A Test of Retrieved Context Models: Dynamics of Recall After Incidental Encoding

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Introduction

- *Temporal Contiguity Effect (TCE):* the tendency for the recall of one event to be followed by recall of another event that was originally experienced nearby in time (Kahana, 1996)

- Retrieved Context Models attribute the TCE to *automatic* encoding of temporal information whenever new memories are formed (Healey, Long, Kahana, 2018)
  - Predict a TCE even when subjects are not intentionally studying
  - Predict that when overall recall is high, there should also be high temporal contiguity

Introduction

- However, previous research has found that the TCE is dramatically reduced under incidental encoding (Nairne et al, 2017; Healey, 2018)

  - Overall recall remains high

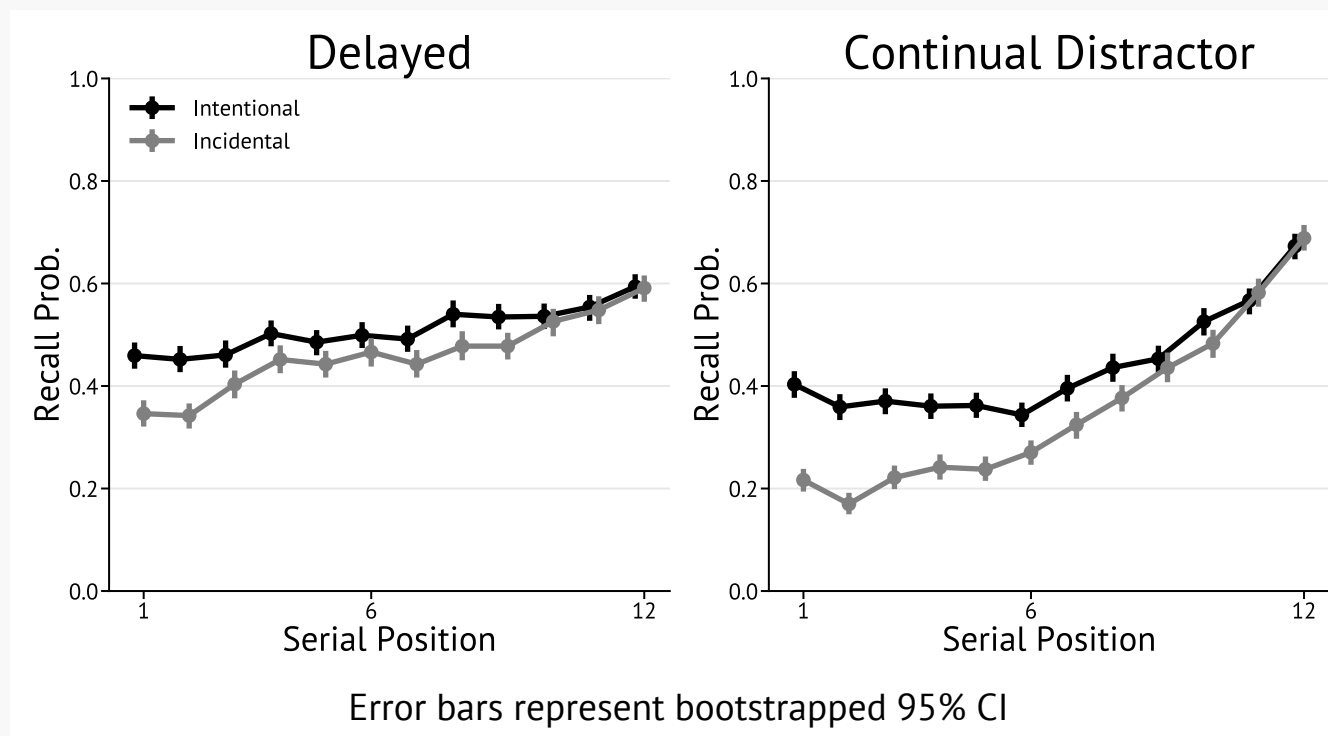Is there a TCE in incidental encoding?

Design

- *N* = 5,443 [Amazon Mturk]
- Free recall task
  - 1 list of 12 words

- 2x2 Between-Subjects Design
  - Explicit vs. Incidental
  - Delayed vs. Continual Distractor Free Recall
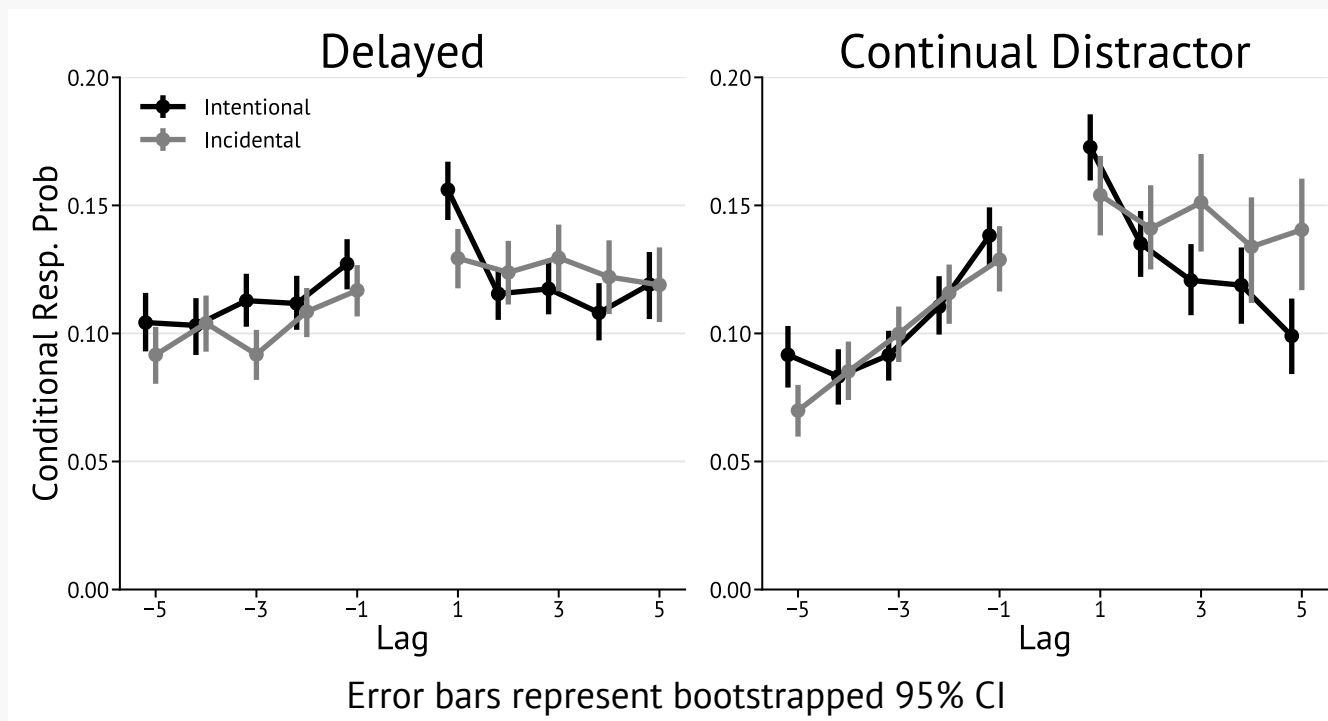
Serial Position Curves

- Expected patterns of overall recall

Error bars represent bootstrapped 95% CI

Lag-CRP

- Temporal contiguity is present in all conditions
  - Forward asymmetry in intentional encoding

Error bars represent bootstrapped 95% CI

Recency and Contiguity

- The incidental encoding conditions:
  - Displayed pronounced recency
  - Displayed a dramatically reduced TCE

- But it is possible that the contiguity observed under incidental encoding is due purely to recency
  - Qualitatively different from the contiguity observed in intentional encoding
  - If so, this would limit the scope of Retrieved Context Models

Pure-Recency Simulation

- Lag-CRP is unable to distinguish between a TCE due to recency only and a TCE generated by a bias for near lags

- To illustrate, we simulated data for a hypothetical subject who recalls recent items, but who has no bias for recalling items in temporal order.
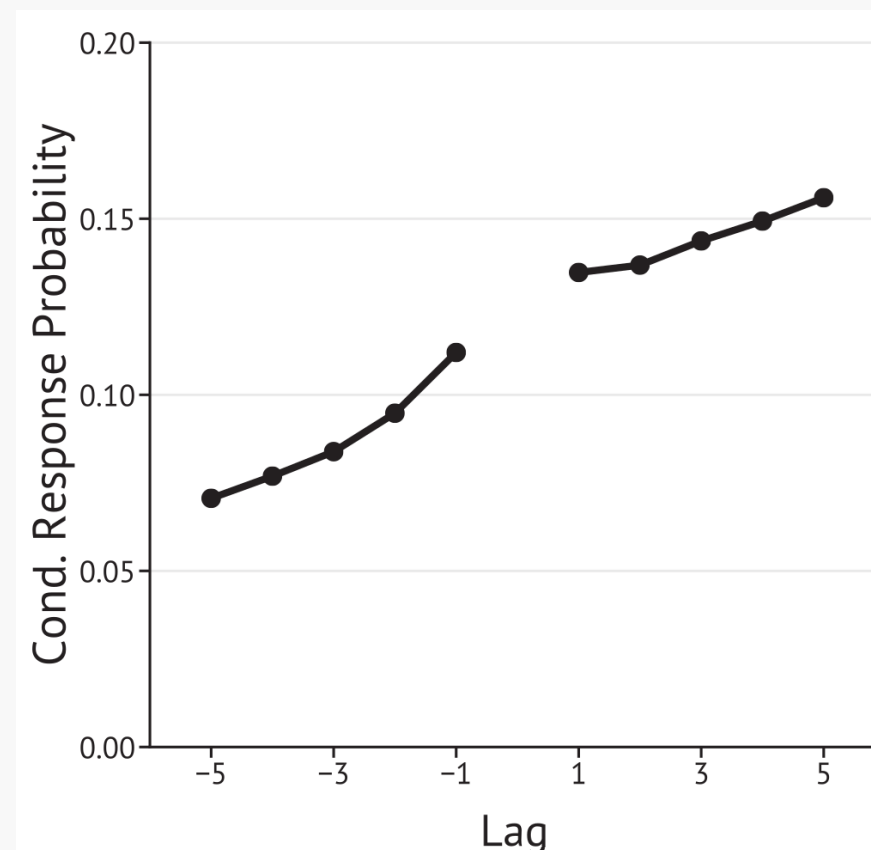
Recency and Contiguity

- Temporal bias scores (Uitvlugt & Healey, 2019)

    - Measure the level of temporal contiguity in a set of recalls relative to what would be expected if the same items were recalled in random order

    - Control for the effects of recency

    - Score of zero indicates that a given lag occurred as often as would be expected

Pure-Recency Simulations

- Lag-CRPs and temporal bias scores for simulated subjects with contiguity due only to recency in their recalls

  - Demonstrates no TCE beyond the effects of recency

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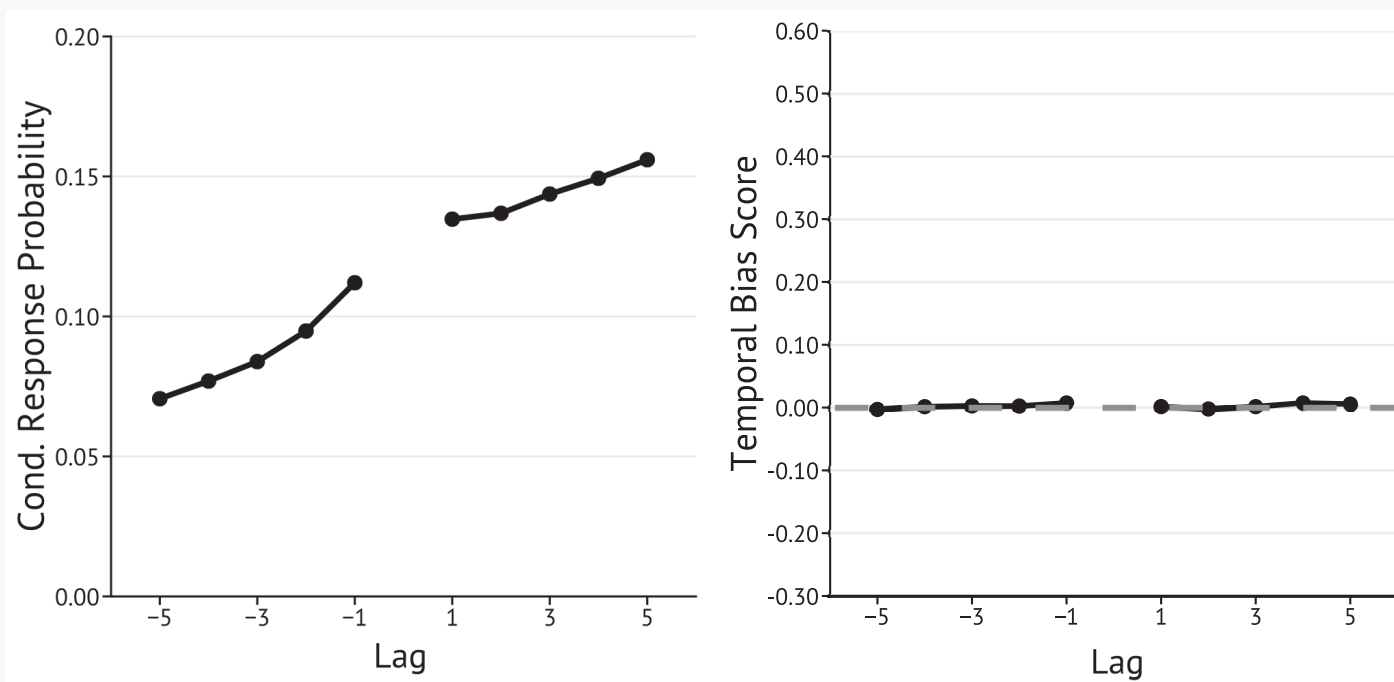
Recency-Plus Simulations

- Lag-CRPs and temporal bias scores for simulated subjects with significant recency in their recalls, but also a strong preference for making near lags
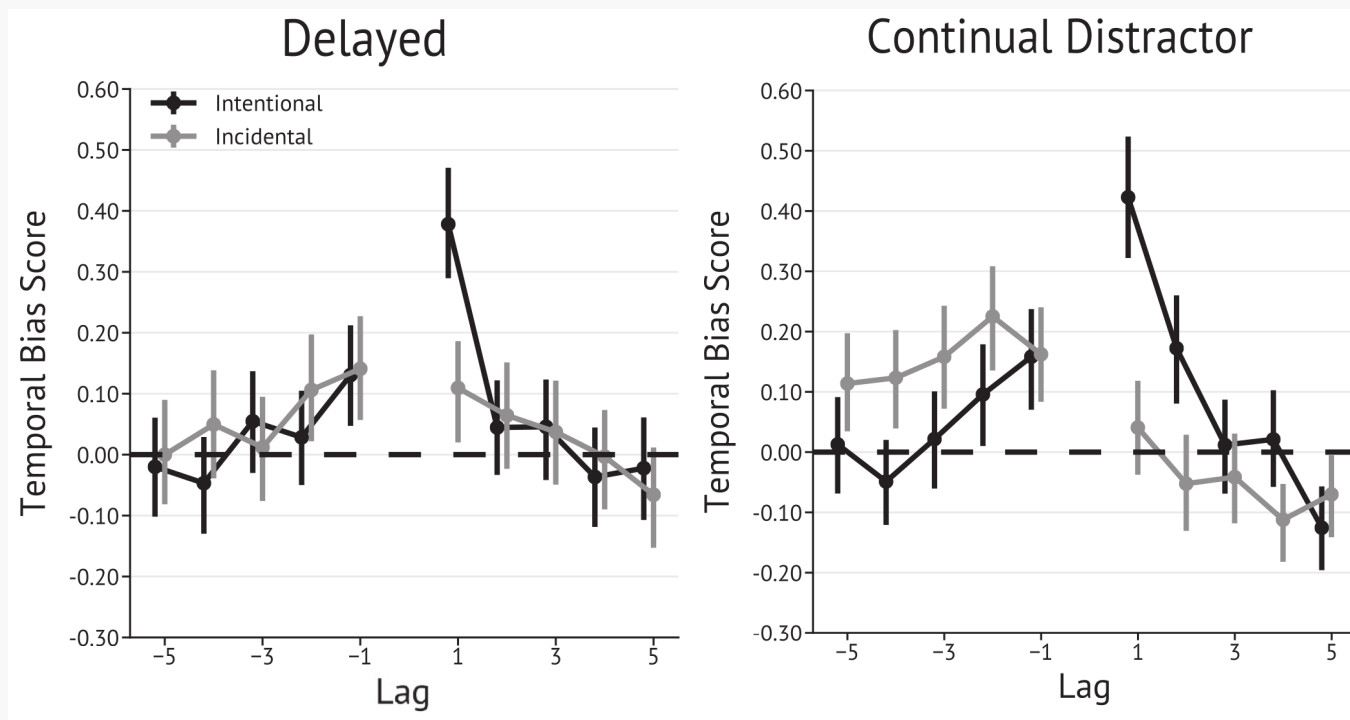
  - Demonstrates a TCE beyond the effects of recency
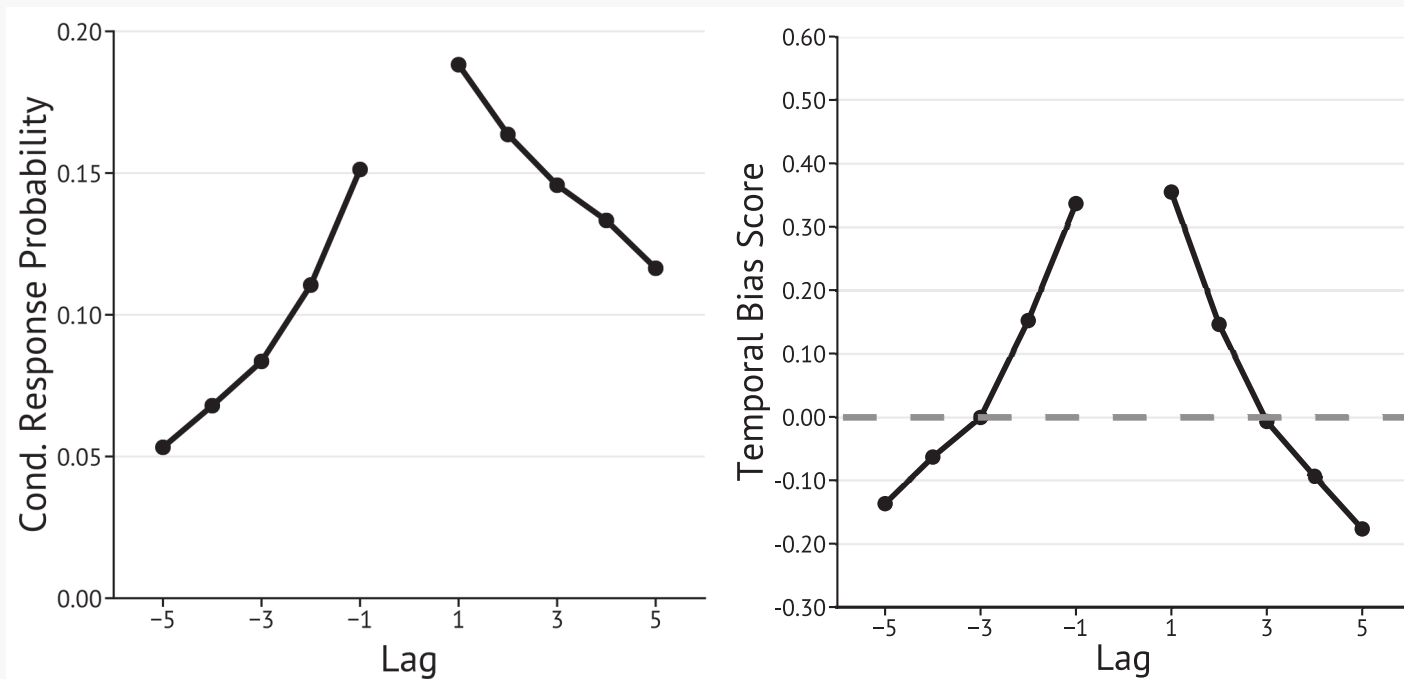
Is there a bias for near lags above and beyond the influence of recency?

Temporal Bias Scores in the Data

- There is evidence of a significant TCE *in all conditions* once the effects of recency have been accounted for


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Retrieved Context Models

- Retrieved Context Models predict
    - A TCE in all conditions
    - The TCE is not generated through recency alone (context reinstatement)

- Can a Retrieved Context Model quantitatively fit to the data?
    - Fit would demonstrate the TCE beyond recency in the model is consistent with the data
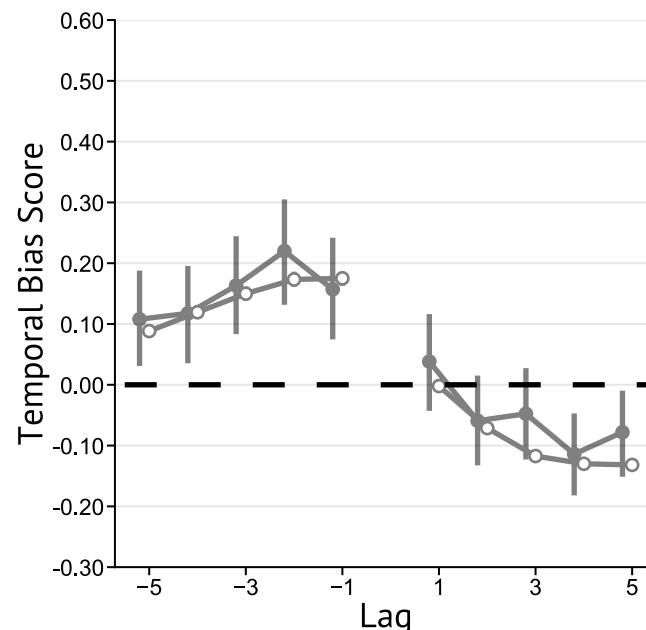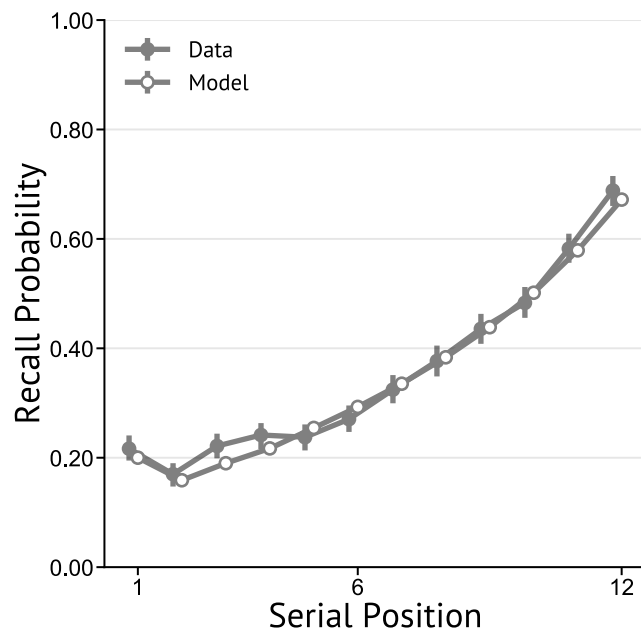
Incidental Delayed

- The model provided good fits to the shapes of the serial position curves and temporal bias scores of the data
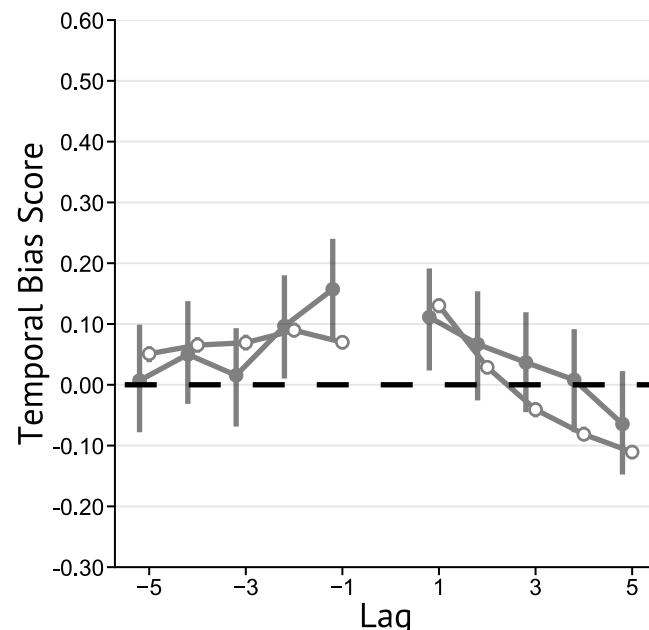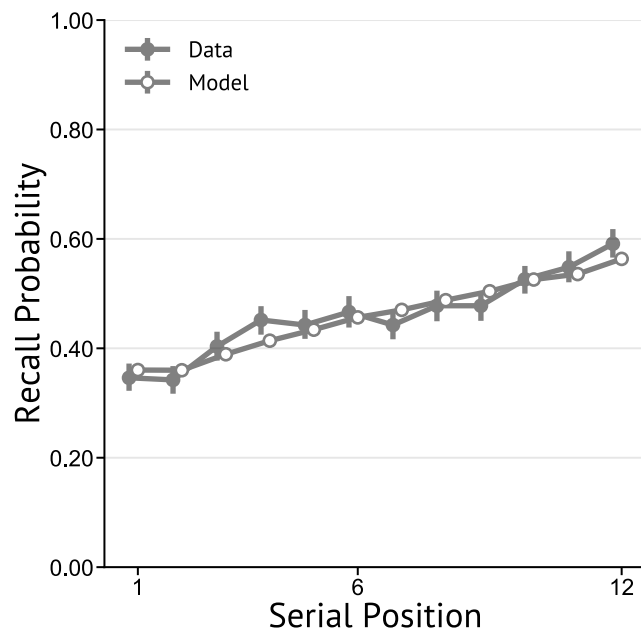
Incidental Continual Distractor

- The model provided good fits to the shapes of the serial position curves and temporal bias scores of the data

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Conclusions

- The TCE is dramatically reduced, but not eliminated, when subjects are not intentionally studying

- The TCE in incidental encoding is not due to recency alone, consistent with the predictions of Retrieved Context Models

Thank you!

Feel free to contact us with any questions or comments:

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