

Lexical-semantic retrieval in the early stage of Alzheimer's disease: A comparison of three interventions based on different theoretical approaches

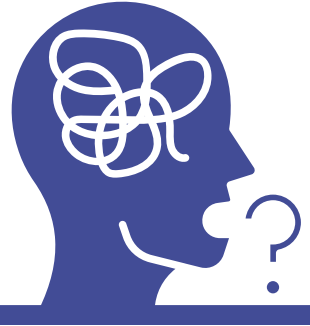
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1. INTRODUCTION

Lexical-semantic deficits, such as **anomia**, appear early in **Alzheimer's disease (AD)** (Laisney et al., 2010; Simoes Loureiro et al., 2021) and interfere with **social interactions** and **quality of life** (Klimova et al., 2015).



2. OBJECTIVES

This study aims to investigate three treatment methods built on different theoretical approaches:

Semantic network model

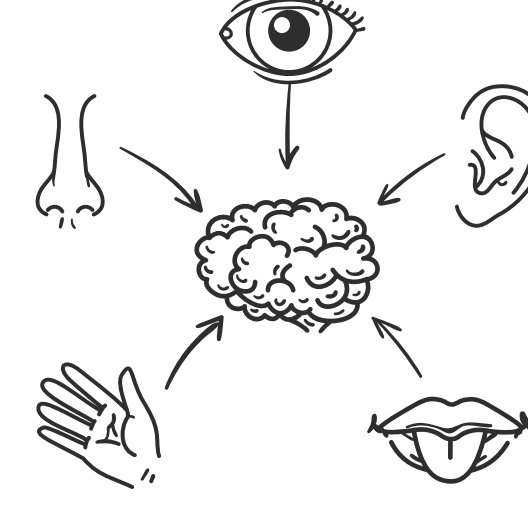
(Collins & Loftus, 1975)



Elaborated Semantic Feature Analysis (ESFA)

Theory of embodied cognition

(Barsalou, 1999, 2008)



Treatment by Embodied Reactivation of Memory (TERM)

Hub-and-spoke model

(Patterson et al., 2007)



Holistic Intervention of Semantic Memory (HOLISM)

3. METHODS

Population - Inclusion and exclusion criteria:

- | | |
|---|---|
| <ul style="list-style-type: none"> ✓ Speaking and understanding French ✓ Diagnostic of AD ✓ MMSE ≥ 20 ✓ Lexical-semantic deficits | <ul style="list-style-type: none"> ✗ Uncorrected visual/auditory disorders ✗ Neurological and psychiatric history ✗ Other neurodegenerative diseases ✗ Pervasive anxiety-depressive disorders |
|---|---|

39 patients at the early stage of AD (MMSE ≥ 20) (comparable groups):

	ESFA (N=10)	TERM (N=9)	HOLISM (N=12)	CONTROL (N=8)
Age	82,7 \pm 4,52	81,78 \pm 7,26	83,58 \pm 6,63	87 \pm 4,81
Gender	7 ♀ 3 ♂	8 ♀ 1 ♂	9 ♀ 3 ♂	5 ♀ 3 ♂
Socio-cultural level*	min. 2 / max. 4	min. 1 / max. 4	min. 1 / max. 4	min. 2 / max. 4
MMSE	22,3 \pm 2,36	22,78 \pm 2,17	21,75 \pm 1,6	22,75 \pm 1,49
PNT_100	63,6 \pm 15,79	65,41 \pm 5,57	62,7 \pm 8,55	60,67 \pm 9,69
CCT	47,8 \pm 7,74	44,85 \pm 4,67	45,33 \pm 5,96	45,17 \pm 8,86

*1=No diploma ; 2=Primary education ; 3=Lower secondary school ; 4=High school

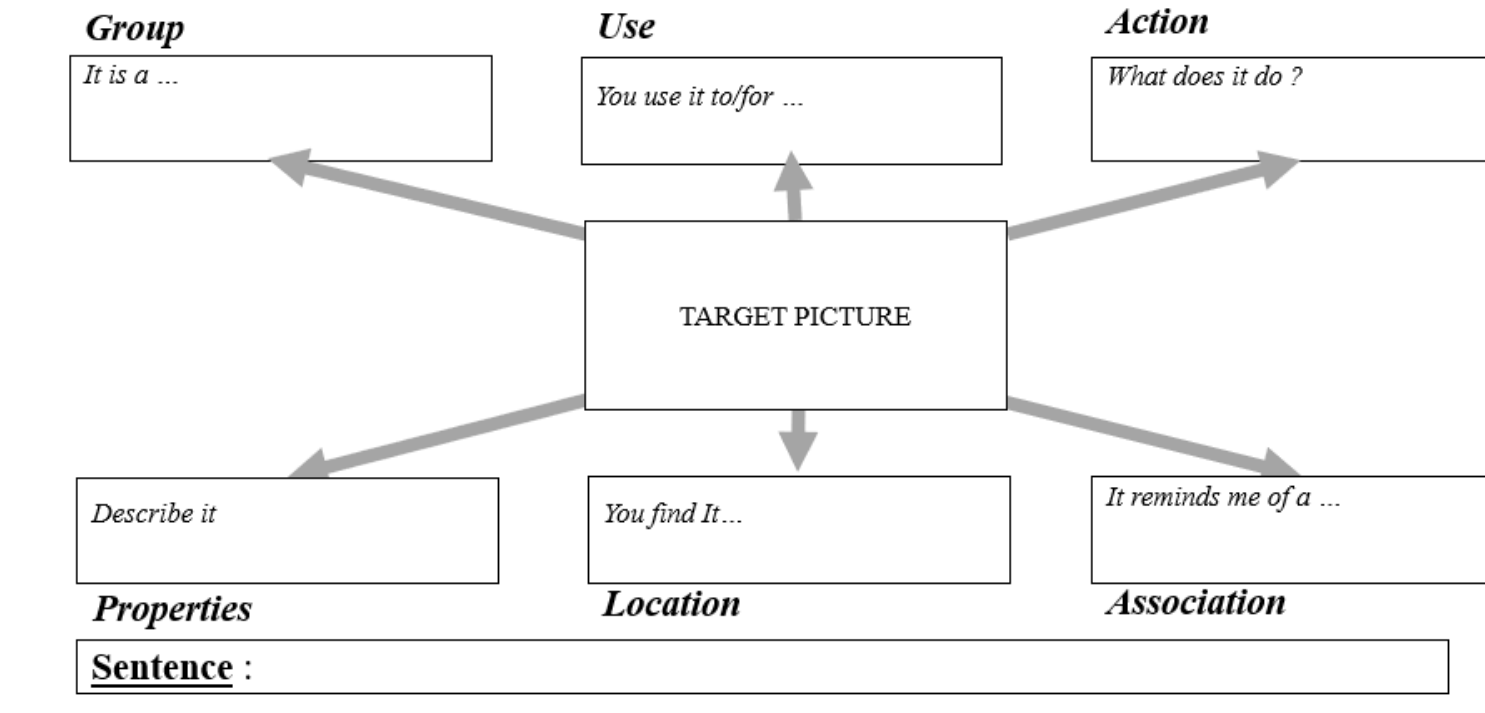
active group with discussion sessions during T phase

Assessment material:

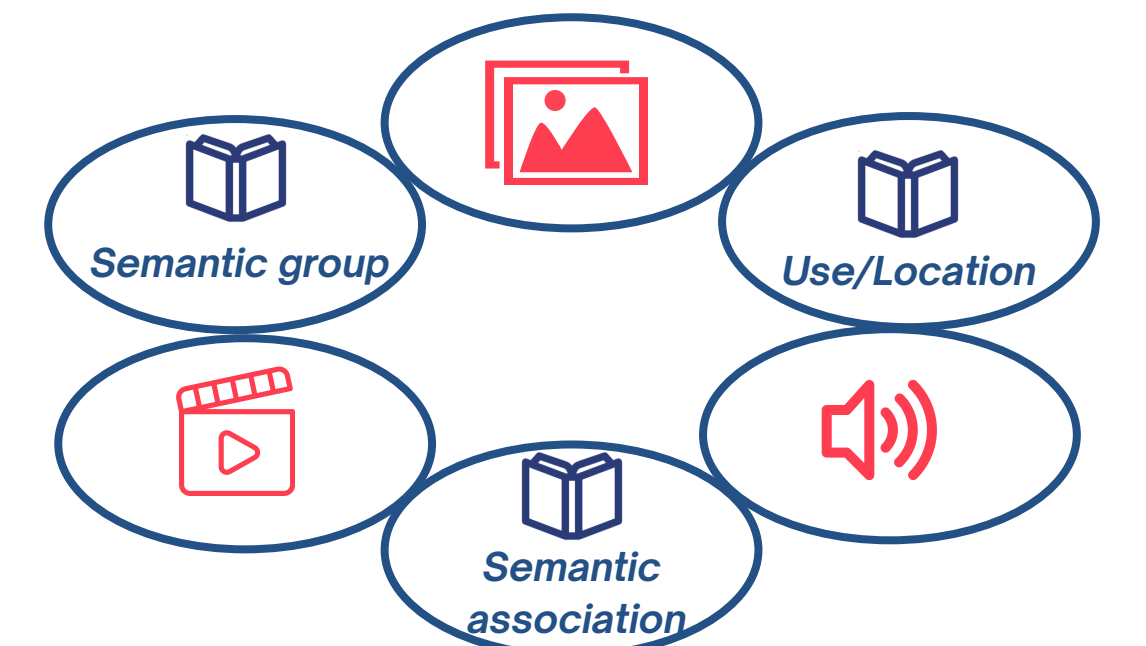
- General cognitive functioning:** Mini Mental State Examination (MMSE)
- Depression and anxiety:** Geriatric depression scale (GDS) ; COVI
- Quality of life:** Quality of life in Alzheimer's disease (QOL-AD)
- Executive functions:** Frontal Assessment Battery (FAB)
- Episodic memory:** 5 words of Dubois (5WD)
- Lexical-semantic abilities:** picture naming task of BECS-GRECO ; experimental picture naming task (PNT_100 items) ; Camel and Cactus test (CCT) ; mini-QCS ; verbal fluency task (VF)
- Speech and functional communication:** narrative discourse task of Grémots ; CETI

Treatment material:

ESFA:



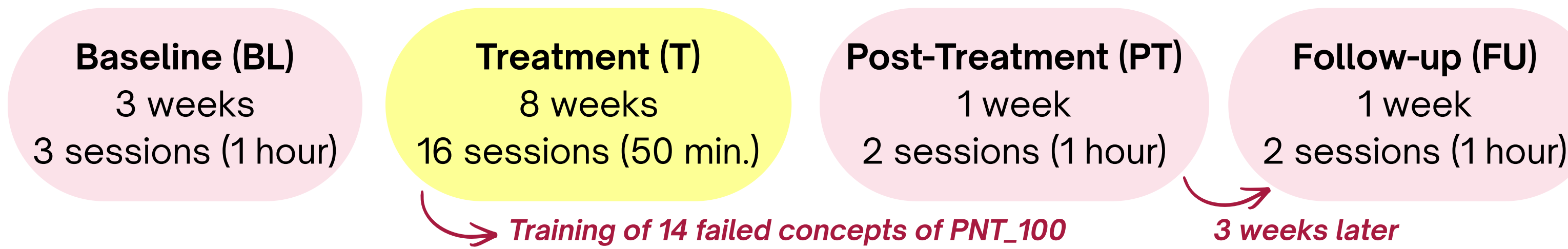
HOLISM: Integration of the ESFA and the TERM approaches



TERM: ± 1400 stimuli



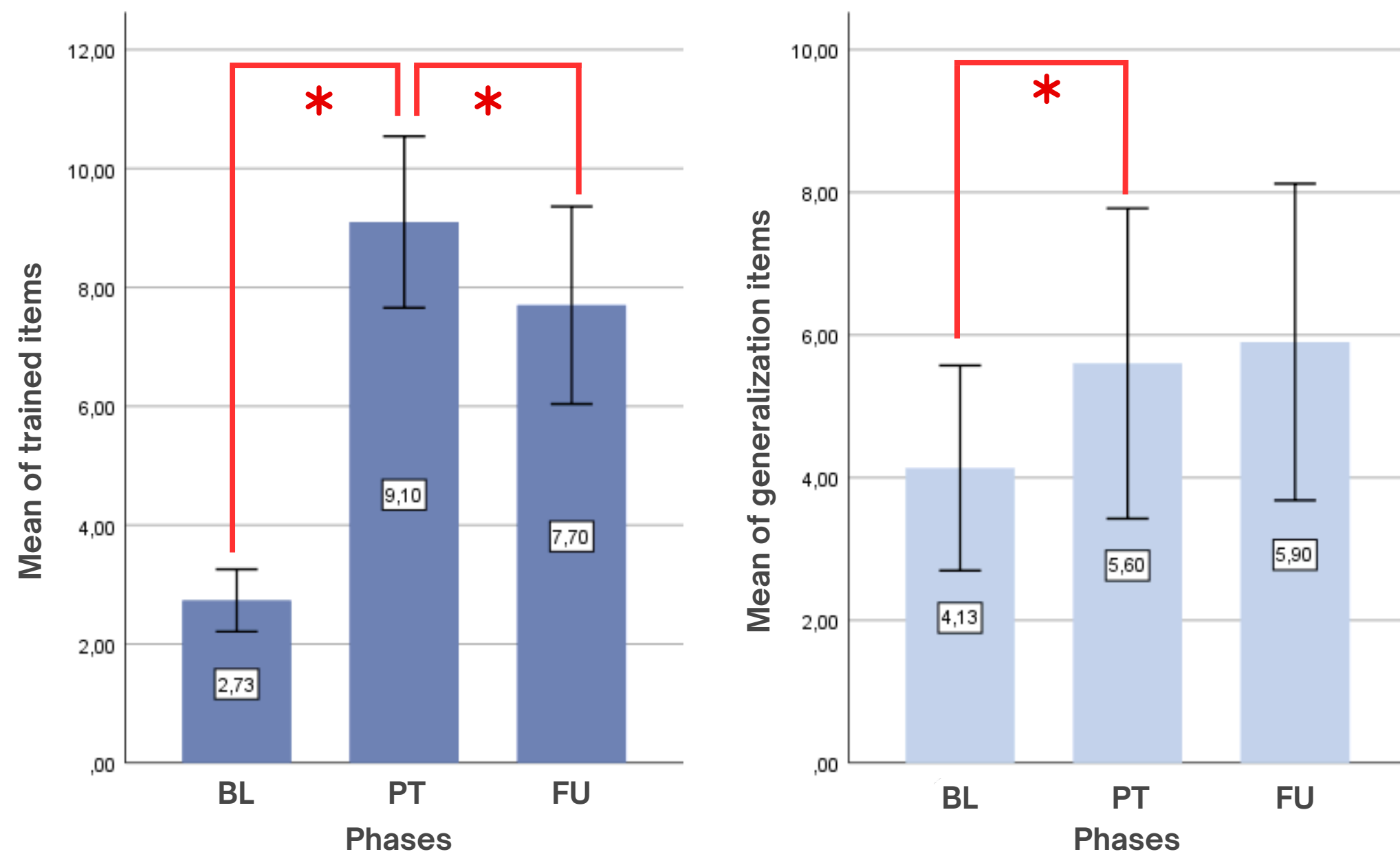
Experimental design:



4. RESULTS

ESFA group:

- PNT_100: $\chi^2(2) = 19,538$; $p < ,001$
- Trained items: $\chi^2(2) = 17,684$; $p < ,001$
- Generalization items: $\chi^2(2) = 6,222$; $p = ,045$

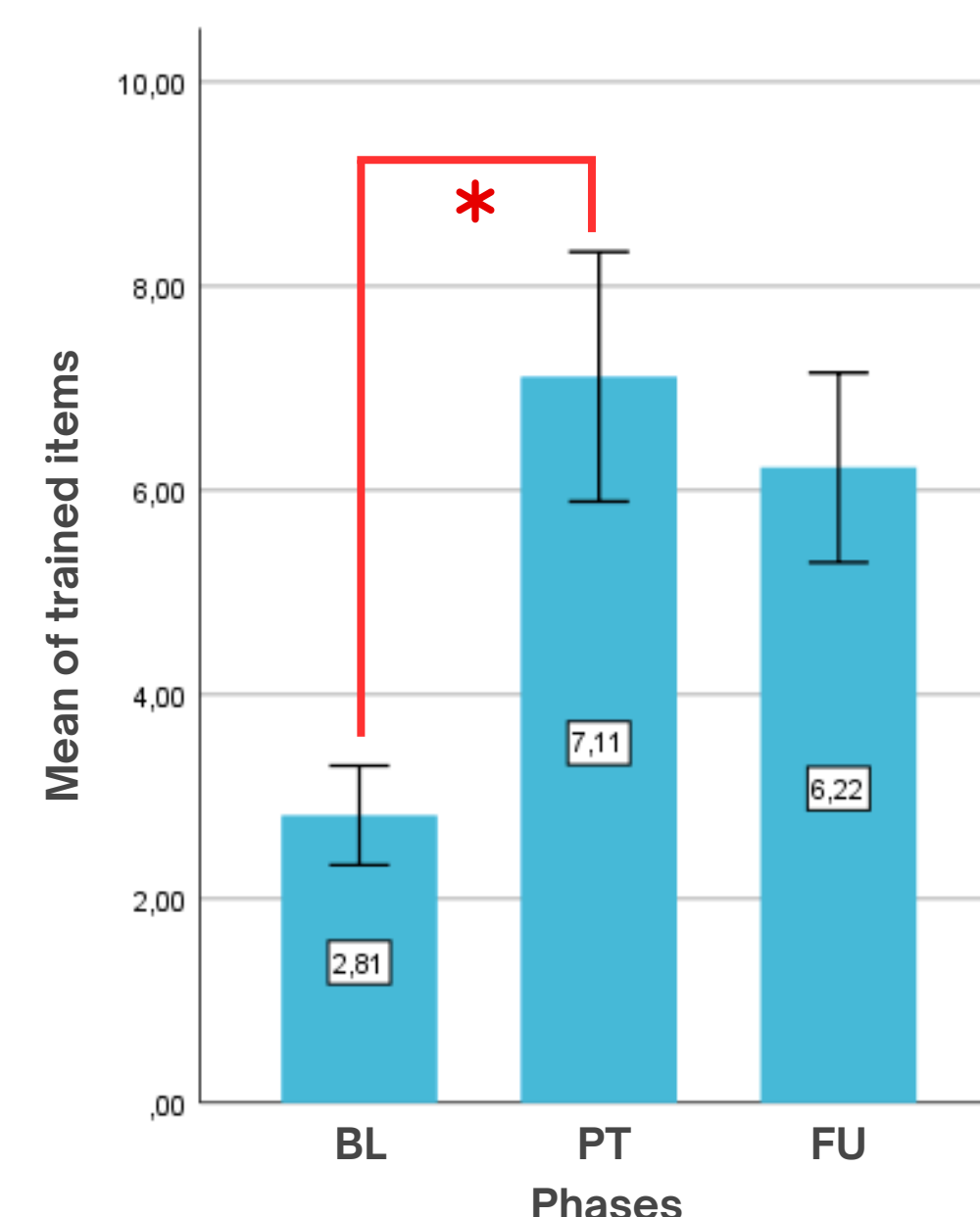


Other tasks:

- VF_Phonological: $\chi^2(2) = 7$; $p = ,013$
- FAB: $W = -2,460$; $p = ,014$

TERM group:

- PNT_100: $\chi^2(2) = 7,588$; $p = ,023$
- Trained items: $\chi^2(2) = 14,824$; $p = ,001$
- Generalization items: $p > ,05$

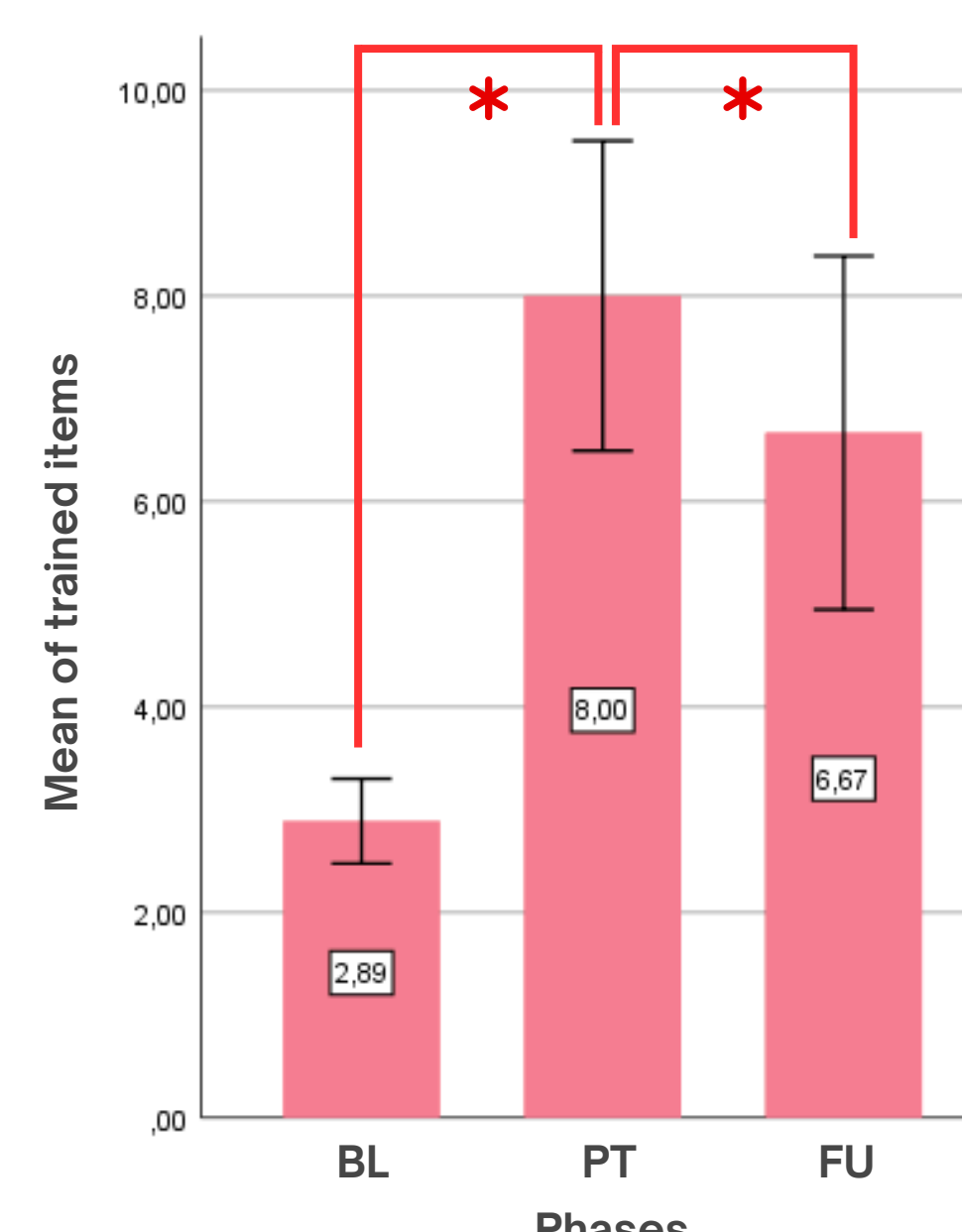


Other tasks:

- no significant change ($p > ,05$)

HOLISM group:

- PNT_100: $\chi^2(2) = 14,609$; $p = ,001$
- Trained items: $\chi^2(2) = 19,957$; $p < ,001$
- Generalization items: $p > ,05$



Other tasks:

- CCT: $\chi^2(2) = 6,933$; $p = ,031$

→ Semantic matching

CONTROL group:

- PNT_100: $p > ,05$
- CCT: $W = -2,383$; $p = ,017$
- VF_Semantic: $W = -2,232$; $p = ,026$
- 5WD: $W = -2,136$; $p = ,033$

5. CONCLUSION

The aim of this study was to investigate three treatment methods of semantic memory in the early stage of AD. This disease is affected very early on by lexical-semantic difficulties, such as anomia, which impact the quality of the patient's interactions with those around them. The methods tested produced different effects: an overall, generalized effect with the ESFA method, an item-specific effect and maintenance of this effect with the TERM method, and a semantic-centered effect with the HOLISM method. Furthermore, free discussion sessions with patients in the control group highlighted the value of interventions that stimulate free language expression using personalized materials. In conclusion, the results demonstrate the effectiveness of semantic and multisensory stimulation in the treatment of anomia. Future research should continue, particularly in partnership with clinicians.