Semantic and episodic contributions to false memory formation

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Introduction

- Semantic memory is memory for concepts[1]
- Episodic memory is memory for events linked to a specific time and place[1]
- False memory is remembering an event differently from how it occurred[2]
- Semantic overlap increases false memory[3]
- Episodic overlap can reduce the ability to differentiate between events[4]
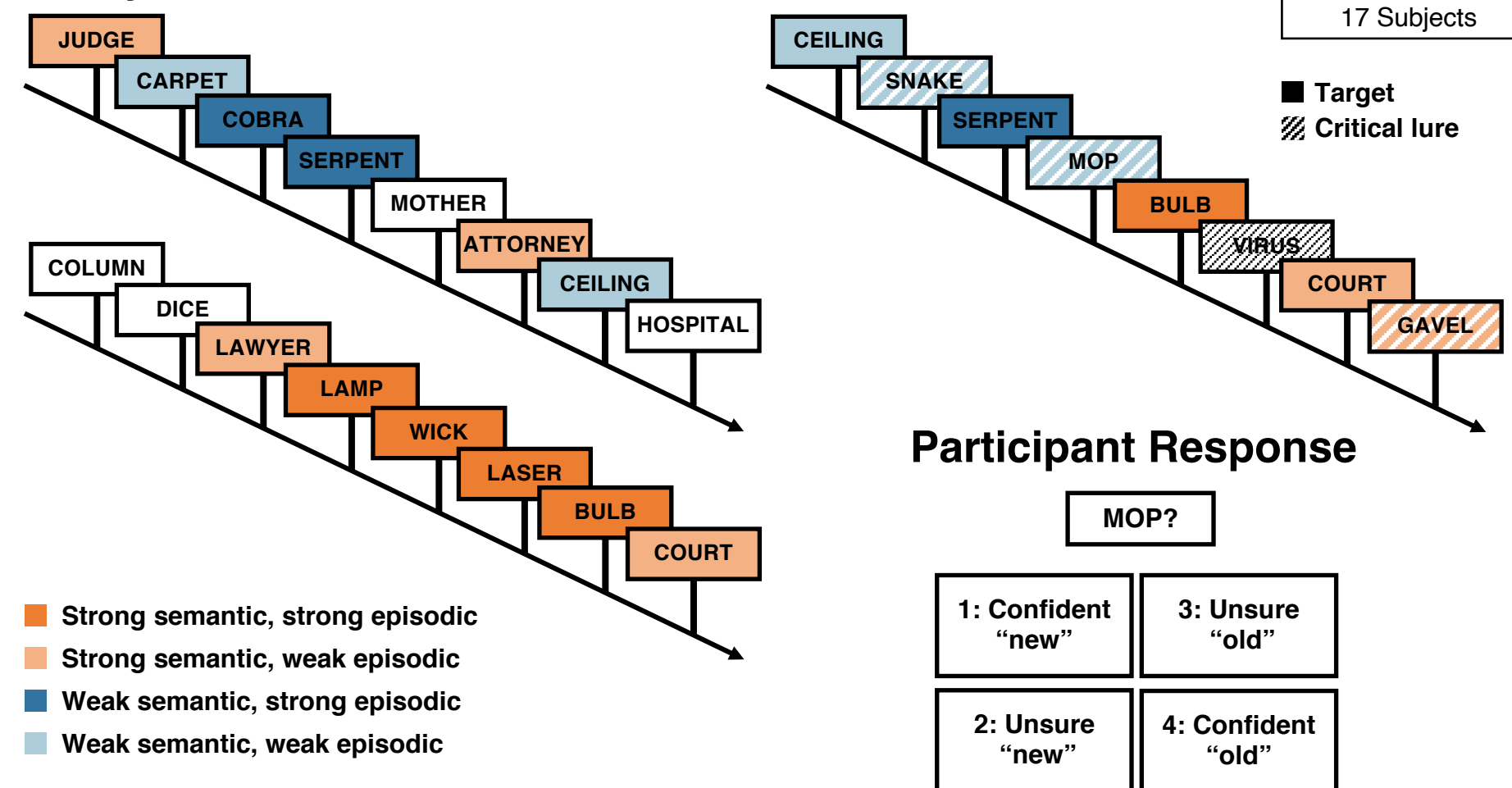
Question

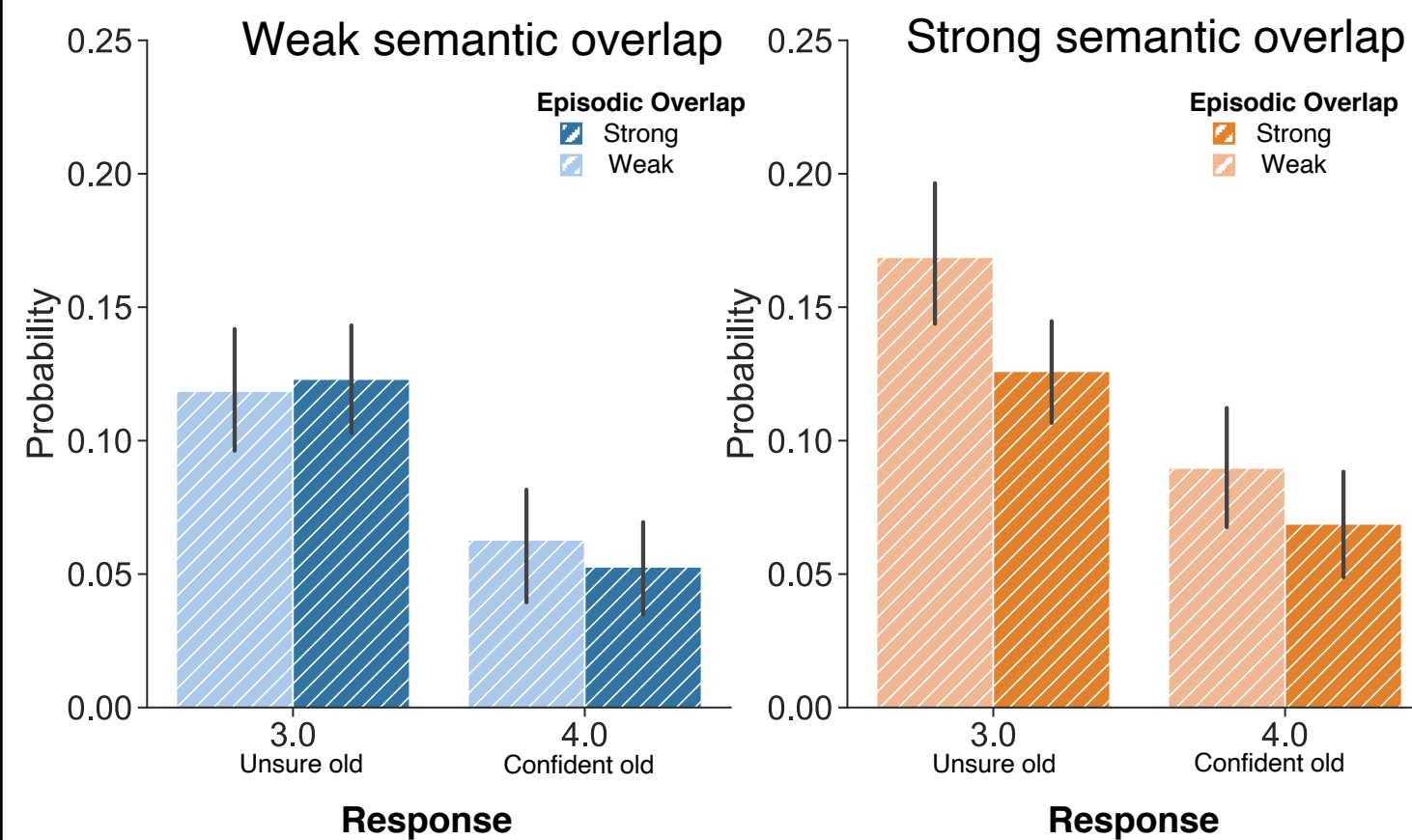- To what extent does semantic and episodic overlap contribute to false memory?

Hypotheses

- Hypothesis 1: attention will be oriented toward the specific details of an event, inhibiting false memory formation
- Hypothesis 2: attention will be oriented toward the shared features between events, promoting false memory formation
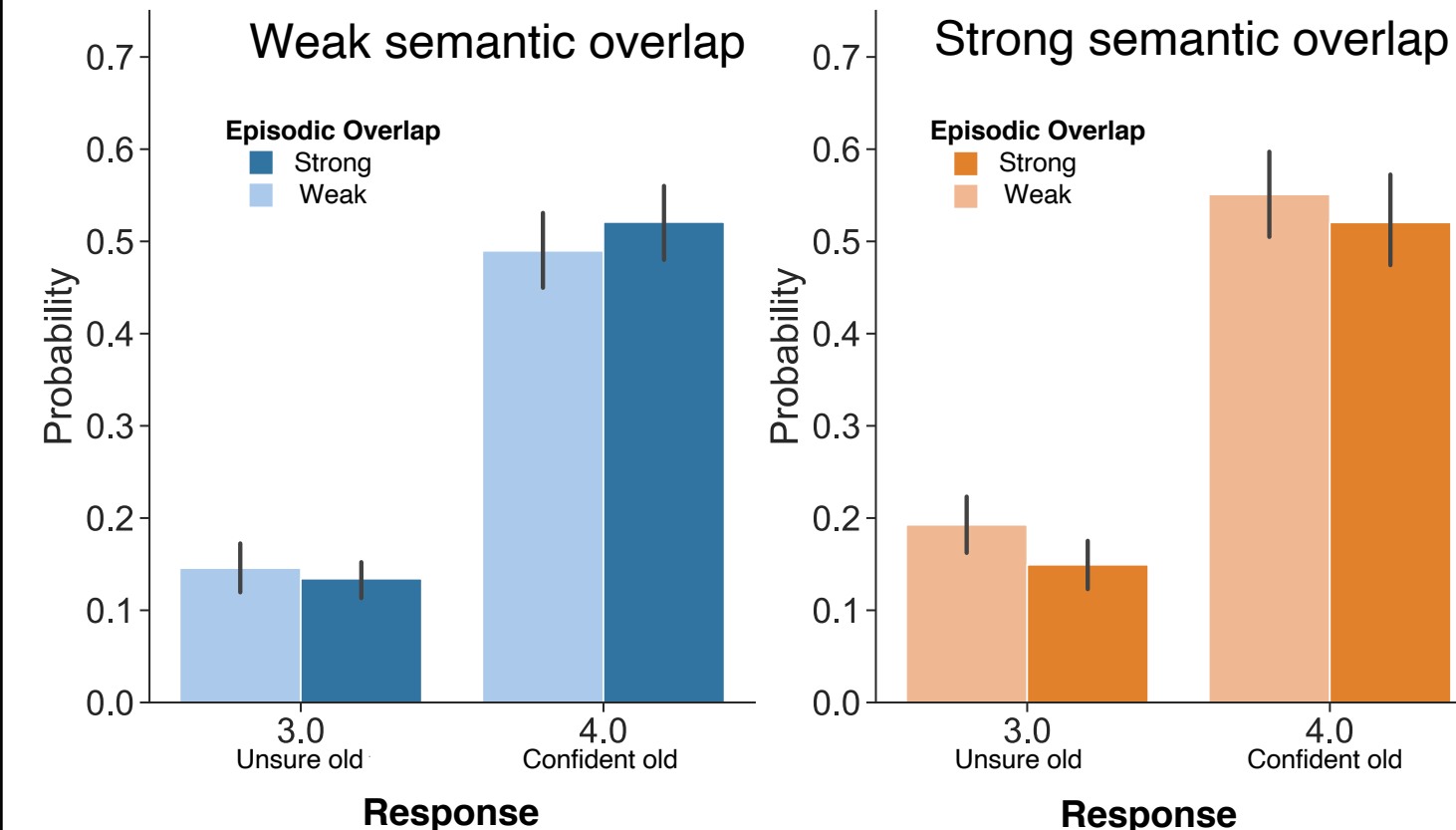
Recognition task

Study Phase

Test Phase

16 items/run
18 runs
2000 ms/stimulus
17 Subjects

- Strong semantic, strong episodic
- Strong semantic, weak episodic
- Weak semantic, strong episodic
- Weak semantic, weak episodic

Participant Response

MOP?

| 1: Confident "new" | 3: Unsure "old" |
| 2: Unsure "new" | 4: Confident "old" |

Participants falsely remember with high confidence

Probe Type
- Target
- Critical lure

- More confident responses have faster reaction times
- Participants most quickly give high confidence "old" responses to lures

Semantic and Episodic Overlap

Impact of overlap on lures

Lures with strong semantic overlap are more likely to elicit false alarms when episodic overlap is weak.

Impact of overlap on targets

Targets with strong semantic and weak episodic overlap are most likely to be classified correctly as "old".

Acknowledgements

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Summary

- Participants experience high confidence false memories.
- Lures with strong semantic overlap and weak episodic overlap are the most likely to elicit false memory.
- Furthermore, items with strong semantic overlap and weak episodic overlap are more likely to elicit an "old" response.
- Episodic and semantic overlap may play similar roles in promoting true and false memory
- This supports hypothesis 1: When events have semantic and episodic overlap, attention is drawn to specific details, inhibiting false memory.

Future Directions

- Continue data collection.
- Analyze the influence of semantic and episodic overlap on unsure versus confident responses.
- Analyze the influence of semantic and episodic overlap for "new" responses.
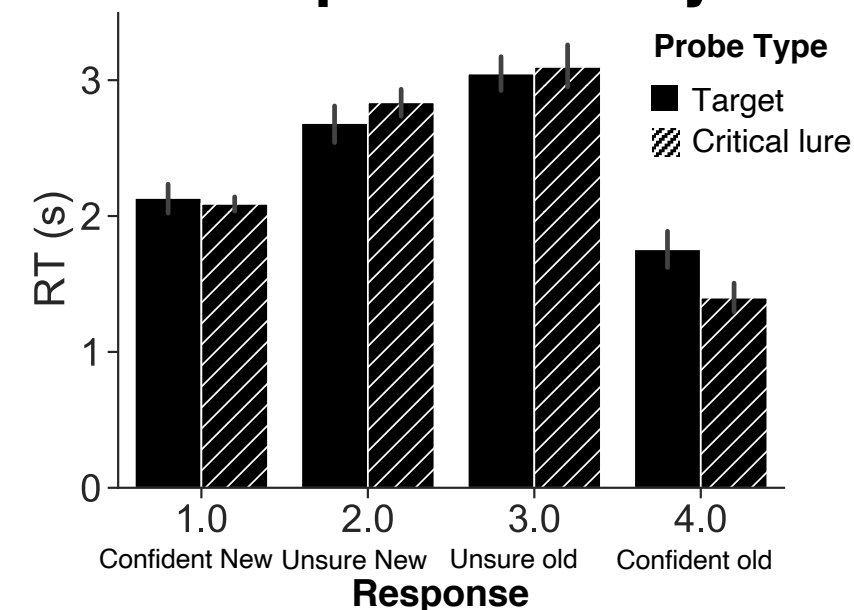
Open Questions

- How are these effects supported by the brain?
- How do these effects change over the lifespan?

References

1. Tulving, E. Episodic and Semantic Memory. Organization of Memory. Academic Press, (1972).
2. Roediger, H.L. et al. (1995). Journal of Experimental Psychology: Learning, Memory, and Cognition 21(4), 800-814
3. Gutchess, A.H. et al. (2012). NeuroImage 59(4), 3418-3426.
4. El-Kalliny, M.M., et al. (2019). Nature Communications 10(203), 1-10.