



Hippocampal repulsion is driven by internal beliefs.

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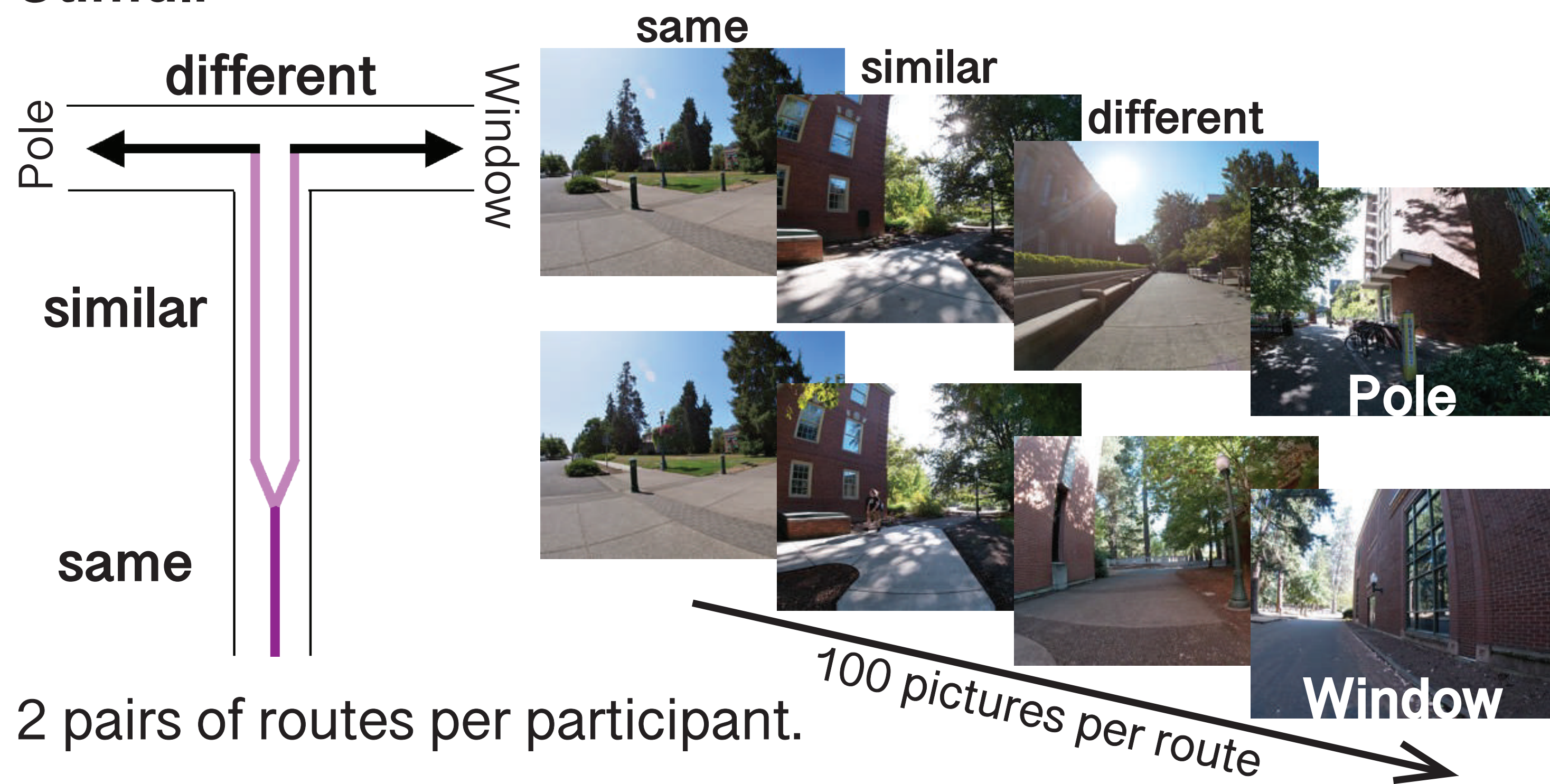
Introduction

Memory Interference occurs when two memories are similar to each other^{1,2}. “**Repulsion**” of hippocampal activity patterns (lower fMRI pattern similarity for overlapping events vs. non-overlapping events) is associated with reduced memory interference^{3,4,5,6,7,8}.

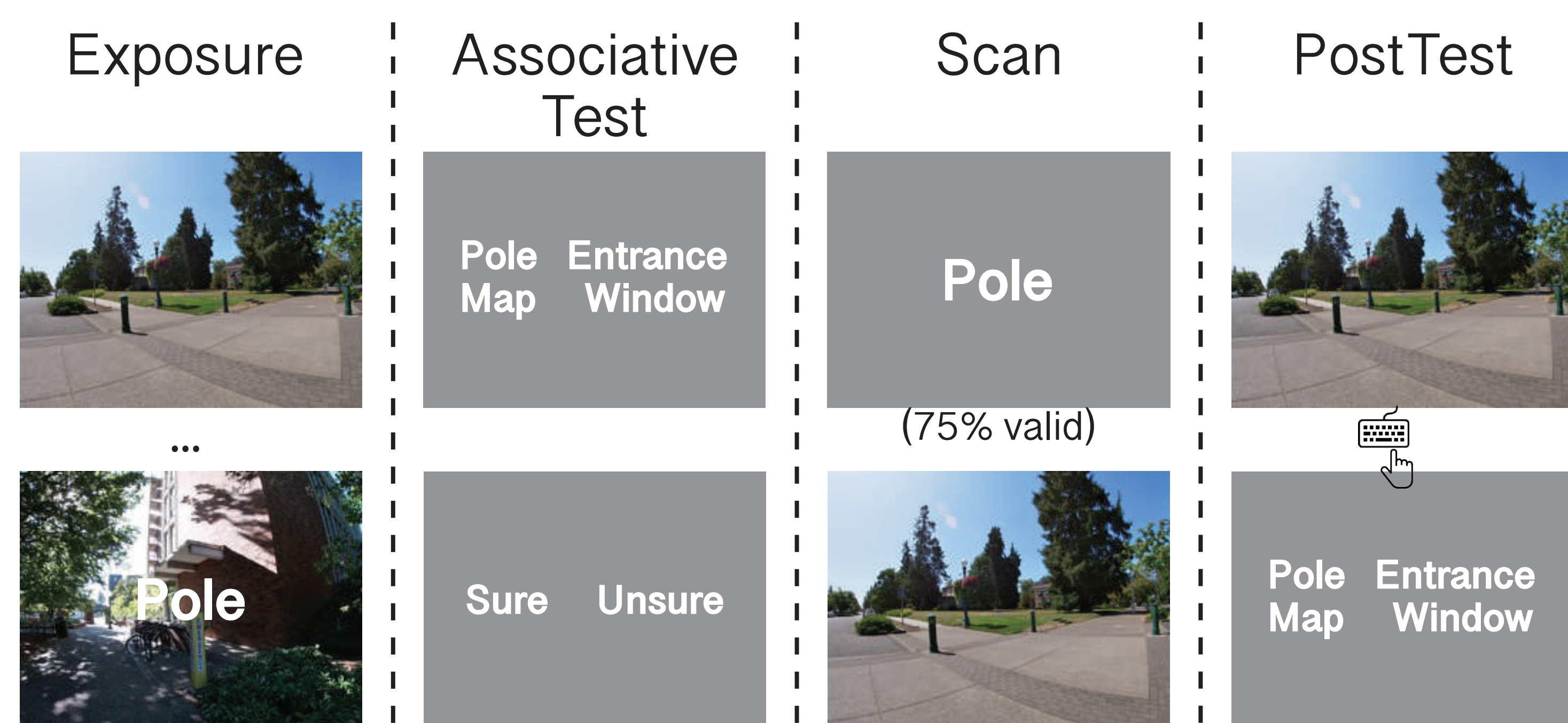
Why does repulsion occur?

Experiment

Stimuli

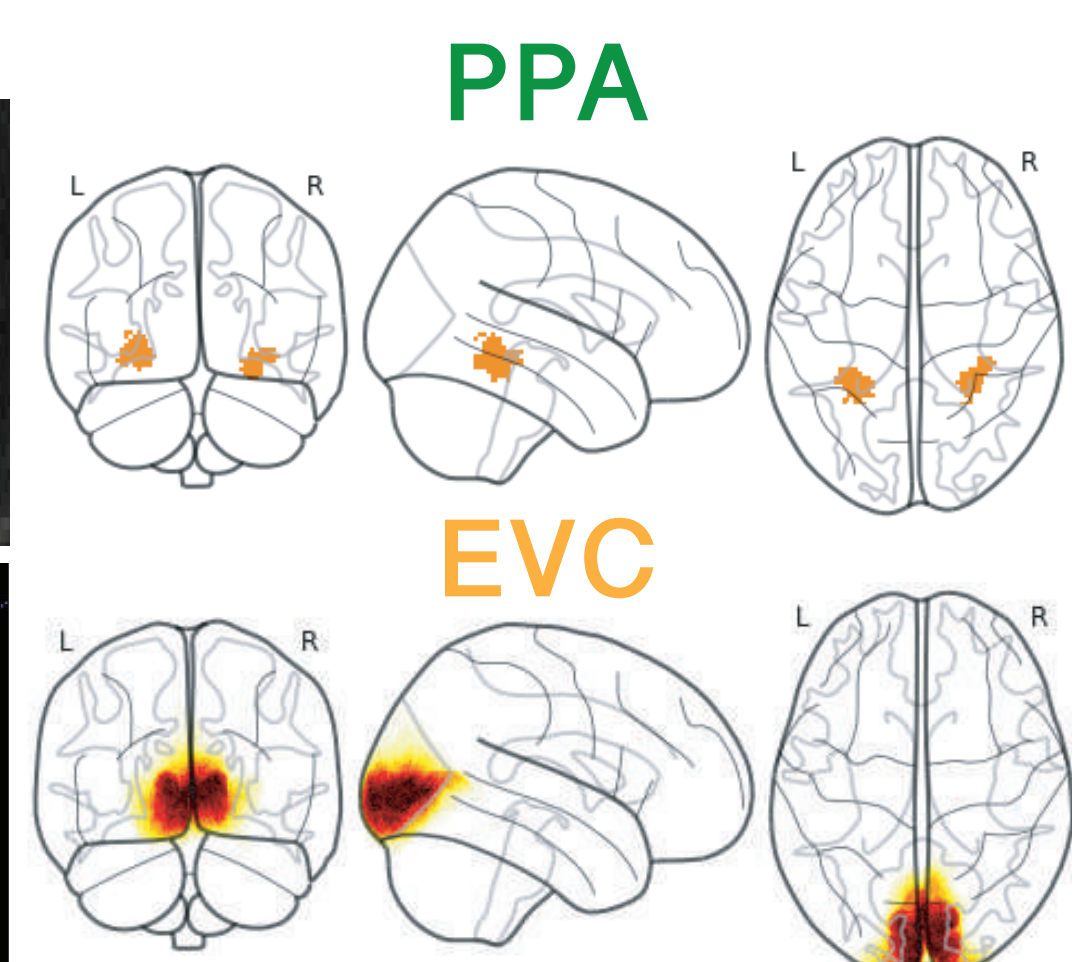
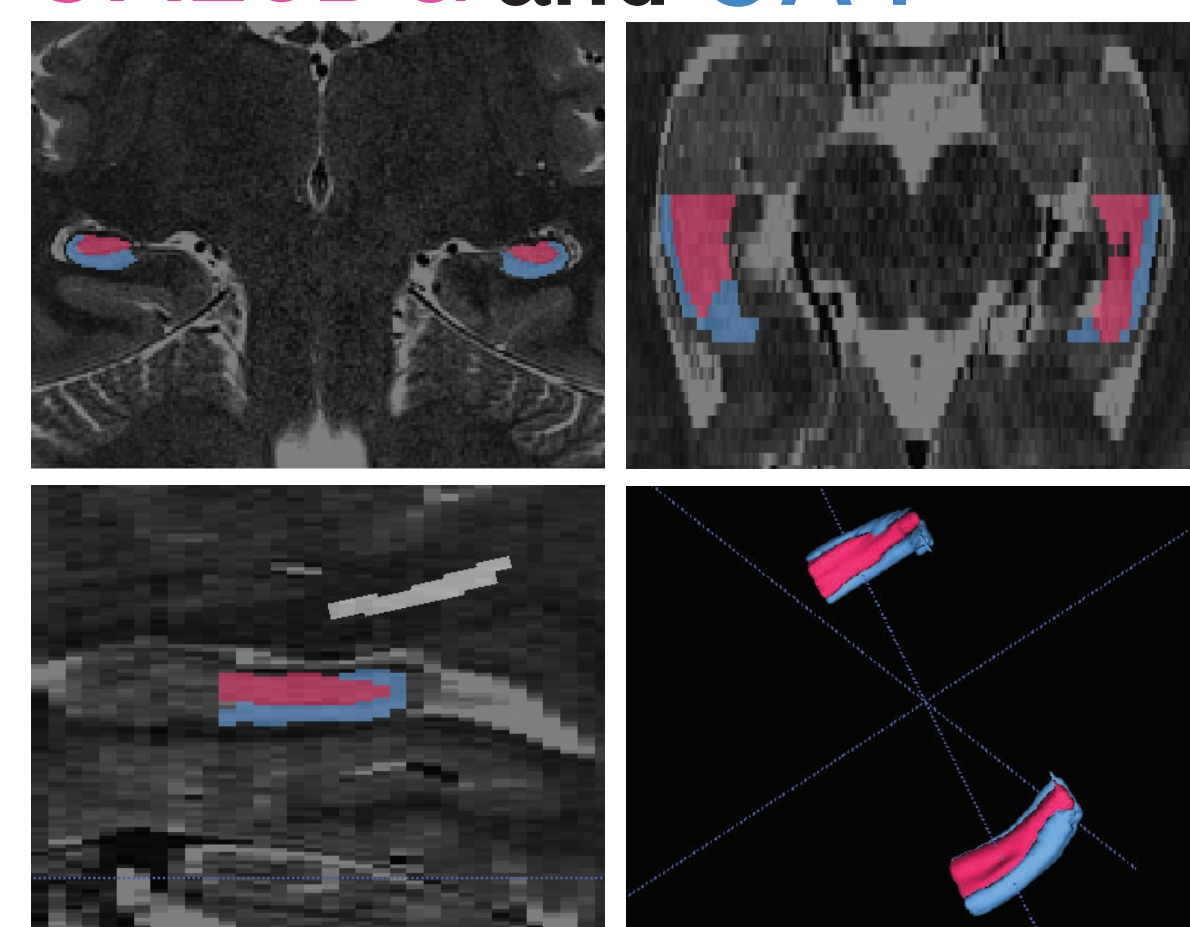


Procedure



ROIs

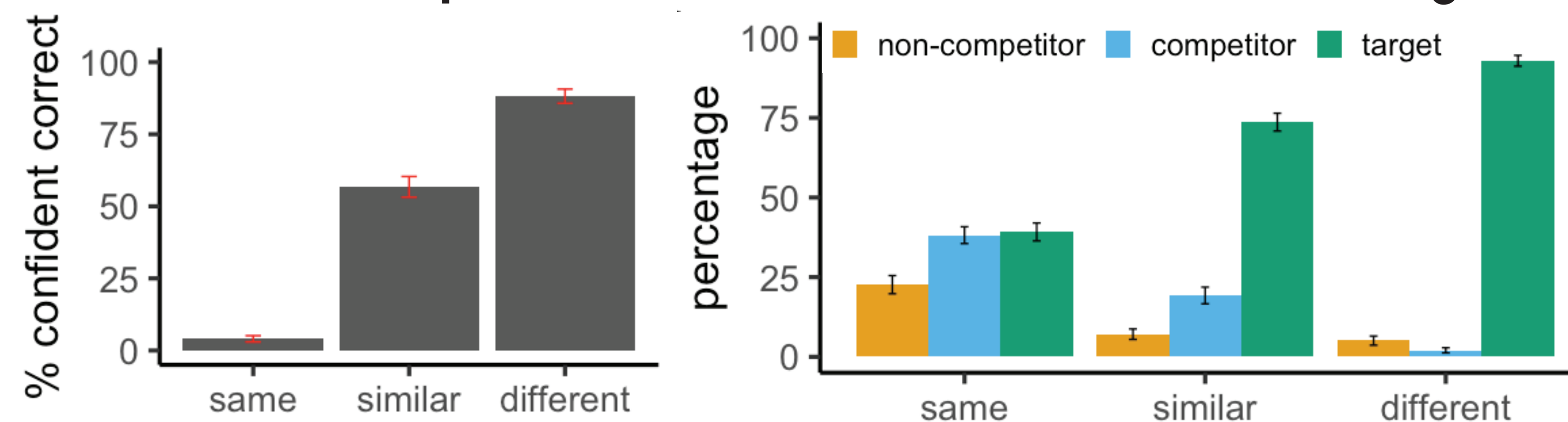
CA23DG and CA1



N = 35
Siemens 3T Prisma
T1: 1mm isotropic
T2: 0.43 * 0.43 * 1.8mm
EPI:
1.7mm isotropic
Repetition Time = 1s
Echo Time = 33ms
10 EPI runs
Preprocessing:
fMRIprep 21.0.1
Subfield segmentation:
ASHS

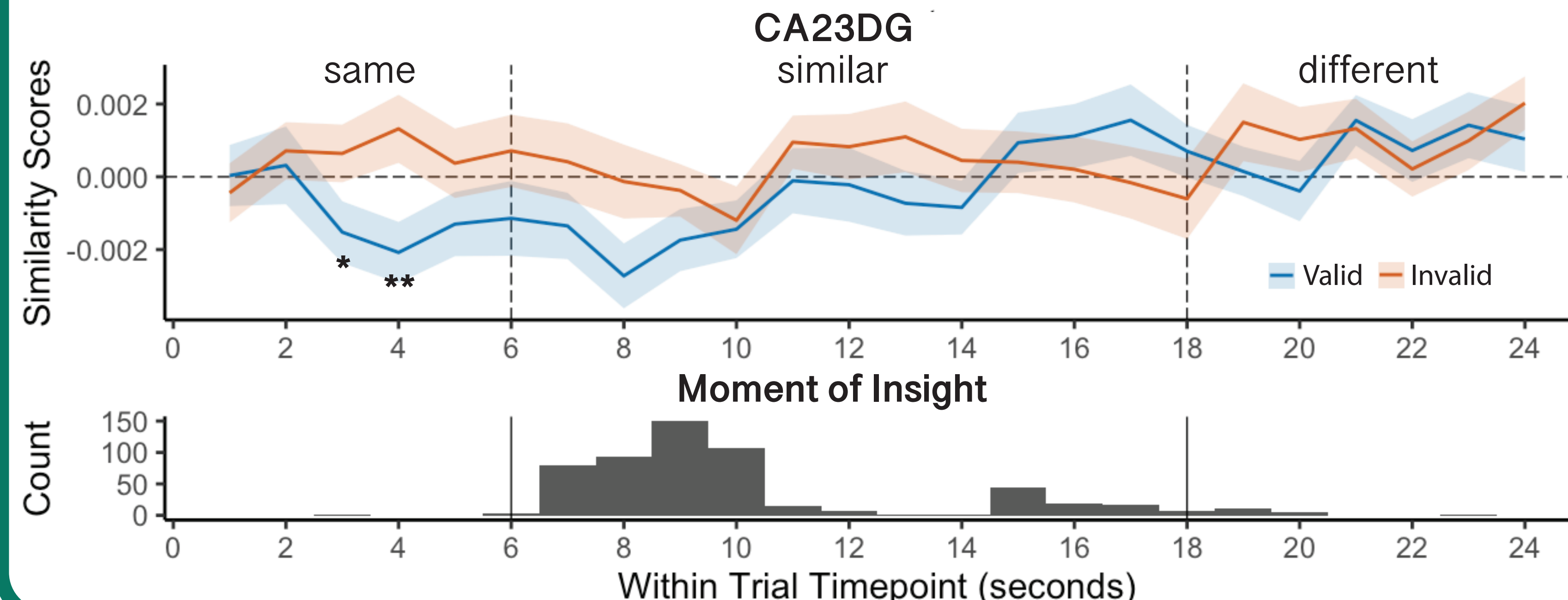
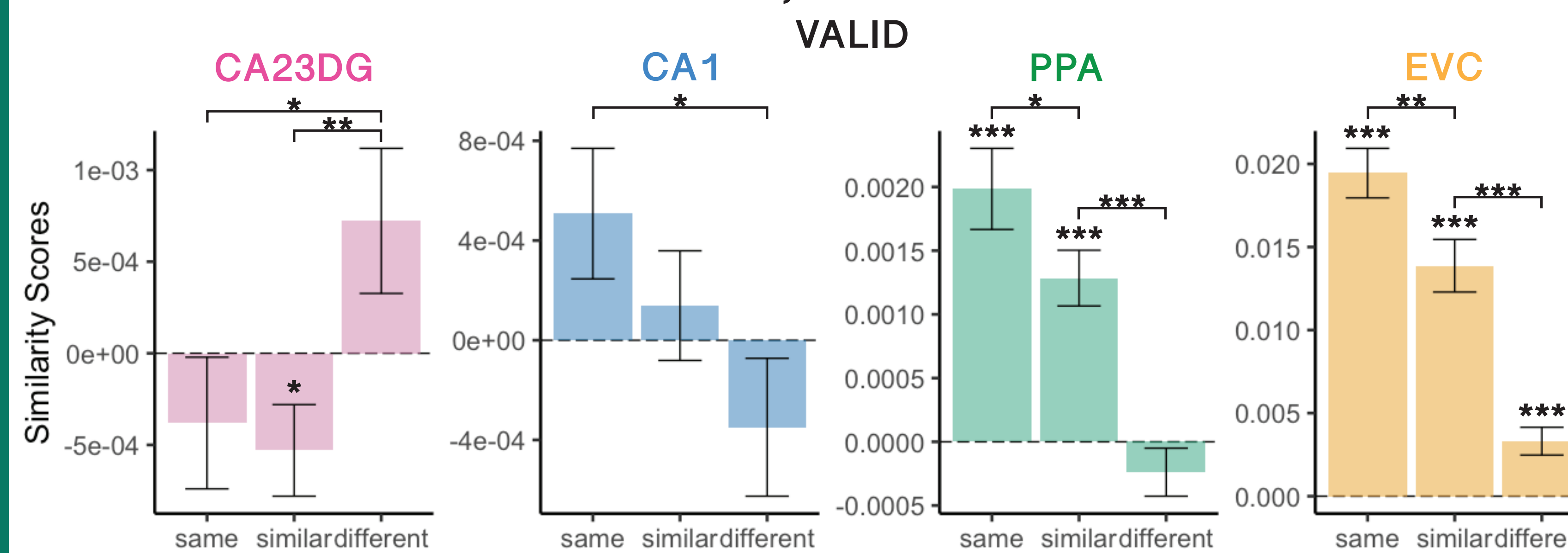
Results

Associative test performance as a function of route segment.



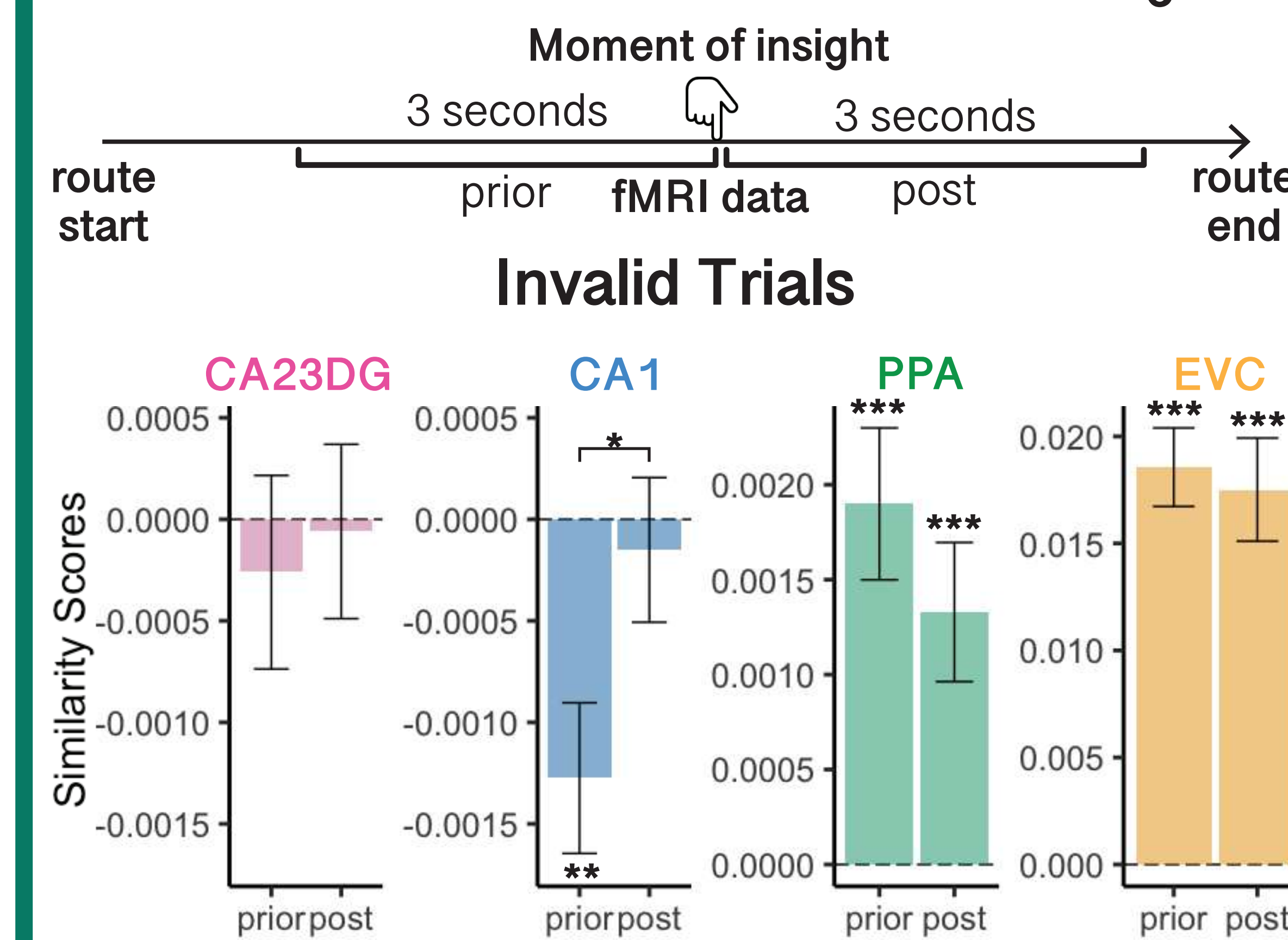
Similarity Score = (within pair - across pair fMRI similarity)

Pattern similarity increases with stimulus similarity in PPA and EVC, but not CA23DG.



Insight related change

fMRI data centered around moment of insight.



CA1 showed decreased pattern similarities prior to moment of insight.

Conclusions

Hippocampus (specifically CA23DG) shows repulsion effects (lower similarity for overlapping vs. non-overlapping routes), but only when routes are most similar.

- disappears/reverses once routes are more distinct or subjects detected differences (moment of insight).

CA23DG “flips” representational structure of visual regions including PPA and EVC.

CA23DG repulsion is influenced by probabilistic cues.

- indicates that repulsion occurs when perceptual input is similar/ambiguous, but beliefs are distinct⁹.
- Repulsion in CA1 selectively occurred at the time of prediction error.

References

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