



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

Table Participant characteristics, test resultsand their comparisons of socio-demographically matched groups								
3	PARTICIPANTS	Patients with neurocognitive disorders	Normal elderly	Propability P	AUC			
	Number of participants	40	70					
	Age	75 <b>±</b> 6	73 <b>±</b> 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			
	<b>PICNIR-NE</b> (0-10 points)	5 ± 4	1±1	< 0.0000001	0.81			
	<b>PICNIR-PICR</b> (0-15 points)	3 ± 2	9±2	< 0.0000001	0.96			
	ACE-III	73 ± 11	96 ± 4	<	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

0.0000001

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

Ultra-brief AMNESIA LIGHT AND BRIEF ASSESSMENT (ALBA)



• 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







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

door	<sup>2</sup> fork	3 globe	4 button	Flower	
6 Airship	<sup>7</sup> lights	8 stamp	9	10 crane	-
Snowman)	°themometer	13 CAKe	14	15 robot	-
<sup>16</sup> waterfall	<sup>1</sup> öhessboard	18 <b>Fence</b>	steering wheel	parachute	-



Correctly recalled picture names (PICR): 6 - 1 confabulation - 1 repetition = Naming errors (NE): 4 wrongly named + 2 unnamed = 6 errors 4 correctly recalled picture names



Focus on the patient's behavior and verbal comments during testing.

A brief hearing examination before cognitive testing may be useful. If necessary, ask a person to repeat the numbers 941-726-583 after you. Good hearing? yes /no

#### **1A. SENTENCE TEST - REPETITION AND ENCODING**

Administration: Say the sentence smoothly with a distinct separation of words. Then the tested person will repeat it after you. If asked, do not repeat any words; simply ask them to repeat what they can. Record words and score correct words as 1 point in the Receiving in a factor of the test. epetition line of Table 1 (row 2).

INSTRUCTION: "Now I am going to say one short sentence, but only once. Please repeat it loud and try to remember it. I will ask you to recall it in a moment. Now listen carefully and repeat this sentence after me exactly as I say it .... " (short pause) .. "And now you."

Т	a	b	le	1

(0-100 points)

Indian	summer	brings	first	morning	frost	Numb	er of	f correct ds
Indian	summer	brings		spring	frost	4	/6	POINTS
1	1	0	0	D	0			2/6
	Indian Indian 1	Indian summer Indian summer	IndiansummerbringsIndiansummerbrings110	IndiansummerbringsfirstIndiansummerbrings1100	IndiansummerbringsfirstmorningIndiansummerbringsspiting11000	IndiansummerbringsfirstmorningfrostIndiansummerbringsspillingsspillingfrost110000	Indiansummerbringsfirstmorningfrosthttps://www.second.com/seco	Indian summer brings first morning frost worn   Indian summer brings specing frost 4 16   1 1 0 0 0 0

Scoring: The sentence must be recalled using the exact words in the exact order. Score 1 point for each correct word. The maximum score for 6 correct words is 6 points.

#### 2. TEST OF GESTURES (TEGEST)

INSTRUCTION: "Now, I would like you to show me some gestures. I will give you six instructions related to your hands or head – a kind of pantomime. "Show me how you would..."

Table 2		M	is hand t	aising	/			
Gestures:	eat with a spoon	stroke your cheek	make a telephone call	put on your glasses	smell a flower	look through a pair of binoculars	Number of correct gestures	
DEMONSTRATION $(\sqrt{\text{or } \chi})$	1/	2/	×	4/	5	6	5/6	POINTS
"There are a total of six without regard to order	gestures. I	Now perfo	orm and give n	ne a verba	atim desci	ription of all 6	gesture	es
RECALL (0 or 1) verba without time limit gest	u: - O	ncheck" × 3	"Thave lars" × O	×O	"flower, smells	+ 2	other gestures note here:	34/6
The recall is not time-limited. can be recalled in any order.	Additionally, y	you can writ	e down the positi	on number of	of the recall	ed gesture, ever + www	though g	gestures
Scoring: Score 1 point for excorrectly demonstrated OR or points. 1B. SENTENCE TES	ach correctly recorrectly descri	ecalled gest bed or BOT	ture. The correcti TH. The maximun	y recalled ge n number of A	points for 6	ored 1 point if the correctly recalled	e gesture ed gesture F/2 +	is EITHER is is 6 5/3
INSTRUCTION: "Now p	please tell m	e what w	as the senten	ce that I to	old you to	remember a	while ag	go."
Record the results in the	e Recall line	of Table	1 (row 3).			TOTAL ALBA SCC	DRE	5 /12
Abadeco fre	Prof. Ales I e for clinica	Bartos, M I, educati	D, PhD ©, tes onal and resea	t form of t irch use, li	the ALBA censed fo	test, 2022 r commercial	use	

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

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

## **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.

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