Cognition: Methods and Models

PSYC 2040

L7: Memory I

Part 2

War of the Ghosts

Please write down the story you read earlier as best you can. Please try to reproduce it exactly. It is very important that you be as precise as you can. Try to use exactly the same words as they appeared in the story as much as possible. Where you cannot remember the exact wording, be sure to at least get the facts and events exactly correct. Do not invent facts to make it a better story; imagine that you are giving a statement to a policeman and accuracy is important. If you cannot remember something, don't guess, just leave it blank.

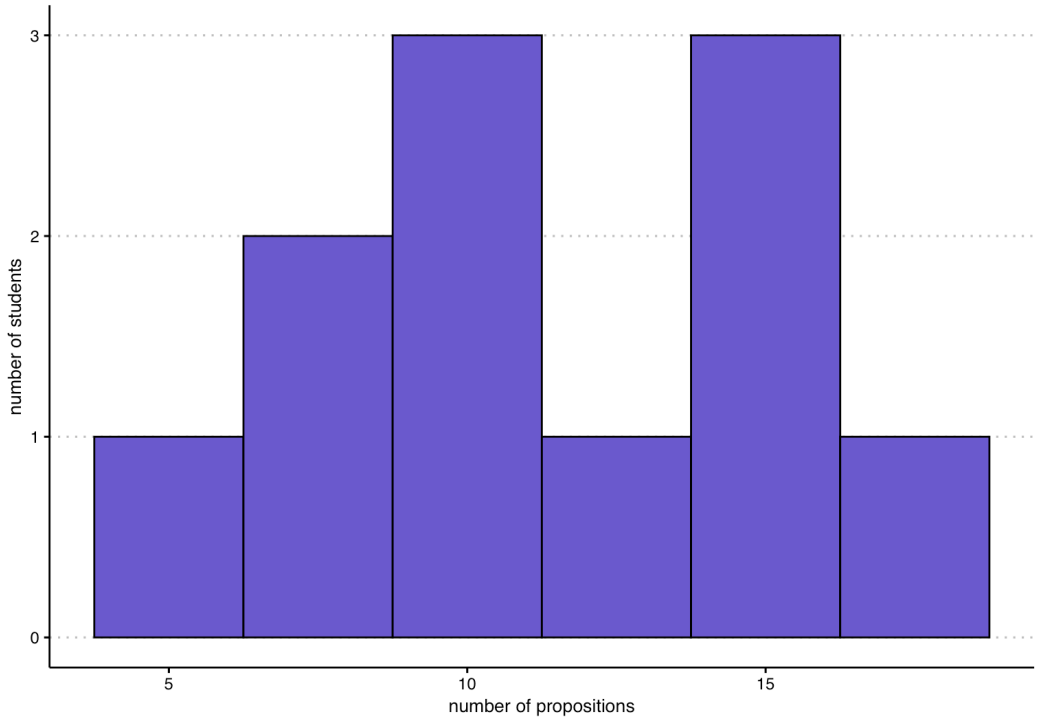
You have about 5 min, should you need it.

scoring

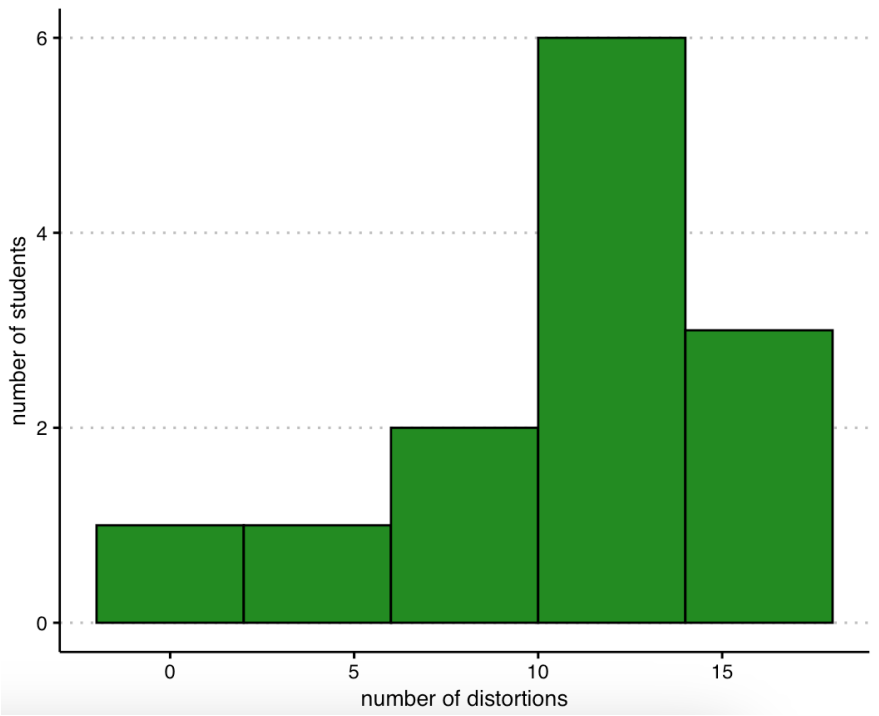
- you will now score your second story reproduction in two ways
- the story has a set of 34 propositions/idea units
- you will score whether your reproduction contains each proposition
  - 1 if a fact was mentioned and 0 if not, 0.5 if there is partial information
- you will also score whether there was a distortion
  - “day” instead of “night”
  - “boat” instead of “canoe”
  - “fish” instead of “seals”
  - new facts, inferences made, etc.
  - use your judgment!

your scores from tuesday

proposition recall score



distortion score



scoring day 2

- go to this scoring spreadsheet
- find your tab and score your story reproduction out of 34 propositions
  - accurate or not (0/1)
  - distortion or not (0/1)
- total up your score and enter it on the “main_scores” sheet
  - use the day 2 columns
- report on your score

report on your score

I scored better on day 1

0%

I scored better on day 2

0%

I scored the same

0%

report on your distortions

More distortions on day 1

0%

More distortions on day 2

0%

Same number of distortions

0%

recap: Mar 28, 2023

- what we covered:
  - information processing and memory
  - forgetting and remembering
- your to-dos were:
  - *fill out*: short march survey (extra credit)
  - *finish:* L7 readings
  - *post*: conceptual question
  - *work on:* project milestone #3 feedback + milestone #4

today’s agenda

- short and long-term memory
- Katie Byrnes! (2.15 onwards)

multi-store model

- Atkinson and Shiffrin (1968) proposed a model of memory that explained how memories were encoded, stored, and retrieved
  - environmental stimuli are first converted to representations, which are stored in sensory registers for a brief duration
  - some of this information makes its way to the short-term store, which is also limited in capacity
  - some of the short-term store information is passed down to the long-term store, which has more capacity
- this model was both theoretical as well as mathematical

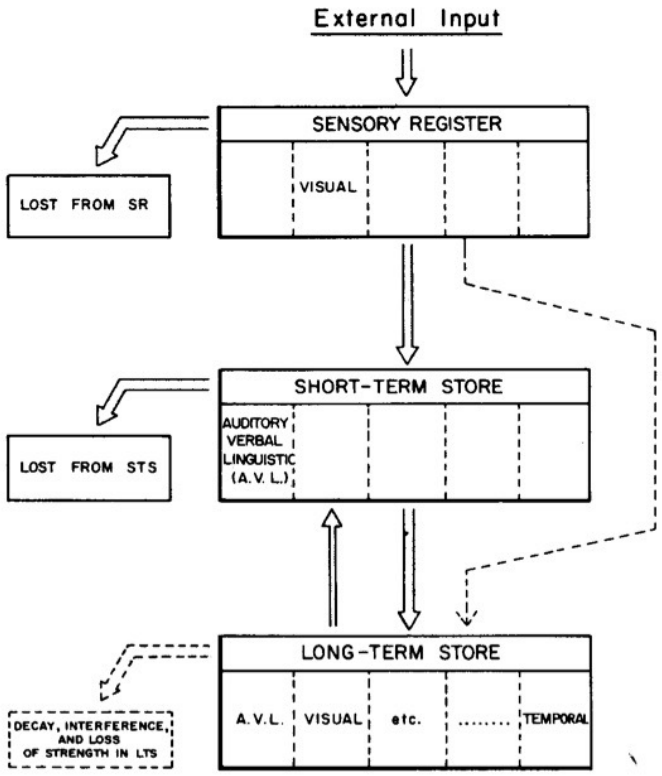


FIG. 1. Structure of the memory system.

multi-store model

- the short-term store is a rehearsal buffer where items can be stored and rehearsed temporarily, and space/capacity is severely limited
- items that stay longer in short-term store have a greater likelihood of being passed to the long-term store
- the long-term store could be affected by decay, interference, etc.

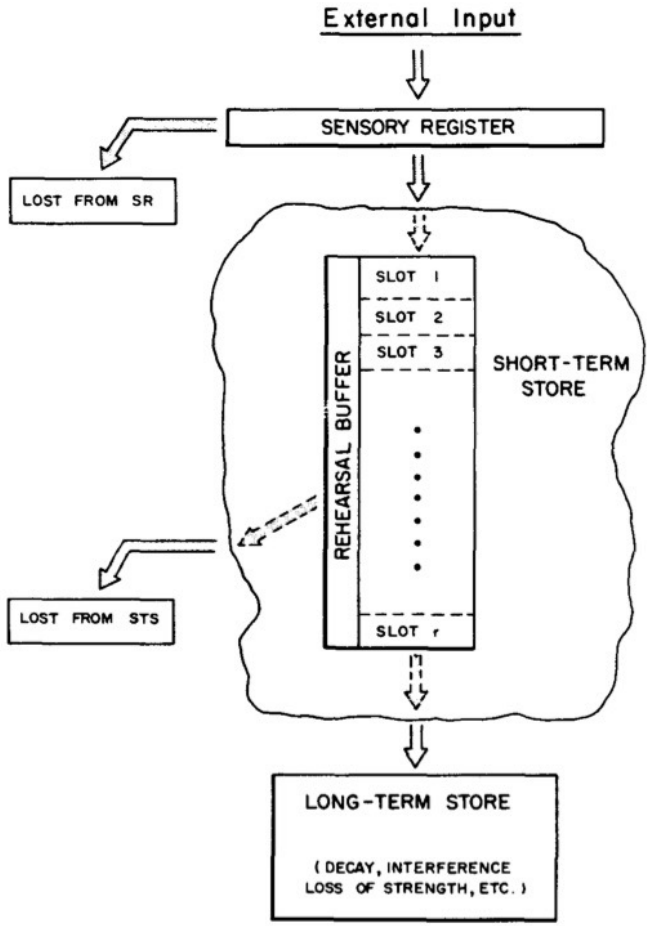


FIG. 2. The rehearsal buffer and its relation to the memory system.

serial position curve

- a serial position curve refers to the U-shaped curve typically obtained from memory experiments where accuracy of recalling words is measured
- serial position effect
  - primacy: recalling first-learned items
  - recency: recalling most recently learned items

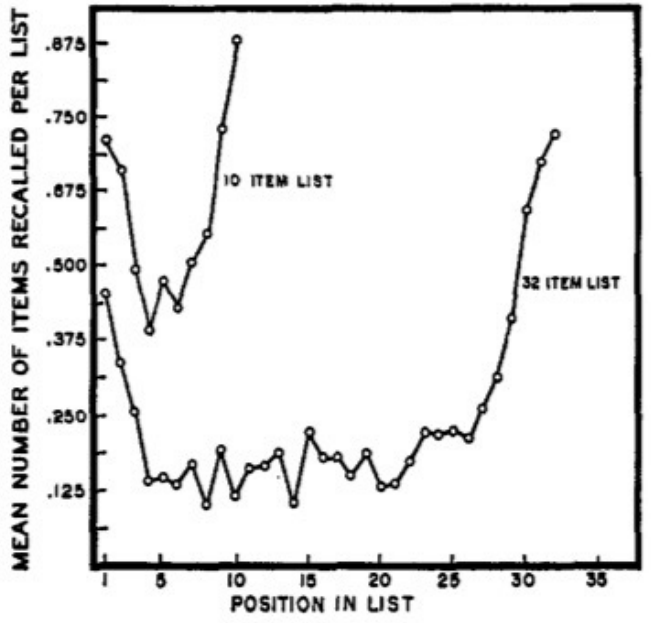


FIG. 1. Mean frequency of recall per list per S for lists of randomly arranged words as a function of position of items in original lists.

multi-store model: serial position effects

- the model provided an explanation for serial position effects
- primacy: the more time items spend in the rehearsal buffer, the more likely they are to be transferred to the long-term store. initially learned items continue to be rehearsed and are more likely to have been transferred to long-term store
- recency: given that the short-term store is limited in capacity, newer items quickly replace older ones, and just before recall, the rehearsal buffer contains the most recently learned items

activity: testing the multi-store model

- go to https://aa4u2f50ix.cognition.run
  - laptop recommended (not sure about iPad)
- do the experiment

activity: debrief

- come back and discuss
  - what do you predict your serial position curve to look like?
  - did you use any strategies?
- I will compile your results in the meantime

multi-store model: testable assumptions

- the model provided testable assumptions/predictions
- if rehearsal was eliminated, would you lose the recency effect?
- Postman and Philips (1995) showed that eliminating rehearsal opportunities (by performing arithmetic at the end of the list) removed the recency effect

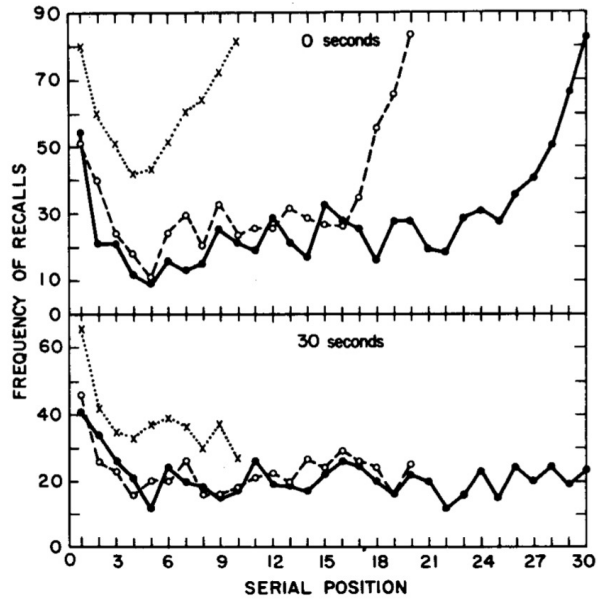


FIG. 28. Probability of correct recall as a function of serial position for free verbal recall with test following 0 seconds and 30 seconds of intervening arithmetic. After Postman & Phillips (1965).

multi-store model: long-term recency

- Tzeng (1973) conducted a memory experiment where participants performed arithmetic after hearing each word
- since rehearsal was prevented, no recency effect should have been observed as per the multi-store model
- the experiment you did was Tzeng's experiment!

your data vs. Tzeng's data

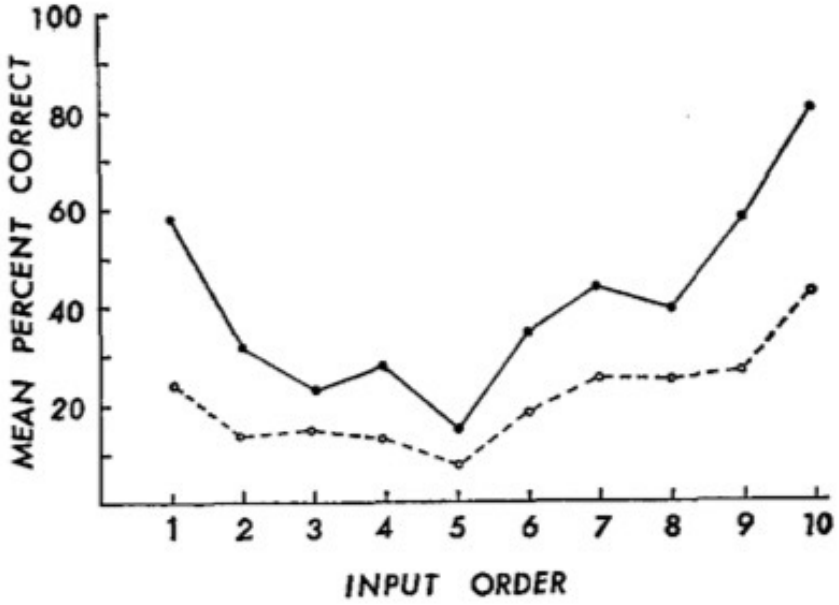


FIG. 1. Mean percent of correct recall on the initial (●—●) and the final (○ - - - ○) free recall as a function of serial positions at input.

multi-store model: long-term recency

- since rehearsal was prevented, no recency effect should have been observed, but it was
- takeaway: short-term rehearsal could not be the only explanation for long-term recency effects
  - strategy, motivation, context could all influence memory (more next time!)

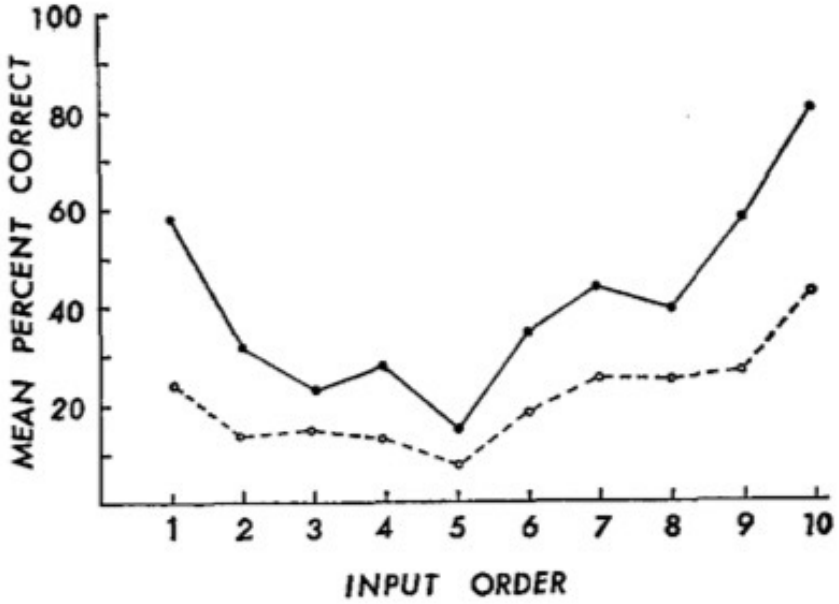


FIG. 1. Mean percent of correct recall on the initial (●—●) and the final (○ - - - ○) free recall as a function of serial positions at input.

short- and long-term memory

- newer work challenges the idea that short-term and long-term memory is homogenous (may have subcomponents and could be influenced by multiple cues and contexts)
- the idea of short- and long-term memory is a central theme in cognitive science and alludes to a distinct/multiple memory systems approach, similar to biology
- an alternative perspective in the field is that memory is a single system of episodes and all retrieval & knowledge emerges from this store, e.g., "instance-based" theory of memory

big takeaways

- the study of memory has early roots in associationism and researchers continue to remain interested in the mechanisms underlying remembering (reconstructive) and forgetting
- the multi-store model provided a theoretical and mathematical model of how information is encoded, stored, and retrieved via the sensory registers, short-term and long-term memory store
- newer work has identified some limitations of this model and argues for a single-system model of memory

next class

- **before** class:
  - *finish:* L7 quiz/writing assignments
  - *work on:* project milestone #4
- **during** class:
  - feedback discussion
  - conceptual questions
  - memory phenomena and principles!

Katie Byrnes!