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Background

- Cognitive impairment is common in patients with MS, however it is not routinely assessed in clinical settings.
- We developed a 5-minute computerized test to measure cognitive dysfunction in patients with MS.
- The proposed test –named **Integrated Cognitive Assessment (ICA)**– is self-administered and language-independent.

Objective

- To determine ICA's validity for screening cognitive impairment in MS by comparing it to the pen-and-paper Brief International Cognitive Assessment for MS (BICAMS).

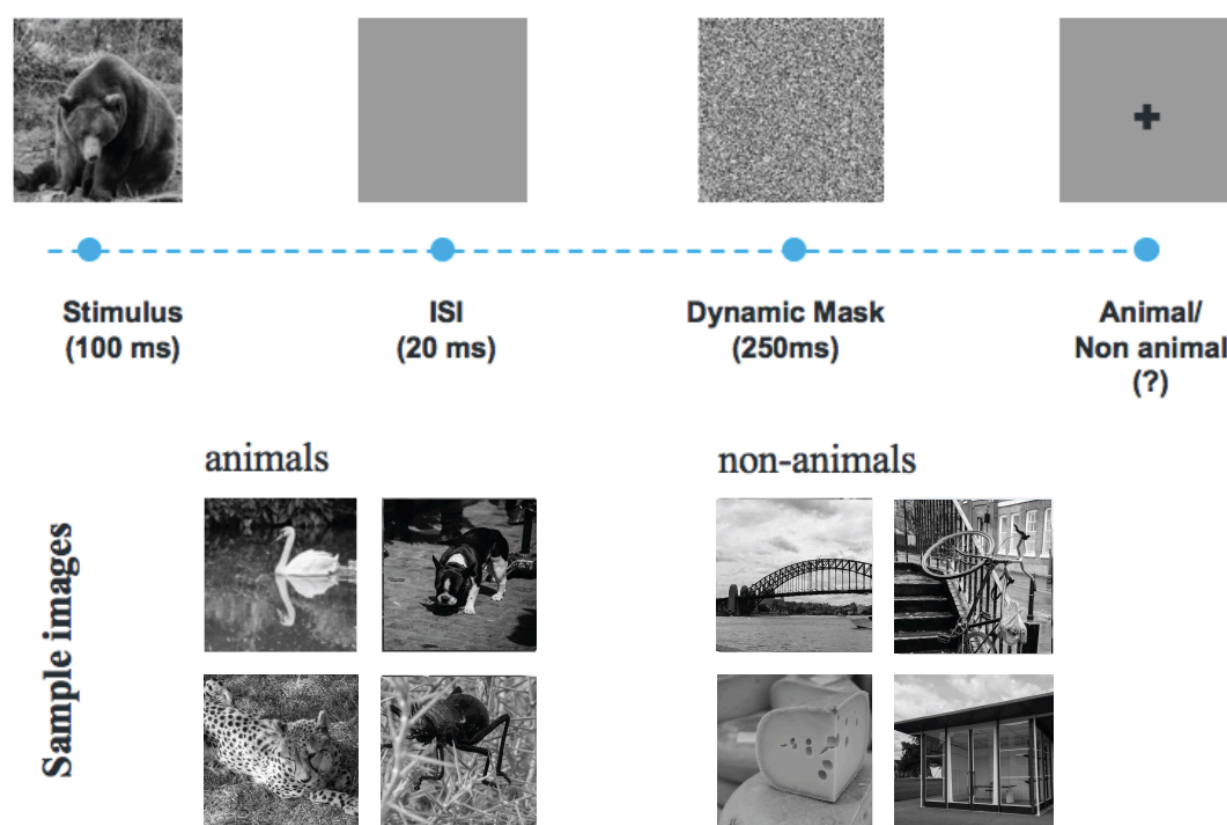
Results

Convergent Validity with BICAMS

Group	BICAMS	Correlation with ICA
MS (n=91)	SDMT	0.71 *
	CVLT-II	0.58 *
	BVMT-R	0.54 *
HC (n=83)	SDMT	0.81 *
	CVLT-II	0.76 *
	BVMT-R	0.80 *

Stars (*) show significant correlation at $p < 10^{-8}$.

ICA Test Outline



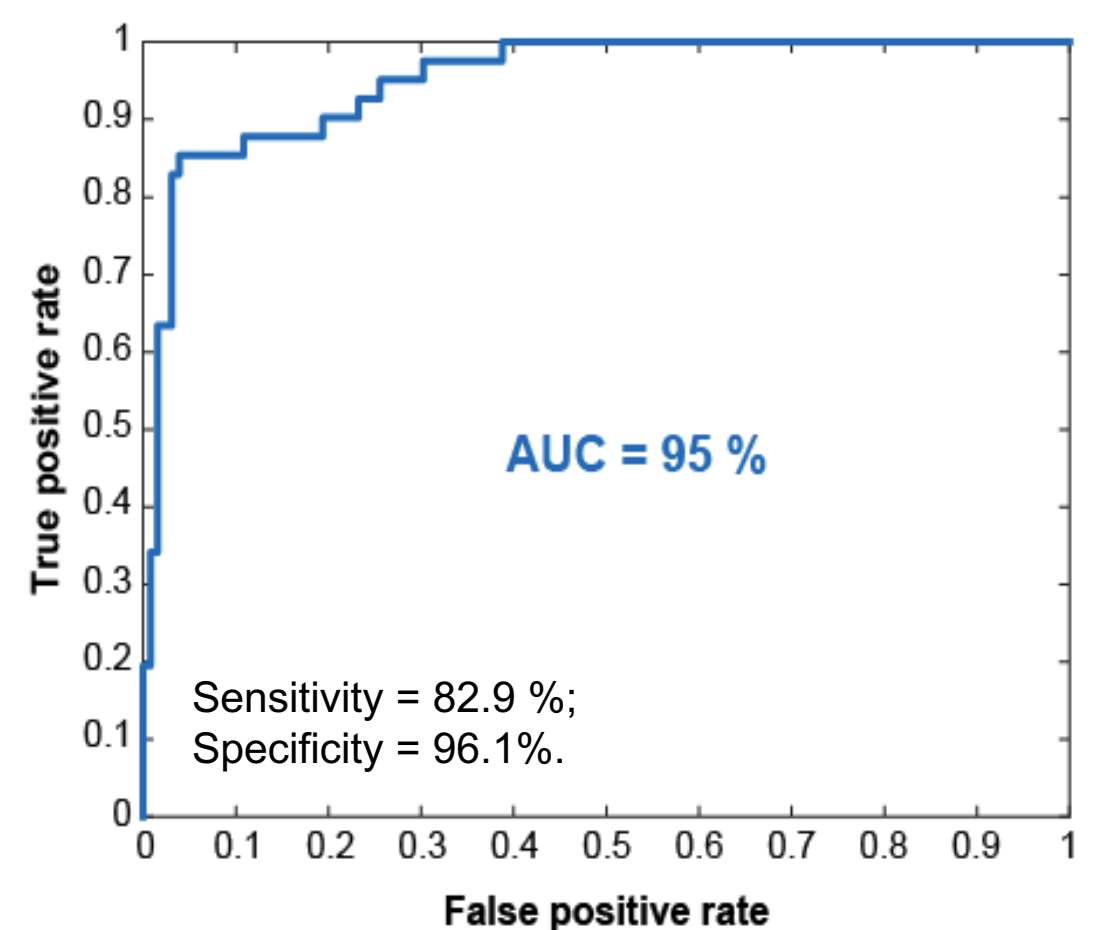
One hundred natural images (50 animal and 50 non-animal) with various levels of difficulty are presented to the participants. Participants are asked to respond (on an iPad) as quickly and accurately as they can, whether the image contained an animal.

Methods

- 91 MS patients and 83 healthy controls (HC) took part in this study.
- Each participant took the ICA test and the BICAMS battery of tests.
- We assessed ICA test-retest reliability ($r=0.94$)
- ICA's convergent validity with BICAMS
- ICA's accuracy in detecting cognitive dysfunction (**AUC=95%**)

ROC Curve

[cognitively impaired vs. cognitively healthy]



Conclusions

ICA has several advantages compared to the standard pen-and-paper tests:

- The ICA test is shorter in duration,
- Self-administered, with automatic scoring
- Intrinsically independent of language and culture
- Potential for electronic medical record integration.
- Equipped with an internal **artificial intelligence (AI)** engine, enabling more accurate classifications
- No learning bias, thus suitable for micro-monitoring of cognitive performance