

A Post-Encoding Pre-Production Reinstatement (PEPPR) Model of Dual- List Free Recall

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CONTEXT AND EPISODIC MEMORY SYMPOSIUM

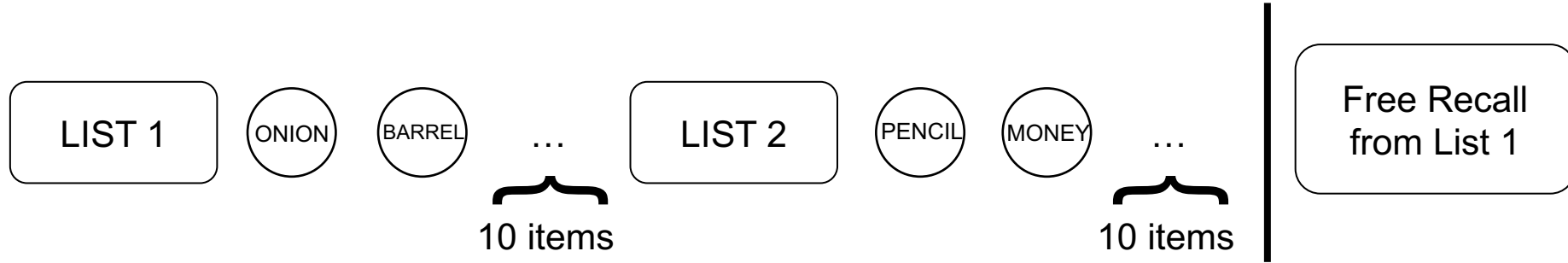
Introduction

- Recall everyone who spoke before lunch
- Recall everyone who spoke at CEMS 2019

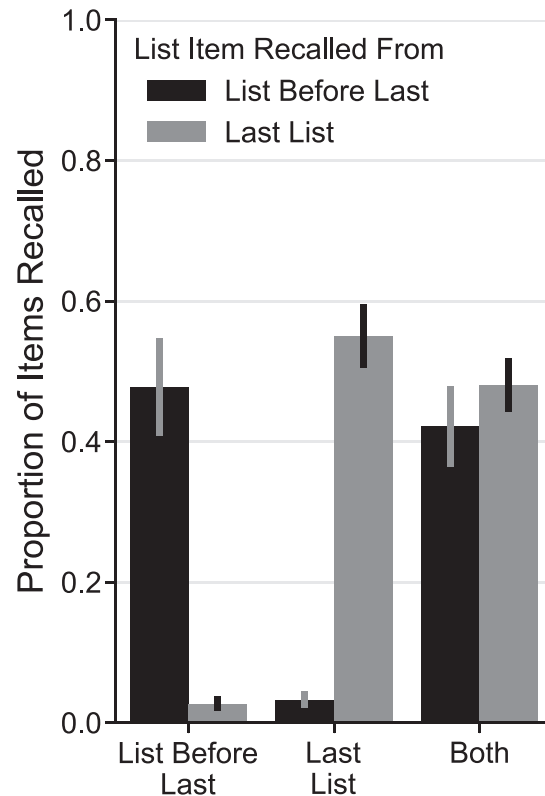
Introduction

- Recent memories come to mind easily
 - We have good models of how this works
- Less recent memories are harder to access
- How does the memory system overcome the pull of recent memories to access non-recent memories?
 - Models are less well developed

The Dual-List Task (Wahlheim et al., 2017)



Wahlheim et al., 2017 Data

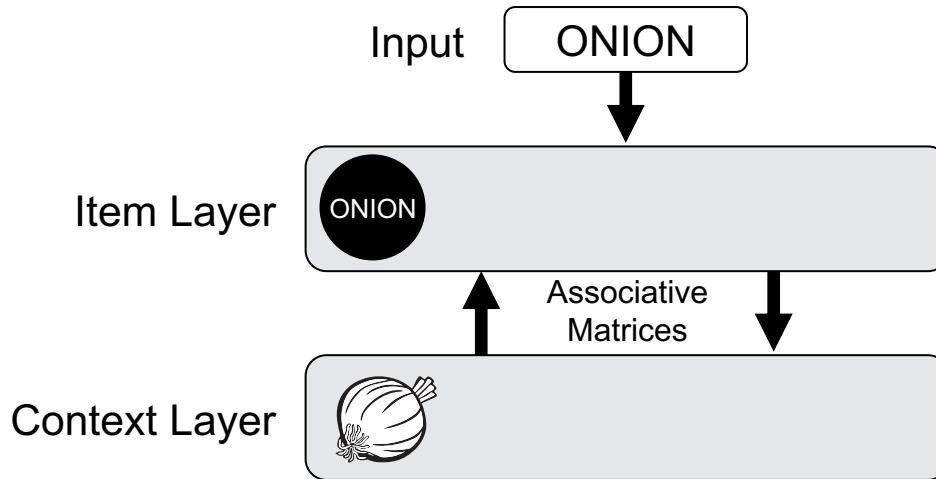


Error bars are 95% CIs

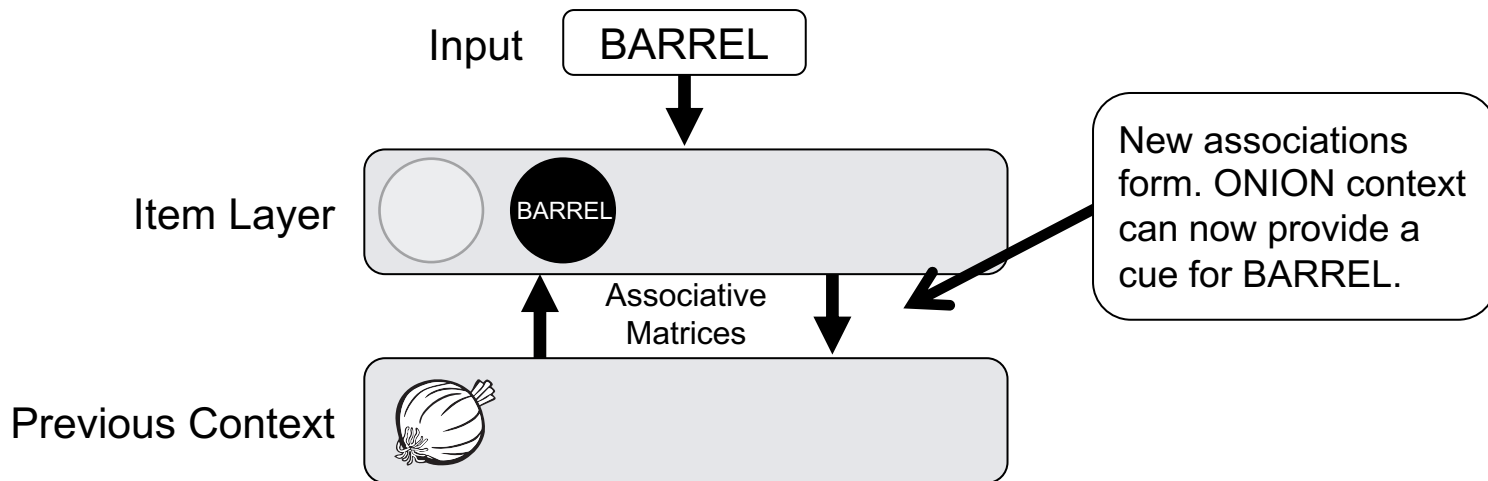
We started with an existing model

- And then added mechanisms to access non-recent items
- We will use Lohnas et al. 2015's Context Maintenance and Retrieval Version 2 (CMR2)
- Let's see how the model encodes items

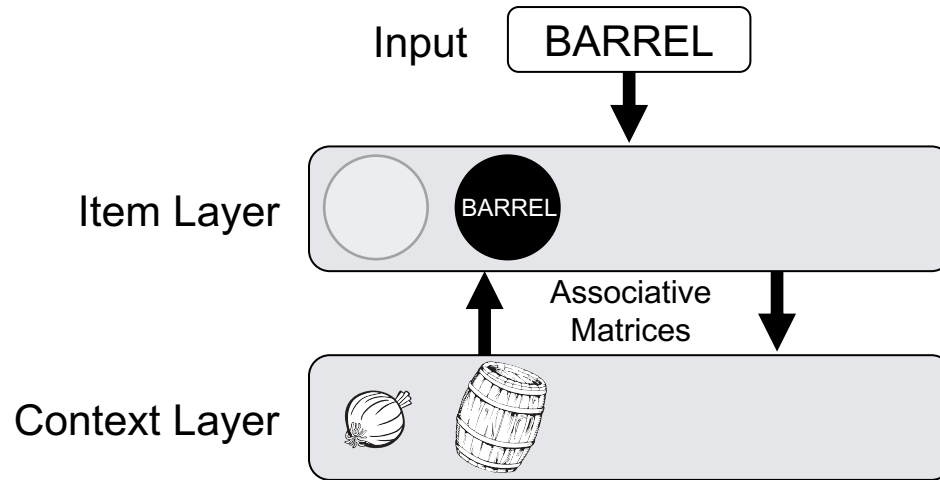
CMR2 Study Phase



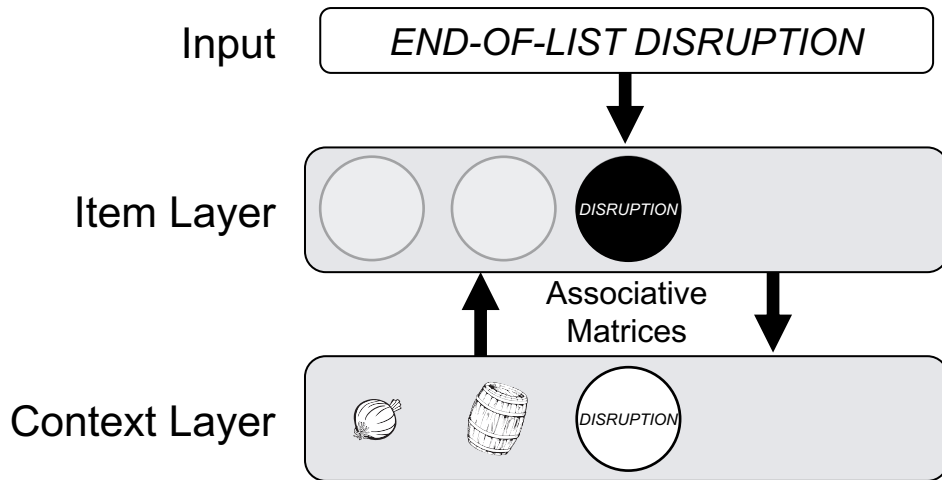
CMR2 Study Phase



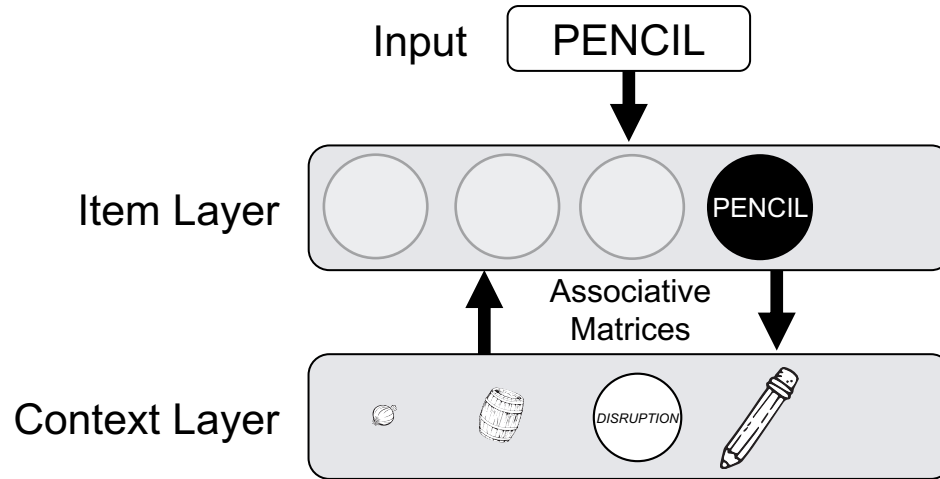
CMR2 Study Phase



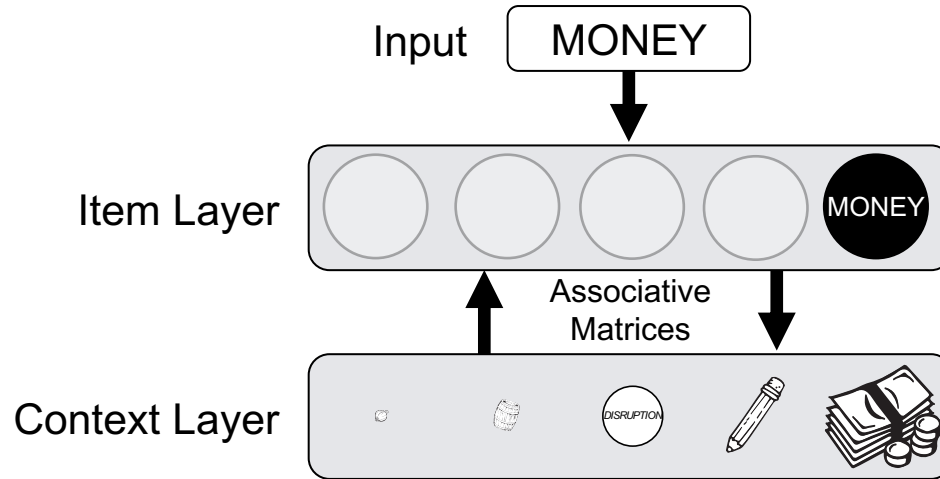
CMR2 Study Phase



CMR2 Study Phase



CMR2 Study Phase



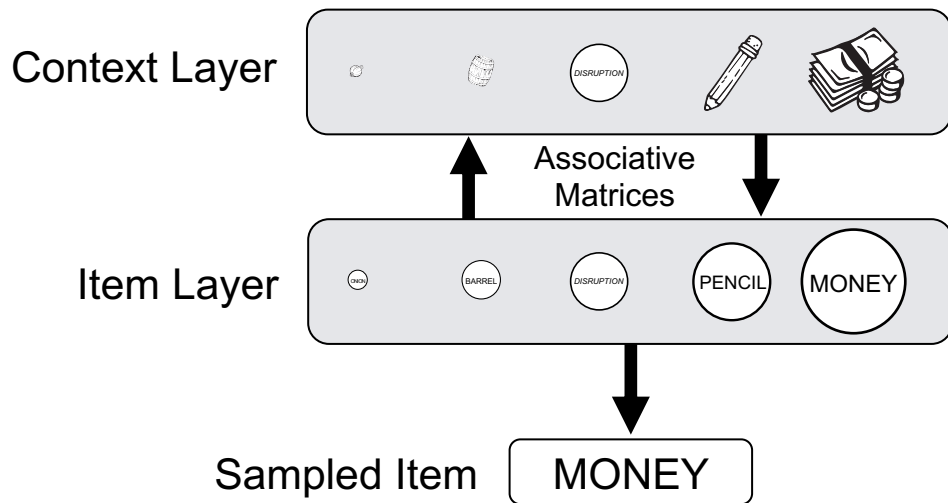
Recalling *non-recent* items?

- We borrowed concepts from the metacognitive literature (Goldsmith, 2016; Halamish, Goldsmith, & Jacoby, 2012; Jacoby, Kelley, & McElree, 1999; Jacoby et al., 2005)
- And test two different mechanisms:
- **Post-retrieval:** Source monitoring to **reject** intrusions from the recent list
- **Pre-retrieval:** Cue specification to **prevent** intrusions from the recent list

Mechanism #1: Post-retrieval Monitoring

- Lohnas et al. 2015 implemented in CMR2 to model List-Before-Last recall
- Assumes that recall starts by using the current context at the end of the most recent list is used as the cue

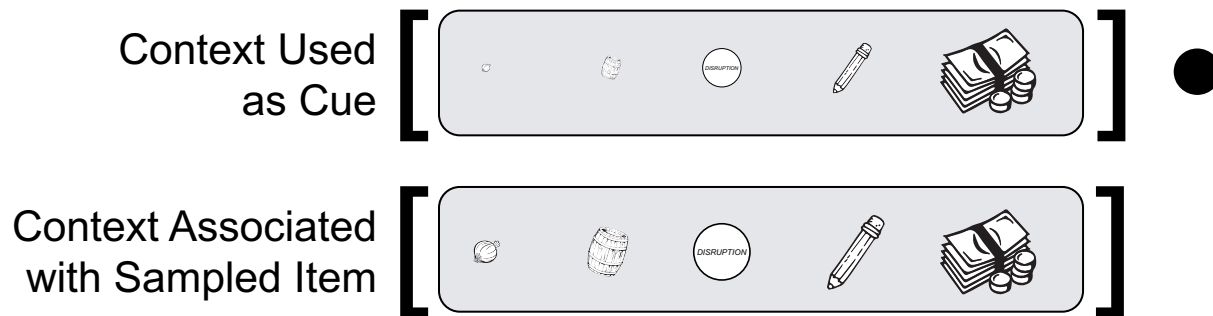
How can *recent* context provide access to *non-recent* items?



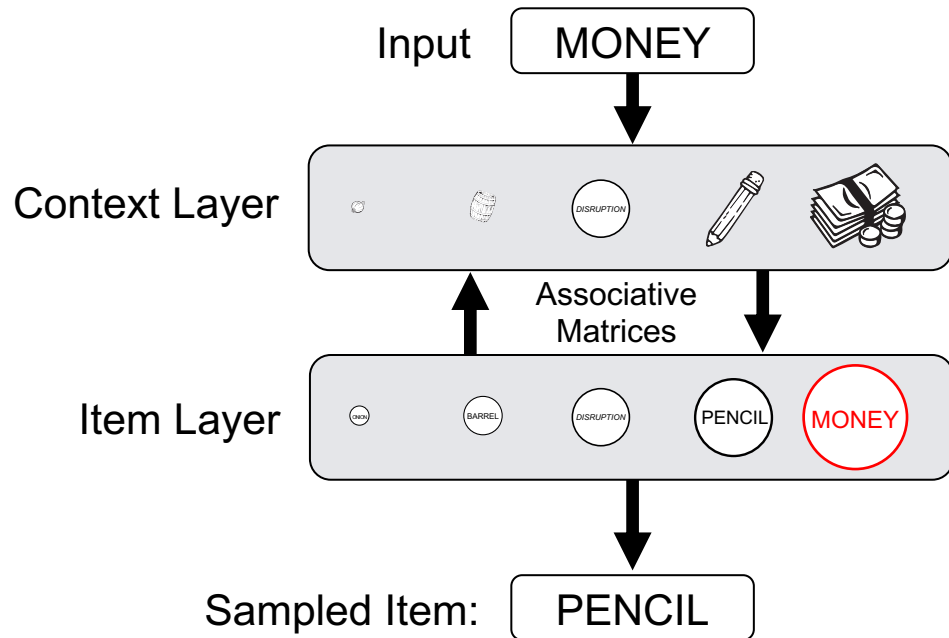
How can *recent* context provide access to *non-recent* items?

- Generate-recognize source monitoring to **reject** intrusions

(Atkinson & Juola, 1974; Bahrick, 1970; Kintsch, 1970)

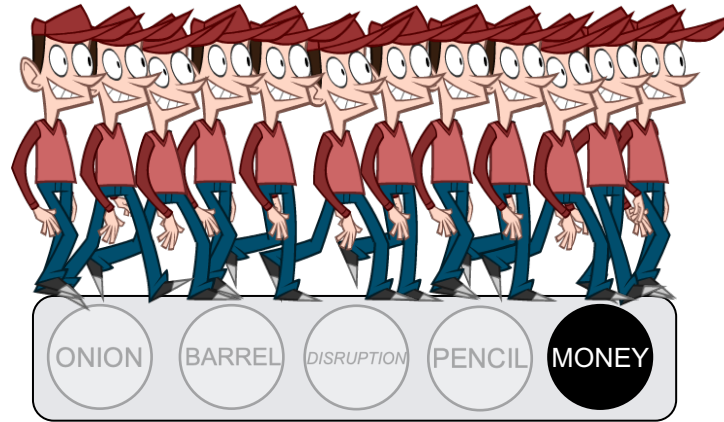


Post-retrieval Monitoring to *reject recent* items



Sampled	Source Monitoring
MONEY	REJECTED
PENCIL	REJECTED

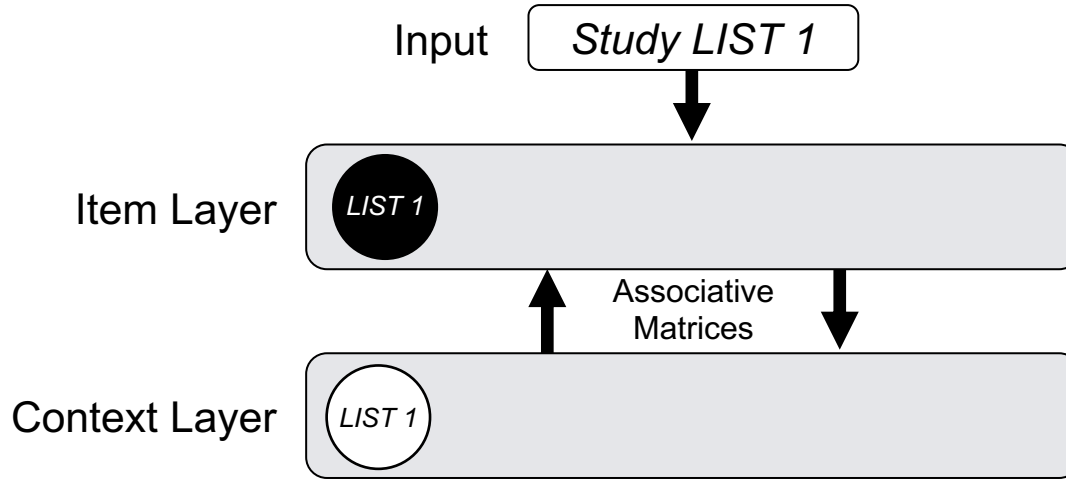
The Backward-Walk Mechanism



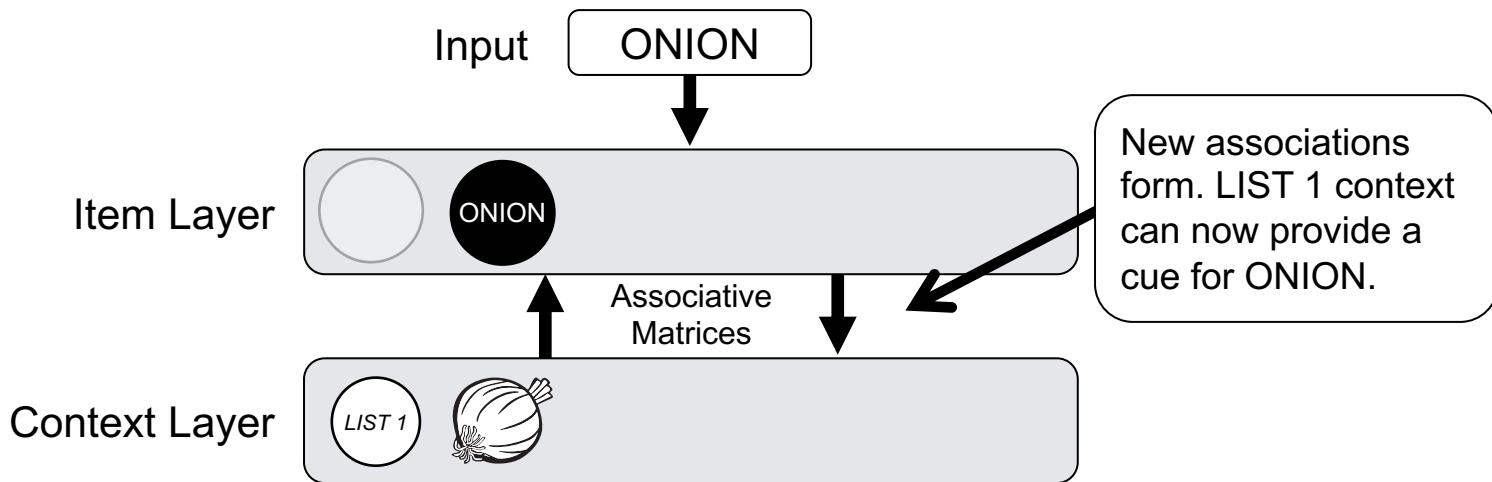
Mechanism #2: Pre-retrieval Context Reinstatement

- Perhaps a Pre-retrieval mechanism provides direct access to non-recent items (e.g., Goldsmith, 2016; Jacoby et al., 2005, Jang & Huber, 2008; Lehman & Malmberg, 2009)
- This class of mechanisms operates:
 - **P**ost-**E**ncoding,
 - but **P**re-**P**roduction,
 - via context **R**einstatement
- So we call it **PEPPR**

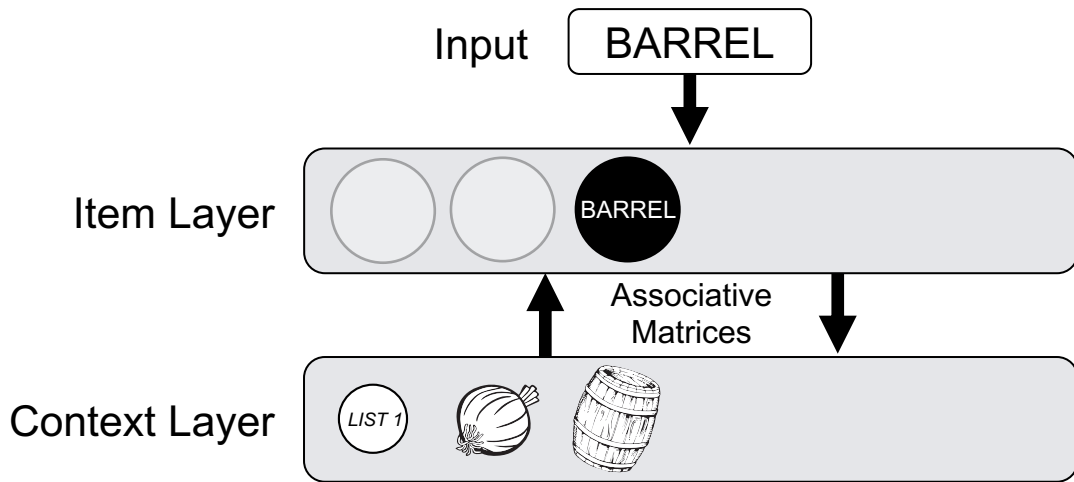
Task instructions have context representations



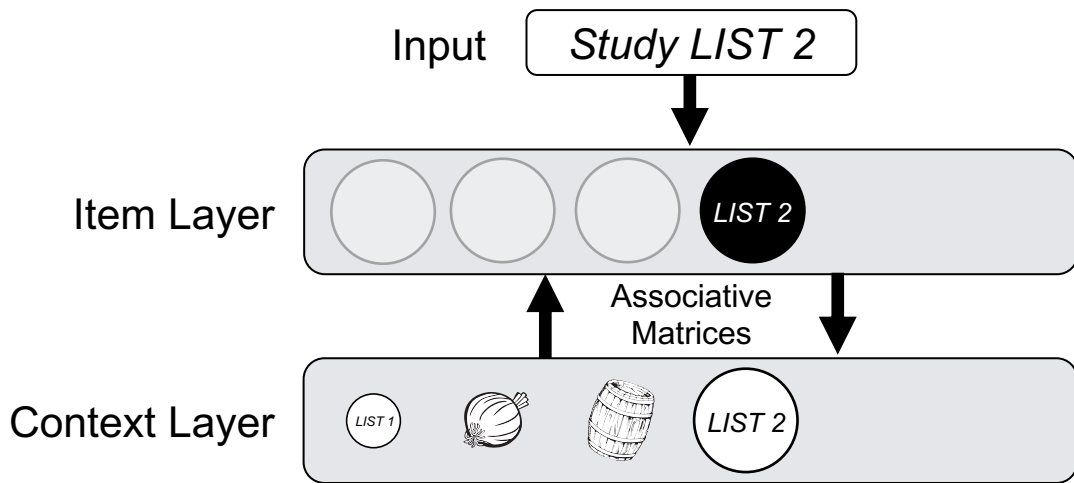
List context representations persist



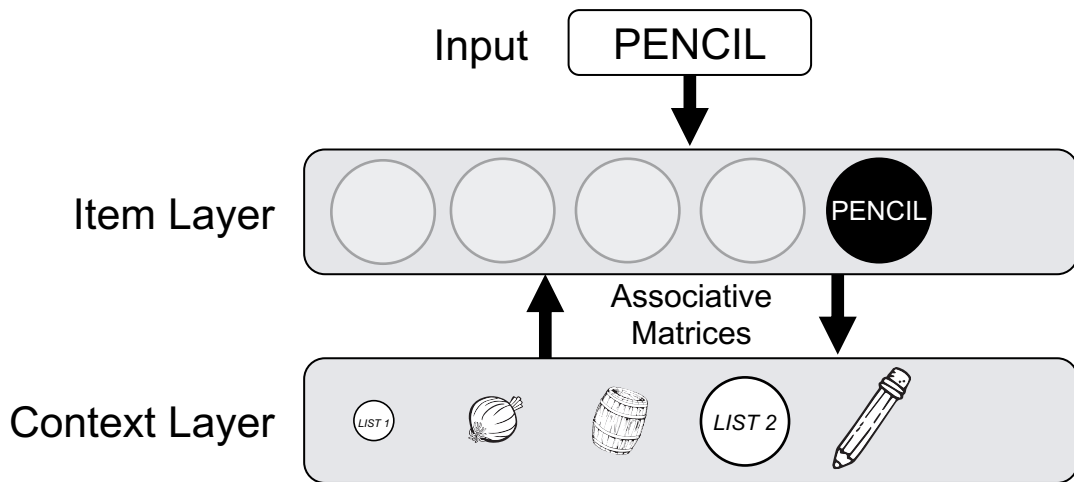
List context representations persist



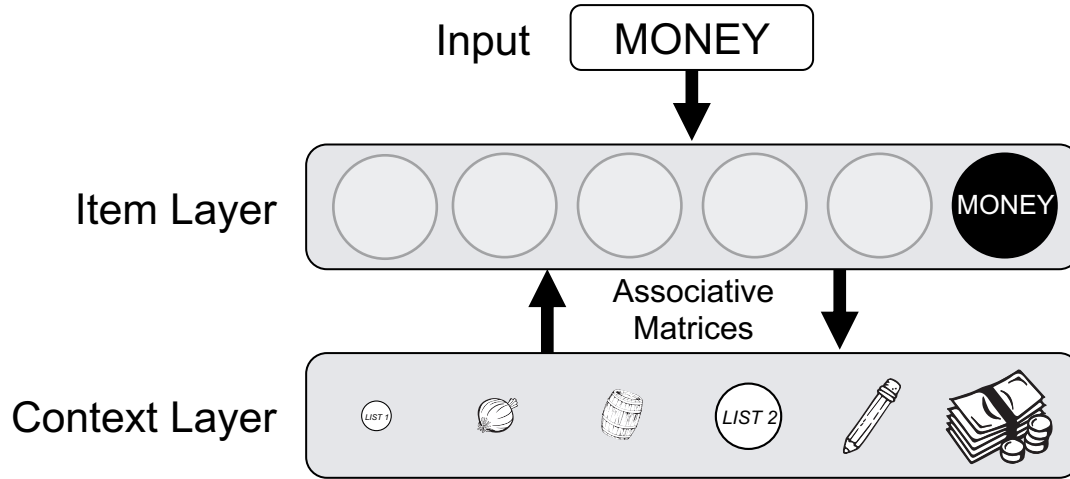
List context representations persist



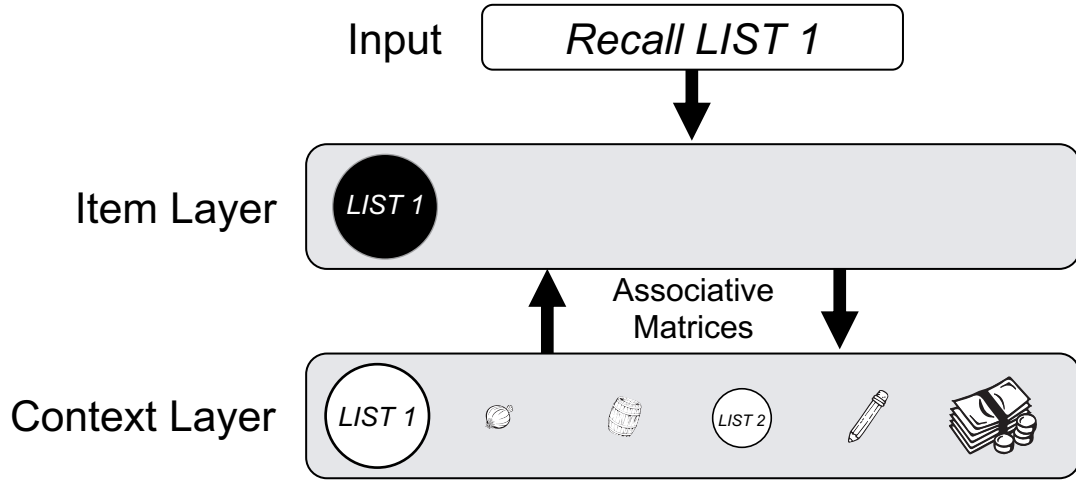
List context representations persist



List context representations persist

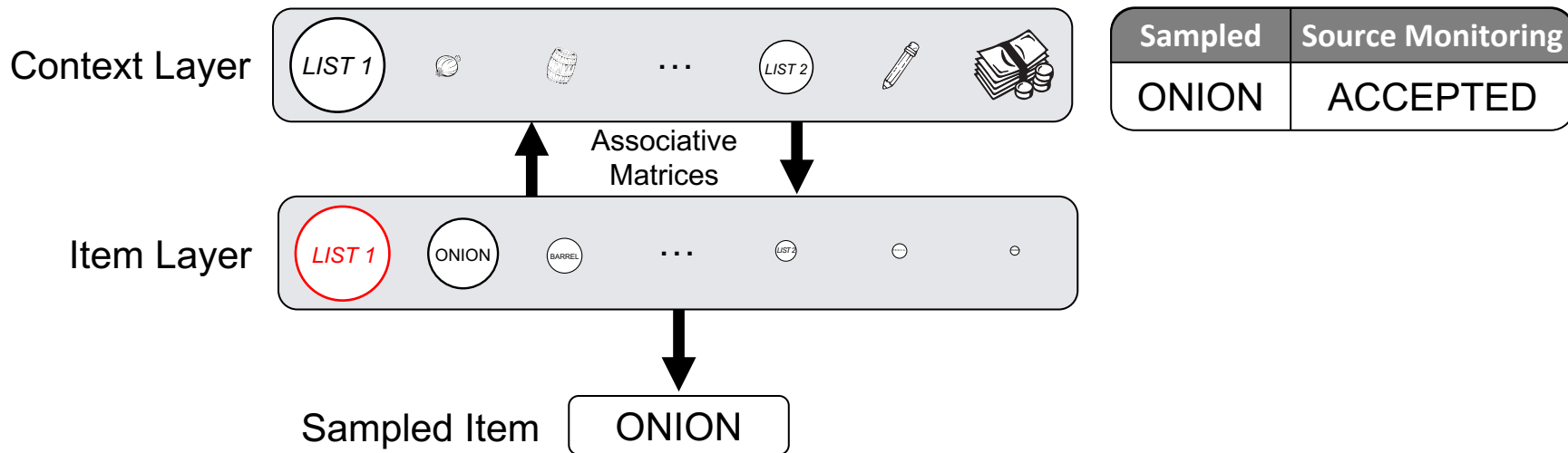


Instructions to recall List 1 reinstate list context

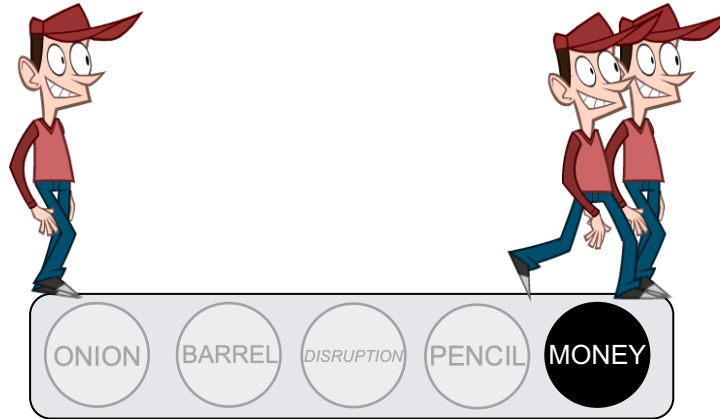


List context forms part of the search cue

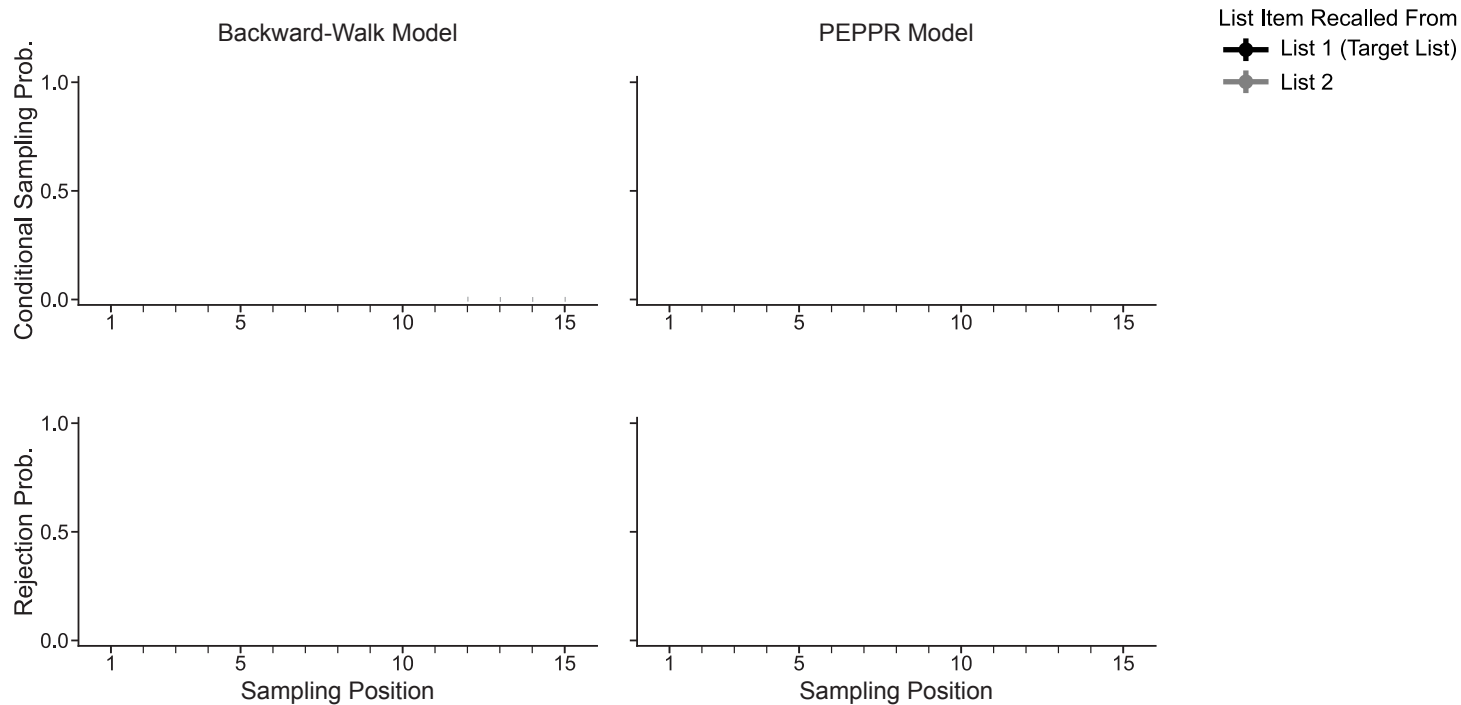
- Reinstated context is used as the cue



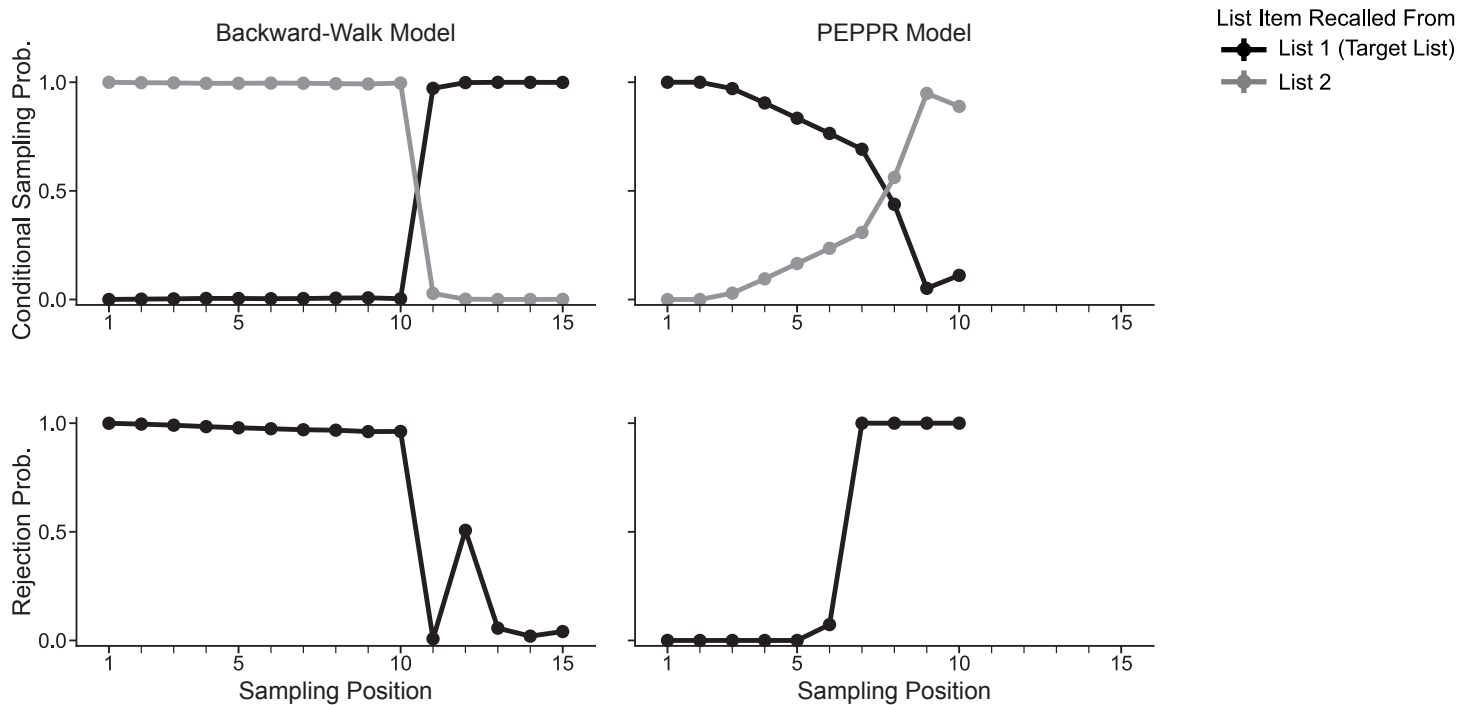
The PEPPR Mechanism



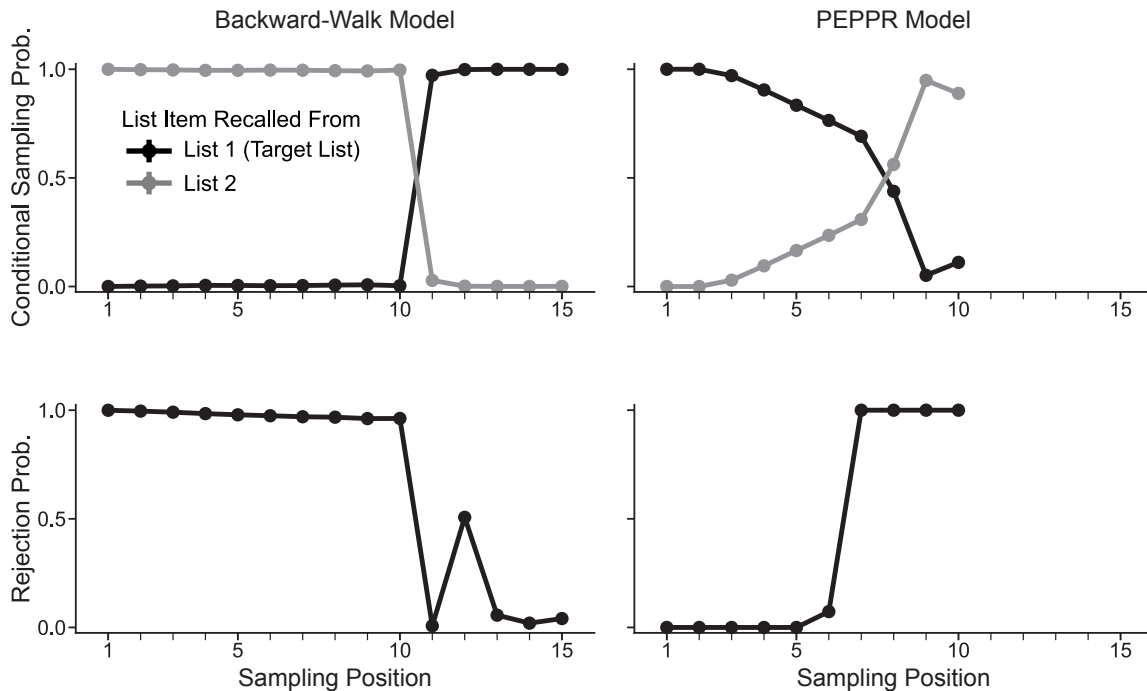
Model Predictions



Model Predictions

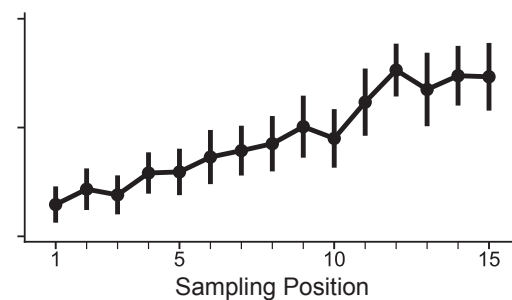
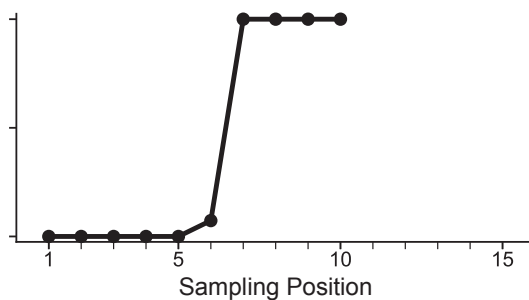
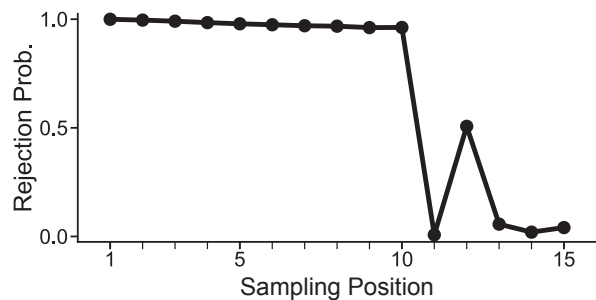
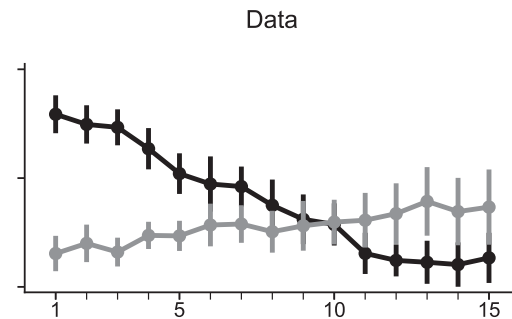
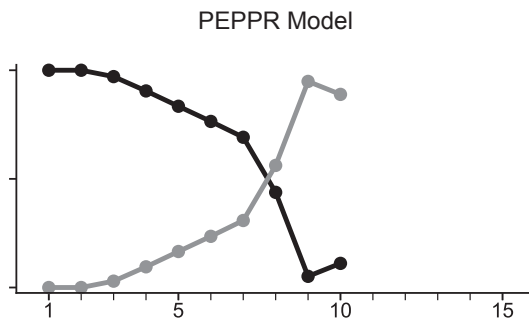
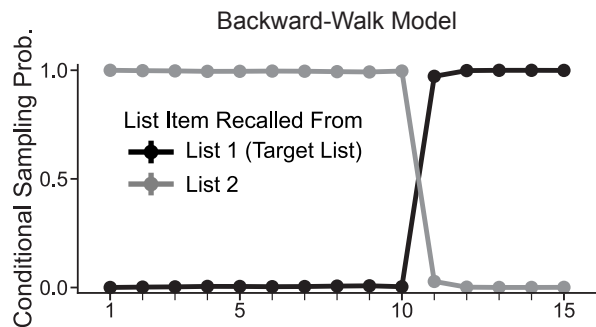


Summary of Predictions



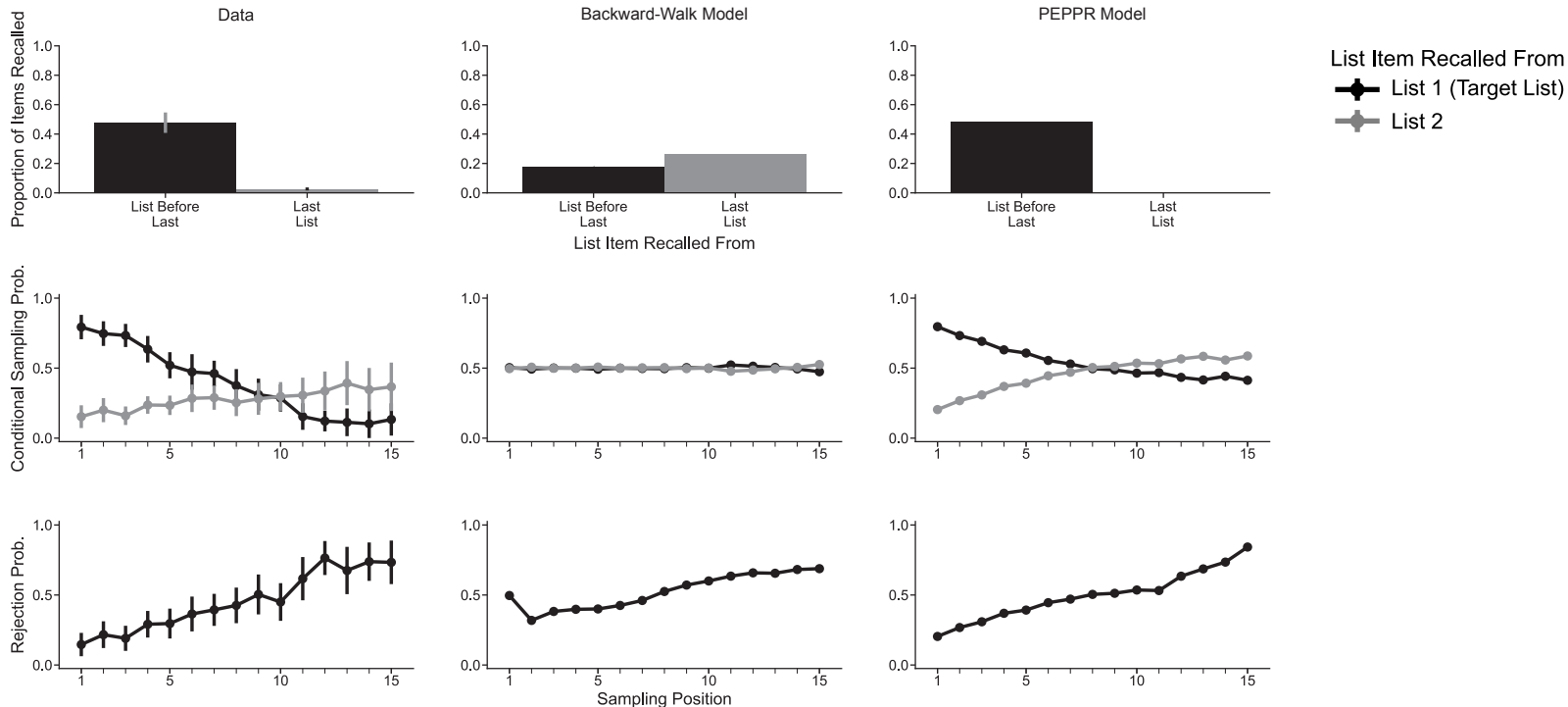
- How can we test these predictions?
- Subjects don't tell us what items they sampled but rejected
- Unless we ask!
- Wahlheim et al., 2017 used an *externalized free recall procedure*

What do subjects do?



Giving Each Model Its Best Chance

Giving Each Model Its Best Chance



How do we overcome the pull of recent memories?

- By integrating perspectives from the metacognitive and memory modeling literatures, we developed a formal model based on two key ideas:
 - Just like stimuli, task instructions have mental representations that drive mental context drift
 - These representations can be reinstated by post-encoding pre-retrieval process (i.e., PEPPR) to provide direct access to non-recent memories

These ideas are relevant beyond dual-list recall and suggest promising future directions

- A common model of other lab paradigms
 - Serial recall
 - Span tasks
 - Value directed remembering paradigm
- Insight into group and individual differences
 - Variations in the efficiency of the PEPPR mechanism may be related to variation in memory and general intellectual ability
 - Groups, such as older adults, that differ in memory performance may differ in the efficiency of PEPPR

Thanks!

- For a preprint: <https://cbcc.psy.msu.edu/publications>



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