVIEW OF Xpresso

Xpresso is a **self-administered** digital cognitive pre-screening tool for the general public to efficiently distinguish individuals with subjective versus objective cognitive impairment.

A performance score is calculated based on **three cognitive domains** which are often affected in MCI stage:

- + **memory recall**
- + **executive function**
- + **processing speed**



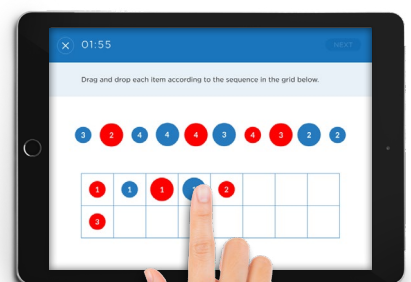
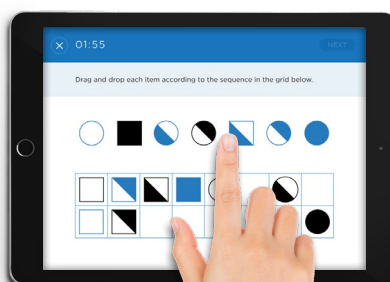
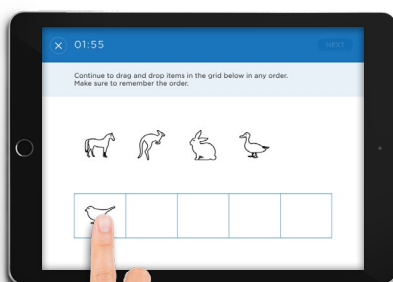
App available
on all devices

XPRESSO
BY **MoCA**

mocaxpresso.com

The test is administered on a desktop, tablet, or mobile in approximately 7 minutes and consists of 3 tasks repeated in two additional variations for a total of 9 tasks:

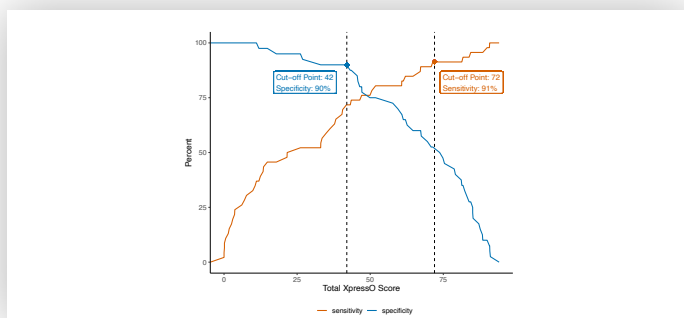
- + **The Placement Task** requires the participant to place five objects into boxes in an order that they are instructed to remember.
- + **The Logical Task** requires the participant to identify a pattern and enter objects into boxes accordingly.
- + **The Recall Tasks** requires the participant to identify the objects from the first task and enter them into boxes in the same order entered previously.



Validity

The XpressO was validated on a tablet by comparing to the MoCA test (n=147) as the gold standard. A crossover validation study design was applied. Analysis of the validation study showed an association between (1) MoCA Memory Index Score (MIS) and XpressO memory task score (Pearson $r = 0.50$, p -values $<.001$); (2) MoCA Executive Index Score and XpressO logical task score (Pearson $r = 0.46$, p -values $<.001$); and (3) total scores of MoCA test and XpressO (Pearson $r = 0.64$, p -values $<.001$).

Sensitivity-Specificity/Predictive values



The area under the curve is 0.897 to predict that the participant would score < 25 in the full MoCA. Two cut-off points were introduced for the total XpressO score. Given the prevalence of cognitive impairment in the population of 33%:

- Negative Predictive Value (NPV) is 93% with a sensitivity of 91% for a cut-off of 72
- Positive Predictive Value (PPV) is 72 with a specificity of 85% for a cut-off of 42
- Scores between 43 and 71, inclusive ($43 \leq \text{score} \leq 71$) constitute a grey zone that is indeterminate.

Original XpressO validation study

Klil-Drori, Sivan et al. "Montreal Cognitive Assessment (MoCA) XpressO: Validation of a digital self-administered cognitive prescreening tool." *Journal of the American Geriatrics Society* vol. 72.8 (2024): 2516-2522. doi:10.1111/jgs. <https://pubmed.ncbi.nlm.nih.gov/38558263/>

Correlation XpressO-MoCA

The performance is classified into 3 categories:

- Red:** Highest probability of cognitive impairment (MoCA $\leq 23/30$)
- Yellow:** Intermediate probability of cognitive impairment (MoCA 24-26/30)
- Green:** Highest probability of intact cognition (MoCA $\geq 25/30$)

Versions

"XpressO Professional" offers researcher or clinician portal access to send out tests to participants/patients and review all results. Viewing of XpressO results for participants can be disabled.

Additional versions are currently being developed with variations in memory objects and patterns tasks

Adaptations

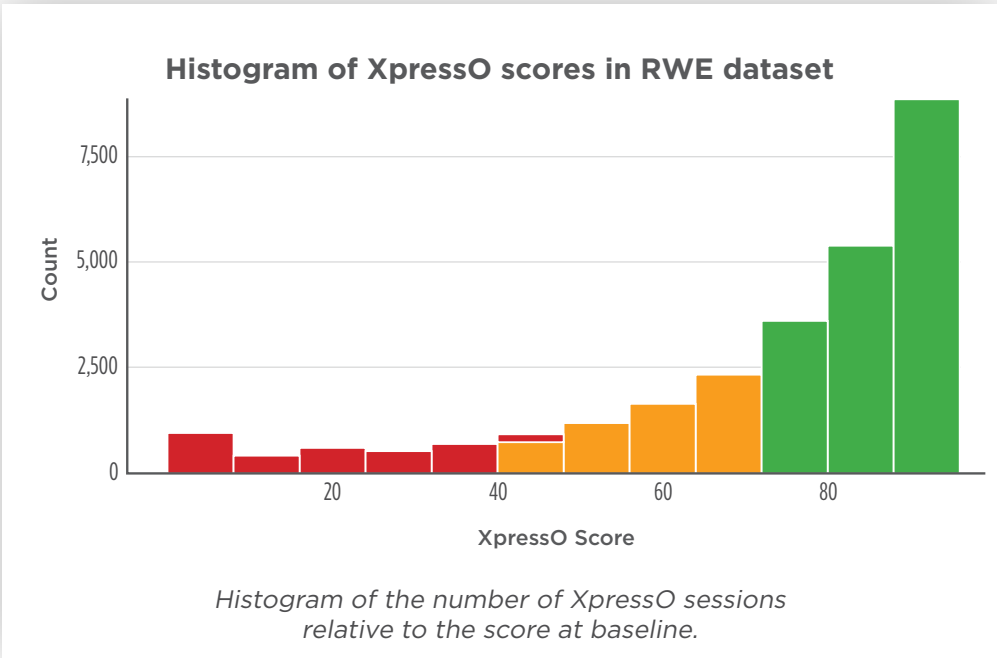
XpressO does not include subtests with a language component (e.g., verbal memory), making it easily implementable worldwide with minimal adaptation to the instructions.



Real-World Data
>11,000 test takers
February-October 2024



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Age	Percentage (High)	Percentage (Medium)	Percentage (Low)	MCI Prevalence
55-59	72.5	18.7	8.8	-
60-64	67.2	21.7	11.0	6.7
65-69	59.7	26.5	13.8	8.4
70-74	46.9	34.1	19.0	10.1
75-79	43.8	31.7	24.5	14.8
80-84	37.0	27.7	35.3	25.2
85-89	10.9	34.8	54.3	-



“Red” category increases with age, in-line with the prevalence of MCI (USA)



Demographics

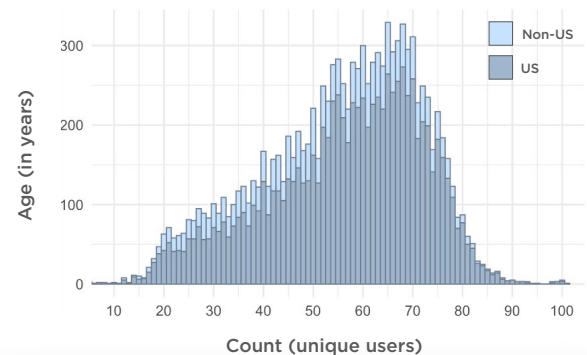
North America Only



Overview of the data across studies

	Prototype Validation (N=86)	Product Validation (N=98)	RWE (N=11284)
Age			
Mean (SD)	70.3 (7.31)	67.4 (9.52)	55.6 (15.9)
Median [Min, Max]	69.0 [46.0, 87.0]	68.5 [26.0, 86.0]	58.0 [0, 101]
Sex			
Female	49 (57.0%)	55 (56.1%)	6841 (60.6%)
Male	37 (43.0%)	43 (43.9%)	4225 (37.4%)
Other	0 (0%)	0 (0%)	218 (1.9%)
Education			
Mean (SD)	13.5 (3.44)	13.4 (3.81)	16.7 (4.84)
Median [Min, Max]	13.0 [0, 21.0]	14.0 [0, 22.0]	16.0 [0, 100]
Missing	0 (0%)	1 (1.0%)	64 (0.6%)
Number of Completed Sessions			
Mean (SD)	1.00 (0)	1.01 (0.101)	2.85 (3.30)
Median [Min, Max]	1.00 [1.00, 1.00]	1.00 [1.00, 2.00]	2.00 [1.00, 127]
Xpresso Score			
Mean (SD)	47.4 (31.0)	41.1 (35.2)	72.2 (24.0)
Median [Min, Max]	46.8 [0.00500, 94.1]	33.0 [0.0660, 92.5]	81.3 [0, 99.1]
MoCA Score			
Mean (SD)	23.5 (3.82)	22.9 (4.03)	NA (NA)
Median [Min, Max]	24.0 [12.0, 29.0]	23.0 [11.0, 30.01]	NA [NA, NA]
Missing	0 (0%)	3 (3.1%)	11284 (100%)
MoCA Score Categorical			
MoCA <= 24	46 (53.5%)	57 (58.2%)	0 (0%)
MoCA >= 25	40 (46.5%)	38 (38.8%)	0 (0%)
Missing	0 (0%)	3 (3.1%)	11284 (100%)

Demographic of people who complete Xpresso online



Demographic Information



The mean age of users was 56.2 (SD=15.8) Mean age of users with low Xpresso scores was higher (63.8, SD=15.1) than users with low Xpresso scores (53.3, SD=15.5).



60.6% of users were female



On average, **users had 16.7 years of education** (SD=5.12)



77.6% of users **were in the United States**

45% of users expressed positive likelihood they will **discuss their Xpresso score with their physician** (N = 548 user survey)