Preference consistency relies on hippocampal function: Evidence from mediotemporal lobe epilepsy

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Abstract

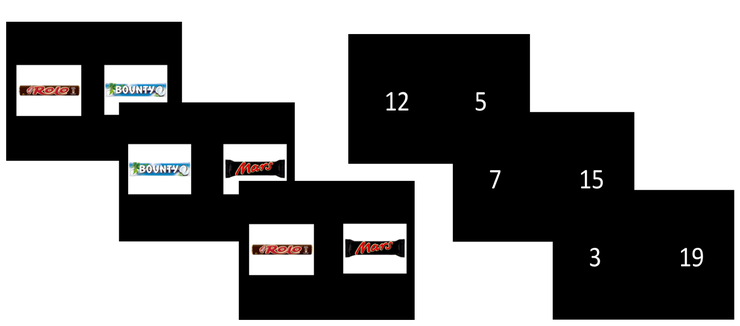
- If preferences are constructed from memory will lesions in associative memory regions lead to increased intransitivity?
- Patients with lesions in associative memory areas (MTL) and two control groups completed two tasks.
- MTL group showed more intransitivity in choice task and not control task when compared to control groups, implicating the hippocampus in preference construction.

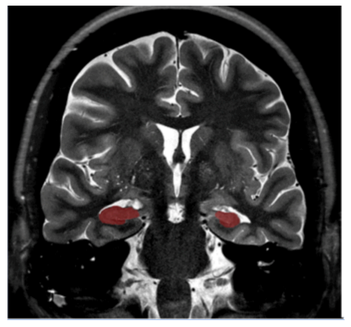
Introduction

- The General Axiom of Revealed Preferences: Choices should transitive (Von Neumann & Morgenstern, 1944)
- Lesions in value computation regions lead to an increase in intransitive choices (Camille et al., 2011; Fellows & Farah, 2007; Fellows, 2006).
- If preferences are often constructed, will memory play a similar role?.
- **H1:** Lesions in associative memory regions, i.e. the medial temporal lobes lead to increased intransitivity of value-based choices but not of simple judgments.
- **H2:** Other areas and controls will show much lower intransitivity.

Methods

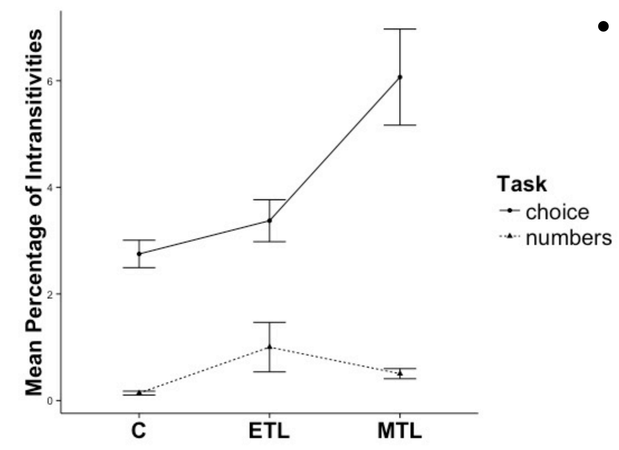
- MTL group: n = 31, mediotemporal lobe lesions,
- ETL group: n = 30 extratemporal lobe lesions,
- Control: n = 30 healthy controls
- 20 candy bars (numbers), 190 trials





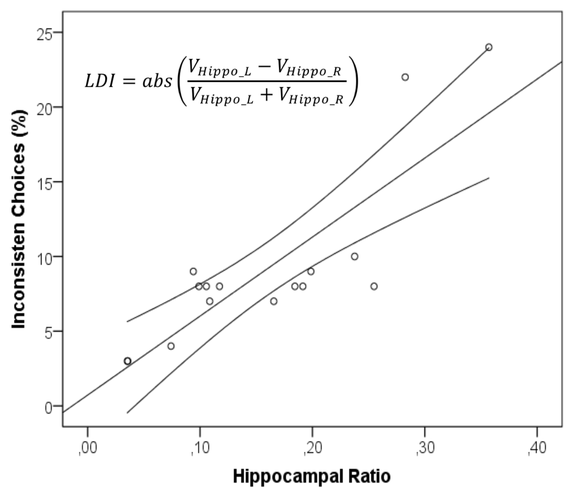
Results

Group differences in intransitivity



- Orthogonal contrasts show the increase in intransitivity for the MTL group is different for the value-based and control task (b = -0.0622 , t(176) = -2.59 , p = 0.01*).
- MTL patients make significantly more intransitivities in the value-based task (b = 0.16, t(176) = 4.85, p<0.001) compared to both control groups and do not in the control task (b = 0.04, t(176) = 1.18, p = 0.238).

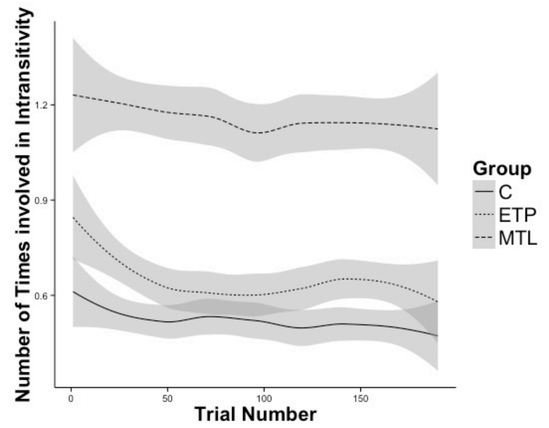
Correlation between lesion size and intransitivity



- Intransitivities significantly correlate with hippocampal asymmetry (as a marker for unilateral atrophy) mean. rho=0.761, p<0.001

Declarative memory deficits

- Inconsistencies were stable across time for all groups ruling out alternative explanations based on declarative memory deficits.



Discussion

- We provide support for the role of memory in preference construction.
- Hippocampal patients produce patterns of intransitivity similar to vmPFC patients, suggesting that the associations stored in the hippocampus may serve as inputs to value calculation occurring elsewhere.
- The role of hippocampal function in producing intransitive preferences awaits further investigation.

References

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