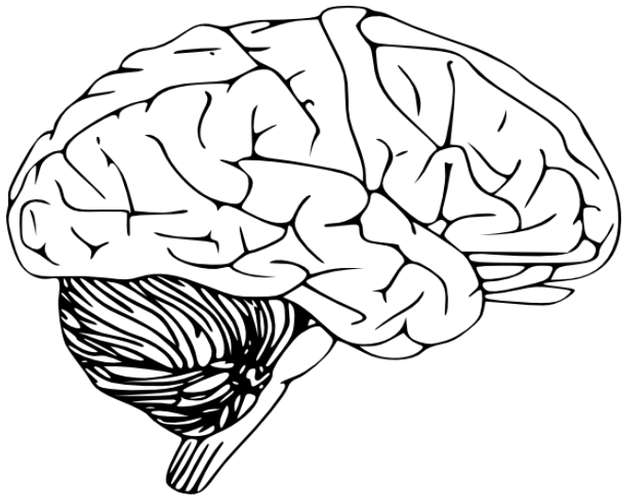
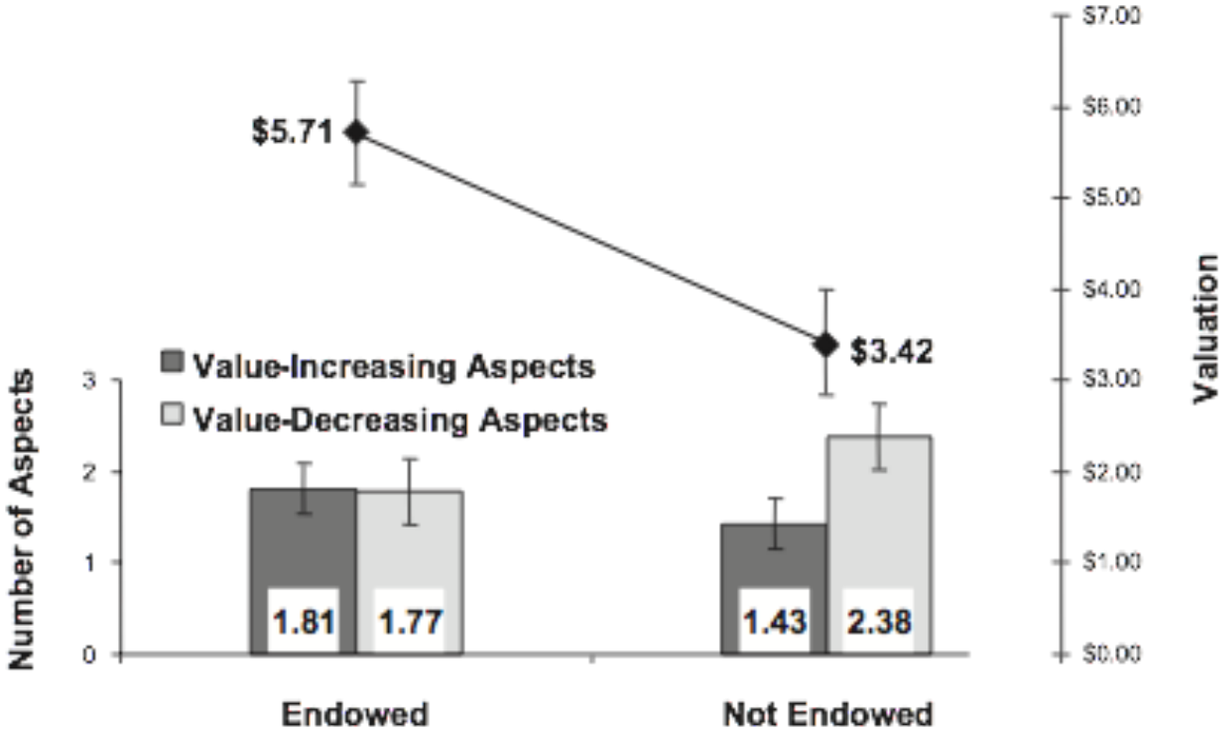
Preference Consistency Relies on Hippocampal Function: Evidence from Mediotemporal Lobe Epilepsy

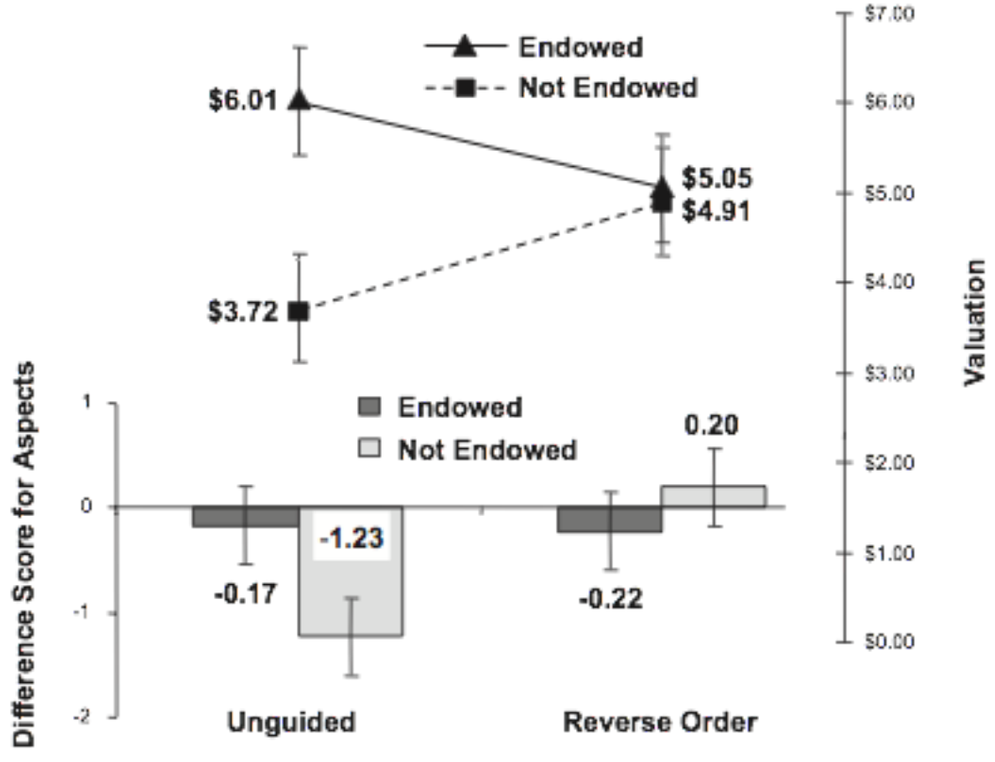
A. Zeynep Enkavi, Bernd Weber, Iris Zweyer, Jan Wagner, Christian Elger, Elke Weber, Eric. J. Johnson

Memory → Preference

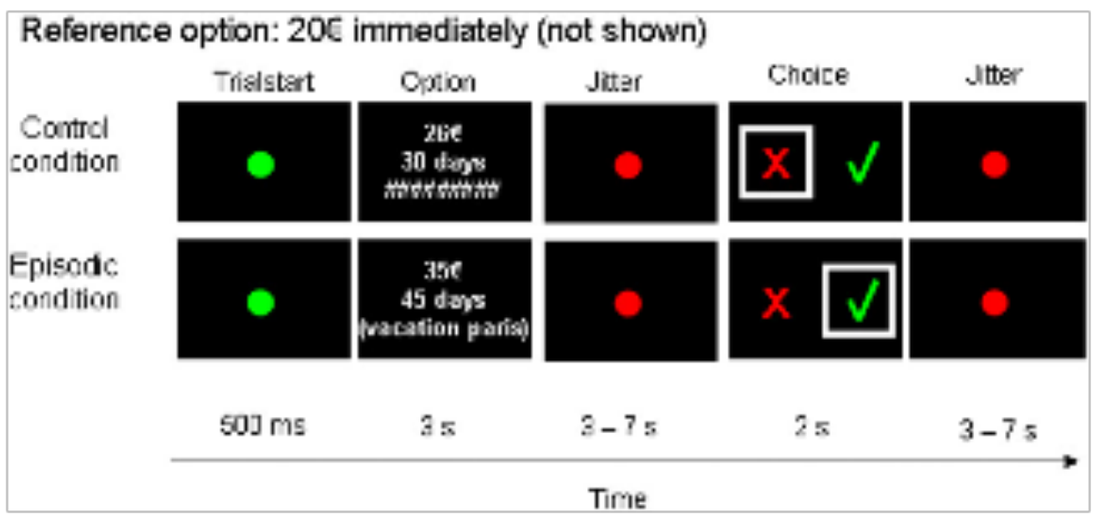


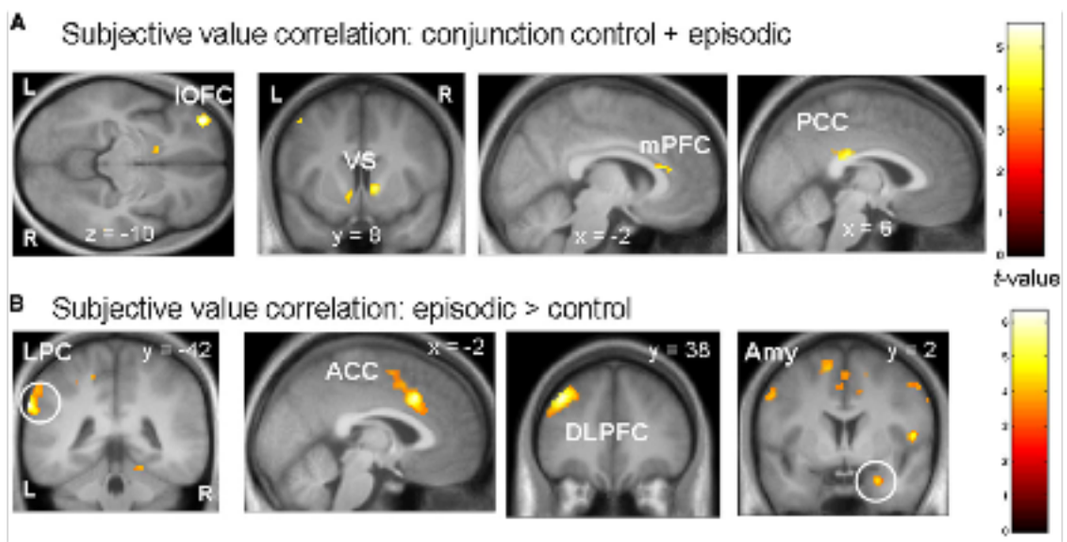

PUSH



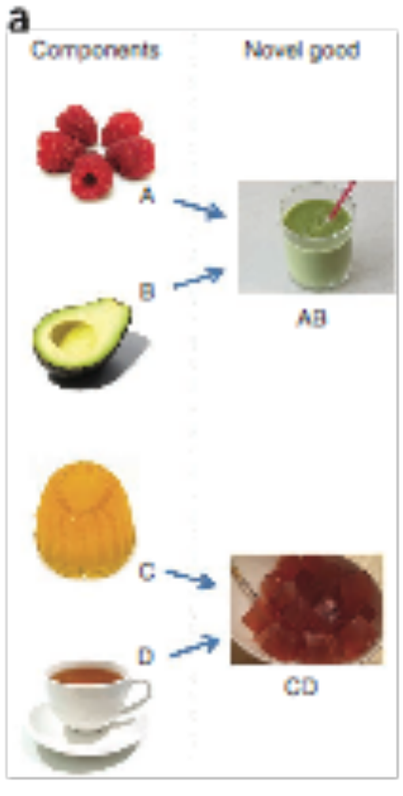


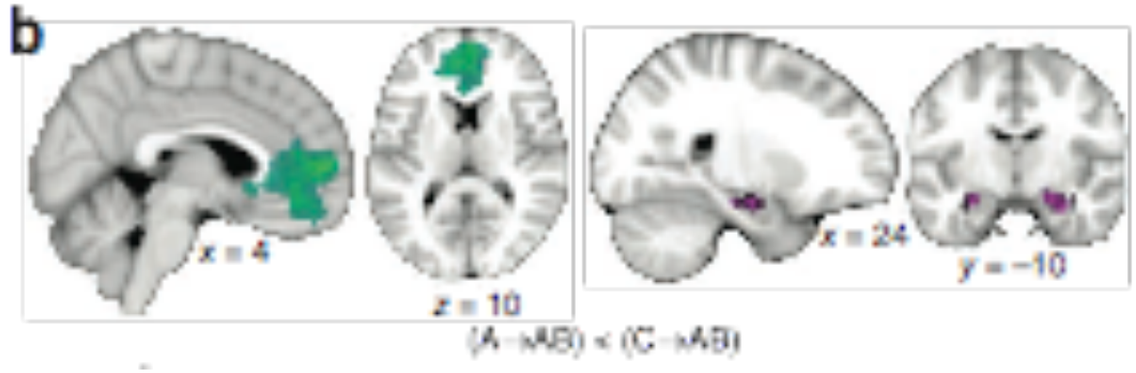
Johnson, Häubl, Keinan (2007)



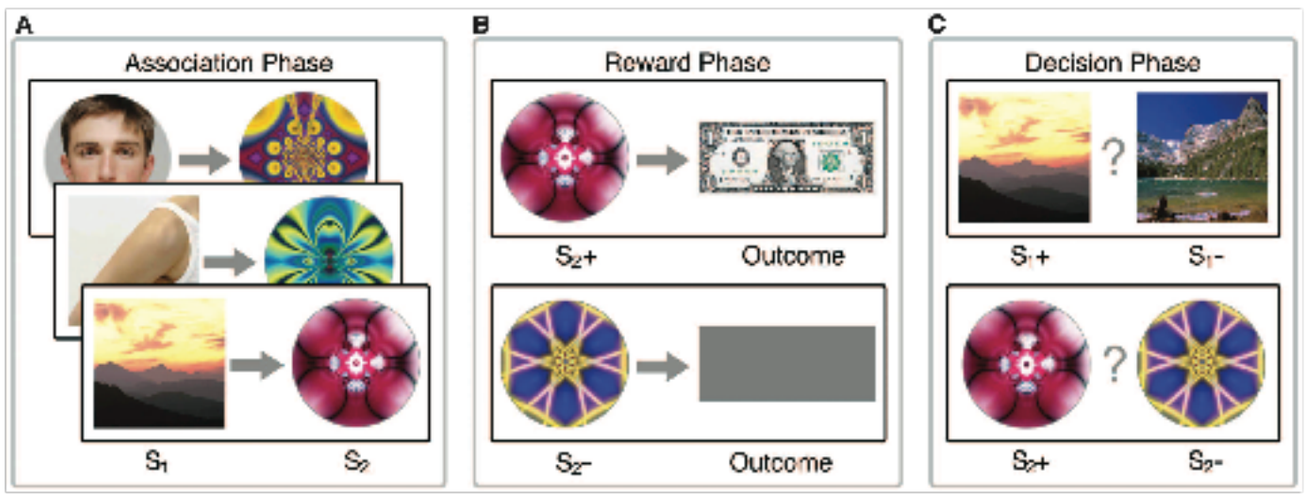


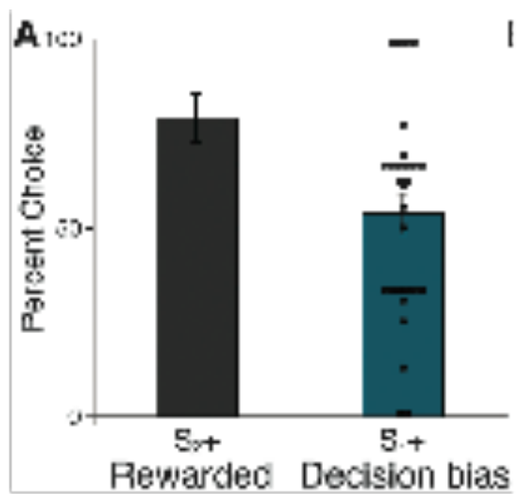
Peters and Büchel (2010)



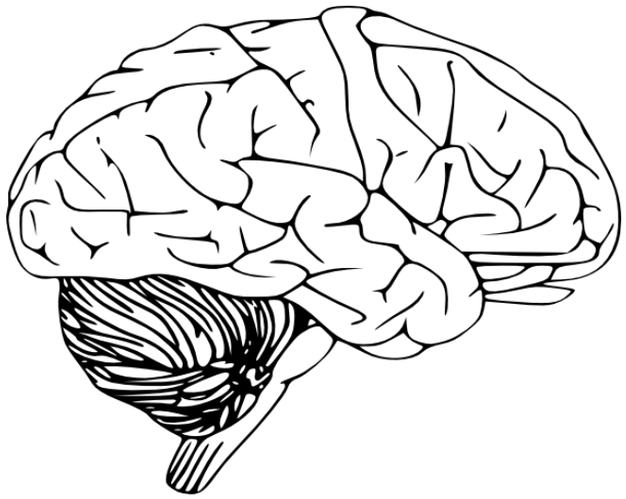


Barron, Dolan, Behrens (2013)





Wimmer and Shohamy (2012)

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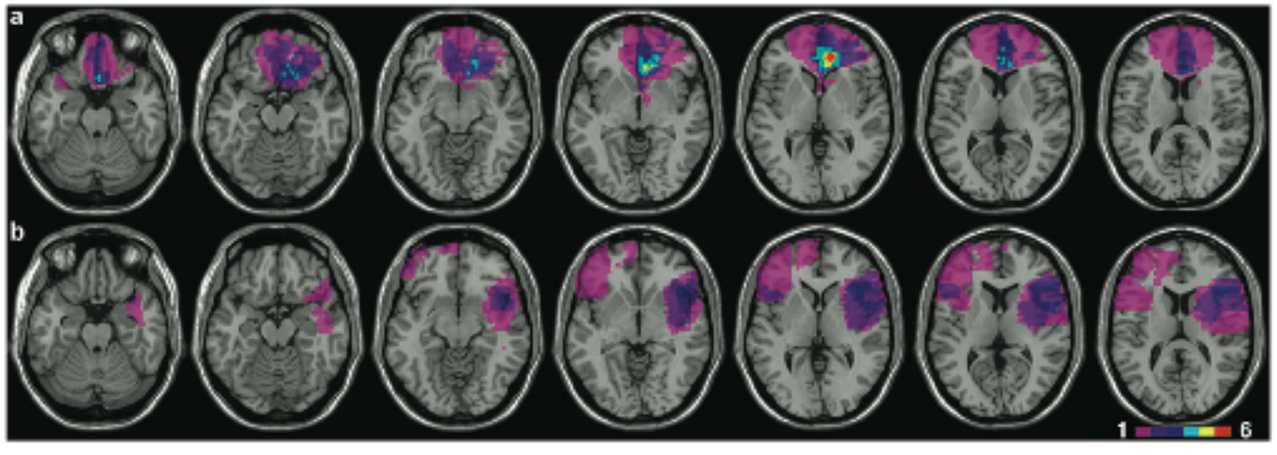


Figure 1. Location and overlap of brain lesions. Panel (a) shows the lesions of the 10 subjects with ventromedial frontal damage, and panel (b) those of the 11 DLF subjects. Lesions are projected on the same 7 axial slices of the standard Montreal Neurological Institute brain, oriented according to radiological convention (i.e., left is right). Areas damaged in one subject are shown in pink; brighter shades denote the degree to which lesions involve the same structures in 2 or more individuals, as indicated in the legend.

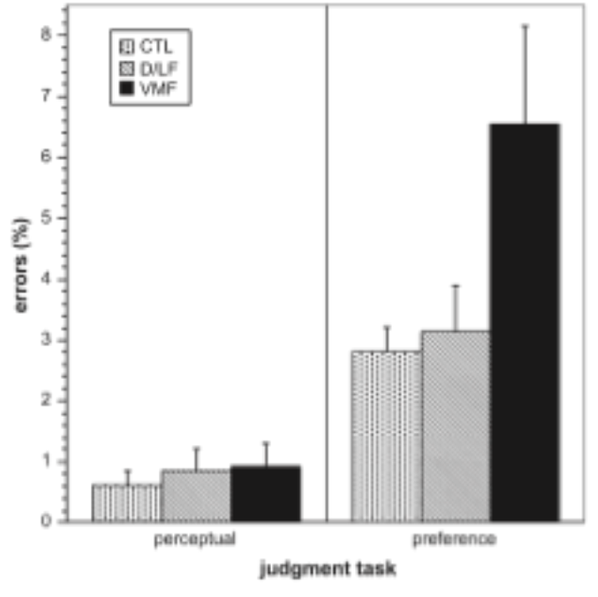


Figure 2. The mean percentage of errors in the perceptual judgment task (left panel) and of erratic choices in the preference judgment task (right panel) for all 3 groups of subjects. Error bars indicate standard errors of the mean.

Fellows and Farah (2007)

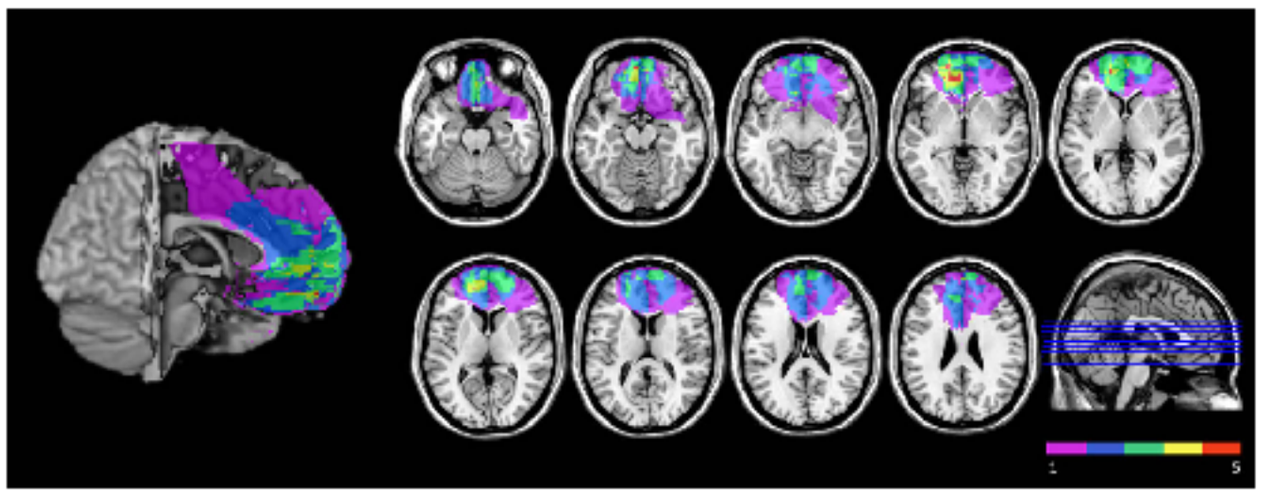
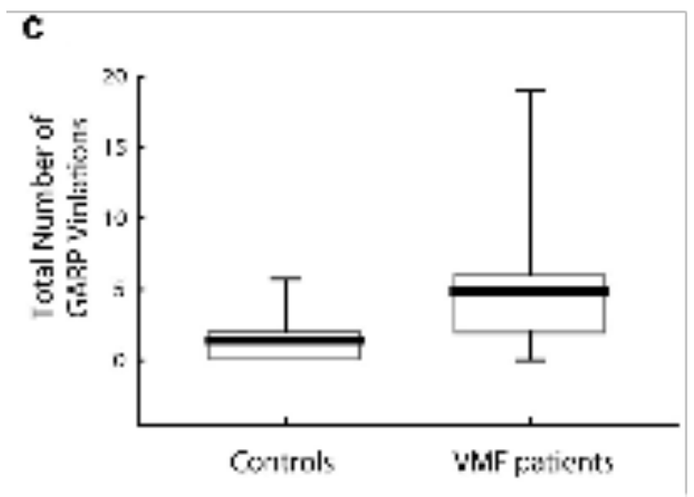
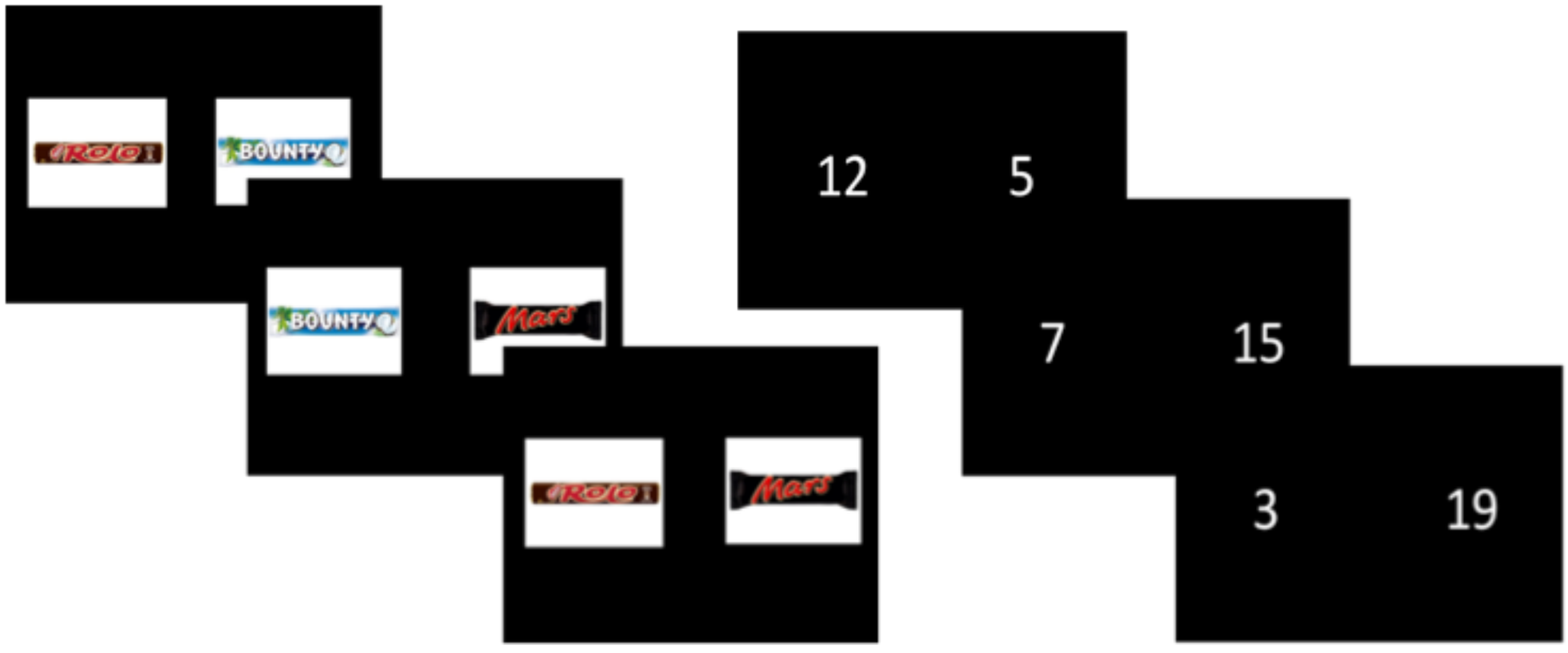


Figure 1. Location and overlap of brain lesions of the nine subjects with VMF damage, projected on axial slices of the MNI brain. Different colors indicate the number of subjects who had damage involving a particular area in common, as indicated in the color key.



Camille, et al. (2011)

Experiment



Test Control

N = 91 (C = 30, ETL= 30, MTL = 31)

Transitivity

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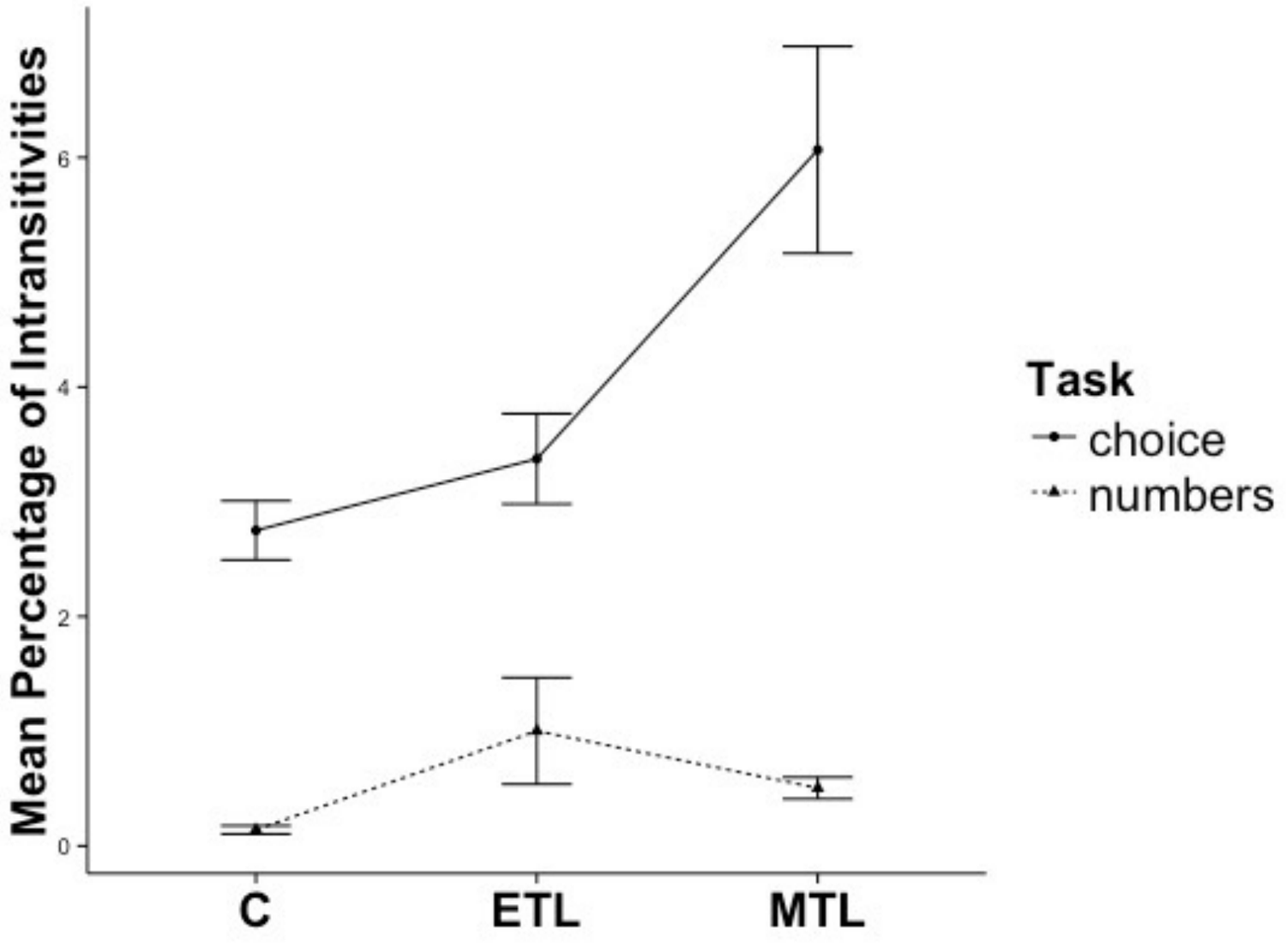
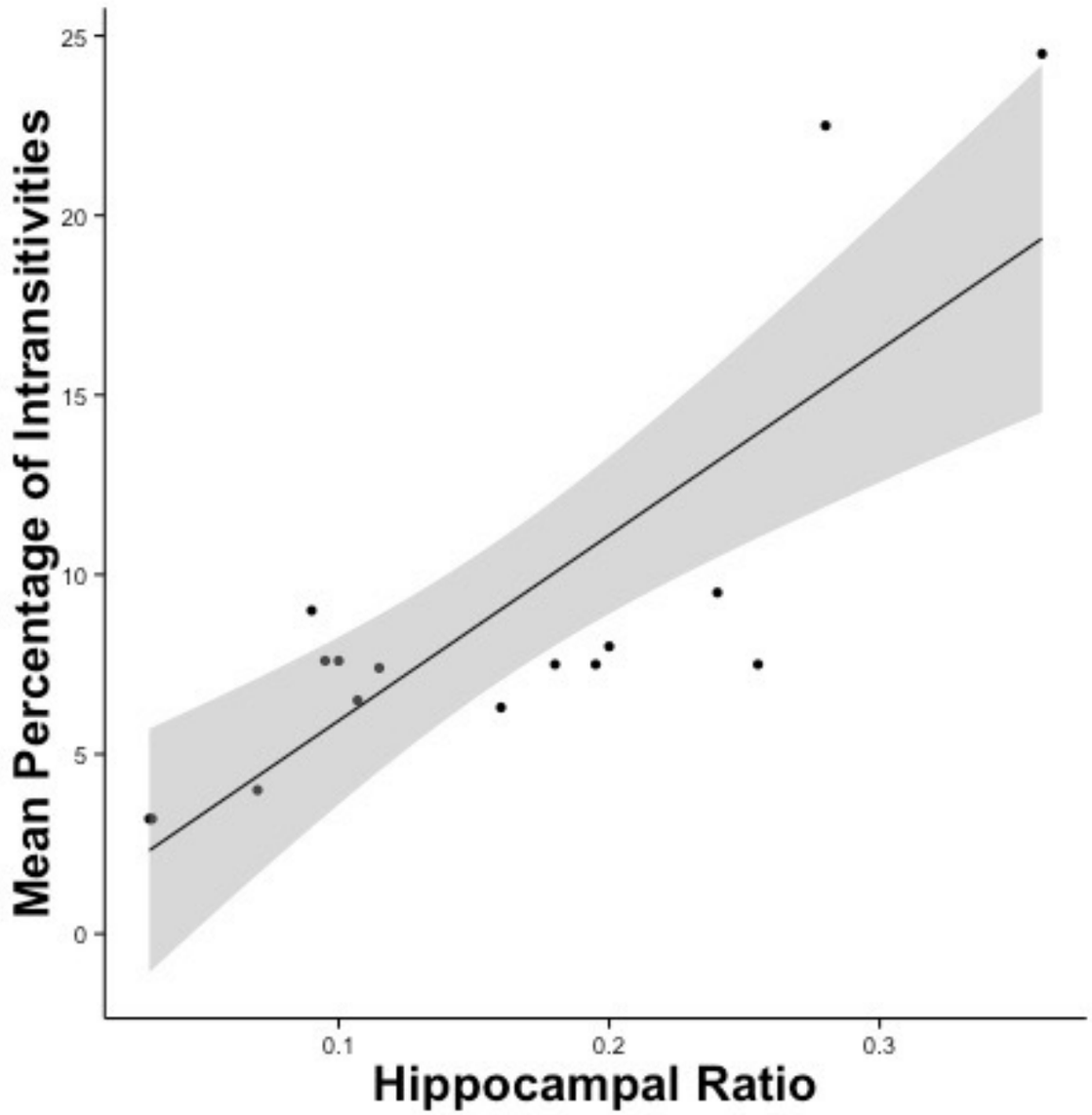
Results

Increased intransitivity in MTL patients



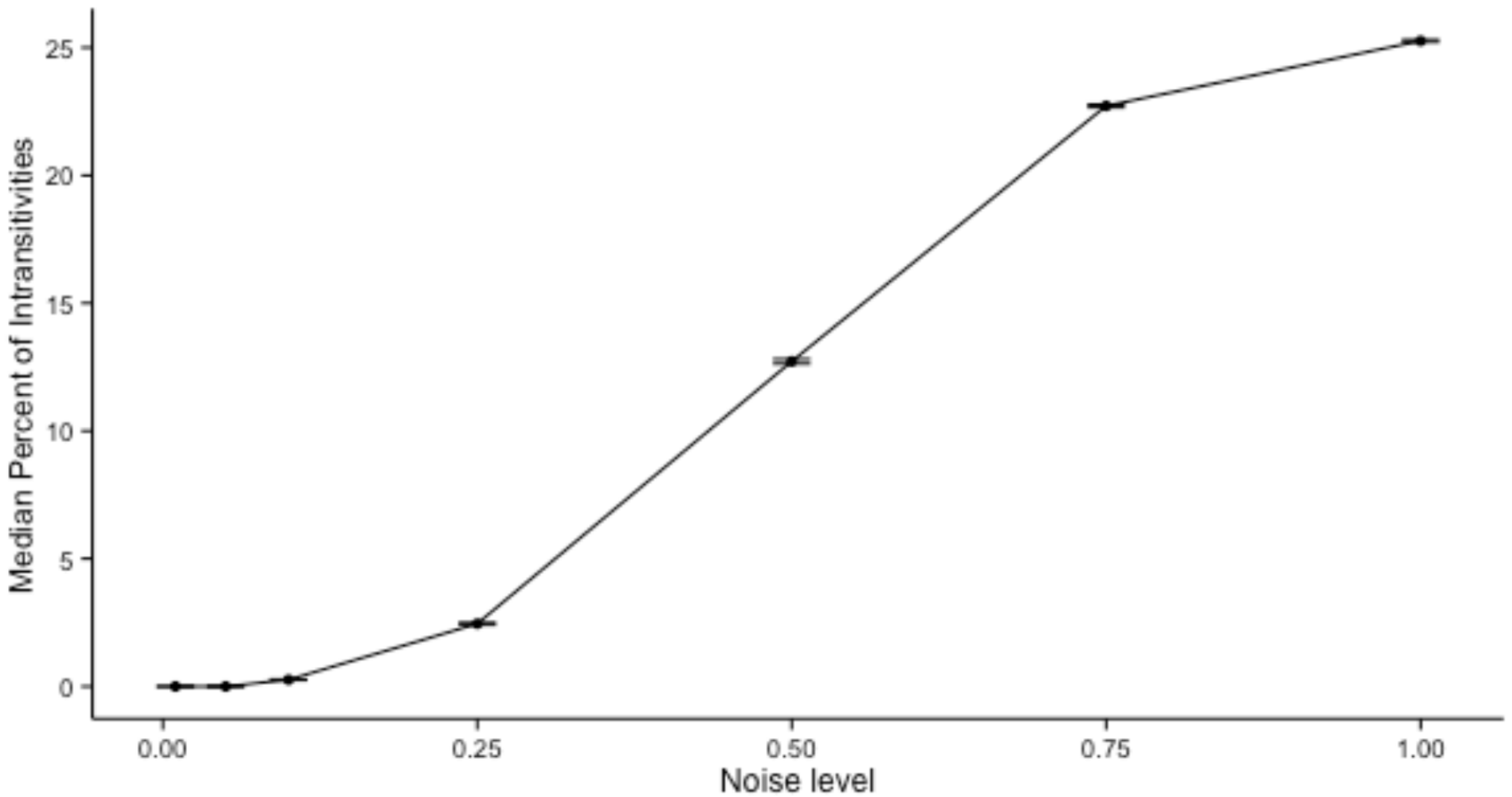
Results

Increased intransitivity with lesion size



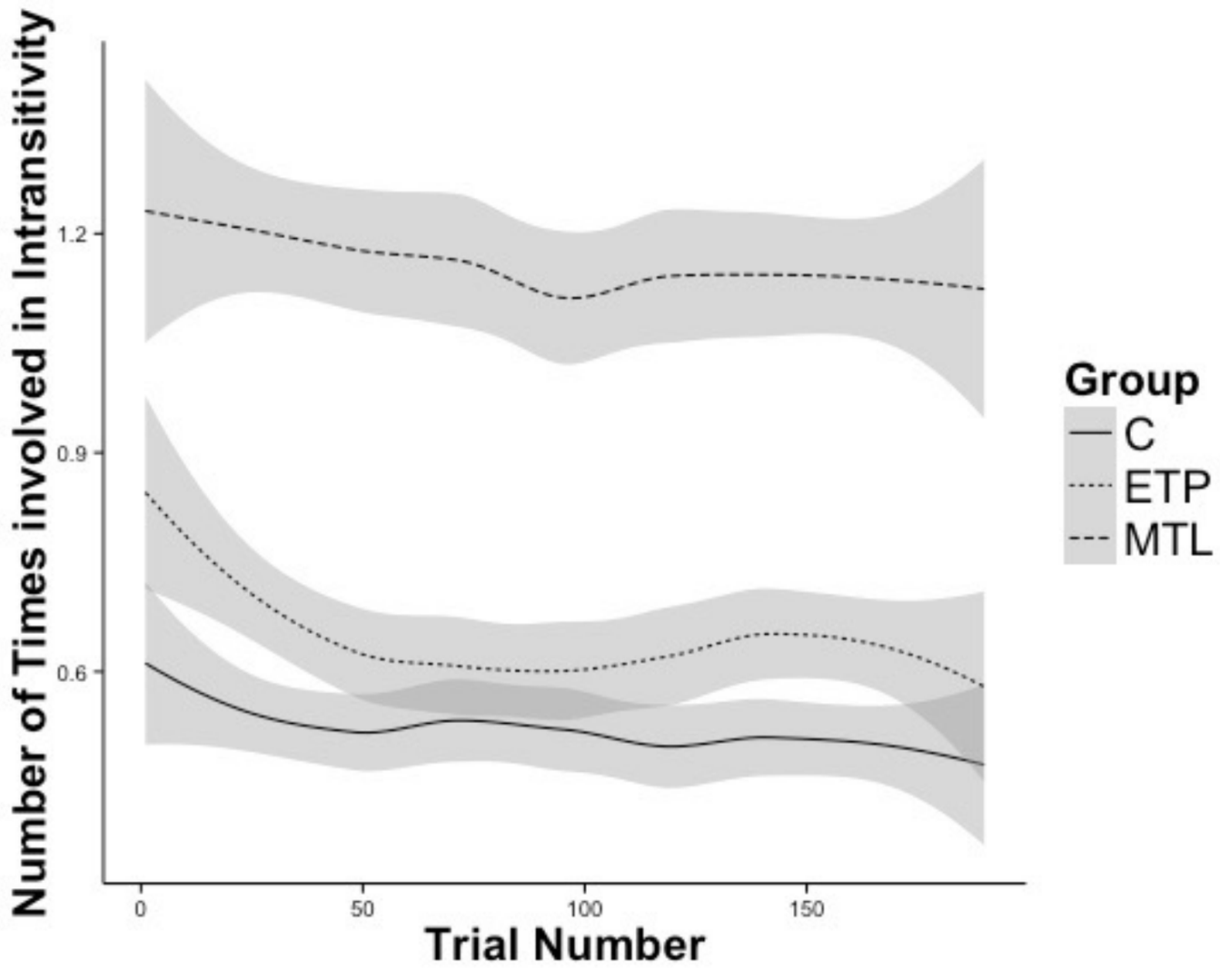
Results

Simulations contextualize the size of the deficit



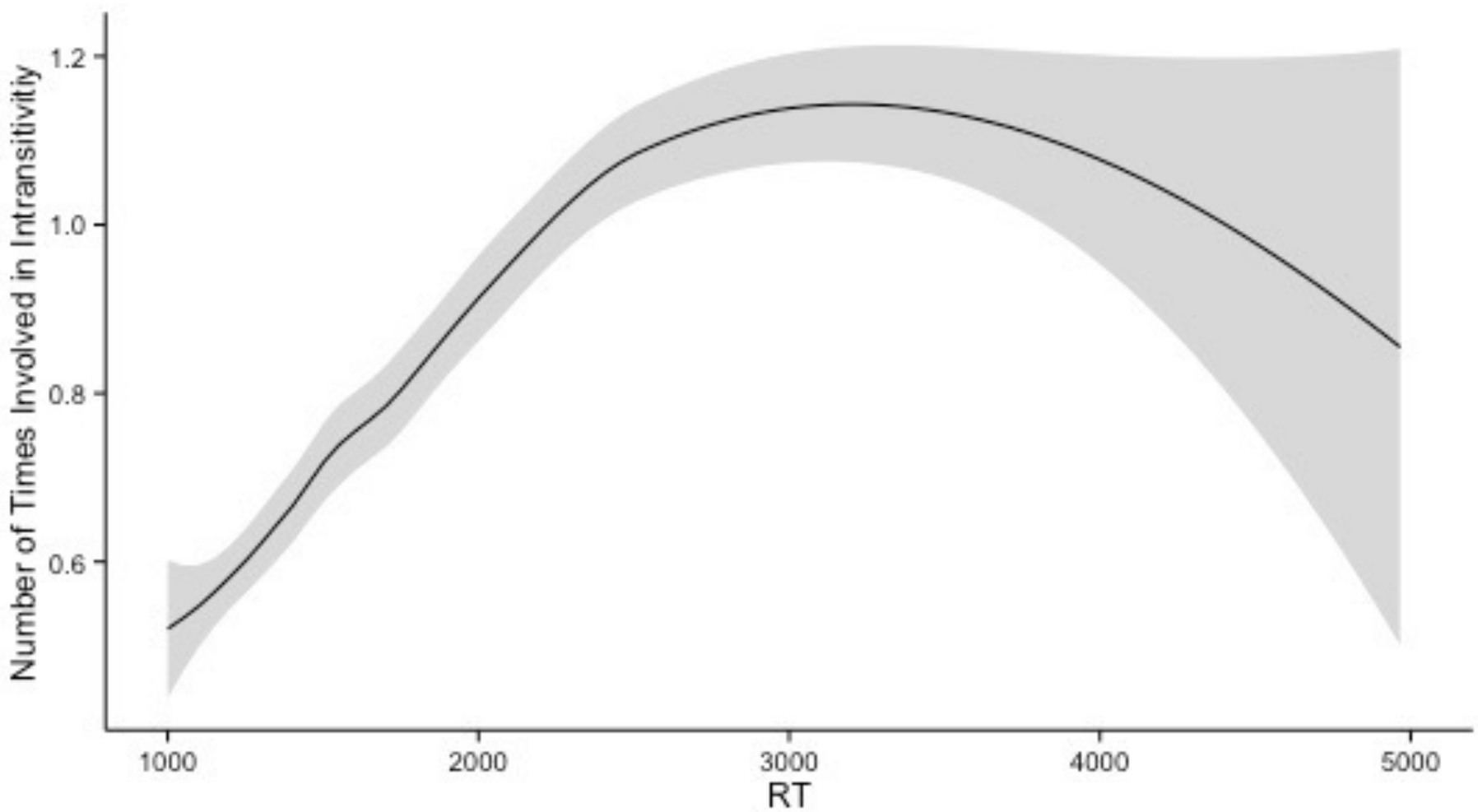
Alternative Explanations

The effect is not due impairment in explicit declarative memory



Alternative Explanations

It is also not due to a speed-accuracy trade-off



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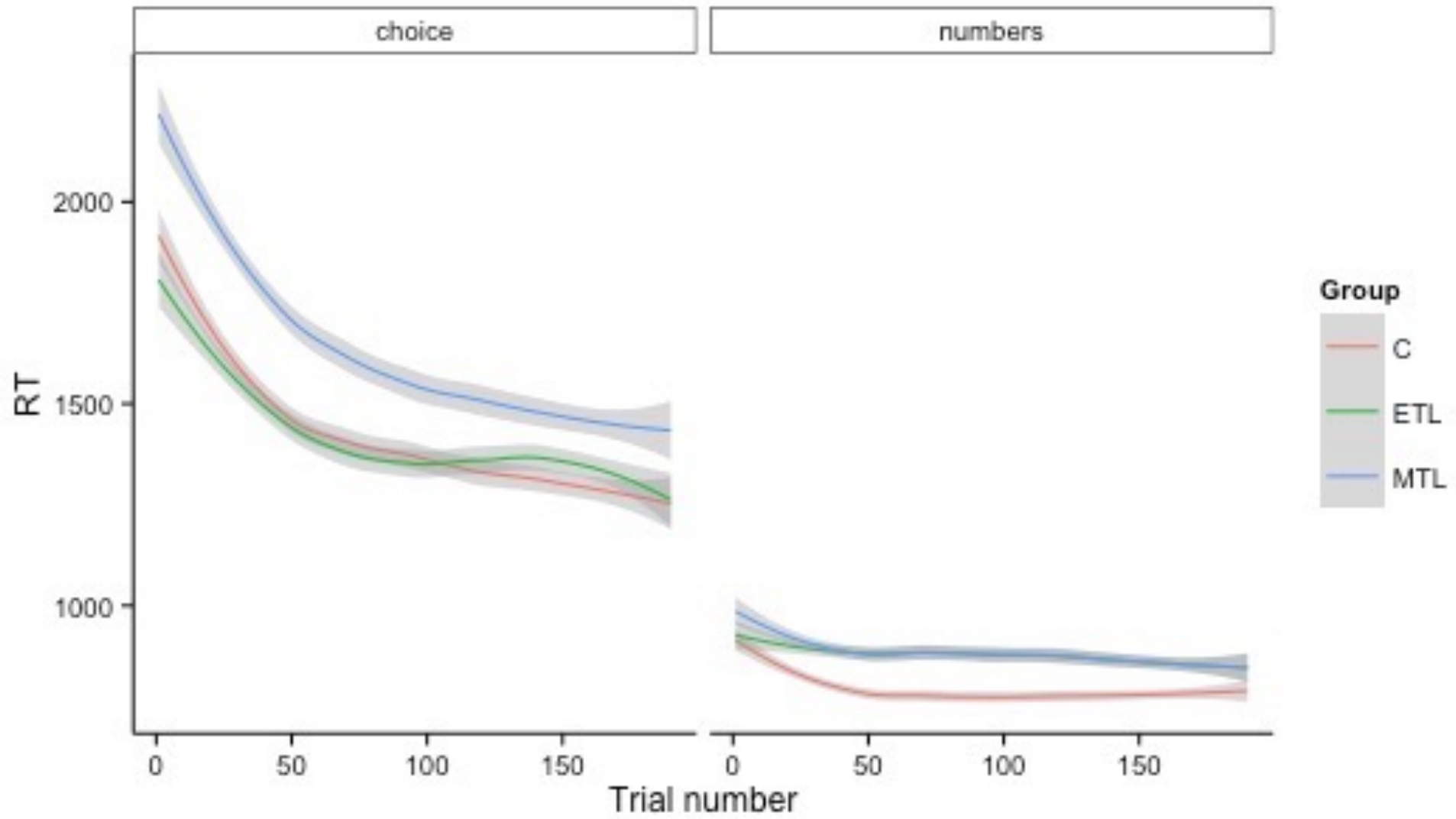

Summary and Implications

- Hippocampal lesions lead to increased inconsistencies in preferences

- The effects cannot be explained by random choosing, explicit declarative memory deficits or speed-accuracy trade-offs

- They point to the necessity of certain cortical regions other than frontal regions, namely the MTL, in value-based decisions supporting the intuition that preferences rely on memories

- Further research will show the exact mechanisms of how the MTL interacts with PFC in value-based decisions

Thank You!

- Bernd Weber
- Eric Johnson
- Elke Weber
- Iris Zweyer
- Jan Wagner
- Christian E. Elger

Outline

- What is transitivity?
- What is the MTL?
- Experiment and results
- Implications

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