Validation and comparisons of the Amnesia Light and Brief Assessment (ALBA), the door Picture Naming and Immediate Recall (PICNIR) and the Addenbrooke's Cognitive Examination III (ACE-III) for detecting cognitive impairment

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1 BACKGROUND

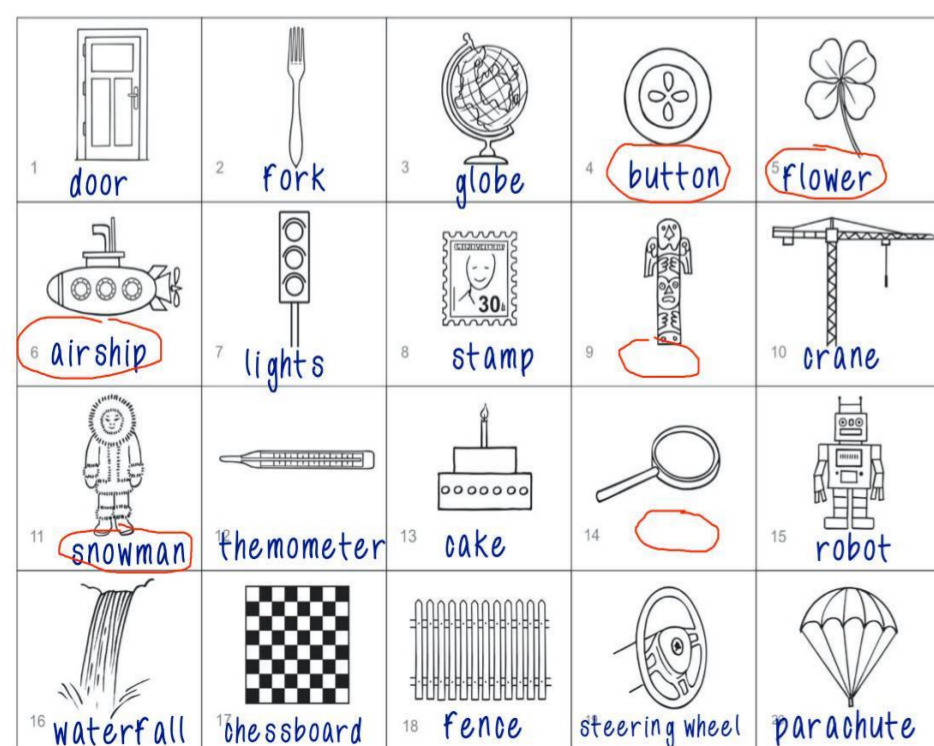• Two unique very brief tests are easily administered and cognitively demanding:

1) the Amnesia Light and Brief Assessment (abbreviated from the initial letters as ALBA) lasting 2 minutes

2) the door PICture Naming and Immediate Recall (PICNIR from the initial letters) lasting 5 minutes

• They were validated and compared with seven times longer Addenbrooke's Cognitive Examination III (ACE-III) (20-30 minutes).

2 METHODS

The ALBA, the PICNIR, and the ACE-III were administered to 110 elderly individuals in 2 groups comprising 40 patients with neurocognitive disorders according to DSM-5 criteria and 70 normal elderly adults characterized in Table.

1. The ALBA test consists of repeating a sentence of six words, performing and immediately recalling six gestures, and recalling the words of the original sentence. The ALBA was evaluated using the memory ALBA score (MAS) with higher scores indicating better cognitive performance (Fig. 1). ALBA educational video is available on YouTube: https://www.youtube.com/watch?v=LyCuWc0-Gro

2. In the PICNIR test, participants are asked to write down the names of 20 black and white pictures and then without distraction to recall and write as many picture names as possible in one minute. The door PICNIR was assessed using a number of naming errors (NE) with lower scores indicating better cognitive performance and correctly recalled picture names (PICR) with higher points indicating better cognitive performance (Fig. 2). The hedgehog version of the PICNIR educational video is available on YouTube: https://www.youtube.com/watch?v=cbJGtPG-nVA

3. The ACE-III includes five subscales to assess five different cognitive domains: attention/orientation, verbal fluency, memory, language, and visuospatial skills. A maximum score of 100 can be obtained, with higher scores indicating better cognitive performance.

Fig. 2 A filled-in form of the PICNIR test

Naming errors (NE): 4 wrongly named + 2 unnamed = 6 errors

Correctly recalled picture names (PICR):
6 - 1 confabulation - 1 repetition =
4 correctly recalled picture names

3 PARTICIPANTS

Table Participant characteristics, test results and their comparisons of socio-demographically matched groups

	Patients with neurocognitive disorders	Normal elderly	Propability p	AUC
Number of participants	40	70		
Age	75 ± 6	73 ± 5	0.05	_
Education (years of schooling)	14 ± 4	16 ± 3	0.07	_
ALBA- MAS (0-12 points)	4 ± 3	9 ± 2	< 0.0000001	0.89
PICNIR-NE (0-10 points)	5 ± 4	1 ± 1	< 0.0000001	0.81
PICNIR-PICR (0-15 points)	3 ± 2	9 ± 2	< 0.0000001	0.96
ACE-III (0-100 points)	73 ± 11	96 ± 4	< 0.0000001	0.98

AUC - area under the receiver operating characteristic curve (ROC), ALBA-MAS – memory Amnesia Light and Brief Assessment score, PICNIR - the door PICture Naming and Immediate Recall: NE – naming errors, PICR – picture name recall, ACE-III – Addenbrooke's Cognitive Examination III

Fig. 1 A filled-in form of the ALBA test with detailed instructions and scoring

Memory ALBA score - MAS is equal to correctly recalled sentence words plus correctly recalled gestures, i.e., 2+3= 5 in this example

4 RESULTS

• All the tests were significantly different between the two age- and education-matched groups. They showed excellent and outstanding diagnostic accuracy based on the area under the Receiver Operating Characteristic curve (AUC) (Table).

• The AUCs of PICR and ACE-III were comparable and larger than those of MAS and NE (Fig. 3).

• The ACE-III strongly correlated with MAS and PICR (0.8, R2=60% each) and NE (-0.7, R2=48%) in the whole sample.

Fig. 3 Comparisons of areas under the receiver operating characteristic curves for the four tests ACE-III, PICNIR-PICR, ALBA-MAS, and PICNIR-NE between patients with neurocognitive disorders and normal elderly
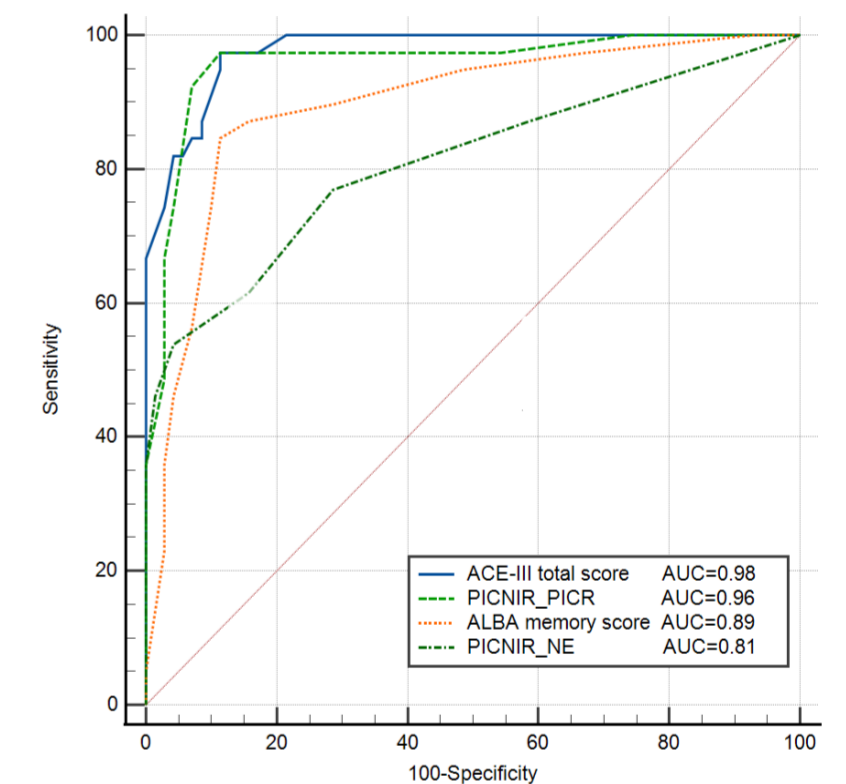
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5 CONCLUSIONS

❖ The innovative and efficient ALBA and PICNIR tests have high discriminant validity for cognitive impairment and high convergent validity with the ACE-III.

❖ Brevity, simple administration and evaluation are major advantages of the ALBA and the PICNIR over much longer ACE-III for busy clinical practice.