

PATTERN SEPARATION PROCESSES IN THE HUMAN MEDIAL TEMPORAL LOBE

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Background:

Pattern Separation is the process of making two similar representations in memory more dissimilar in order to reduce retrieval errors.

Computational models posit that the hippocampus is responsible for forming rapid, orthogonalized (pattern separated) representations.

Question:

Does damage to the hippocampus selectively impair pattern separation processes?

Patients:

2 patients with damage limited to the hippocampus:

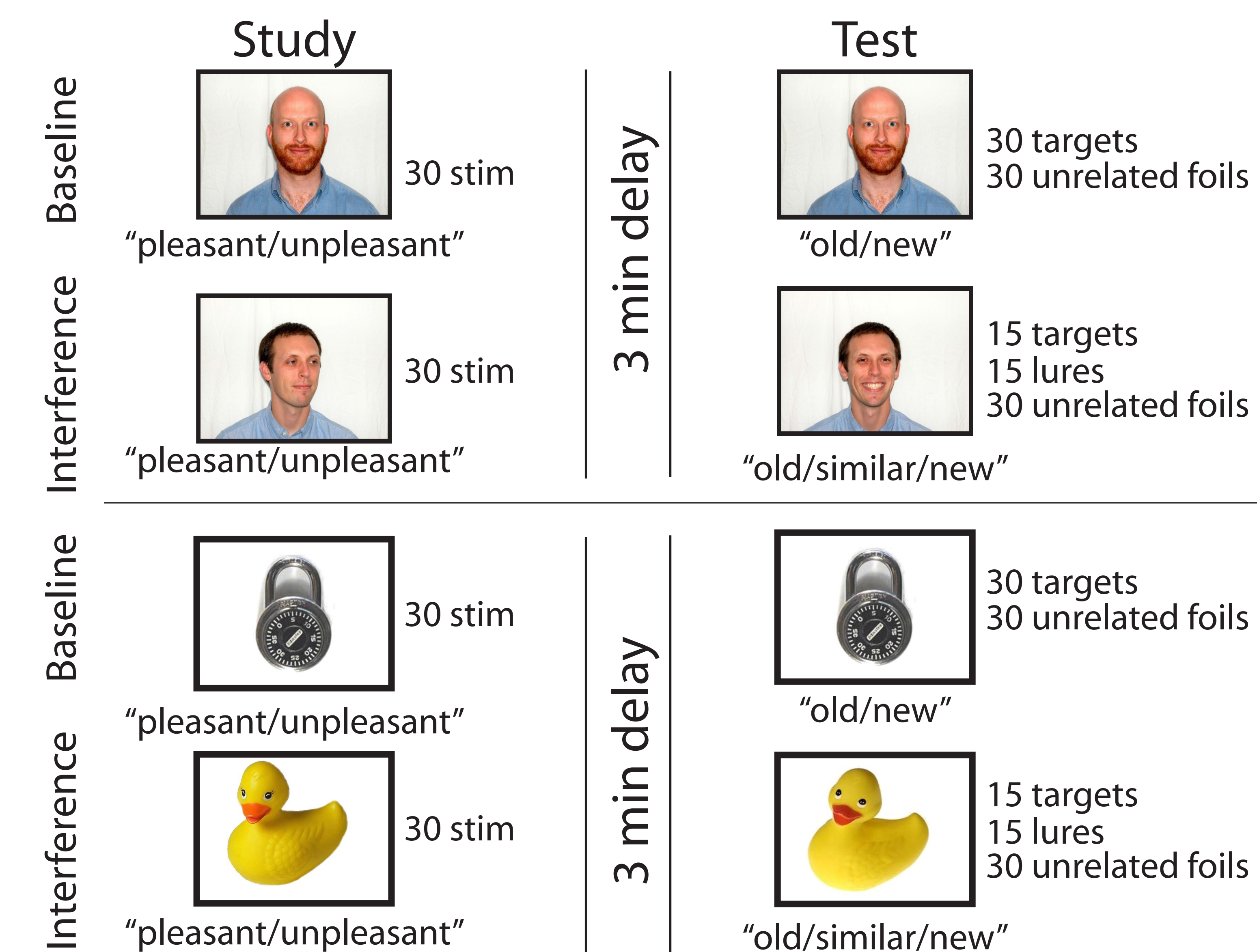
- CA - traumatic brain injury
- RS - drug overdose.

1 patient with more wide-spread MTL damage:

- HS - developmental amnesia.

	age	edu.	gen.	WAIS IQ	WMS Immed.	WMS General.	WMS WM	Hx L	HxR
CA	35	18	F	116*	78*	66*	85	--	--
RS	50	12	M	109	82*	<50*	87*	24%	35%
HS	30	13	M	89	78*	60*	75*	--	--
M	38.3	14.3							

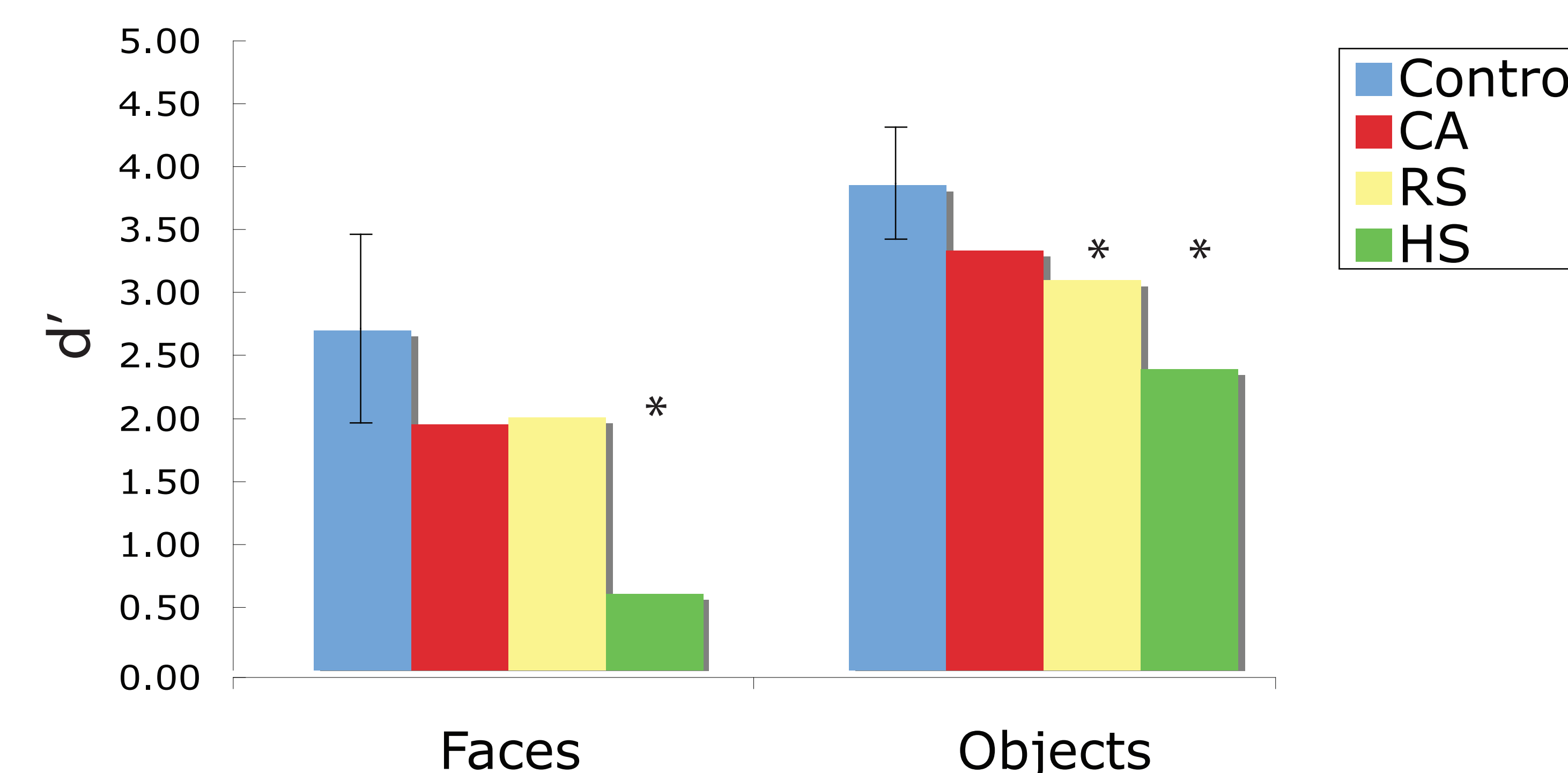
Behavioral Method:



All patients contributed 1 baseline and 2 interference study/test blocks (order counterbalanced across subjects) in the same testing session. Example order: Faces: baseline, interference 1, interference 2, Objects: baseline, interference 1, interference 2

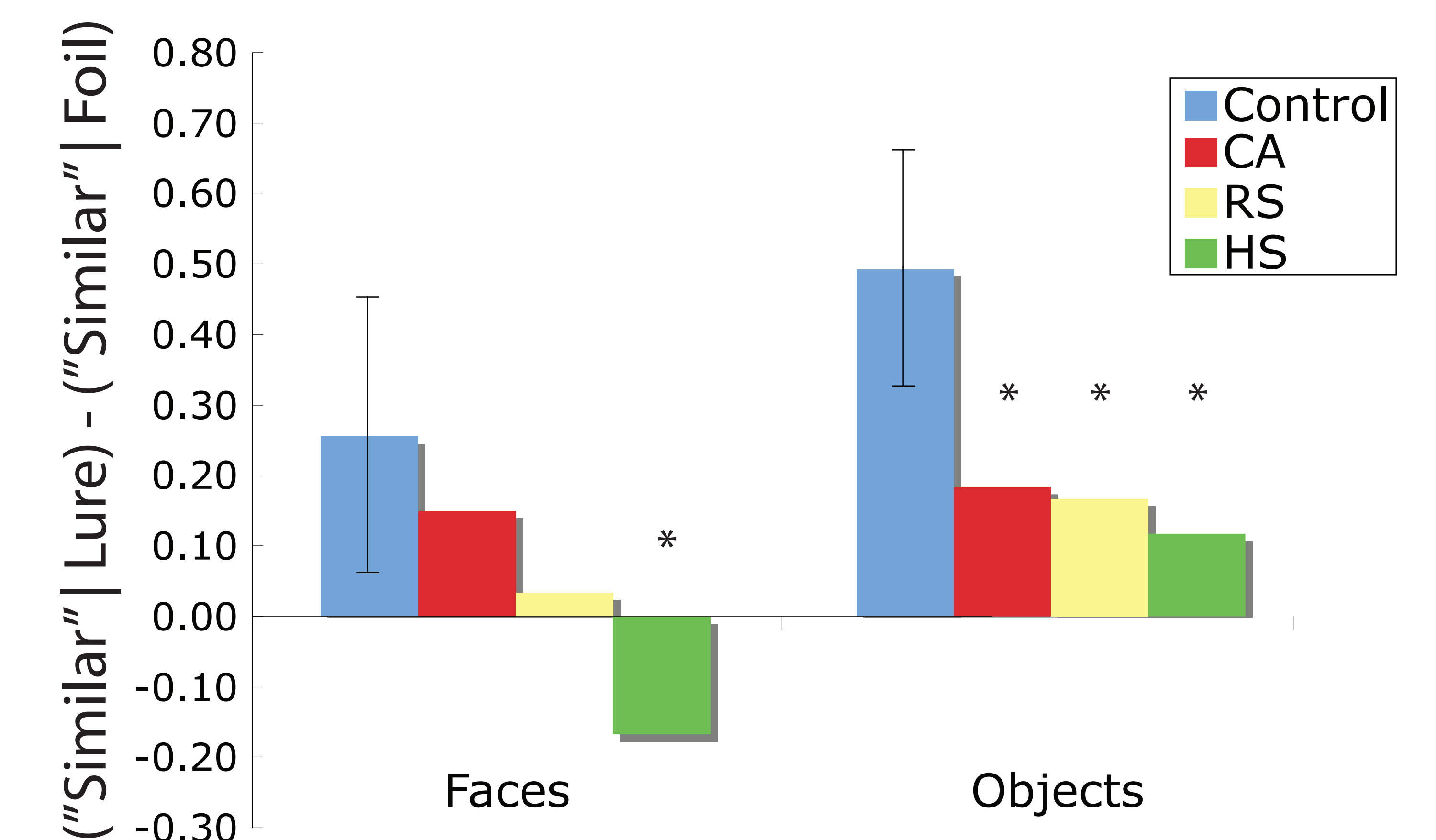
Prediction: patients will be more impaired in the interference condition than at baseline.

Results: Baseline Recognition



Results: High Interference Condition

Similarity score calculated by correcting lure correct rejections by the baseline "similar" response rate [p("similar"|lure) - p("similar"|foil)].



Discussion:

- Patients with hippocampal damage are impaired under conditions of high overlap, possibly due to compromised pattern separation mechanisms.
- Future work will focus on testing in more patients with limited hippocampal damage.

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