Overlap between events has different consequences for learning and memory when events overlap in location versus content information

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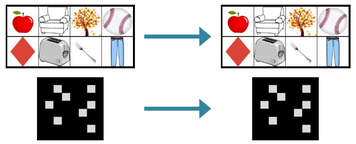
Background:

- Overlap between events can hinder new learning through interference[1,2]
- Overlap between events can facilitate new learning through integration and schemas[3,4]
- Pattern separation in human hippocampal subregions CA3 and dentate gyrus resolves interference[5]
- Pattern completion in human CA1 promotes memory integration[6]

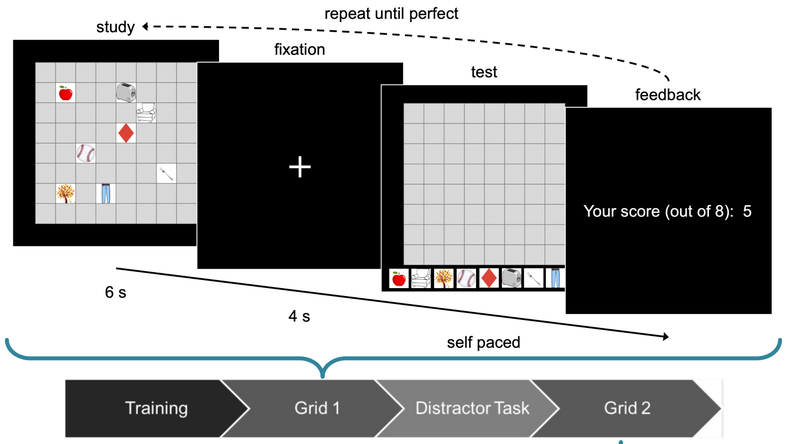
We explored two types of information overlap:

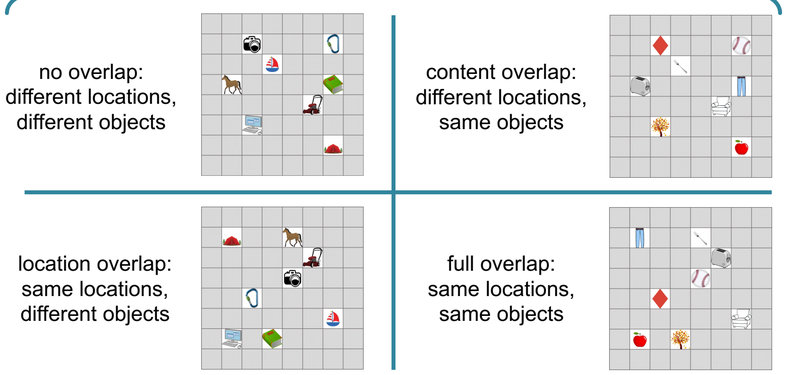
- content overlap (same objects)
- location overlap (same locations)



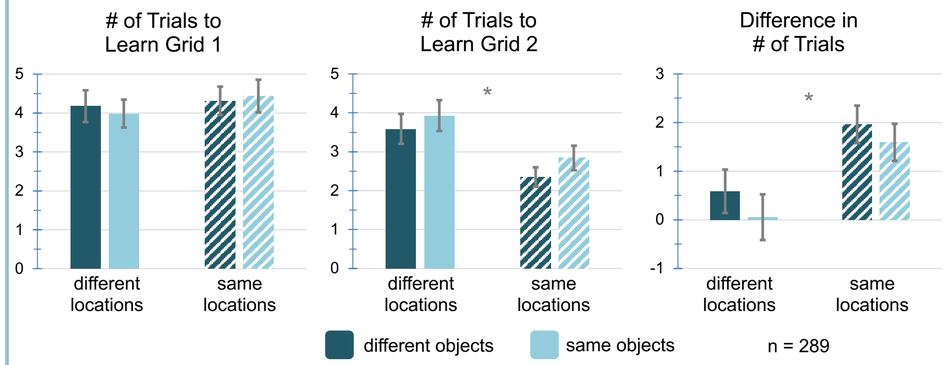
Do content overlap and location overlap differentially affect learning and memory?

Exp. 1 Method (between-subjects & full reconstruction)



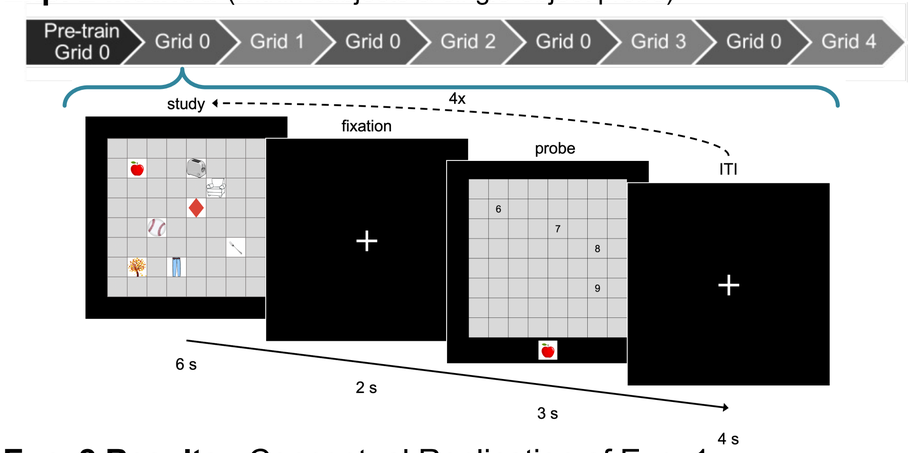


Exp. 1 Results - Differential Effects of Overlap

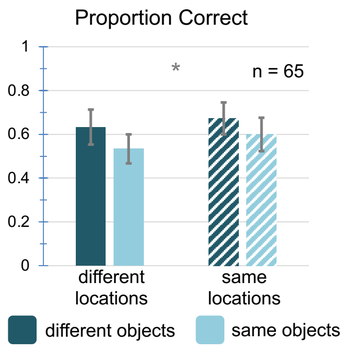


- Location overlap → faster learning of the second grid
- Content overlap → slower learning of the second grid
- No interaction → effects are independent and additive

Exp. 2 Method (within-subjects & single-object probe)

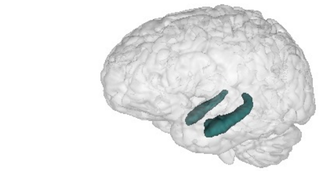


Exp. 2 Results - Conceptual Replication of Exp. 1



- Location overlap → better memory
- Content overlap → worse memory
- Conceptually replicates Exp. 1
- Subset of sample scanned using fMRI

Exp. 2 Results - Preliminary Pattern Similarity Analysis



pattern similarity analysis:
base grid (Grid 0) compared to experimental grids (Grids 1-4)

- Interaction in whole hippocampus: integration for same locations when objects differ
- Location overlap → Pattern integration in CA1, CA2/3
- Content overlap → Pattern separation in dentate gyrus

References

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