Standard and preliminary data of lexical-semantic impairment screening in Alzheimer's disease and primary progressive aphasia: presentation of the relevance of a multimodal semantic knowledge assessment

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INTRODUCTION

Lexical-semantic disorders are one of the major manifestations in semantic variant primary progressive aphasia (svPPA) and Alzheimer's disease (AD). In clinical practice, these disorders are mainly assessed by verbal tests, while, according to literature, the deficit must be observed in several modalities. The aim of this study was to create a French multimodal semantic assessment battery called EMCS (Évaluation Multimodale des Connaissances Sémantiques), which investigates semantic memory efficiency through several tasks of different input modality.

METHOD

Population

129 participants

117 controls | 4 svPPA | 8 AD

Exclusion criteria for all: food allergies, swallowing and sensory disorders

Controls
Age = 69.1 ± 7.8
60 ♂ ; 57 ♀
MMSE = 29.12 ± 0.8

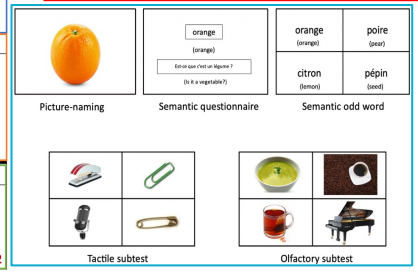
Patients
Age = 71.4+/-6.2
6♂ ; 6♀
MMSE = 23.1+/-2.3

Material

35-40'

Pictorial Visual Modality			
Picture naming		/8	TOTAL /24
Designation		/8	
Celebrity Knowledge	/24 (report on 8)	/8	
Written Visual Modality			
Semantic Matching		/8	TOTAL /24
Semantic Questionnaire	/48 (report on 8)	/8	
Semantic Intrusion	/24 (report on 8)	/8	
Sensorial Modality			
Auditory test	/6		TOTAL /24
Tactile test	/6		
Olfactory test	/6		
Gustatory test	/6		TOTAL /72

Analysis of the nature of the lexical-semantic impairment (central versus access) around 8 concepts processed across the 2 first modalities



	Pictorial Visual Modality		Written Visual Modality		
	Picture naming	Designation	Semantic Matching	Semantic Questionnaire	Semantic Intrusion
Lavender	X	X	X	X	X
Tractor			Central semantic disorder		
Necklace					
Orange					
Shirt			exemple		
Mouse	X	✓	✓	✓	X
Smell			Access disorder		
Anger					

RESULTS

Preliminary norms (n = 117)

- ✓ Education level effect for all tasks ($p < 0.05$)
- ✓ Age effect
  unless for semantic matching ($p = 0.9$), auditory ($p = 0.7$) and olfactive ($p = 0.9$) tasks
- X No gender effect ($p = 0.28$)

n = 117 Age Education level	n = 12 50 - 64 < 8 years	n = 15 50 - 64 9-11 years	n = 35 50 - 64 > 11 years	n = 17 65 et + < 8 years	n = 21 65 et + 9-11 years	n = 17 65 et + > 11 years
EMCS Score total /72						
Percentile 5	54,83	54,50	59,06	54,08	54,01	56,50
Percentile 10	54,98	55,00	60,16	54,55	55,63	59,57
Percentile 95	59,92	66,46	70,01	62,00	64,16	66,01
PICTORIAL VISUAL MODALITY /24						
Percentile 5	18,00	19,00	18,83	17,33	17,03	19,00
Percentile 10	18,00	19,40	19,80	18,00	17,70	20,04
Percentile 95	21,18	23,67	24,00	22,87	23,78	24,00
WRITTEN VISUAL MODALITY /24						
Percentile 5	19,33	18,67	21,01	20,67	21,52	21,50
Percentile 10	19,63	19,67	21,33	20,67	21,67	21,63
Percentile 95	21,67	21,67	24,00	23,55	23,50	23,92
SENSORIAL MODALITY /24						
Percentile 5	13,50	15,00	15,75	13,50	13,65	13,50
Percentile 10	13,95	15,00	16,95	14,10	15,15	15,90
Percentile 95	20,55	20,10	24,00	18,50	20,25	20,23

Group comparisons

Quantitative analyses

For every patient, discriminatory results compared to the reference control group for:
* picture-naming (U=2.5; p=.001)
* semantic knowledge about celebrities (U = 4.5; p=.001)
* semantic questionnaire (U=4.5; p<.001)
* semantic odd word (U=6.5; p=.001)

Qualitative analyses

svPPA patients:
* more semantic paraphasias than AD patients
* more constant errors

⇒ central impairment of semantic knowledge for svPPA participants

DISCUSSION and CONCLUSION

This tool can contribute to identify, with quantitative and qualitative analyses, the semantic disorder (unimodal/multimodal, access/central) for patients suffering from svPPA and AD. Evaluating semantic memory across all modalities may help for clinical diagnosis and to determine, at early stages, a semantic impairment to better define the therapeutic project.

Référence

Basaglia-Pappas, S., Bourgey, R., Boulangé, A., Amiot, P., Champeaux, E., Rendón de la Cruz, A., Lefebvre, L., Simoes Loureiro, I. (2023). Multimodal semantic knowledge assessment – Standard and preliminary data in semantic variant primary progressive aphasia and Alzheimer's disease in comparison with vascular aphasia. *L'Année Psychologique* , special issue.

Basaglia-Pappas, S., Bourgey, R., Boulangé, A., Simoes Loureiro, I., Getenet, J-C., Lefebvre, L. (2021). Une évaluation multimodale courte des connaissances sémantiques dans l'aphasie primaire progressive variant sémantique et la maladie d'Alzheimer. *Revue Neurologique* 177 (5) : S132-S157. https://doi.org/10.1016/j.neurol.2021.02.073

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