Cognition

PSYC 2040

L7: Memory I

Part 2

recap

- what we covered:
  - information processing and memory
  - forgetting and remembering
  - memory processes
- your to-dos were:
  - *finish:* L7 readings

a demonstration

- I will read aloud a list of words for you to remember
- you will then be asked to recall these words

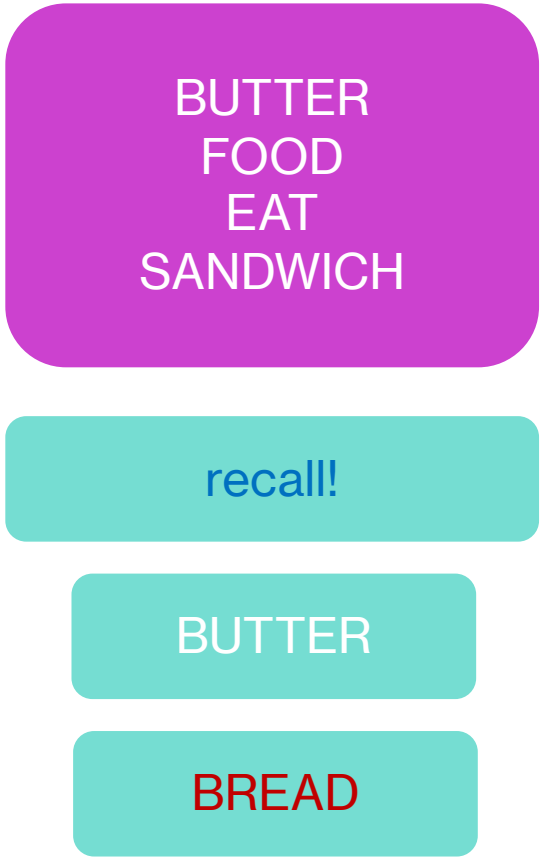
today's agenda

false memory

research summaries

recall task

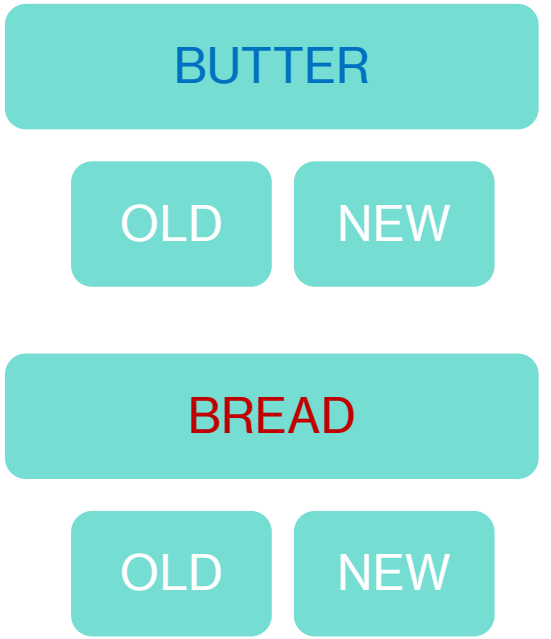
- a recognition task involves a study (encoding) phase and a test (retrieval) phase
- study phase: participants are exposed to stimuli
- test phase: participants are asked to actively generate all items they studied
- how would you measure memory performance? total words, intrusions, etc.



recognition task

BUTTER
FOOD
EAT
SANDWICH

- a recognition task involves a study (encoding) phase and a test (retrieval) phase
- study phase: participants are exposed to stimuli
- test phase: participants decide whether they have seen a given item (old) or not (new)
  - some items are targets, some are foils/lures
- how would you measure memory performance?
  - the proportion of correct/old items
- limitations? pair up and discuss!



recognition task: hits and false alarms

- observing only the correct responses could be misleading if the person simply answers “old” for all items
- hits and false alarms together provide a clearer picture

	item	
response	OLD (BUTTER)	NEW (BREAD)
OLD	hit	false alarm
NEW	miss	correct rejection

understanding signal vs. noise

- this framing comes from signal detection theory, that has wide applications in decision-making and statistics

	world truth	
your experiment	effect exists	effect doesn't exist
effect found	hit	false alarm
effect not found	miss	correct rejection

activity: understanding signal vs. noise

- a researcher hypothesizes that men and women remember the plot of an action movie differently. apply the signal detection idea and discuss what a hit / false alarm / miss / correct rejection would mean here

	world truth	
your experiment	effect exists	effect doesn't exist
effect found	hit	false alarm
effect not found	miss	correct rejection

Deese-Roediger-McDermott (DRM)

- Roediger & McDermott (1995) conducted an experiment designed to test “false memories”
- presented word lists to participants with critical “lures”
- found high rates of recalling and recognizing words that were never presented!

Roddy Roediger

Kathleen McDermott

Two experiments (modeled after J. Deese's 1959 study) revealed remarkable levels of false recall and false recognition in a list learning paradigm. In Experiment 1, subjects studied lists of 12 words (e.g., *bed, rest, awake*); each list was composed of associates of 1 nonpresented word (e.g., *sleep*). On immediate free recall tests, the nonpresented associates were recalled 40% of the time and were later recognized with high confidence. In Experiment 2, a false recall rate of 55% was obtained with an expanded set of lists, and on a later recognition test, subjects produced false alarms to these items at a rate comparable to the hit rate. The act of recall enhanced later remembering of both studied and nonstudied material. The results reveal a powerful illusion of memory: People remember events that never happened.

DRM Paradigm

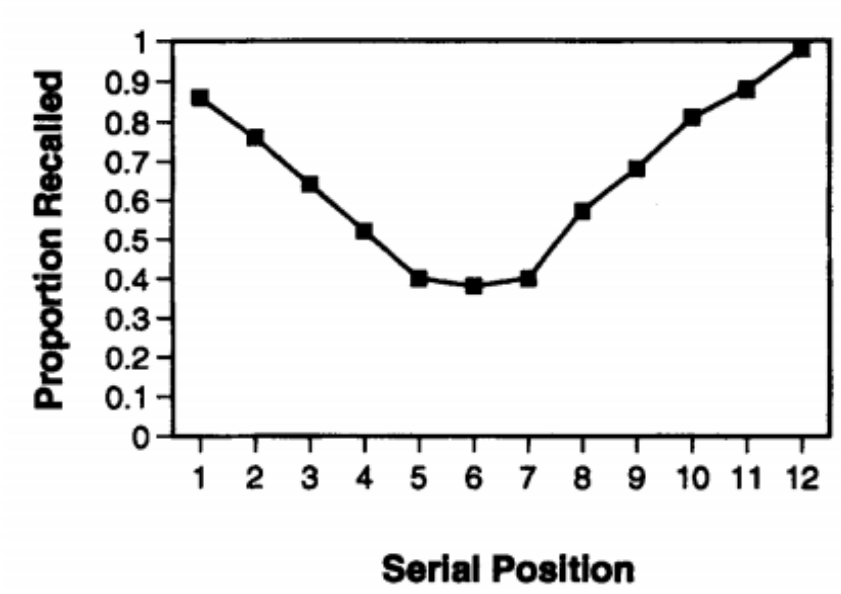


Figure 1. Probability of correct recall in Experiment 1 as a function of serial position. Probability of recall of the studied words was .65, and probability of recall of the critical nonpresented item was .40.

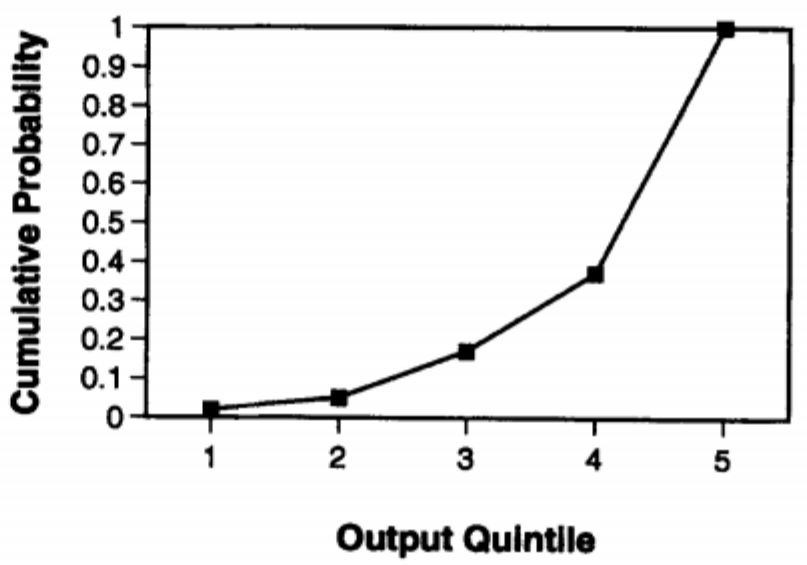
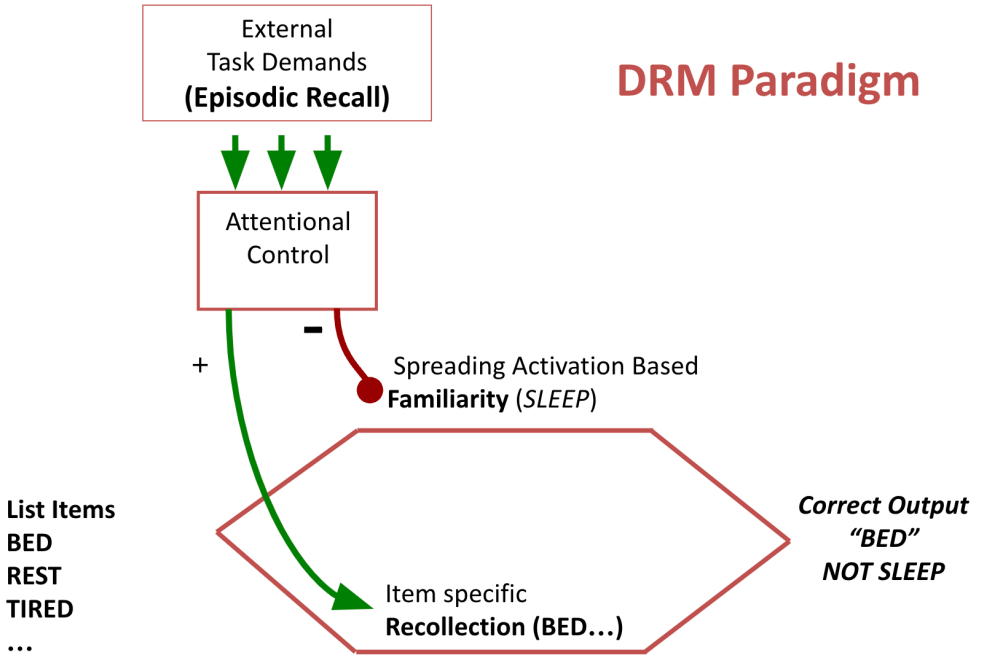


Figure 2. Recall of the critical intrusion as a function of output position in recall. Quintiles refer to the first 20% of responses, the second 20%, and so on.

why do we do this?

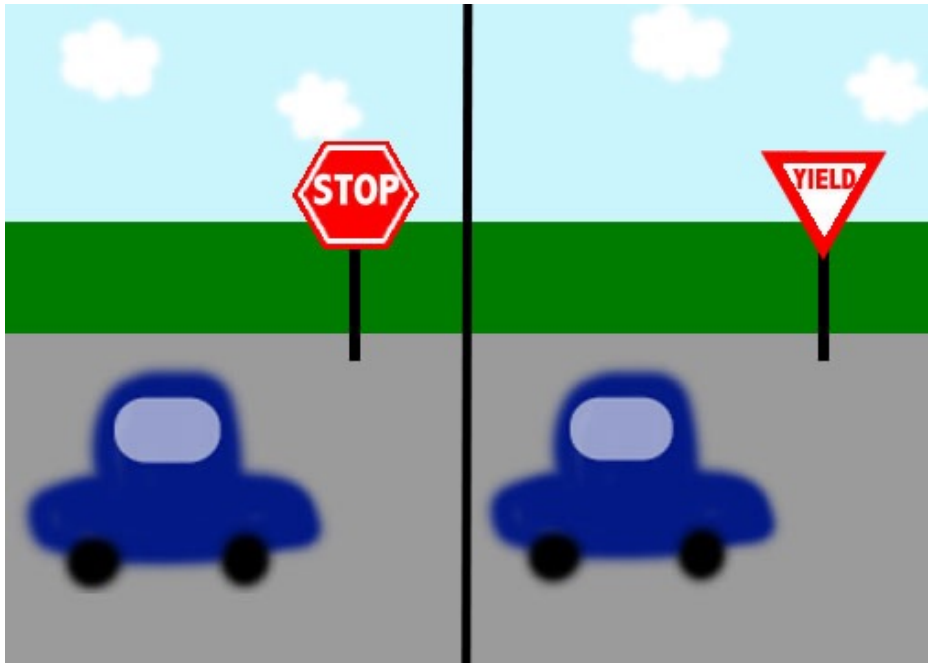
- decades of research on DRM!
- two-process account:
  - automatic activation (familiarity): when some words are presented, their related words are activated in the memory network, the critical lure is activated by MOST words on the list, becoming extremely heightened
  - source monitoring (recollection): actually searching through memory for words, requires controlled monitoring. when this monitoring fails, you get false memories



Balota et al., 1999

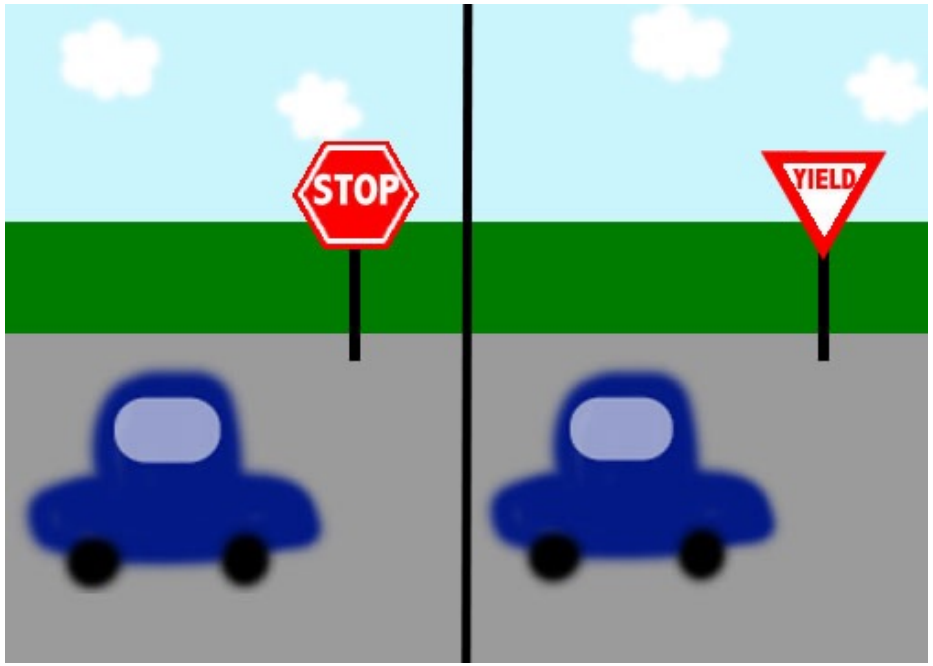
Loftus, Miller, and Burns (1978)

- participants were presented 30 color slides, half saw stop sign, half saw a yield sign
- after viewing the slides, they answered 20 questions, with one critical question, number 17
- varied when the questionnaire was presented (immediate vs. delayed) as well as the question itself



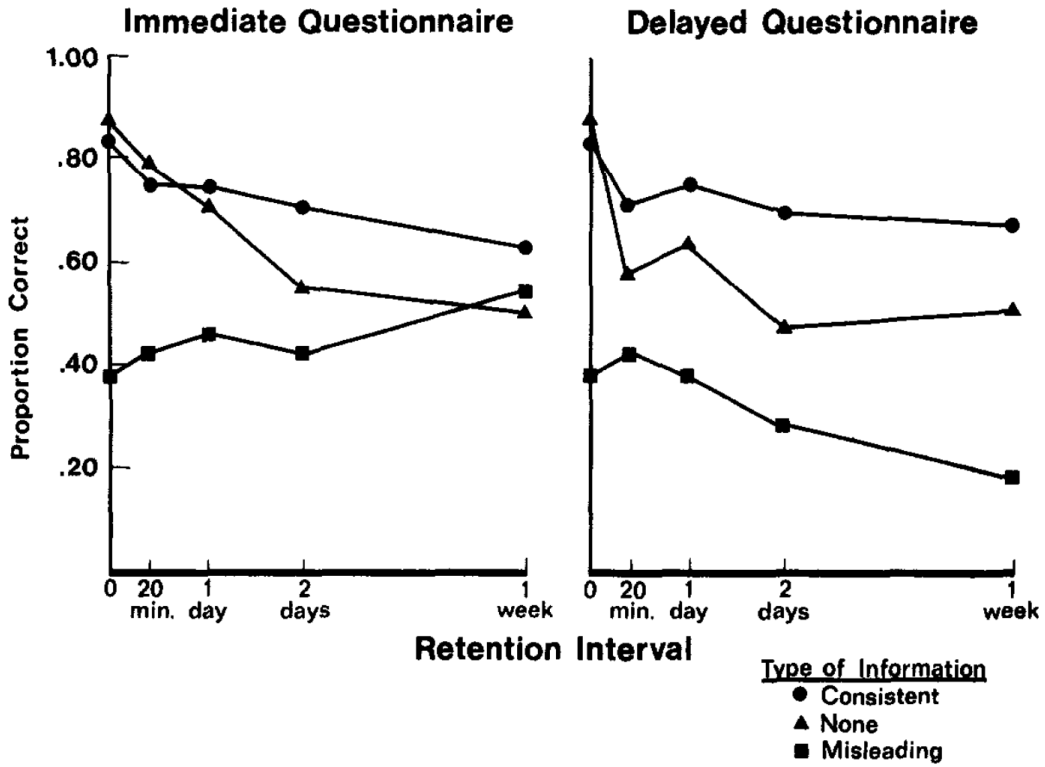
Loftus, Miller, and Burns (1978)

- Q 17: Did another car pass the blue Datsun while it was stopped at the...
  - STOP sign (Consistent)
  - YIELD sign (Inconsistent)
  - Intersection (Neutral)
- test: pairs of slides shown, forced choice [stop/yield]



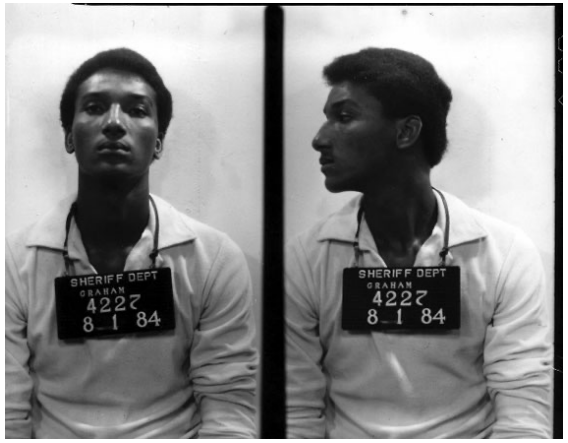
misinformation paradigm

- longer retention intervals led to worse performance
- providing inconsistent or misleading information produced the least accuracy overall, but the impact was worse when the questionnaire was delayed
- the weaker the original trace, the easier it is to alter



why is this important?

- The curious case of Ronald Cotton



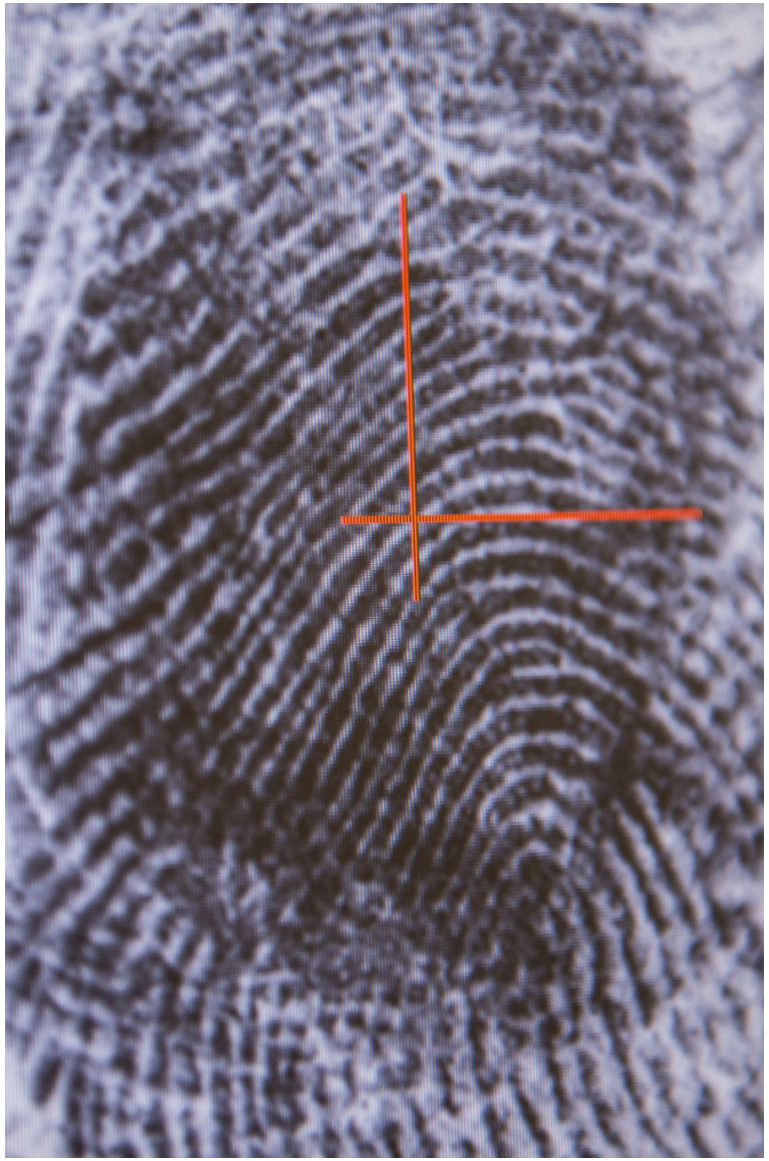
https://www.youtube.com/watch?v=u-SBTRLoPuo

discuss

- should we rely on eyewitness testimony? why or why not?
- what factors may affect the accuracy of the testimony?

eyewitness testimony

- several factors affect eyewitness testimony
- at the time of crime: race, exposure duration, lighting, retention interval, stress, weapon focus
- during initial identification: nature of lineup, suggestive questions, similarity, memory strength
- after initial identification: reinforcing memories, repeated exposure



cognition and legal system

- admissibility of evidence in cases is governed by the Federal Rules of Evidence, which have largely remained unchanged since 1975 (Yilmaz, Shen, & Wixted, 2023)
- eyewitness testimony played a role in almost 70% of 375 wrongful convictions overturned by DNA evidence since 1989 (Innocence Project, 2023)
- even without suggestibility, the act of testing a witness' testimony creates a memory trace that can be later reinforced
- the first identification is therefore the purest and most indicative of innocence (or guilt)
- there is a systematic predictive relationship between confidence and accuracy during early lineups (Wixted, Mickes, et al., 2016)

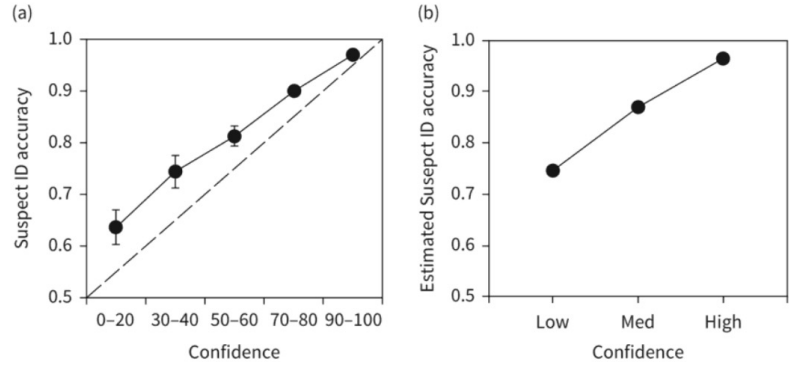
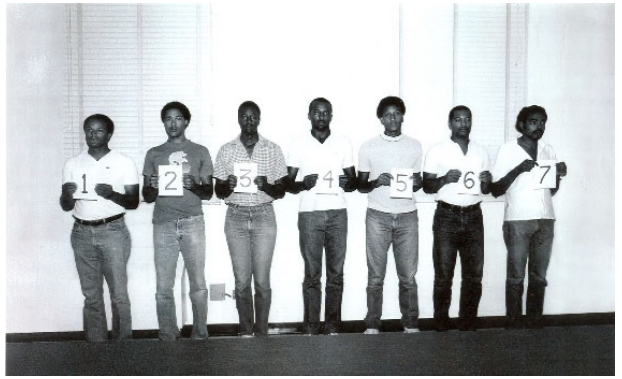
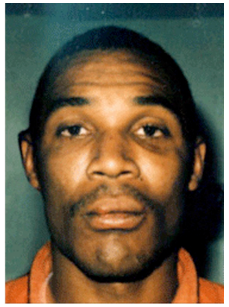


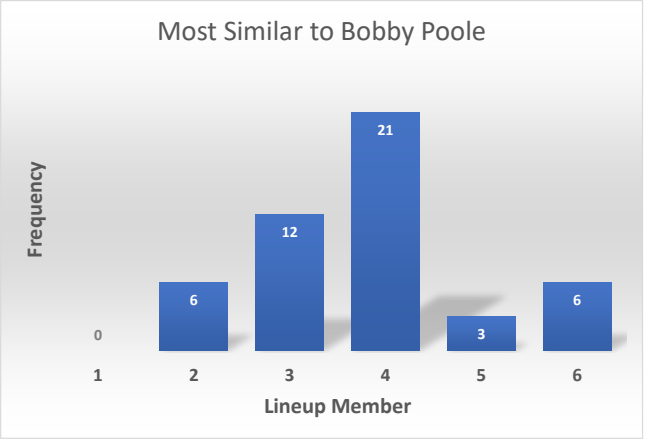
Figure 4.7 (a) CAC plot showing suspect identification accuracy (proportion correct) averaged across 15 studies with comparable scaling on the confidence (*x*-) axis (Wixted & Wells, 2017). (b) Estimated suspect identification accuracy (proportion correct) as a function of confidence for the data from the Houston Police Department field study assuming equal base rates (Wixted, Mickes, et al., 2016).

recollection vs. familiarity

- in a face-recognition test (a lineup), the witness is not being asked to actively generate information about the perpetrator but instead may be relying on their recollection of or familiarity with the suspects
  - familiarity is driven by a matching process (the same neural circuits and regions are activated upon seeing the face again)
  - recollection is driven by probabilistic search, i.e., you might be able to retrieve the memory trace (or not)
- key point: recollection may be initially unsuccessful but eventually successful (hypermnesia) but familiarity should not show such gains
- if the key suspect is in the line-up, they should be identified with high confidence initially (in ideal situations)

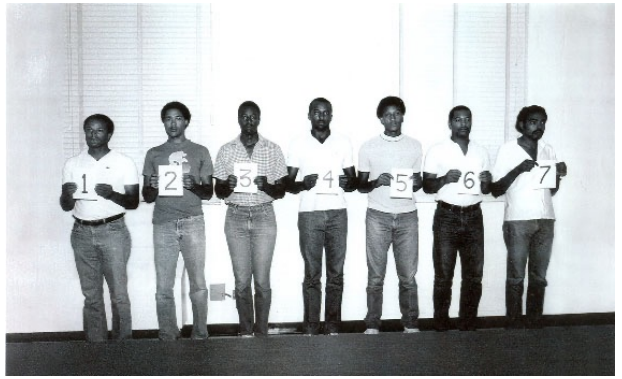


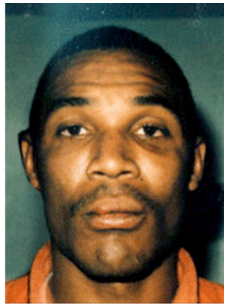


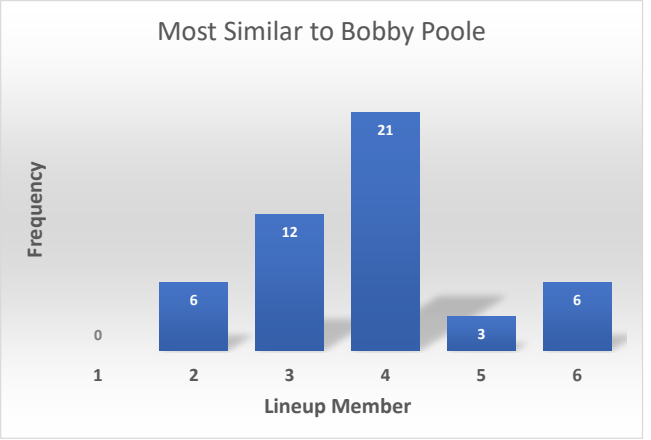


“pristine” eyewitness identification

- only one suspect per lineup
- suspect should not stand out in the lineup
- caution that the offender might not be in the lineup
- use double-blind testing (administrator of lineup should not know who the suspect is)
- collect a confidence statement at the time of the identification







today's agenda

false memory

research summaries

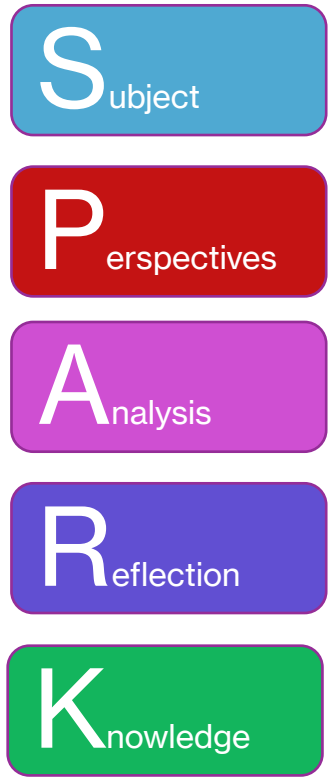
research summaries

- you will engage with contemporary research on a sub-domain of cognition through two kinds of research summaries + a reflection
  - SPARK: summarizing a broad review article
  - QALMRI: summarizing two empirical articles
- review course website for more details on the expected format of these summaries
- worth 5% of your grade
- sub-domain of your choice! (with my help)

8	Wednesday, March 13, 2024	SPRING BREAK! [no class]
8	Friday, March 15, 2024	SPRING BREAK! [no class]
9	Wednesday, March 20, 2024	SPRING BREAK! [no class]
9	Friday, March 22, 2024	SPRING BREAK! [no class]
10	Wednesday, March 27, 2024	L8: Cognitive Models
10	Friday, March 29, 2024	**Guest Session: President Safa Zaki**
11	Wednesday, April 3, 2024	L9: Memory II
11	Friday, April 5, 2024	L9 continued…
12	Monday: April 8, 2024	**Research Summary [SPARK] due**
12	Wednesday, April 10, 2024	L10: Judgment and Decision Making
12	Friday, April 12, 2024	L10 continued…
13	Tuesday: April 16, 2024	**Monthly Quiz 2**
13	Wednesday, April 17, 2024	L11: Language
13	Friday, April 19, 2024	L11 continued…
14	M: April 22, 2024	**Research Summary [QALMRI] due**
14	Wednesday, April 24, 2024	L12: Social Cognition
14	Friday, April 26, 2024	L12 continued…
15	Monday: April 30, 2024	**Monthly Quiz 3**
15	Wednesday, May 1, 2024	L0-L12 review!
15	Friday, May 3, 2024	**Final**
16	Wednesday, May 8, 2024	Wrapping up!
16	M: May 13, 2024	**Research Reflection due**

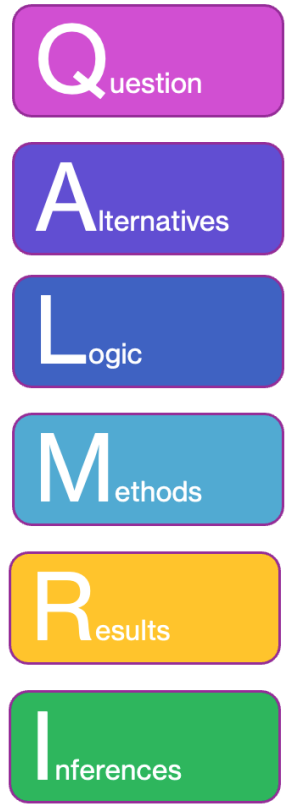
review article summary (SPARK)

- review articles summarize a large collection of empirical/experimental work on a sub-domain of cognition
- they often highlight key emerging themes, ideas, and questions
- SPARK is a tool to help you summarize the information from a review article (created using ChatGPT!)
- you can pick ANY sub-domain of cognition but your review article MUST be published in a journal from the approved list



empirical article summary (QALMRI)

- empirical articles typically describe one or a set of studies aiming to answer a specific research question
- your review article and empirical article(s) MUST be from the same sub-domain
- use your review article as a starting point to guide your search (which articles does it cite that seem interesting to you?)
- you can pick ANY sub-domain of cognition but your empirical articles MUST be published in a journal from the approved list
- overall, you will provide 1 review summary + 2 empirical article summaries + 1 broader reflection



exercise: finding articles

- log into PsycInfo

next class

- **before** class:
  - *finish:* L7 quiz/writing assignments
  - *start your search:* review article!
- **have a wonderful spring break!!**