Psychometric Properties of the Biber Figure Learning Test: The Vanderbilt Memory & Aging Project

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Background & Objective

- The Biber Figure Learning Test (BFLT) is a non-verbal supraspan learning test analogous to the California Verbal Learning Test-2nd Edition (CVLT-II).
- We examined the psychometric properties of the BFLT and its associations with other neuropsychological measures.

Methods

- Participant data was drawn from the Vanderbilt Memory & Aging Project, a case-control longitudinal study investigating vascular health and brain aging.
- At screening, participants were identified as having normal cognition following a comprehensive assessment.
- Separate from diagnostic determination, participants completed a comprehensive neuropsychological protocol at enrollment (see **Table 1**).

Table 1. Participant Characteristics

	n=166
Age, years	72±7
Sex, % female	40
Education, years	16.5±2.5
Race, % White	89
Geriatric Depression Scale	2.4±2.8
WRAT-III Reading subtest	51.5±4.2
Montreal Cognitive Assessment	27.1±2.1

***Note*:** WRAT=Wide Range Assessment Test

Table 2. BFLT Factor Analysis Results

	Factor I Learning & Retrieval	Factor II Errors	Factor III Recognition
Trial 1 Total Recall	**0.81**	-0.14	0.05
Immediate Recall (Trials 1 to 5)	**0.95**	-0.24	0.17
Immediate Recall Extraneous Responses	0.22	0.02	0.03
Immediate Recall Perseverations	0.03	0.09	-0.09
Distractor Trial Total Recall	**0.54**	-0.09	-0.02
Short Delay Total Recall	**0.76**	-0.23	0.29
Long Delay Total Recall	**0.76**	-0.30	0.30
Recognition Total Hits	0.31	0.09	**0.91**
Recognition Total False Alarms	-0.37	**0.88**	-0.27
Recognition Response Bias Total	-0.12	**0.89**	0.44

***Note*:** bold font text=absolute value>0.4; BFLT=Biber Figure Learning Test

Table 3. BFLT Correlations with Other Neuropsychological Measures

	BFLT Total Learning		BFLT Distractor Set		BFLT Long Delay		BFLT Discrimination	
	r	p-value	r	p-value	r	p-value	r	p-value
Montreal Cognitive Assessment	0.48	**<0.001**	0.29	**<0.001**	0.38	**<0.001**	0.40	**<0.001**
CVLT-II Total Learning	0.54	**<0.001**	0.37	**<0.001**	0.48	**<0.001**	0.50	**<0.001**
CVLT-II Distractor List	0.24	**0.002**	0.16	**0.04**	0.28	**<0.001**	0.20	**0.01**
CVLT-II Short Delay Free Recall	0.49	**<0.001**	0.29	**<0.001**	0.49	**<0.001**	0.49	**<0.001**
CVLT-II Long Delay Free Recall	0.51	**<0.001**	0.30	**<0.001**	0.53	**<0.001**	0.50	**<0.001**
CVLT-II Recognition Discrimination	0.36	**<0.001**	0.34	**<0.001**	0.37	**<0.001**	0.35	**<0.001**
BVRT Total Score	0.39	**<0.001**	0.27	**<0.001**	0.43	**<0.001**	0.44	**<0.001**
WAIS-IV Block Design	0.37	**<0.001**	0.15	0.06	0.33	**<0.001**	0.35	**<0.001**
Hooper Visual Organization Test	0.39	**<0.001**	0.25	**0.001**	0.41	**<0.001**	0.32	**<0.001**

***Note*:** BFLT=Biber Figure Learning Test; CVLT-II=California Verbal Learning Test-2nd Edition; BVRT=Benton Visual Retention Test; WAIS-IV=Weschler Adult Intelligence Scale-4th Edition

Analyses & Results

- An exploratory factor analysis with varimax rotation yielded a 3-component structure (see **Table 2**). Root mean square error of approximation index=0.134 and Tucker Lewis Index of factoring reliability=0.899.
- Partial correlations (adjusting for global cognition) between the BFLT and other cognitive tests assessed convergent validity (see **Table 3**).

Conclusions

- The factor structure for the BFLT was similar to other learning and retrieval assessments (Campos-Magdaleno et al., 2014; Donders, 2008).
- The BFLT demonstrated convergent validity with other neuropsychological measures involving similar cognitive demands.
- Future research is needed to understand the biomarker associations and predictive ability of the BFLT.

Bibliography

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Funding Sources: K12-HD043483 (KAG), K24-AG046373 (ALJ), IIRG-08-88733 (ALJ), R01-AG034962 (ALJ), UL1-TR000445 (Vanderbilt Institute for Clinical & Translational Research), Vanderbilt Memory & Alzheimer's Center