Repulsion of Competing Hippocampal Representations Parallels Learning-Related Reductions in Memory Interference

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INTRODUCTION
- Overlap among hippocampal representations is related to memory interference[2,3].
- Similarity between memories can trigger repulsion of hippocampal representations[4,5,6].
- Repulsion of hippocampal representations predicts reduced memory interference[6].

Is the timing of repulsion related to the timing of learning?

ASSOCIATIVE MEMORY IMPROVES ACROSS RUNS

Inflection Point = transition to high confidence, correct associative memory.

MEASURING NEURAL SIMILARITY

Scene Pair Difference Score[6]

- Mean

Regions of Interests

CA3-DG
CA1
PPA
EVC

Scene Pair Difference Scores Vary by ROI

Main effect: p < 0.001 **
CA3-DG vs. CA1: p = 0.015
CA3-DG vs. PH: p = 0.074
CA3-DG vs. EVC: p < 0.001 ***

CA3-DG Scene Pair Difference Scores by Run

RELATING SCENE PAIR DIFFERENCE SCORES TO LEARNING

Repulsion in CA3-DG Occurs at Inflection Point

CONCLUSIONS
- CA3-DG exaggerates differences between similar memories (repulsion effect).
- Repulsion was strongest at inflection point: when participants transitioned to high confidence, correct associative memory.
- Repulsion went away after inflection point.

References:

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