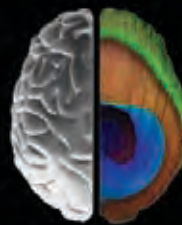


Exploring how and why we forget memories that are related in time

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Lewis-Peacock Lab

Exploring how and why we forget memories that are related in time

1. Episodic memories and context
2. Memory competition and forgetting
3. Behavioral experiment
4. Expected outcomes
5. Conclusions

Episodic memories

- Rich experiences throughout our lifetimes
- Allow us to recall specific details from our past



Context and episodic memories

Context is all the peripheral information associated with an episode.

Ex. time, people, place

Binding agent of these episodic memories.

Importantly, context allows us to recall episodic memories and reactivate related memories.

Context triggers related memories and brings them along for the ride



Context triggers related memories and brings them along for the ride



Memories are fragile

What happens when memories are co-activated?

Memories can get integrated + strengthened.

Memories can get separated + weakened.

Memories are fragile

What happens when memories are co-activated?

Memories can get integrated + strengthened.

Memories can get separated + weakened.

Focus on why co-activation leads to memory competition and memories are weakened.

How is context experimentally tested?

Bias the memory retrieval process!

Experiments typically associate unrelated items to each other based on context.

Contextual clues can influence memory during recall.

How is context experimentally tested?

Retrieval process

Context A: bias people towards a context that asks them to activate the desired items.

Recognition process

Context B: bias people towards an item that leads them to activate the desired context.

Memory competition

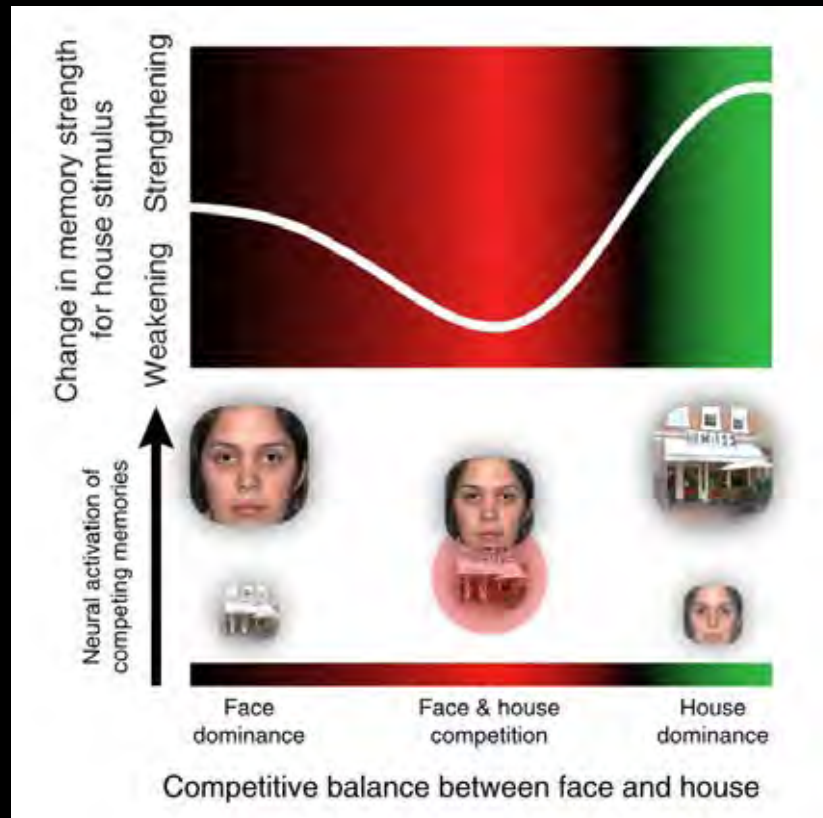




Memory competition

Retrieval of memories

Recognition of memories



Norman et al., 2007; Detre et al., 2013; Lewis-Peacock & Norman, 2014

How does competition occur during retrieval and recognition?

- Memories can compete in different contexts.
- Investigate the contributions of temporal context to memory reactivation and both types of forgetting.
- Compare different mechanisms of forgetting.

**How does the time between
the presentation of items
influence forgetting?**

Hypothesis

**How does the time between
the presentation of items
influence forgetting?**

Changes in temporal distance between the presentation of items will bias the competitive dynamics between those items during recall.

Specifically, items seen closer in time will be more likely to compete with each other during recall and later be forgotten.

There may be differences between retrieval and recognition.

Experimental overview

- I. Encoding phase: integrate memory for objects.
- II. Memory phase: recall objects by associating them to specific temporal contexts.
- III. Long-term memory test: assess memory for all objects plus novel foils.

I. Encoding trial

Context:
temporal
distance



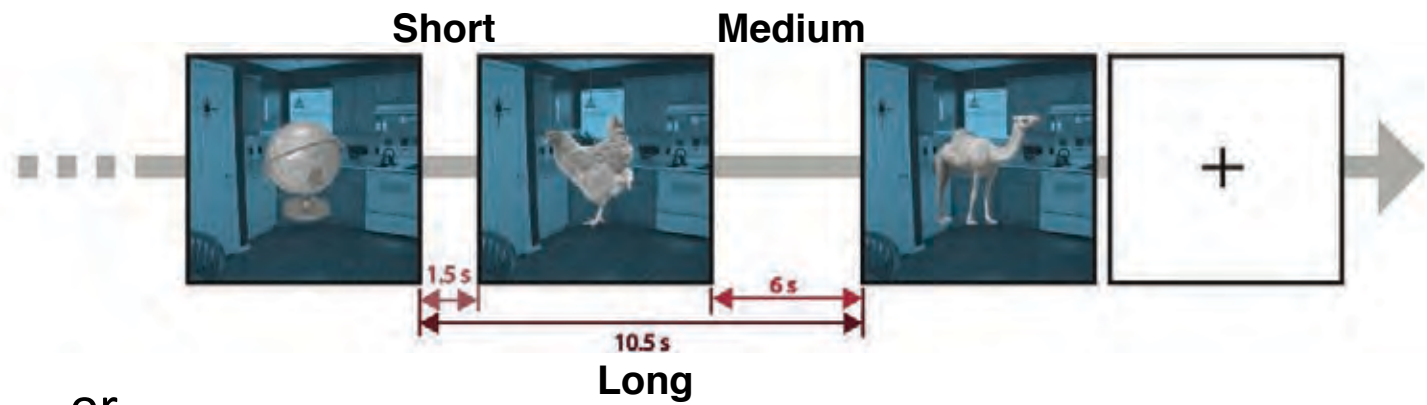
Task:
natural/
manmade?

Encoding triplet

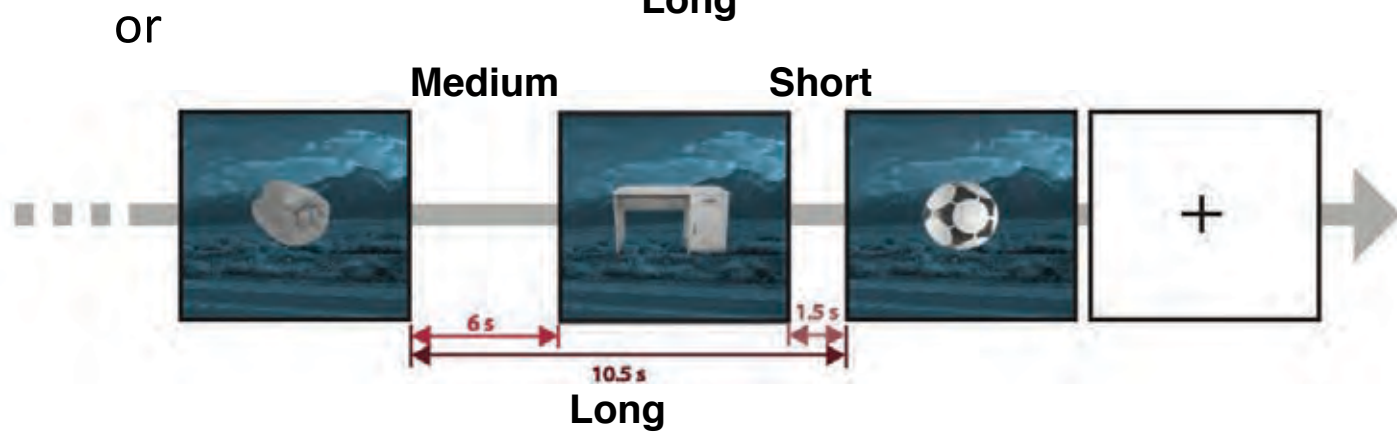
Three objects share a unique background scene but are encoded over different temporal distances.

I. Encoding trial

Context:
temporal
distance



Task:
natural/
manmade?



II. Practice trials

retrieval



recognition



II. Memory phase

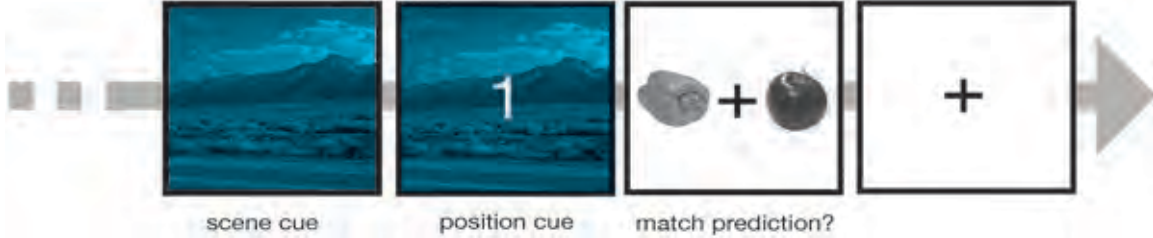
retrieval



recognition



retrieval +
recognition

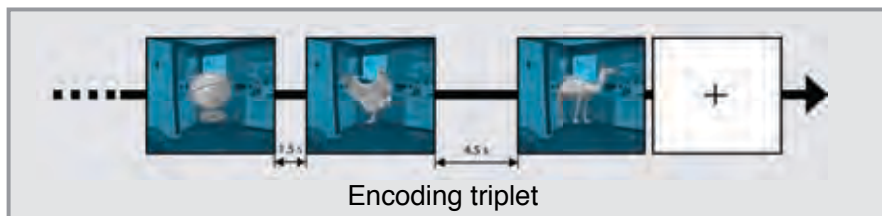




“Think of **all 3** objects associated with scene”

“Think of the **one** object corresponding to position”

“Match?”

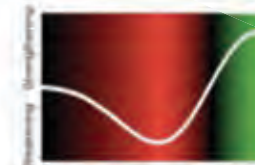
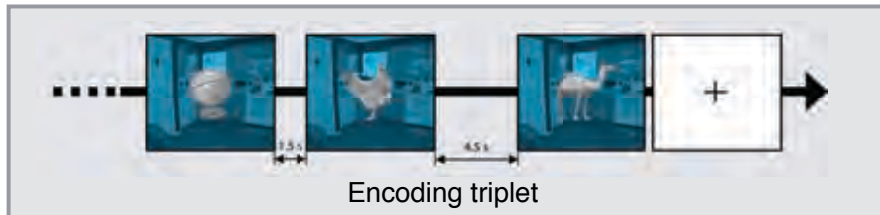




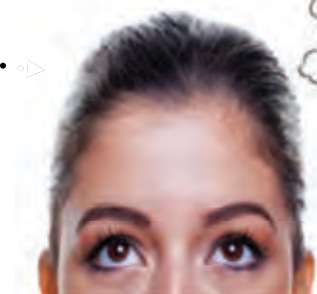
“Think of **all 3** objects associated with scene”

“Think of the **one** object corresponding to position”

“Match?”



The more a non-target item comes to mind, the more it may be forgotten.

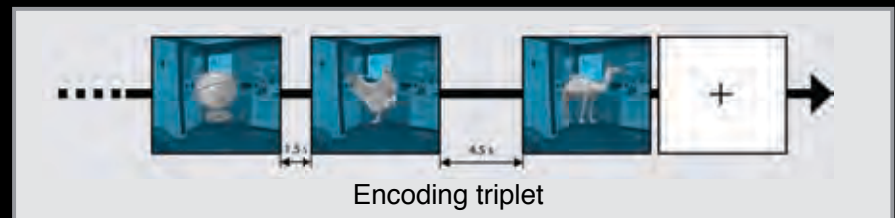
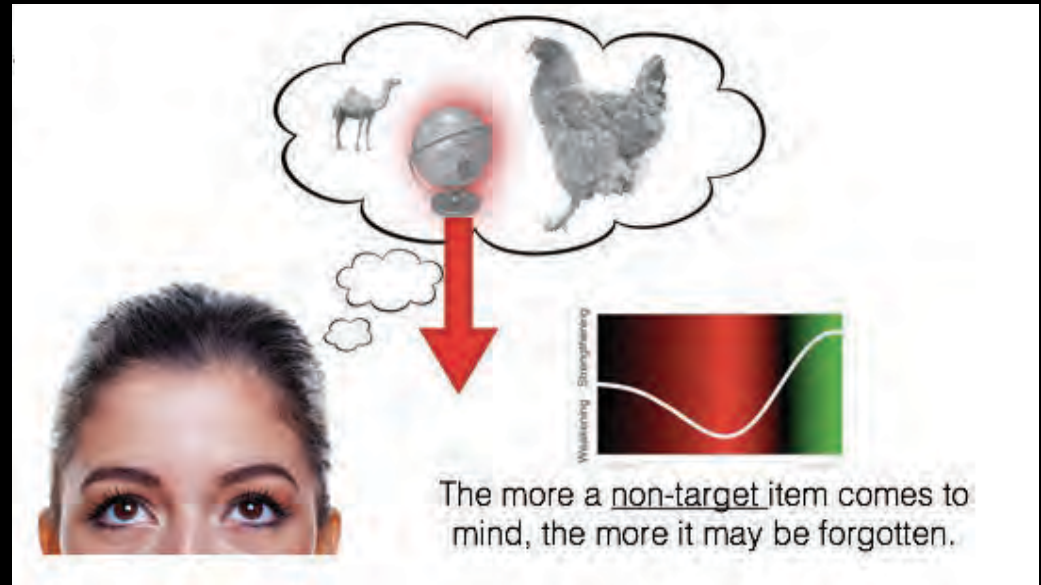


III. Memory test

- Participants' memory is assessed with a confidence rating task.
- Test for forgetting!
 - Compare memory performance across temporal contexts (short, medium, long) against practiced vs non-practiced objects.

Expected outcomes

- Objects that are more temporally clustered will **compete** during retrieval and recognition.
- The more a non-target comes to mind, the more it may be **forgotten**.



Summary

- Investigate
 - whether and how the time between the presentation of items influences memory.
 - how memories compete during recall and if this leads to forgetting.
- Elucidate forgetting effects during retrieval and recognition processes.
- Further understand the relationship of context with episodic memory.
- Eventually use neural decoding to analyze memory reactivation.

Thank you!

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Honors class!

