

CogniPaz: Validation Of An Ecologically Oriented Digital Tool For Detecting Mild Cognitive Impairment

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CogniPaz is a rapid, gamified digital tool that accurately discriminates Mild Cognitive Impairment, particularly in its amnestic phenotypes, from Subjective Cognitive Decline and Healthy Controls, offering a feasible, age-independent cognitive assessment for early-stage screening.

INTRODUCTION

- Discriminating **Mild Cognitive Impairment (MCI)**, particularly amnestic forms (**aMCI**), from Subjective Cognitive Decline (**SCD**) and Healthy Controls (**HC**), remains a clinical challenge.
- Traditional paper-and-pencil tests (e.g., MoCA) → ceiling effects, limited sensitivity to early changes, low ecological validity...
- Digital tools offer a sensitive, automated, and engaging alternative for early cognitive screening.

Objective
To evaluate the diagnostic accuracy of CogniPaz.

METHODS

Tablet-based, ecologically oriented, gamified cognitive assessment. **Max. 38 points.**

9 tasks: episodic memory (6-word list; visual + auditory input), executive function, attention, orientation, and visuospatial working memory.

ELIGIBILITY

Cognitive complaints
No dementia (CDR<1)
Excl: sensory/motor deficits · no consent

CLINICAL EVALUATION

History · neuro exam
Lab tests
Biomarkers if available (MRI · PET · CSF)

MOCA (BLINDED NEURO)

Standard admin
Blinded to CogniPaz
Fixed order:
MoCA → CogniPaz

COGNIPAZ (BLINDED RESEARCH)

Self-administered
Minimal supervision
Auto-scored · ~9 min
Quiet room · 1 session

FEASIBILITY RECORDING

Completion rate
Administration time
Technical failures
Assistance required

SATISFACTION QUESTIONNAIRE

9-point Likert scale
Utility · Ease of use
Clarity · Duration
Median: 8.4/9

RESULTS

La Paz University Hospital · April 2025–Jan 2026 **N=84**

HC n=27
Age 74.0 y · MoCA≥26 · No complaints

SCD n=17
Age 59.0 y · MoCA≥26 · Complaints

MCI n=40
Age 74.0 y · MoCA<26 · CDR 0.5
aMCI n=22 (76.5y) · naMCI n=18 (71.5y)

- Age: aMCI significantly older than SCD (P=.003)
- Family hx of AD: MCI 42.5% vs HC 11.1% (P=.028)
- Sex & Education: no significant differences (ns)

Comparison	AUC	95% CI
MCI vs HC	0.880	0.798–0.961
MCI vs SCD	0.915	0.841–0.990
aMCI vs HC	0.910	0.830–0.990
aMCI vs SCD ★	0.943	0.878–1.000

FEASIBILITY, USABILITY & VALIDITY

COMPLETION
100%
No failures
No data loss

MEDIAN TIME
9.4 min
IQR 7.53–11.38
MCI>SCD P=.007

SATISFACTION
8.4/9
IQR 7.86–8.57
Items median 9.0

ZERO ASSISTANCE
54%
SCD 87.5%
MCI 30.8%

GLOBAL VALIDITY — COGNIPAZ VS MOCA

r = .81
95% CI 0.75–0.89 · P<.001 · Spearman · N=84

DOMAIN-SPECIFIC — MEMORY TASKS VS MOCA MEMORY

r = .61–.68
P<.001 all comparisons · disease-specific construct validity

28.5 pts
CUTOFF SELECTION
(AMCI VS SCD)
Se: **90.9%**
Sp: **82.4%**
NPV: **87.5%**
LR: **0.11**
AGE INDEPENDENT
DeLong P>.05 all comparisons
CogniPaz: **20–39%**
Age: **1–3%** variance

N=39

BIOMARKER SUB-ANALYSIS
MRI · FDG-PET
Amyloid-PET · CSF
Confirmed AD n=15
Unconfirmed n=24

aMCI vs SCD

Cutoff (pts)	Se (%)	Sp (%)
24.5	77.3	94.1
26.5	81.8	82.4
28.5	90.9	82.4

Confirmed Neurodegenerative Disease

Cutoff (pts)	Se (%)	Sp (%)
24.5	80	75
26.5	86.7	54.2
28.5	86.7	41.7

CONCLUSIONS

CogniPaz demonstrates **excellent discrimination**, independent of age, in distinguishing MCI and **aMCI** from SCD and HC, and **promising capacity** for identifying neurodegeneration suggestive of **AD** at an unified cutoff of **28.5 points**, with a strong correlation with MoCA. These results support its use as a **rapid digital screening tool** for early-stage cognitive impairment.

External longitudinal validation is essential before implementation

REFERENCES

Scan QR for references and full assessment demonstration (Spanish version)

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