Pareidolia as diagnostic marker of prodromal Lewy Body Dementia

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Introduction

Pareidolia refers to complex visual illusions in which ambiguous and visually-noisy stimuli are perceived as meaningful forms. Its presence and severity are often prodromal of visual hallucinations and may be helpful in the diagnosis of Dementia with Lewy Bodies (DLB). The present work aims to assess the potential of pareidolia as a diagnostic marker of prodromal DLB (MCI-LB), in comparison to overt DLB and mild cognitive impairment due to Alzheimer's disease (MCI-AD), and examined its association with clinical/cognitive characteristics.

Materials and methods

77 subjects were studied

18 patients with DLB, 22 with MCI-LB, 17 with MCI-AD and 20 healthy controls (HC).

They performed the Montreal Cognitive Assessment (MoCA) and two Pareidolia Tests: **the *Scenary Pareidolia Test* and the *Noise Pareidolia Test*. Figure 1**

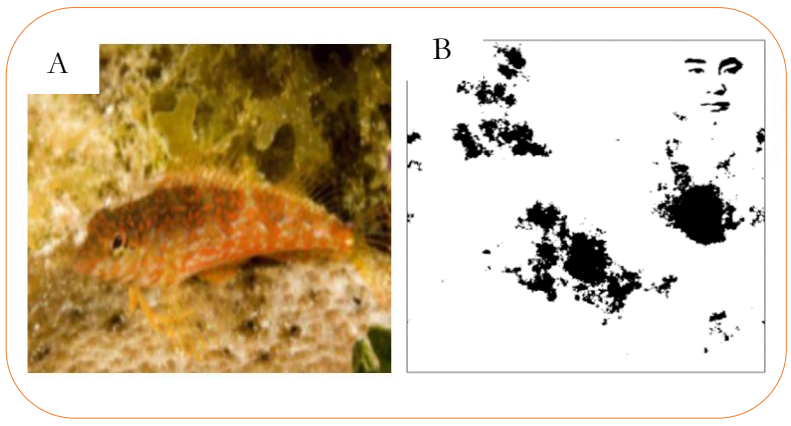

Figure 1. Experimental tasks
(A) ***Scenary Test*:** participants described blurred natural scenes; objects incorrectly perceived were scored as illusory responses (pareidolia).
(B) ***Noise Test*:** participants identified faces in noisy images; false detections were scored as illusory responses (pareidolia).
The *total pareidolia score* was the sum of illusory responses in both tests.

Results

Both DLB and MCI-LB patients showed significantly more illusory responses than HC ($p<0.001$; $p=0.001$, respectively).

DLB patients performed worse than MCI-AD patients in both pareidolia tests (*Scenary Test*: $p=0.007$; *Noise Test*: $p<0.001$), whereas MCI-LB patients differed from MCI-AD patients only in the *Noise Test* ($p=0.02$).

Pareidolic responses in the "*Scenary and Noise Tests*" were more frequent in DLB/MCI-LB patients reporting minor hallucinatory phenomena (n=8), such as the feeling of presence or passage ($p=0.04$), but were not associated with visual hallucinations.

Finally, only in the DLB group, illusory responses were negatively correlated with global cognition ($r=-0.53$, $p=0.012$) and visuo-spatial abilities ($r=-0.49$, $p=0.03$).

Table 1. Demographic and cognitive characteristics of study participants

	DLB (n = 18)	MCI-LB (n = 22)	MCI-AD (n = 17)	HC (n = 20)	p-value
Age, mean ± SD years	77.5 ± 7.12	75.32 ± 6.65	74.76 ± 8.6	73.05 ± 9.29	0.39
Sex, females/males	8 females 10 males	9 females 13 males	13 females 4 males	9 females 11 males	0.12
Education, mean ± SD years	8.44 ± 5.2	10.14 ± 3.69	10.71 ± 3.42	8.65 ± 4.93	0.055
MoCA (total score), mean ± SD	15.0 ± 5.25	21.68 ± 3.56	18.88 ± 3.82	23.55 ± 3.33	<0.001
MoCA visuo-spatial/executive items (score), mean ± SD	1.53 ± 1.19	2.62 ± 1.4	2.18 ± 1.33	3.3 ± 1.13	0.002

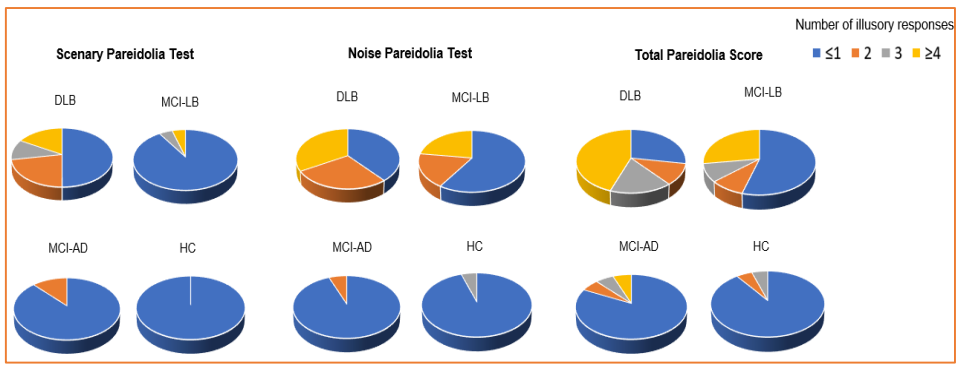

Figure 2. Number of illusory responses in the *Scenary* and *Noise Pareidolia Tests*, and *total pareidolia score* in the four groups.

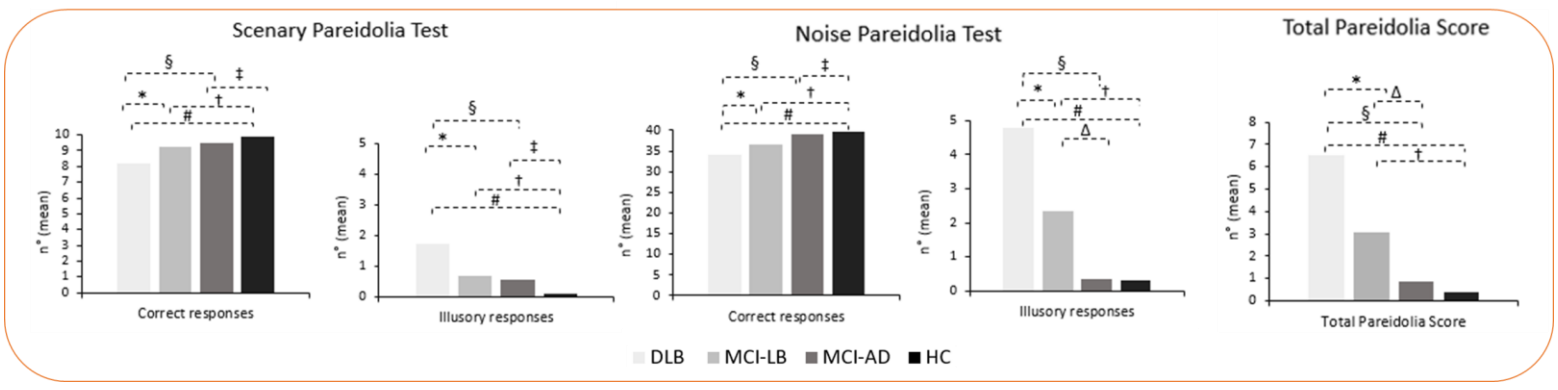

Figure 3. Mean correct and illusory responses across groups in the *Scenary* and *Noise Pareidolia Tests*. *Total pareidolia scores* are also shown. Significant group differences are indicated as follows: # DLB vs HC; * DLB vs MCI-LB; § DLB vs MCI-AD; † MCI-LB vs HC; Δ MCI-LB vs MCI-AD; ‡ MCI-AD vs HC.

Discussion and conclusion

DLB and MCI-LB patients exhibited more pareidolic illusions than MCI-AD patients and HC, especially with ambiguous visually-noisy stimuli, suggesting that **pareidolia can be a potential cognitive marker for the diagnosis of prodromal DLB**. Pareidolia scores were associated with minor hallucinatory phenomena, but not with visual hallucinations. Furthermore, only in DLB patients pareidolia correlated with global cognitive decline and visuo-spatial deficits, whereas in MCI-LB additional mechanisms, such as abnormal interpretations or delusional beliefs, may be involved. Ongoing study will assess the usefulness of pareidolia as a prognostic marker for the development of visual hallucinations.

References

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