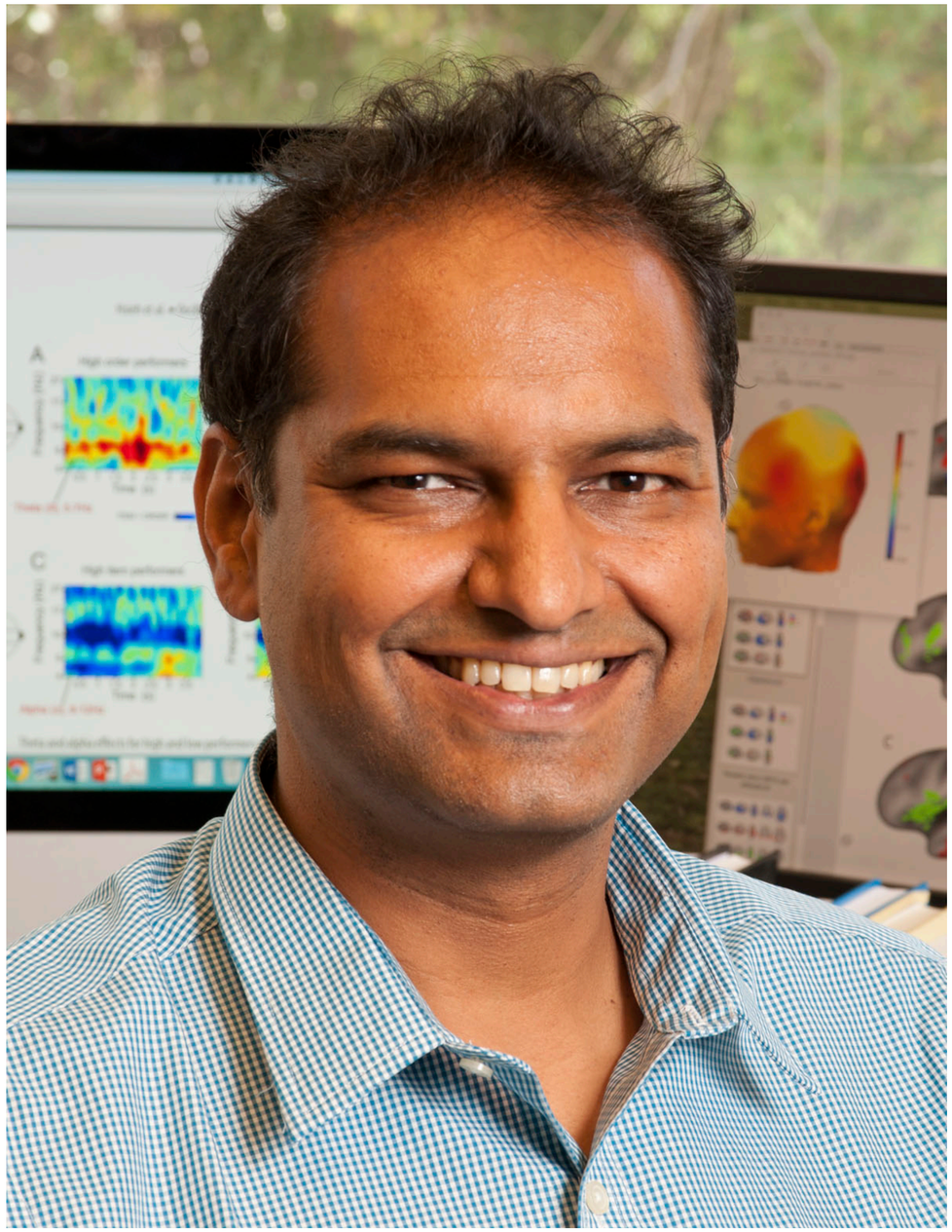
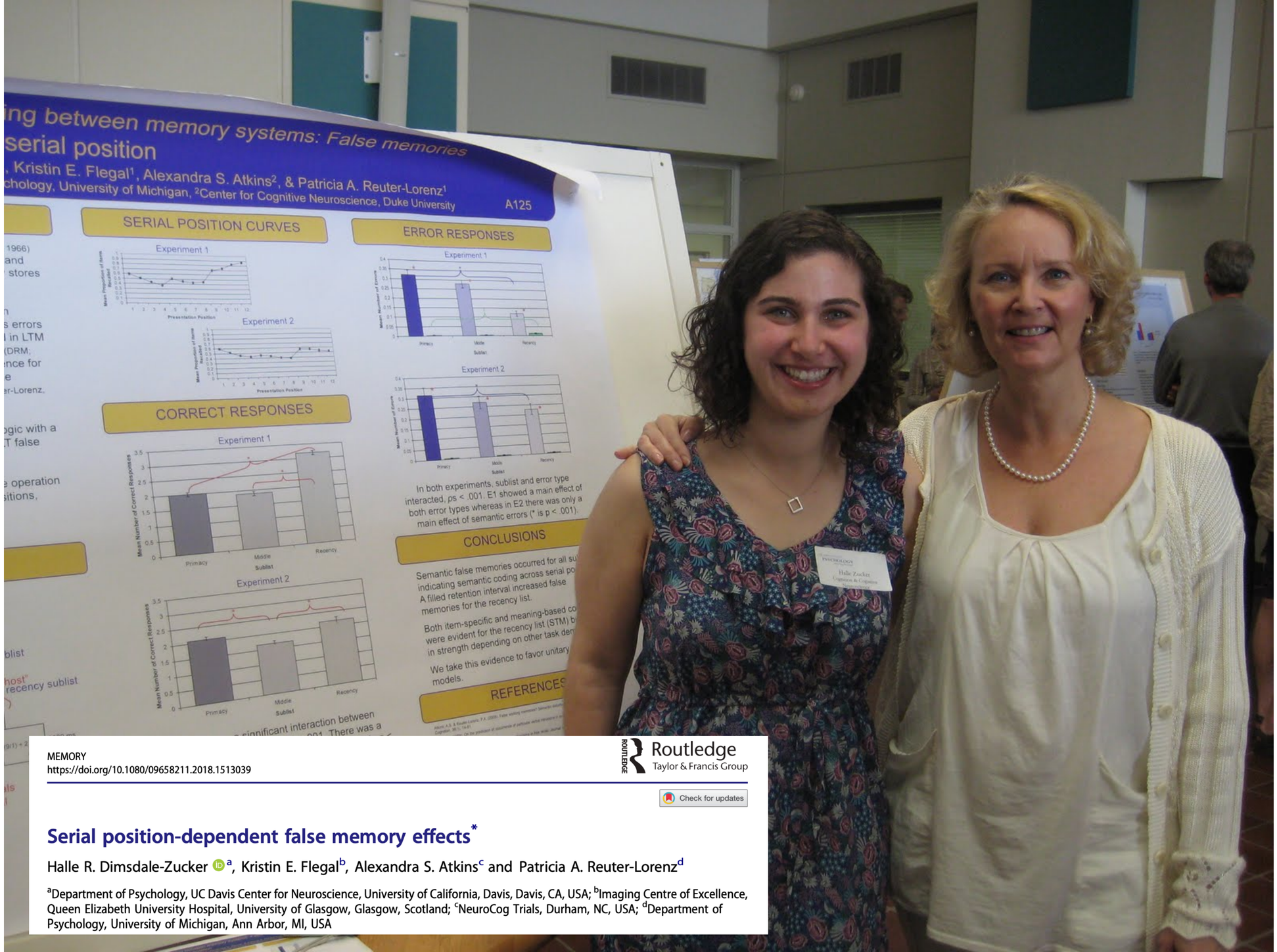
SIPPS Journal Club

Doubts about double dissociations between short- and long-term memory

Ranganath & Blumenfeld

Presenter: Halle R. Dimsdale-Zucker





MEMORY
https://doi.org/10.1080/09658211.2018.1513039

Serial position-dependent false memory effects*

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classic ideas about STM/LTM

- many early ideas derived from patient HM’s deficits (and other neuropsychological patients)

brief digression: patient HM

In Defense of Suzanne Corkin

Howard Eichenbaum and Elizabeth Kensinger

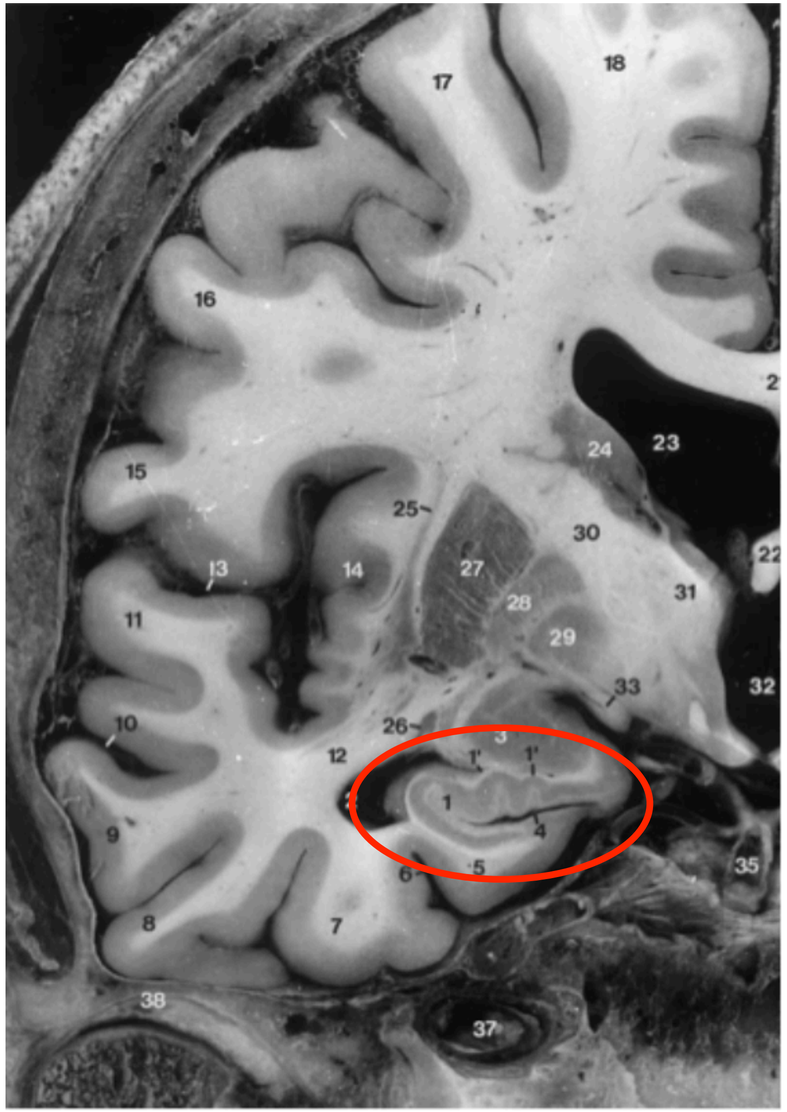
FEATURE

The Brain That Couldn't Remember

The untold story of the fight over the legacy of "H.M." — the patient who revolutionized the science of memory.

https://www.livescience.com/42896-slicing-of-the-brain-of-patient-hm.html

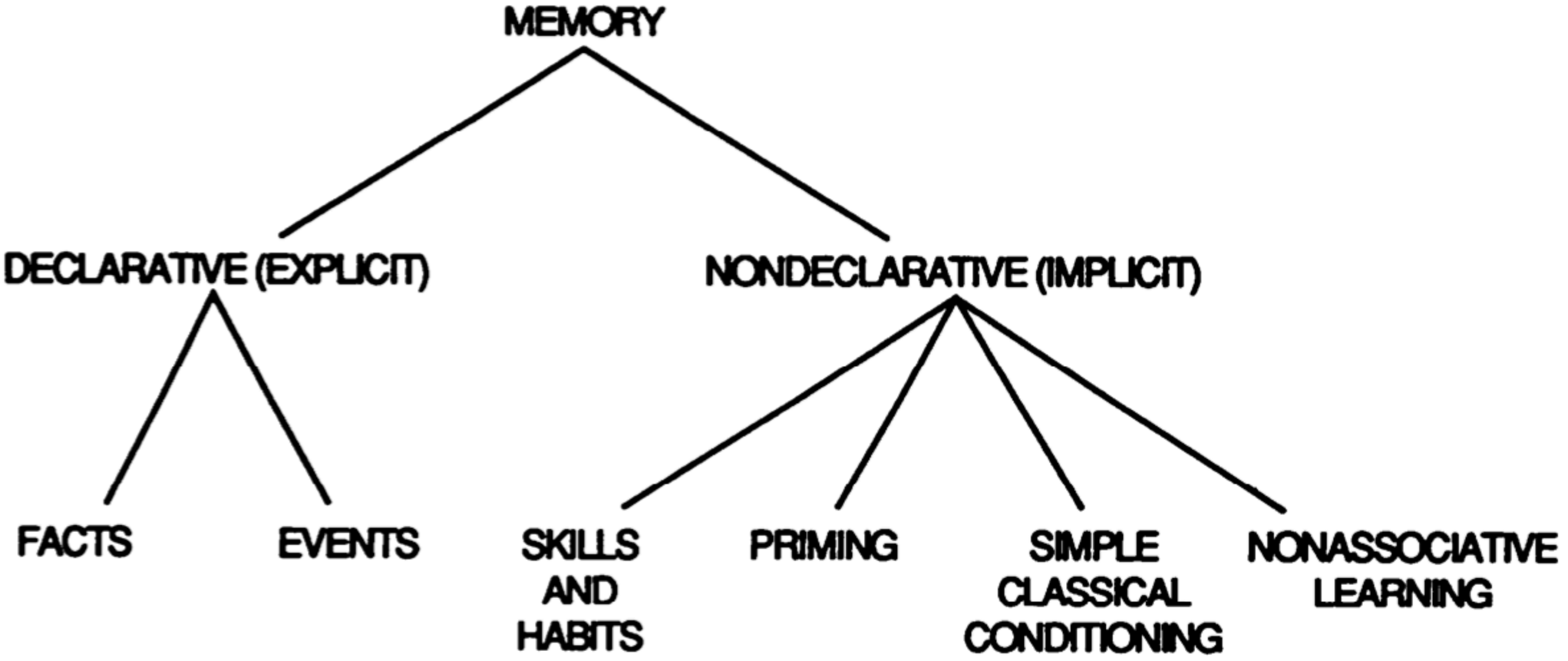
the hippocampus



why is patient HM so important to the field of memory?

- Patient HM first reported by Scoville and Milner (1957)
- foundational to the idea that there are different kinds of memory
  - patient HM had some long-term (e.g., childhood) memories (although not those from close to his surgery), but couldn't form new memories (e.g., learning the name of a new person)
  - he had some retrograde amnesia, but is primarily an example of anterograde amnesia
- set up the idea that the hippocampus was critical for supporting memory
- also set up the idea that memory is not just one thing (i.e., we have different types of memory)

other memory theories



Squire & Zola-Morgan (1991)

types of memory

- declarative memory
- implicit memory
- long-term memory
  - this is what is most classically associated with the hippocampus (and probably what you think of when someone says “memory”)
- short-term (working) memory - the information that you can hold in mind; often includes some reference to being able to flexibly manipulate that information (e.g., remember phone number in order to dial it, do mental arithmetic)
- episodic memory - memory for experiences
- semantic memory - memory for facts

why is this view too simplistic?

- other hippocampal amnesiacs are able to learn new information and form episodic memories
- brain imaging studies (like fMRI) have shown evidence for regions in addition to the hippocampus supporting declarative and episodic memory

Table 1.3 Contrasts between two views of memory

Topic	Prevailing view	Evolutionary accretion model[a]
Functions of cortical areas	Some areas function in memory, others in perception, and still others in "executive" or motor control	All areas function in memory, using specialized representations
Substrate of explicit (declarative) memory	Four cortical areas called "the medial temporal lobe"	Interactions among the navigation, feature, goal, and social–subjective systems[b]

Murray, Wise, & Graham (2016)

classic ideas about STM/LTM

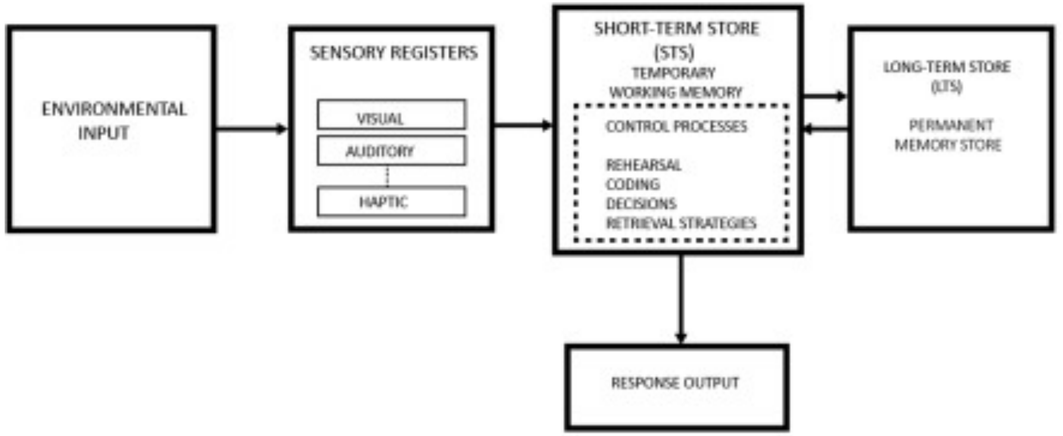
- many early ideas derived from patient HM's deficits (and other neuropsychological patients)
- LTM depends on the hippocampus
- STM…
  - could depend on prefrontal cortex (e.g., persistent spiking activity)
  - perceptual areas (e.g., paper mentioned inferior temporal lobe)
- STM/LTM distinction has generated lots of debate

some ideas about STM

- STM has a “buffer” that (temporarily) stores/holds items in memory (Atkinson & Shiffrin (1966, 1968, 1971)
  - Baddeley’s working memory buffer model (Baddeley, 2000; Baddeley & Hitch, 1974)
- STM is an activated (sub)set of LTM (Oberauer, 2002, 2009) or simply the focus of attention (Cowan, 1988)

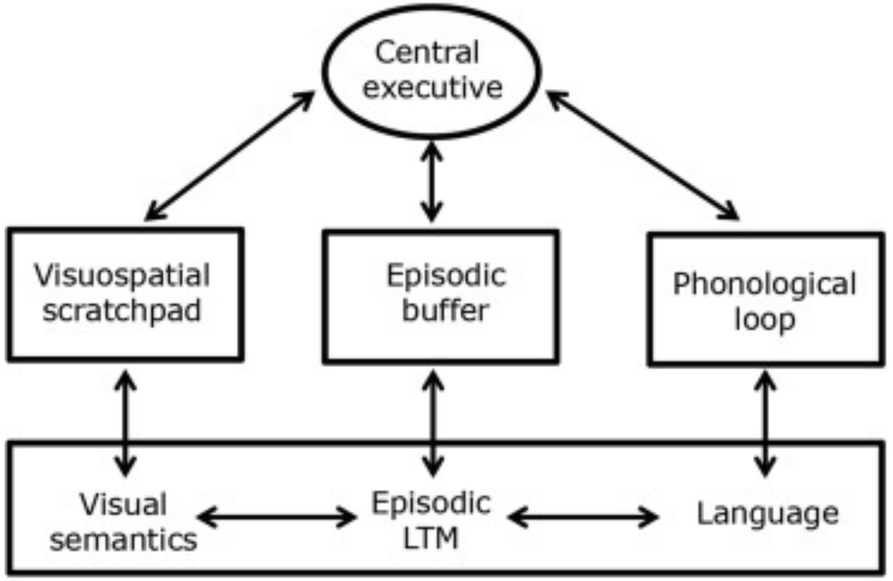
A

Atkinson & Shiffrin



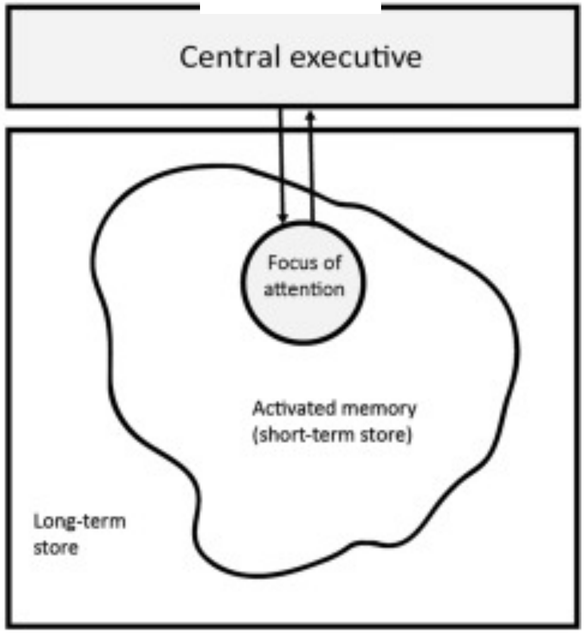
B

Baddeley



C

Cowan



D

Oberauer

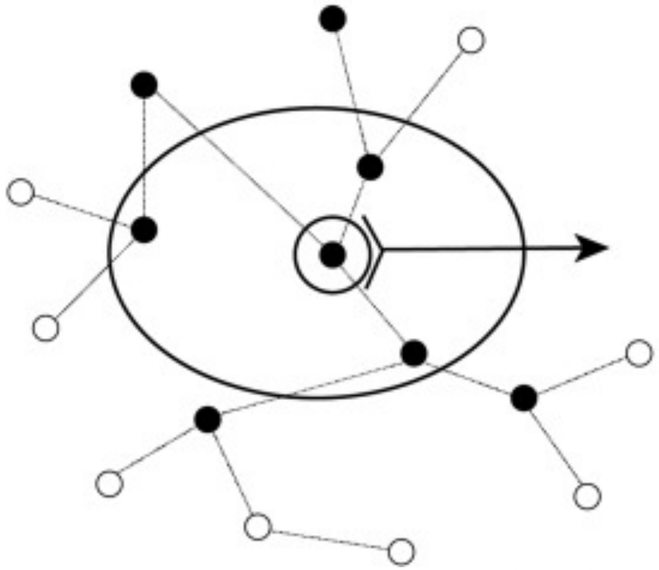
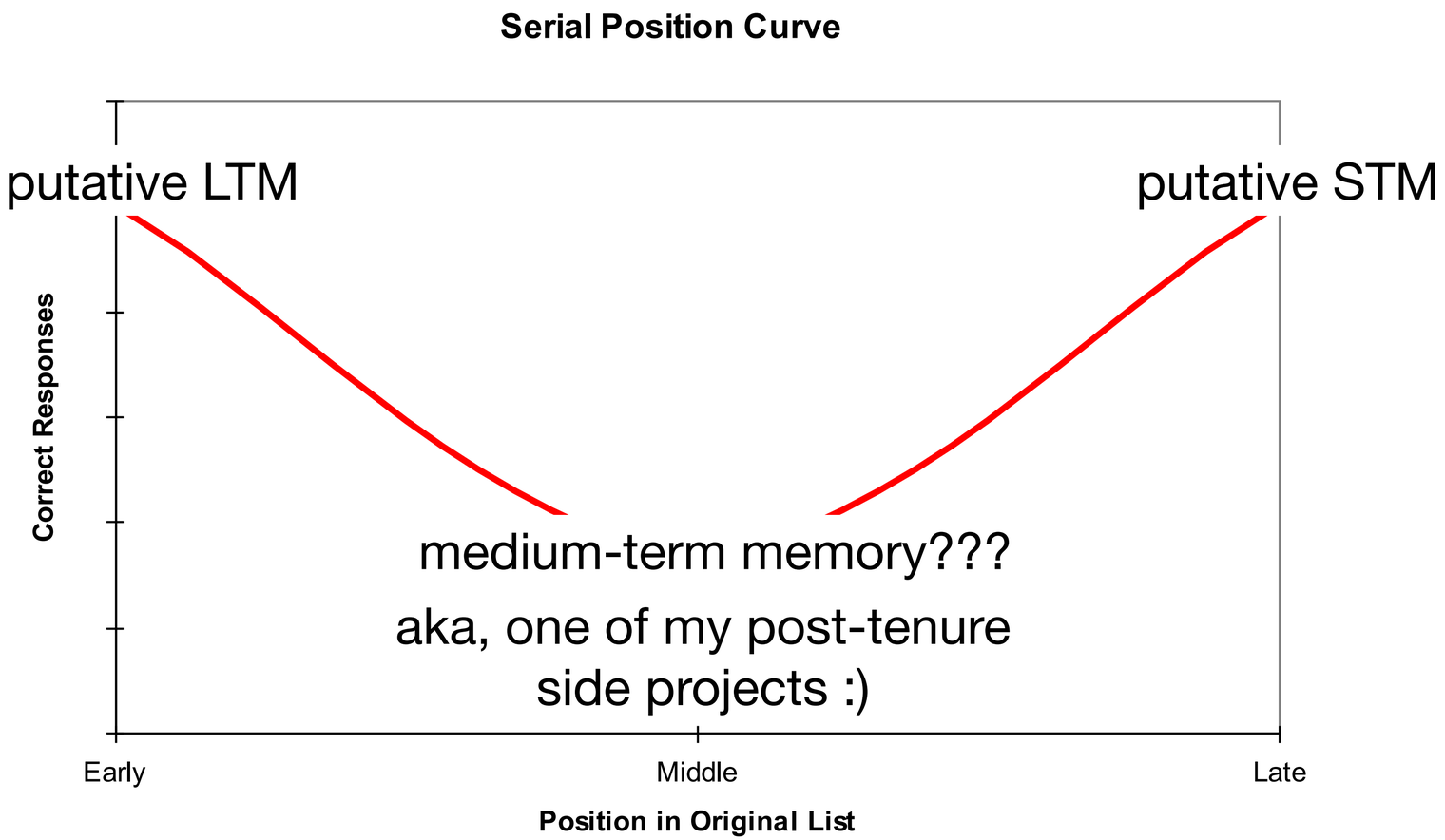


figure from Norris (2017) *Psychological Bulletin*

what is a “store”?

- one wrinkle (especially in early theories) was that it is unclear if a memory “store” needs to be a specific region that’s uniquely used for a given process
- can STM/LTM be different processes but not be associated with unique brain activity signatures?

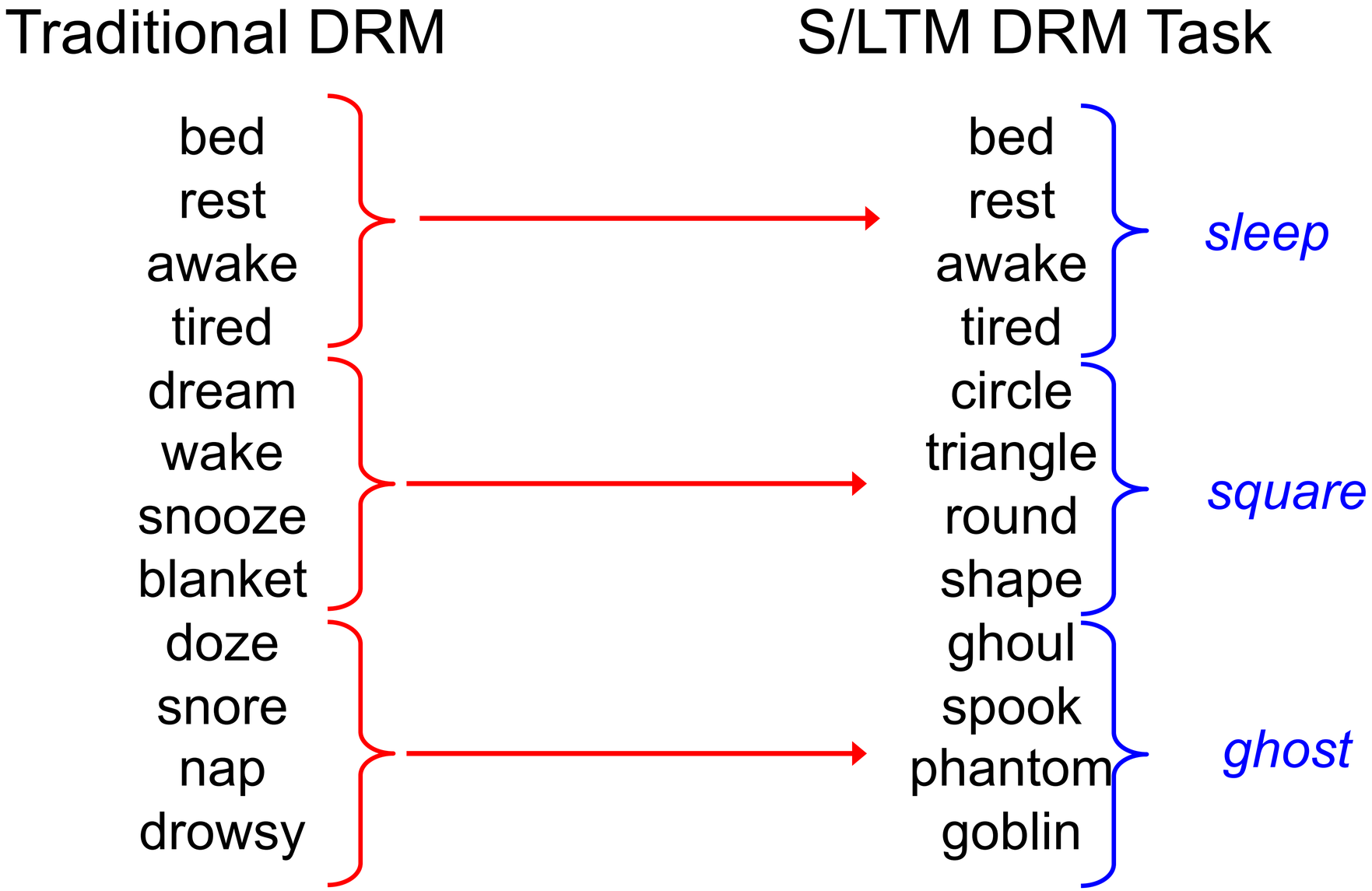
how can you study STM and LTM concurrently?



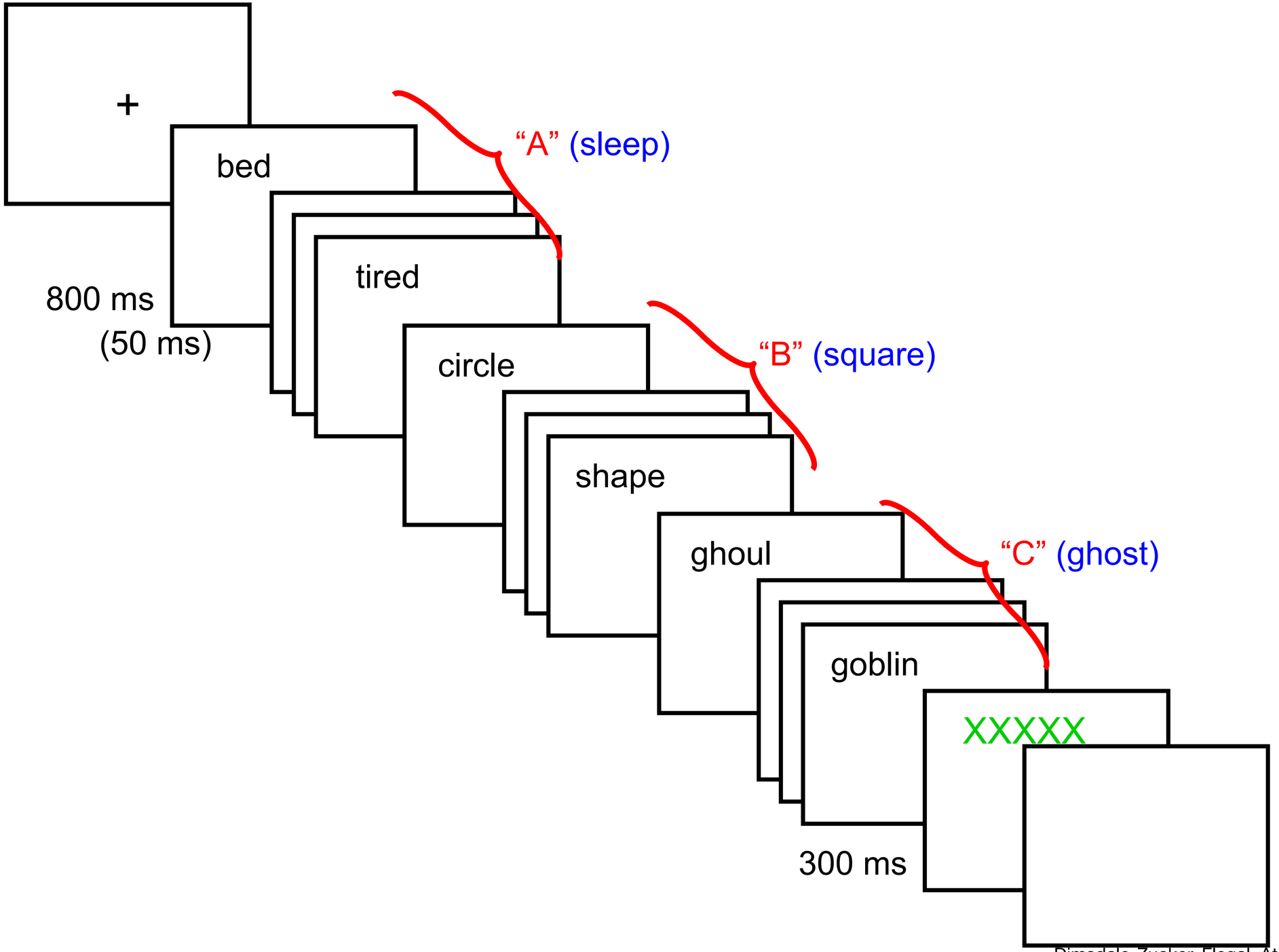
Dimsdale-Zucker, Flegal, Atkins, & Reuter-Lorenz (2018)

how can you study STM and LTM concurrently?

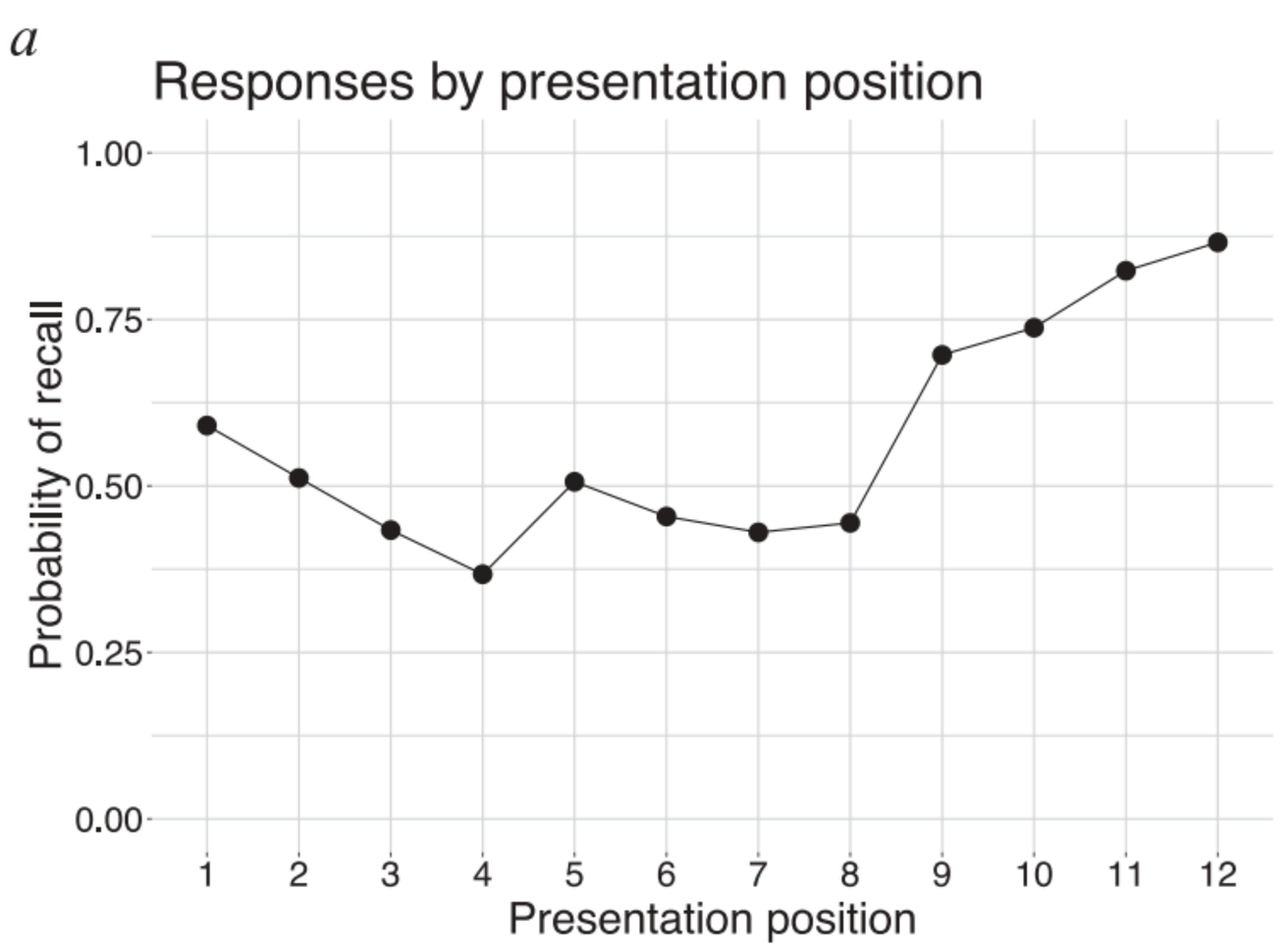
- Amnesics (Milner, 1968)
- Interleaved time & forgetting (Postman & Phillips, 1965)
- Distraction (Baddeley, 2003)
- Error types across positions (Vallar & Shallice, 1990)

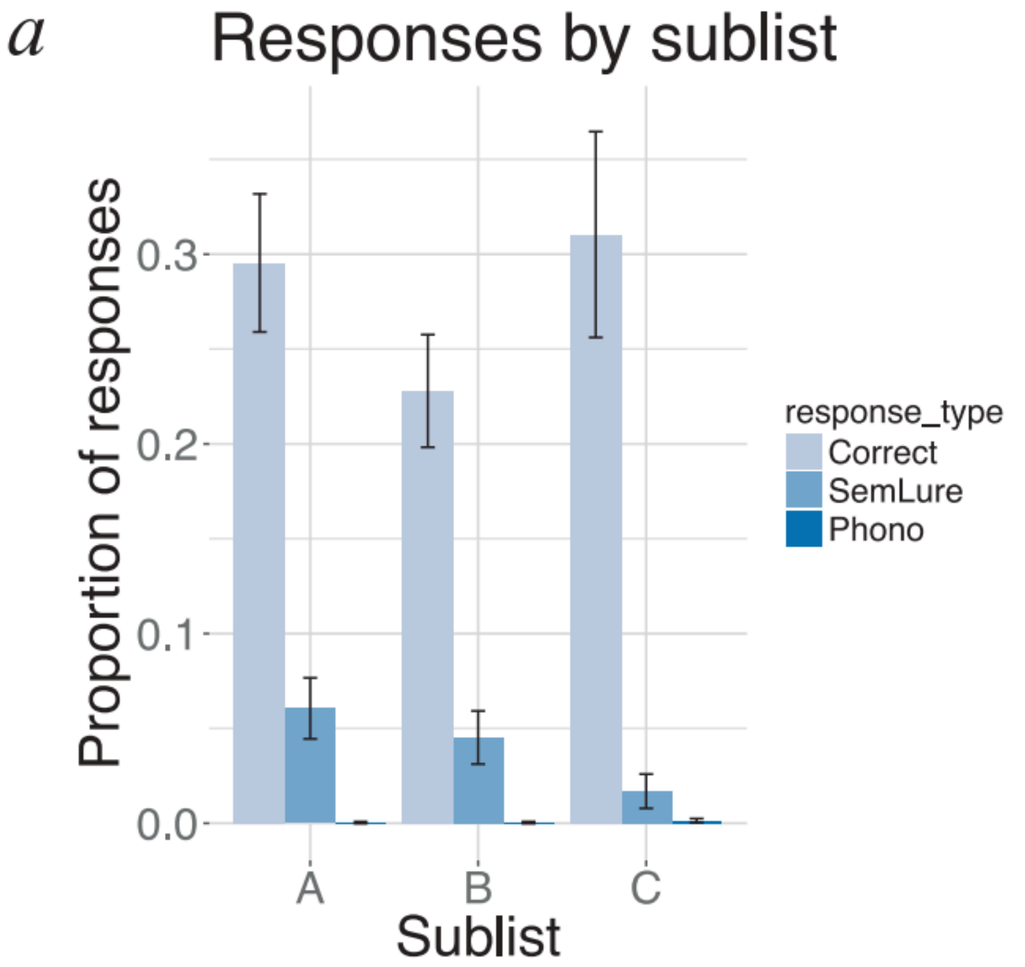


Dimsdale-Zucker, Flegal, Atkins, & Reuter-Lorenz (2018); LTM DRM task based on Roediger & McDermott (1995), STM DRM from Atkins & Reuter-Lorenz (2008)



Dimsdale-Zucker, Flegal, Atkins, & Reuter-Lorenz (2018)





Dimsdale-Zucker, Flegal, Atkins, & Reuter-Lorenz (2018)

where does this leave us?

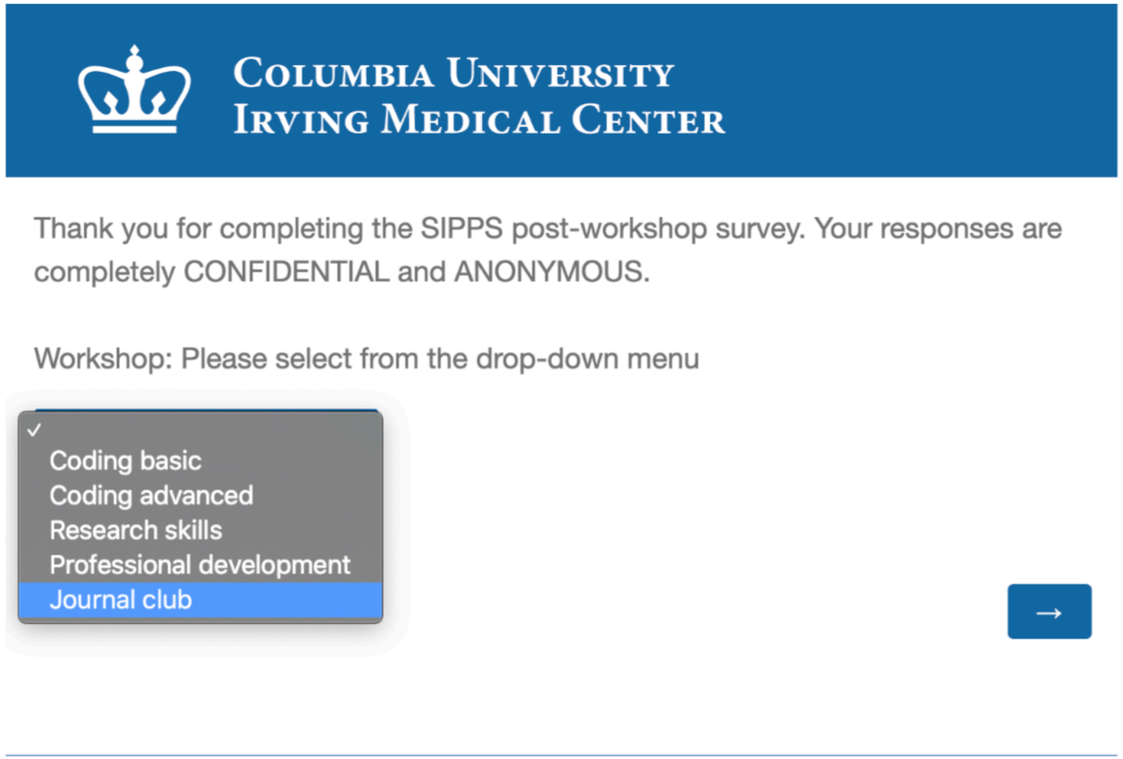
- STM and LTM don’t seem to be 100% the same thing
  - think: access to perceptual details immediately after learning vs. hours, days, weeks, months later
- but, it also seems overly simplistic to say they’re completely separate
  - patient evidence
  - behavioral evidence (including my senior thesis)
  - similar brain regions implicated in both types of processes

feedback survey

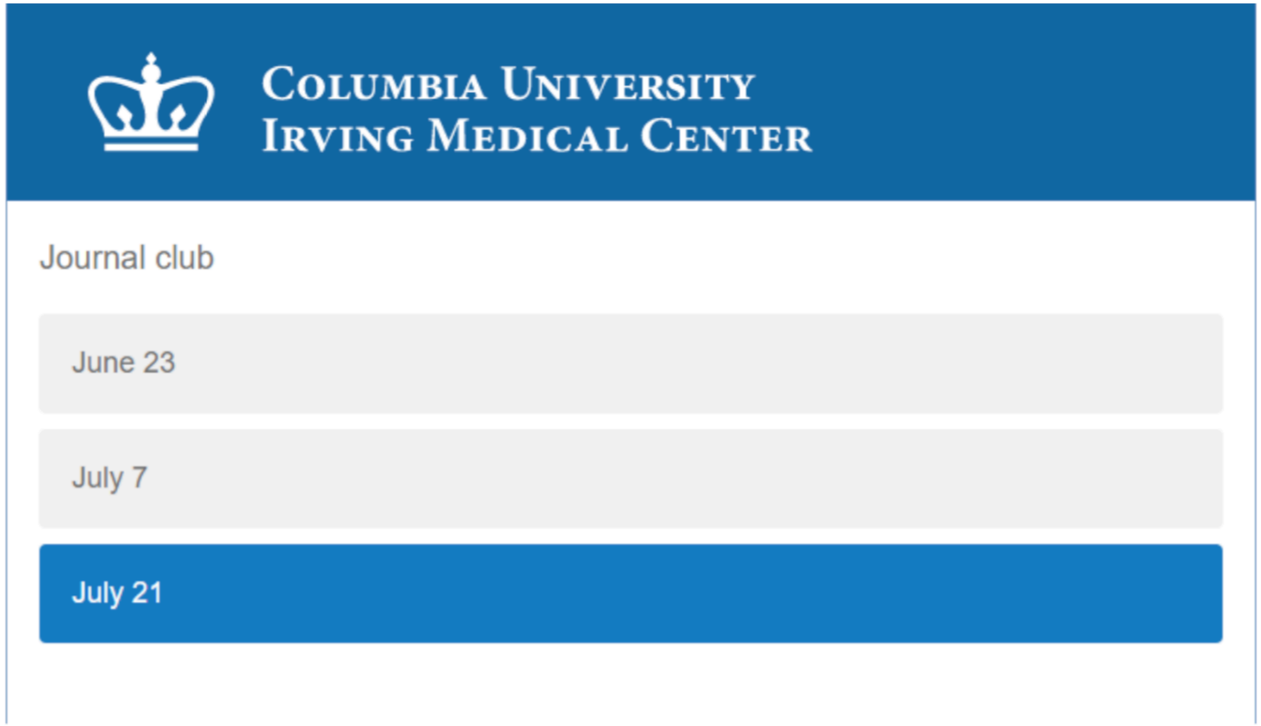
Post-workshop survey (anonymous)

link: https://cumc.co1.qualtrics.com/jfe/form/SV_9HVYLAL5iXvjEmq

1. Select “Journal Club” and press arrow



2. Select “Journal club (July 21)” and press arrow



Thank you!!!

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