

Standardization, Clinical Validation, and Typicality Norms of a New Test Assessing Semantic Verbal Fluency

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BACKGROUND AND OBJECTIVES

Background: A large body of evidence support the diagnostic role of the semantic verbal fluency (SVF) tests in detecting Alzheimer's disease (AD) [1]. An impairment of performance on SVF tasks has been also reported in subjects affected by amnesic MCI (aMCI), with some evidence supporting its role as a predictor of progression to dementia. Most of the studies takes into account the total word count obtained in SVF tasks. Other features of the words could also predict conversion of aMCI to AD, such as frequency, age of acquisition and typicality [2]. A normative studies on words typicality is missing.

Aim: We propose the standardization and clinical validation of a new SVF test based on the production of names of birds and articles of furniture (Birds and Articles of Furniture tests—BAF), providing also data about the typicality of words produced by a healthy sample on a standard verbal fluency test.

SUBJECTS AND METHODS

Subjects: 268 subjects aged 40 years or more were recruited; clinical validation was conducted on subjects affected by aMCI (N=106), mild (N=178) and moderate (N=114) AD.

Neuropsychological assessment: all subjects underwent the semantic fluency test which consists in producing as many items as possible belonging to the categories of birds and furniture in one minute for each category. Healthy subjects also underwent a phonological (F, A and S) verbal fluency test. The number of words produced for each category and the total number of words were registered as scores. In order to obtain norms on the typicality, individual items were registered separately.

Statistics: multiple variables linear model including were obtained to predict individual corrected scores of the sample, thereafter ordered from the worst to the best performance. The cut-off point was identified in a non-parametric way as the tolerance limit that allowed to leave above at least 95% of the population with 95% of confidence, corresponding the 8th worst observation and the inner tolerance limit is the 20th observation. The typicality of lexical entries was assessed by following the methodology by Van Overschelde and colleagues (2004). We determined also the mean rank and the number of times in which each entry was generated.

RESULTS The BAF total score was influenced by both age and education, the single scores obtained on BAF were also influenced by gender. The percentage of subjects with pathological score on BAF increased from aMCI (19%) to mild (45.5%) and moderate (71.1%) AD, and receiver operating characteristic curves analysis showed that the BAF may be highly reliable in distinguishing aMCI and AD patients from healthy subjects (AUC respectively 0.713 and 0.892). We also provide typicality norms for birds and articles of furniture (Tab. 1).

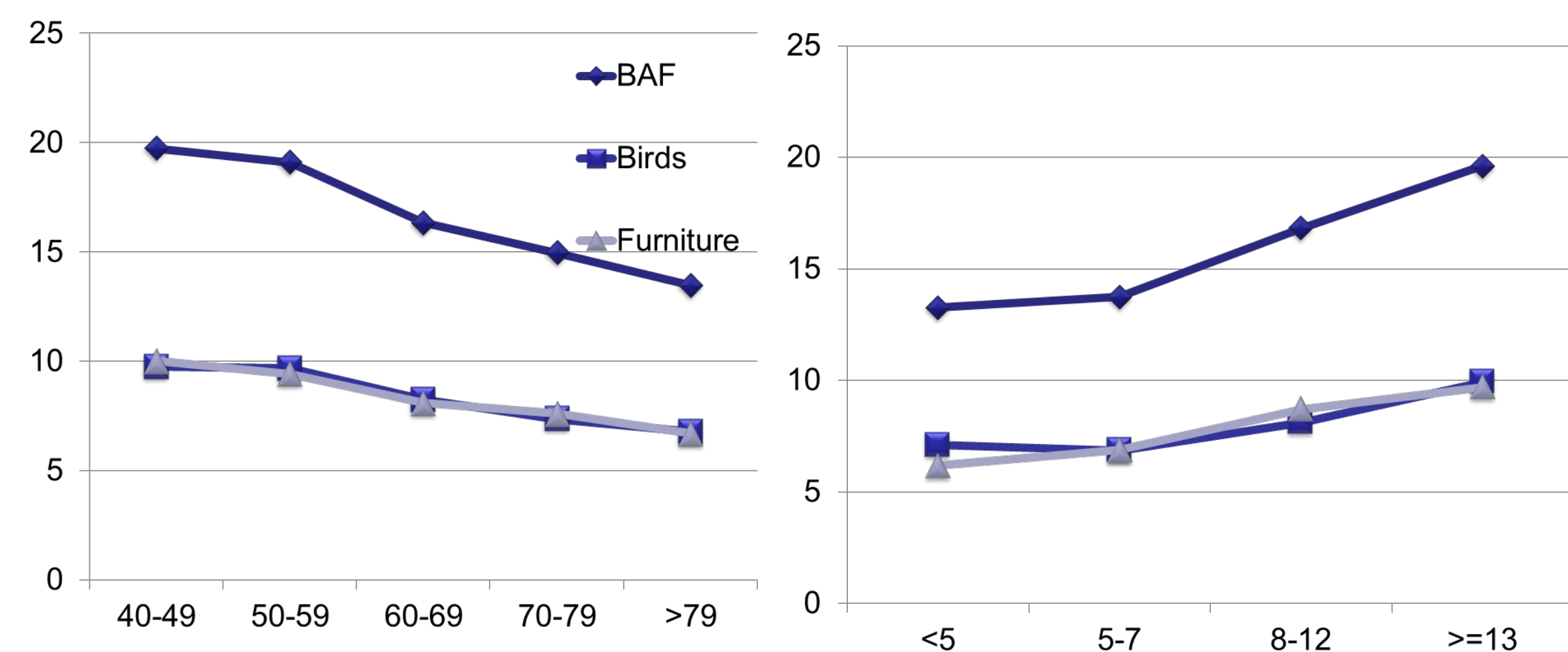
CONCLUSIONS

The BAF test could be a valid and reliable tool in both clinical practice and research on subjects affected by cognitive impairment.

REFERENCES

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Fig 1 and Fig. 2.: mean number of lexical entries produced on BAF, Birds and Articles of furniture according to age and education.



Tab1: Typicality of lexical entries produced as response to the “birds” and “articles of furniture” categories. Words with frequency less than 0.02 omitted.

Lexical entry	Birds			Lexical entry	Articles of furniture		
	Fr	MRank	First		Fr	MRank	First
Barn owl	0.05	6.33	0.00	Armchair	0.60	7.18	0.00
Blackbird	0.22	7.14	0.03	Bed	0.71	4.76	0.11
Buzzard	0.06	10.50	0.00	Bookcase	0.49	7.44	0.02
Canary	0.49	4.09	0.14	Bookshelf	0.14	7.11	0.00
Condor	0.18	6.17	0.00	Cart	0.06	9.25	0.00
Crane	0.05	11.00	0.00	Chair	0.85	3.44	0.17
Crow	0.22	7.07	0.00	Chest	0.12	7.63	0.00
Cuckoo	0.06	8.50	0.00	Closet	0.83	3.35	0.28
Dove	0.20	5.31	0.02	Console	0.15	7.80	0.00
Duck	0.09	9.83	0.00	Drawers	0.26	6.00	0.00
Eagle	0.66	4.56	0.12	Dresser	0.65	5.40	0.03
Finch	0.17	5.36	0.00	Dress table	0.08	9.40	0.00
Flamingo	0.09	12.00	0.00	Escritoire	0.06	6.00	0.00
Goldfinch	0.32	4.10	0.03	glass dipl g	0.20	6.15	0.00
Goose	0.06	6.00	0.00	Hanger	0.06	10.50	0.00
Gosling	0.05	7.67	0.00	Nightstand	0.72	5.79	0.03
Hawk	0.42	5.89	0.03	“settimino”	0.09	6.50	0.00
Hen	0.12	7.63	0.02	Shelf	0.06	4.75	0.00
Hoopoe	0.17	6.09	0.02	Showcase	0.05	6.00	0.00
Hummingbird	0.06	4.50	0.00	Sideboard	0.32	5.05	0.00
Kite	0.05	4.00	0.00	Sofa	0.69	6.51	0.02
Lark	0.20	5.31	0.05	Table	0.85	3.11	0.25
Little owl	0.23	6.33	0.02	Wallcupboar	0.28	7.50	0.00
Magpie	0.06	8.50	0.00	Writing desk	0.49	5.69	0.06

Fig 3.: ROC curves of BAF applied in distinguishing healthy subjects from AD and aMCI patients

