

Introduction

- Encoding and retrieval are competing memory processes that cannot be simultaneously engaged (Hasselmo 2005, Eichenbaum et al 2007, Long and Kuhl 2019)
- Brain states can be decoded from neural data (Long and Kuhl 2019, Smith et al 2022)
- Behavioral evidence suggests brain states linger to influence ongoing judgments, but the neural dynamics are unclear (Duncan et al 2012, Patil and Duncan 2018)

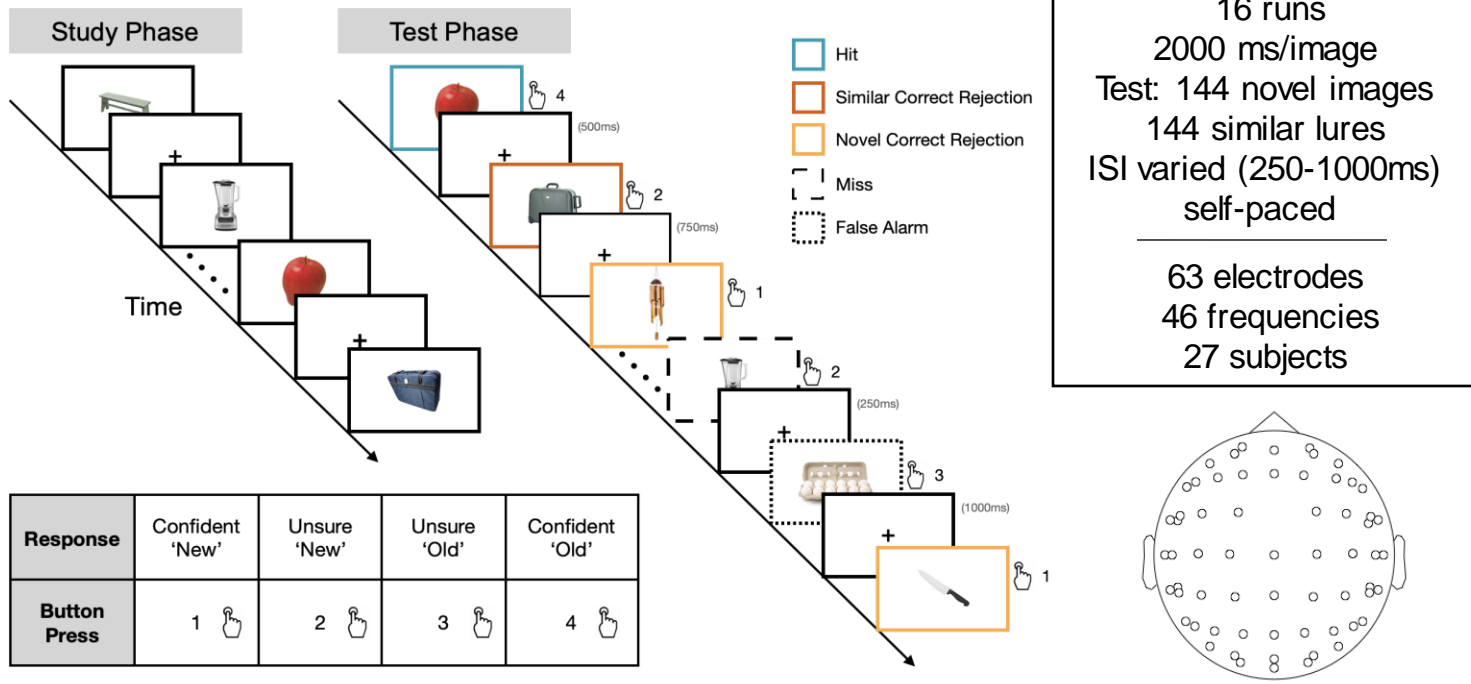
Question

To what extent do memory judgments induce lingering states that influence ongoing behavior?

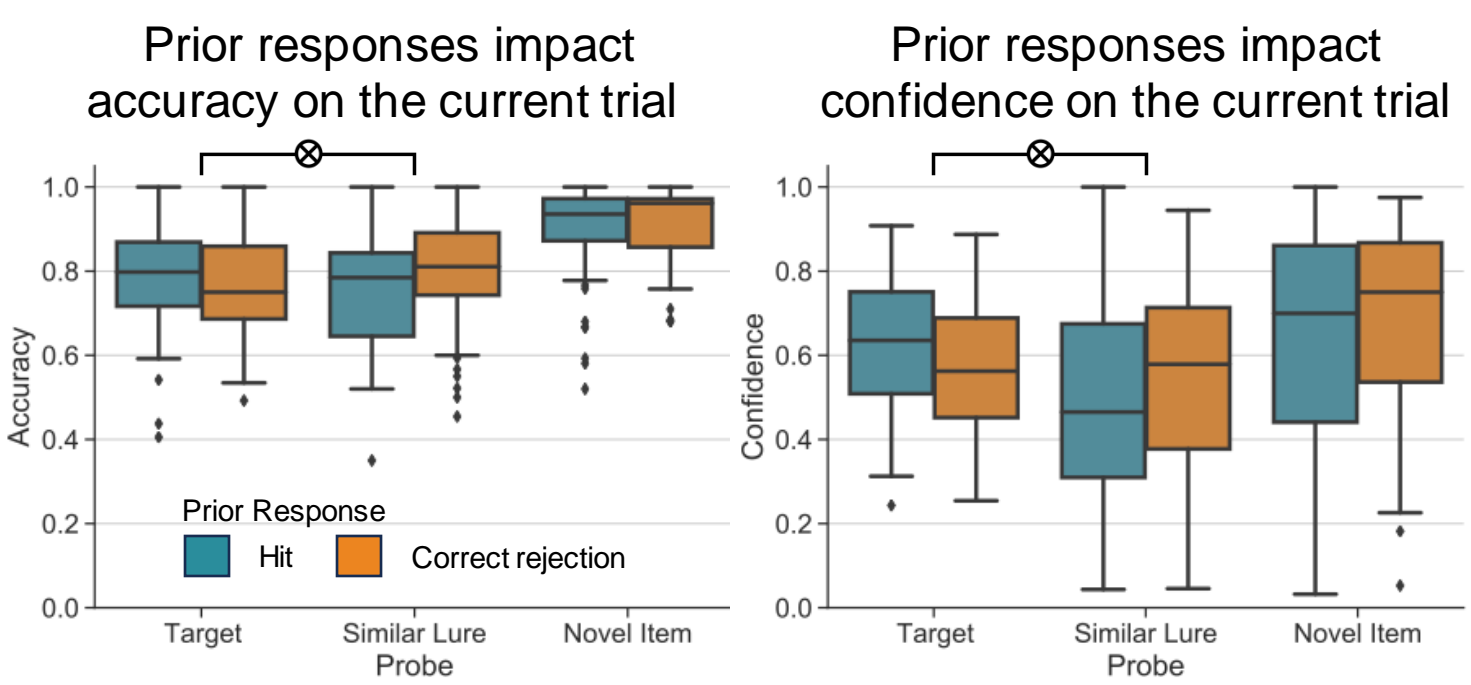
Hypothesis

- Memory brain states are modulated by memory judgments, and these brain states persist for several hundred milliseconds to impact subsequent memory judgments

Recognition task design

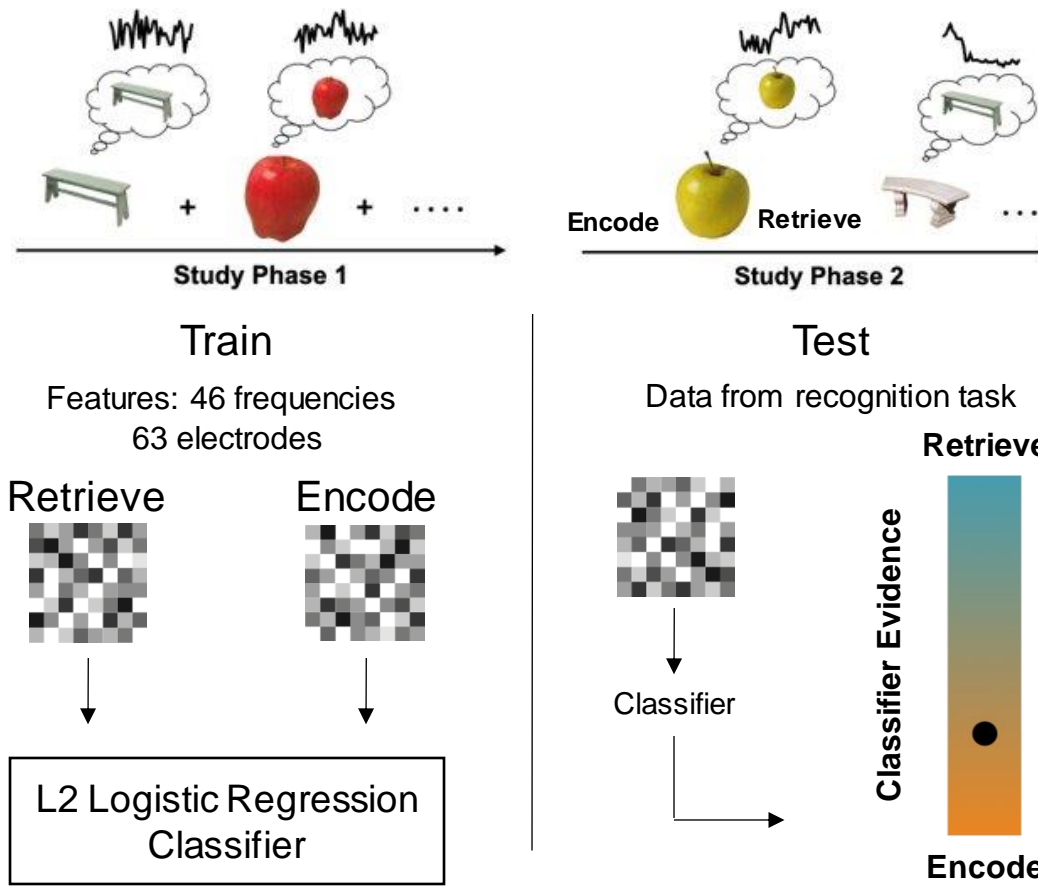


Lingering behavioral effects

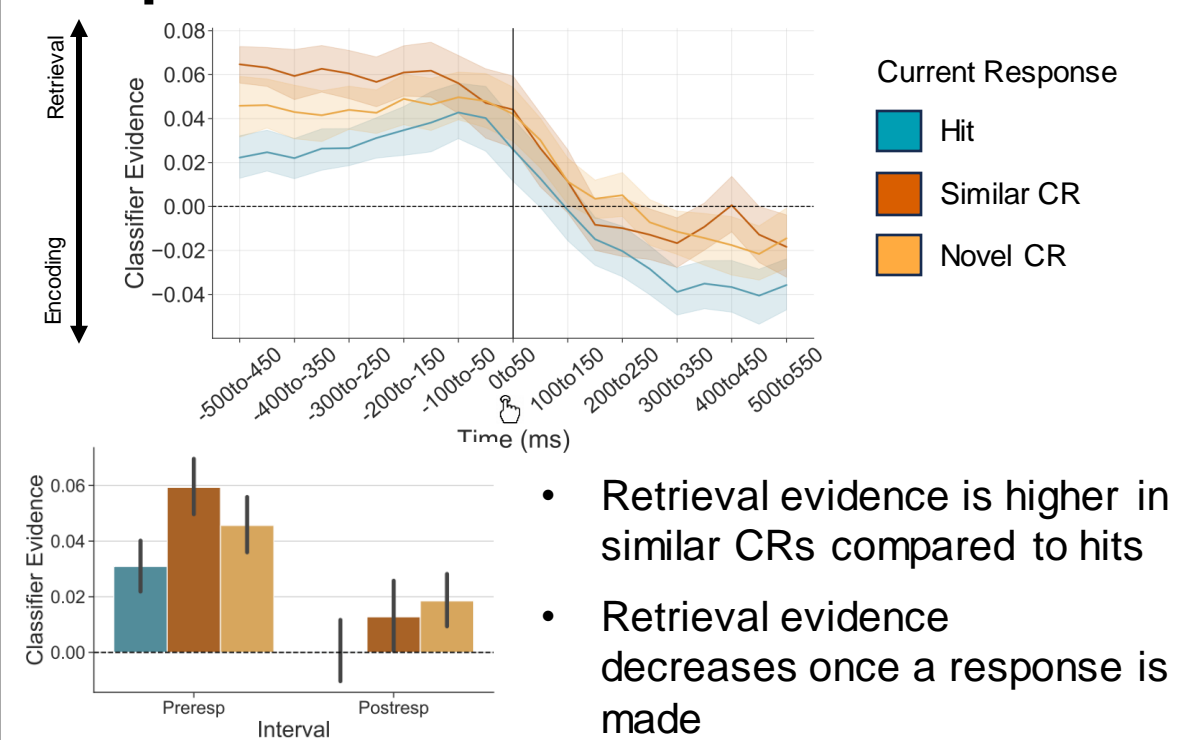


Cross-study classifier approach

Classifier trained on an independent dataset (N=35) in which participants were explicitly biased to encode or retrieve each item (Long 2023)



Response-locked classifier evidence



References

Duncan, K., Sadanand, A., & Davachi, L. (2012). Memory's penumbra: Episodic memory decisions induce lingering mnemonic biases. *Science*, 337(6093), 485-487.

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Long, N. M., & Kuhl, B. A. (2019). Decoding the tradeoff between encoding and retrieval to predict memory for overlapping events. *NeuroImage*, 201.

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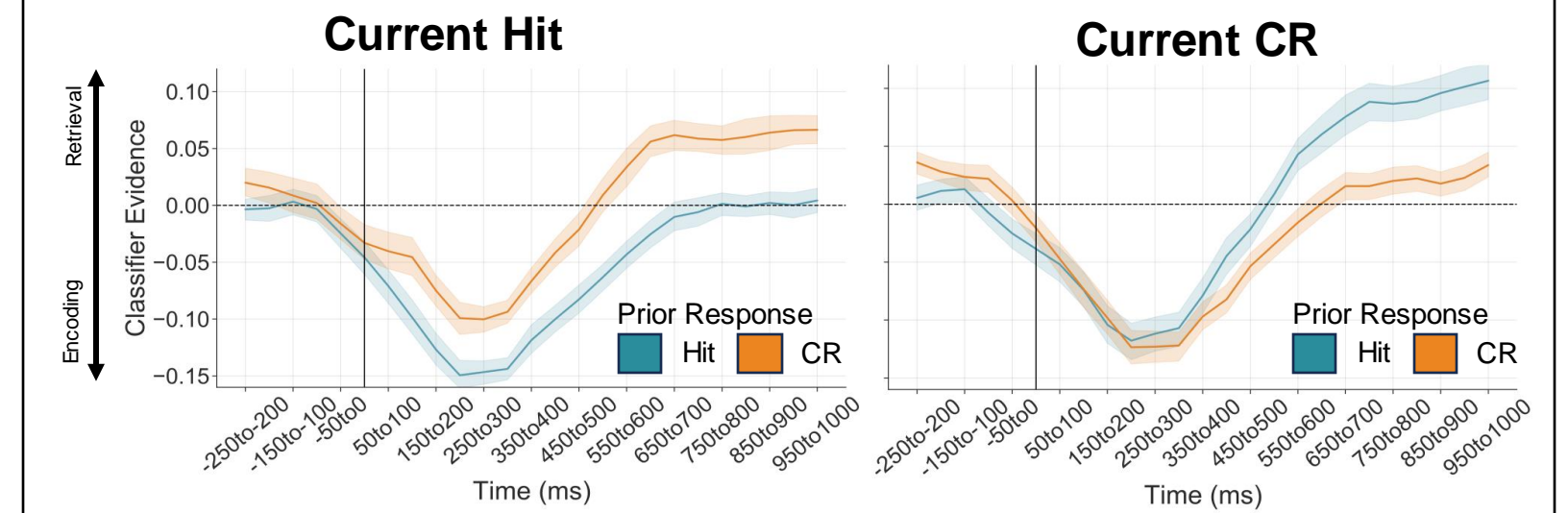
Patil, A., & Duncan, K. (2018). Lingering cognitive states shape fundamental mnemonic abilities. *Psychological Science*, 29(1), 45-55.

Smith, D. E., Moore, I. L., & Long, N. M. (2022). Temporal context modulates encoding and retrieval of overlapping events. *Journal of Neuroscience*, 42(14), 3000-3010.

Acknowledgments

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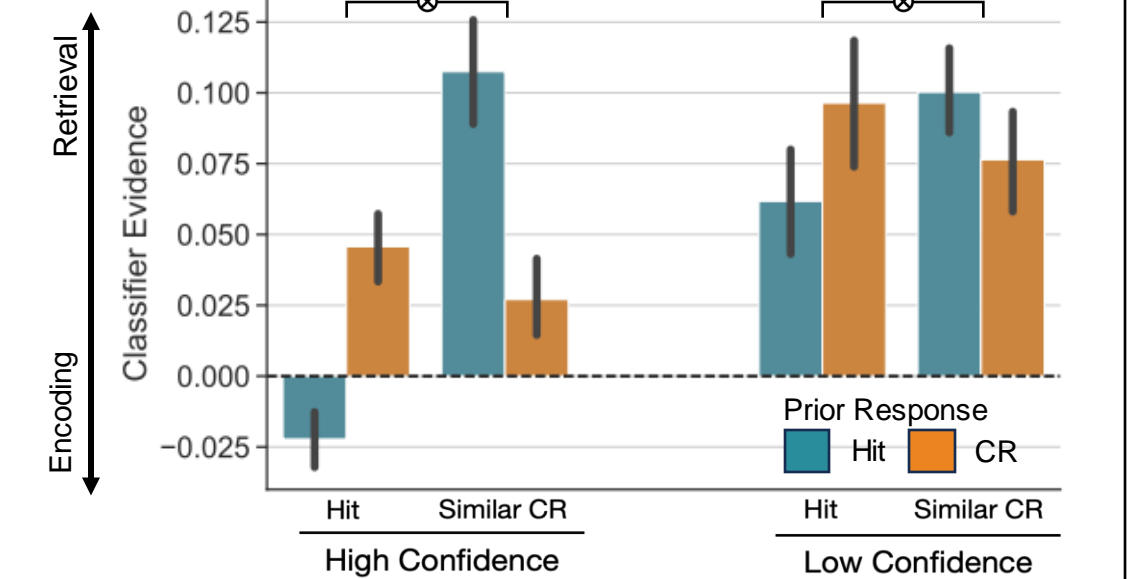
Stimulus-locked classifier evidence by prior and current response



- Retrieval evidence is higher for incongruent trials relative to congruent trials

Classifier evidence by prior response and current confidence

- Retrieval evidence is higher for low confidence responses relative to high confidence responses



Summary

- Prior responses modulate accuracy and confidence on the current response
- We do not find evidence that memory states linger after responses
- Prior responses modulate the extent that memory states are engaged on the current trial, whereby retrieval engagement is less when the demand of the current trial matches that of the prior
- Retrieval evidence is higher for low confidence responses

Conclusion

Ongoing behavior is modulated by prior memory judgments, whereas brain state engagement may reflect changes in task demands.

Future directions and open questions

- How do the congruency effects in memory brain states contribute to the observed behavioral effects?
- Can we differentiate memory state dynamics from attentional/control states?