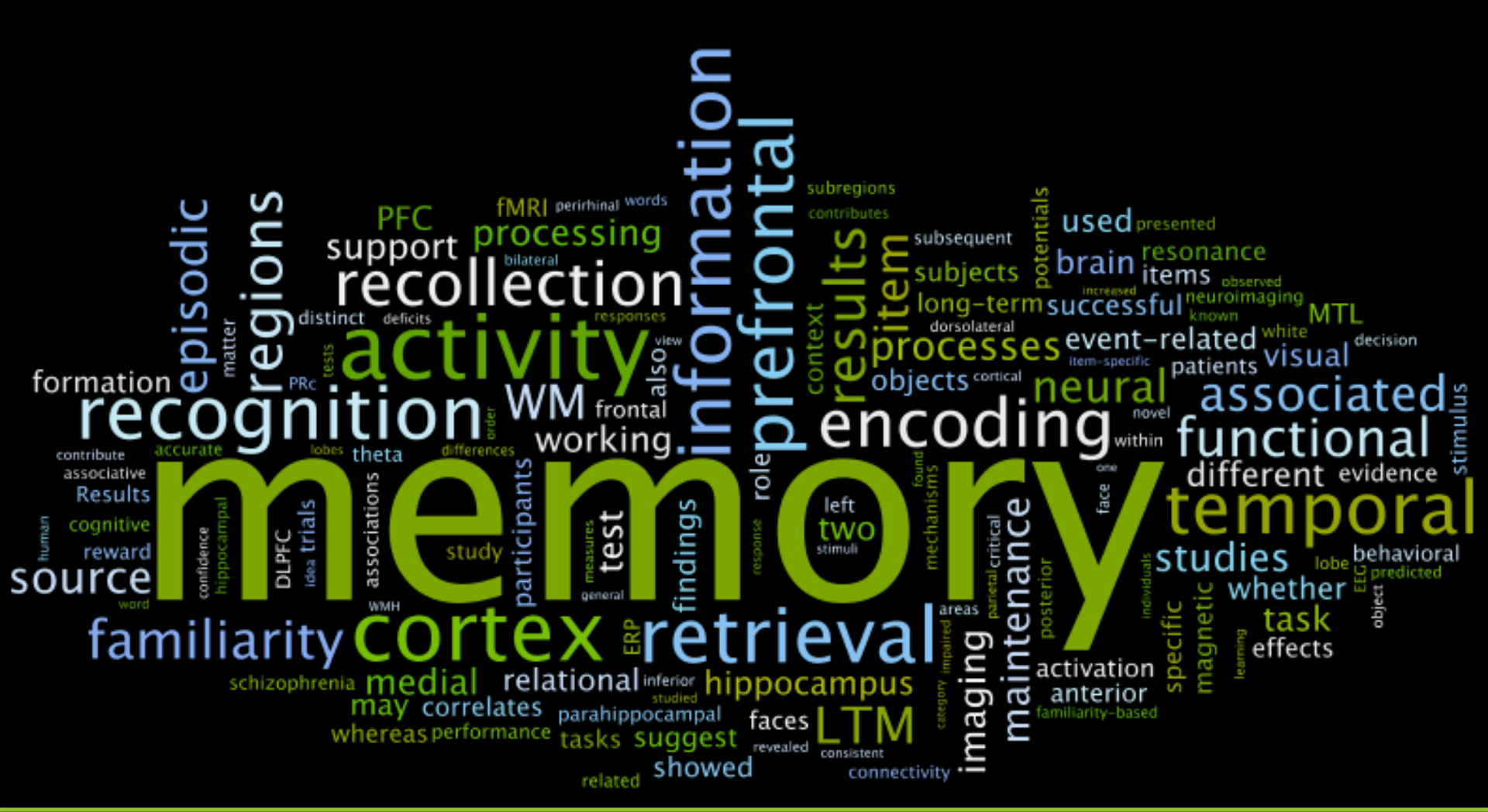


Memory 1

Psyc 364: Sept 28th 2016

Shelagh Freedman

Deese-Roediger-McDermott Paradigm (DRM)

- false memory!
- “lure” words
- high association between all words
- well controlled, lab based
- simple
- robust effects
- the “gist”

Miller's Law

- the magic number 7, +/- 2
- time limited rehearsal
- what counts as an item?
- chunks

Aspects of STM

- follows the attentional filtering stage
- where the immediately present moment is held in consciousness
- where active mental effort is expended
- where comprehension takes place

The Brown-Peterson Task

- Goal: Determine how long non-rehearsed information stays in STM, given that according to Miller, rehearsal is important for keeping information in STM

Phase 1. Consonant trigram presented: "DXM"

Phase 2. Rehearsal prevention task:

Show a number: "568" and count down by 3's

Phase 3. Test memory for consonant trigram

What happens to information if it is not rehearsed?

You will see a group of letters, followed by a group of numbers

- memorize the letters
- count backwards by 3s from the number
- report the letters when signaled to do so

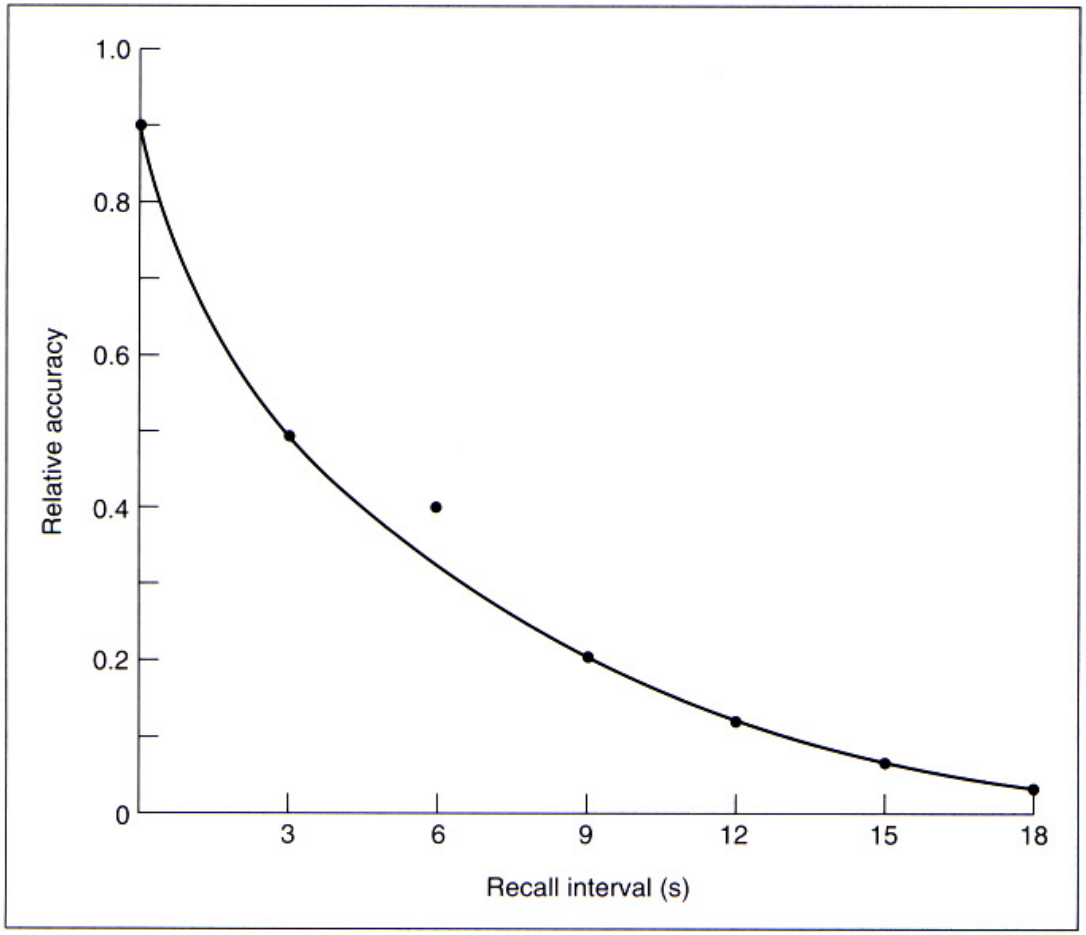
Ready?

SWQ

682

RECALL

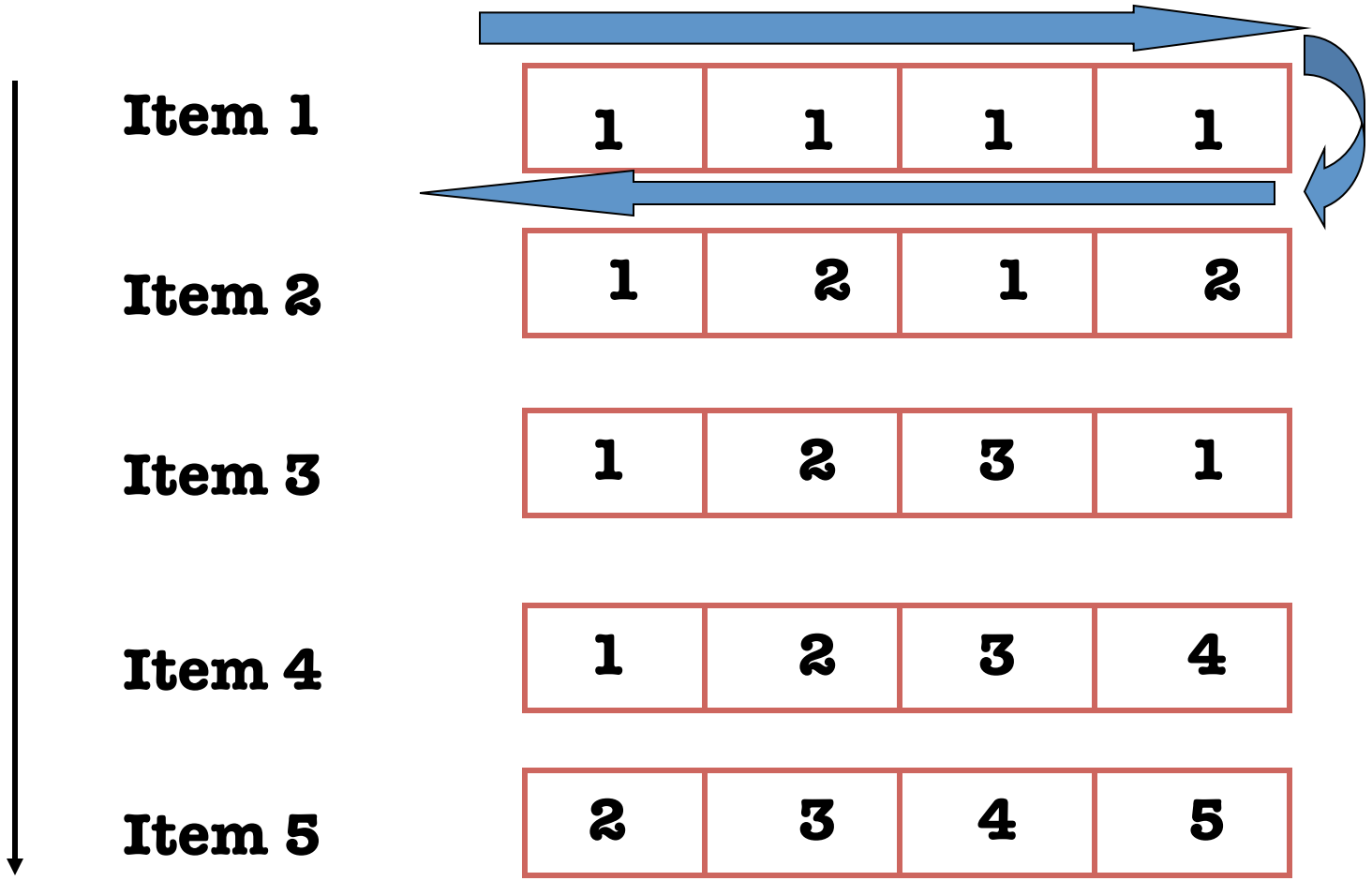
Recall Accuracy in the Brown-Peterson Task



Brown-Peterson's Interpretation

- The data represent a simple decay function
- **Decay**: Loss of a memory trace due simply to the passage of time
- Supported Miller's claim that rehearsal was crucial for retaining items in STM, and that decay (absence of rehearsal) was the reason for forgetting

Short-term Buffer



Further Evidence of Interference

- Keppel and Underwood (1962)

  Performance on the Brown-Peterson Task is relatively good early on (and nearly perfect on Trial 1)

- Performance gets much worse on later trials….
  Proactive interference

  Similar to studying for cumulative exams!

Proactive & Retroactive Interference

- **Proactive Interference** (PI)
  - Previously presented material interferes with new learning (e.g., walking today to where you parked your car yesterday)
  - Evidence: Keppel & Underwood

- **Retroactive Interference** (RI)
  - Recent material interferes with older learning (e.g., a busy signal erases memory of a phone number)

Release from PI in the Brown-Peterson Task

- Wickens (1972): remember words, then count backwards by 3's from number

  Dog, Cat, Mouse: 745

  Rabbit, Horse, Tiger: 687

  Elephant, Zebra, Lion: 496

  Cow, Bear, Wolf: 313

  Doctor, Lawyer, Baker: 891*

- Shift in semantic category for final trial causes **release from PI**

From Learning Trigrams to Word Lists...

- Memory for word lists can be probed in several ways:

  - **Free recall** - *tell me all the study words in any order*
  - **Cued recall** - *tell me the word on the study list that begins* **TAB? ?**
  - **Serial recall** - *tell me all the study words in the order you learned them*

Serial Position Effects & Free Recall

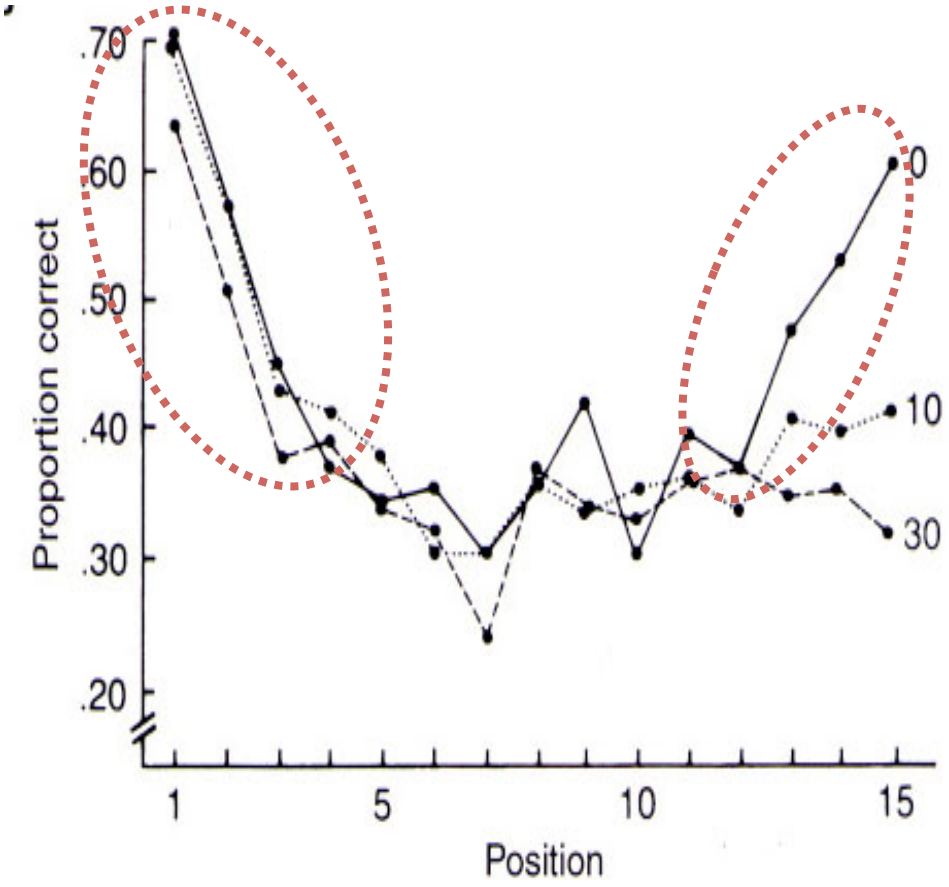
- **Primacy effect**:

  Better memory for the first few list items, due to more rehearsal time in the STM buffer.

- **Recency effect**:

  Better memory for the last few list items, due to those items being active in the STM buffer at recall phase.

The Serial Position Curve



No backwards counting

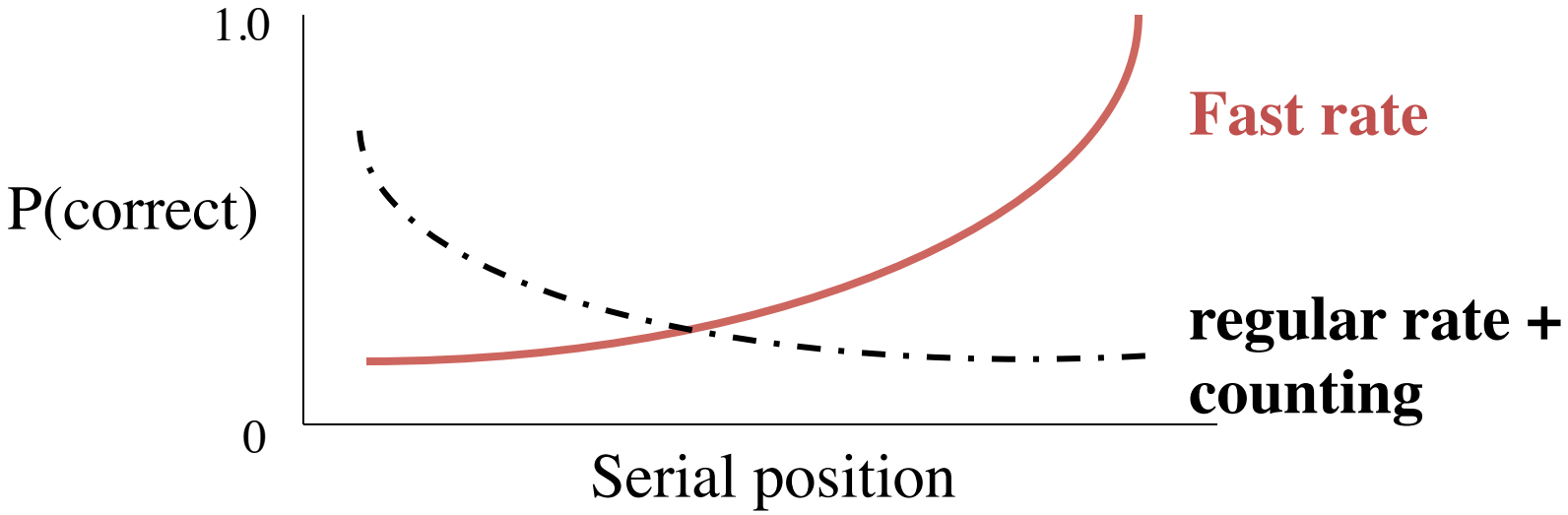
10 s backwards counting

30 s backwards counting

Counting task only affects the most recent items that remain in STM

Evidence for Two Memory Stores

- Glanzer and Cunitz (1966) free recall of words
  - Cond. 1: fast presentation rate
  - Cond. 2: regular presentation rate + counting
  - Results: cond. 1 wipes out primacy effect, whereas cond. 2 wipes out recency effect
  - ***Double dissociation*** suggests two components, hence supports the difference between STM and LTM effects



Classical Research on Short-Term Memory

- **Atkinson and Shiffrin's Model of Information Processing**
  - information-processing approach
  a) Mental processes are similar to the operations of a computer
  b) Information progresses through a series of stages, one step at a time

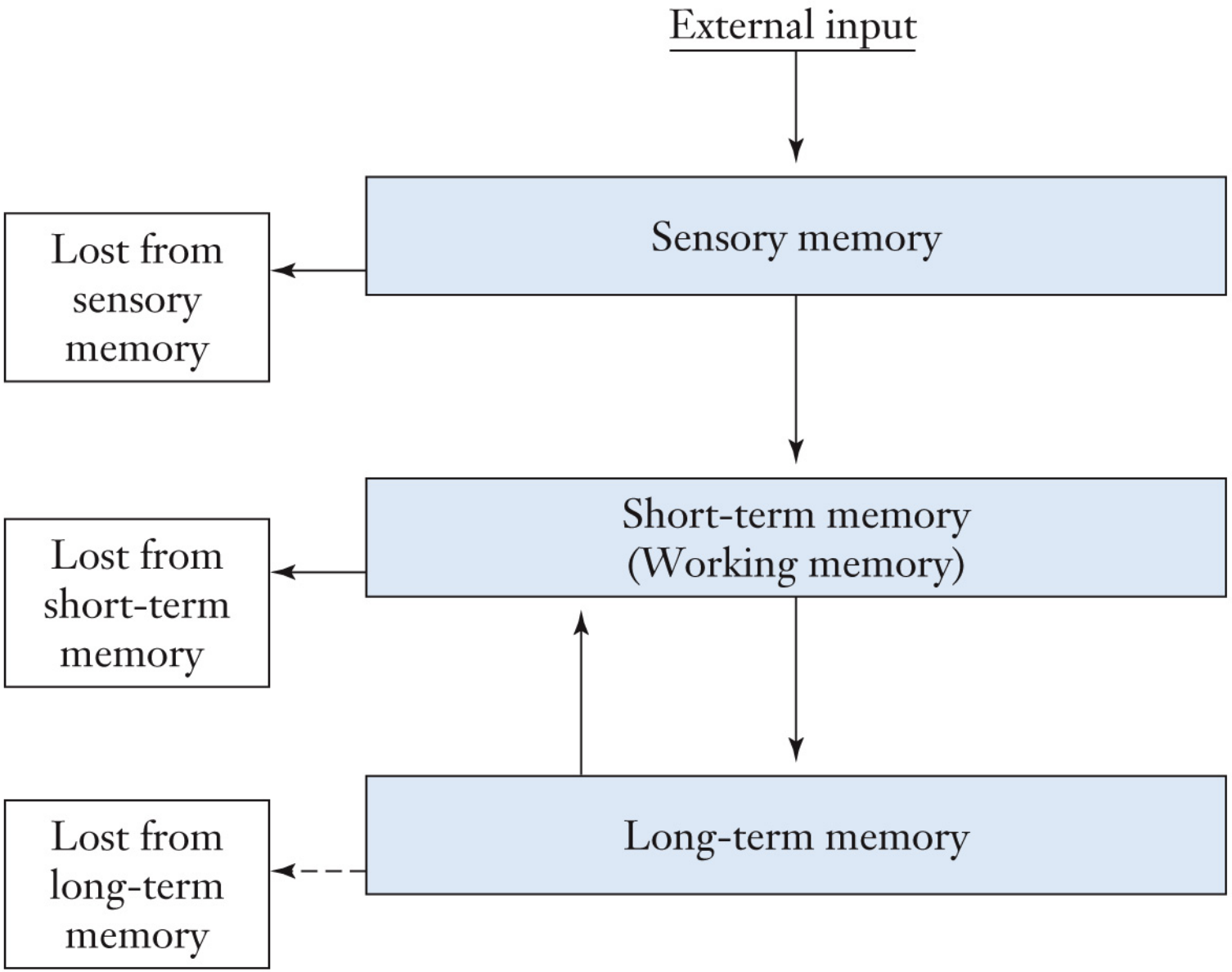


Figure 4.4

Short Term Versus Working Memory

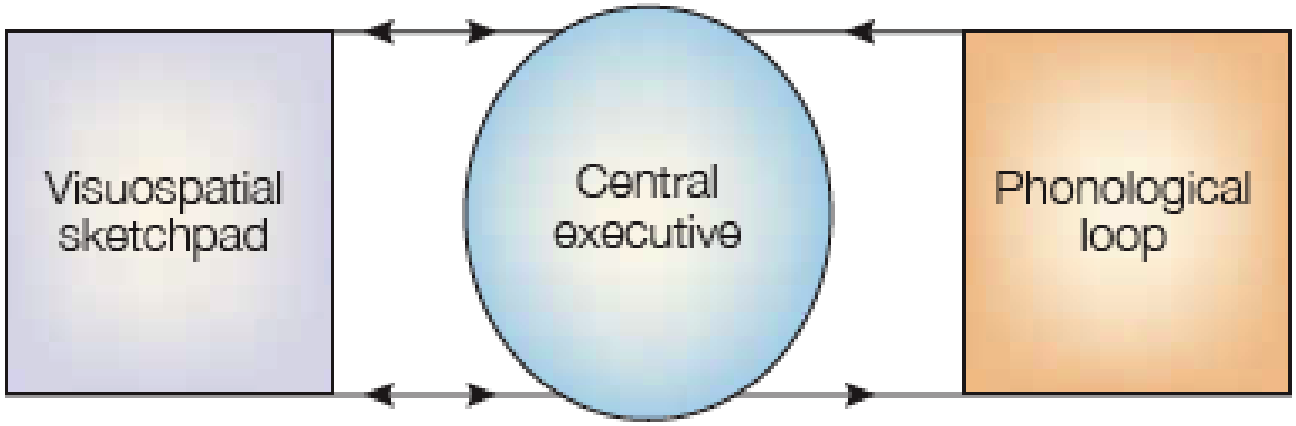
- **STM**:

  Older term emphasizing input and storage of new information (e.g., a phone number)

- **Working Memory**:

  Newer term emphasizing processing and storage -- the mental workbench

Working Memory: The Early Model



From Baddeley & Hitch (1972)

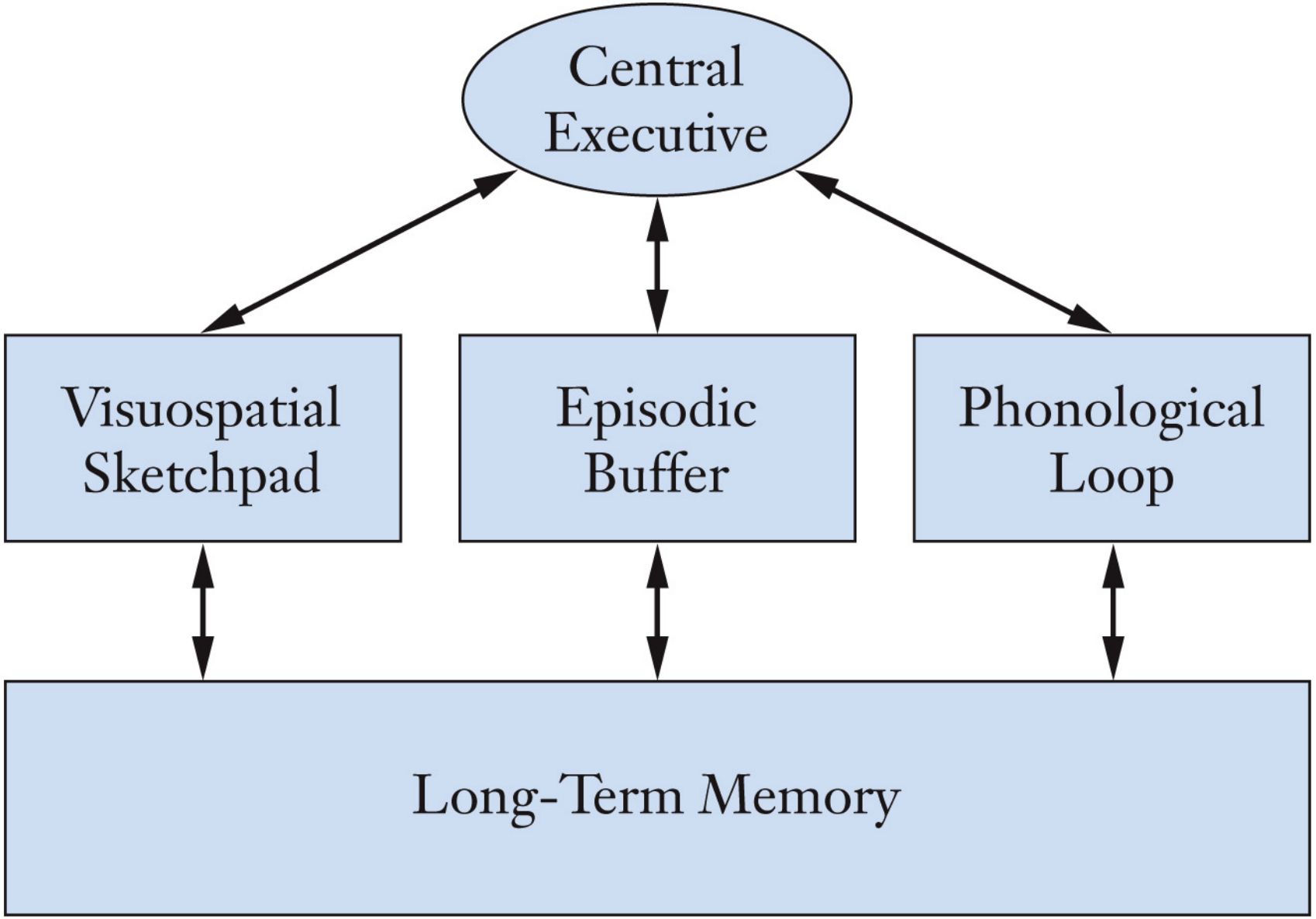


Figure 4.5

The Articulatory Loop (AL)

- The speech and sound related component responsible for rehearsal of verbal information

- Items are rehearsed in the **articulatory loop**, and recoded if the presented information is in a visual format

- Another sub-component, the **phonological store** holds the speech-based information

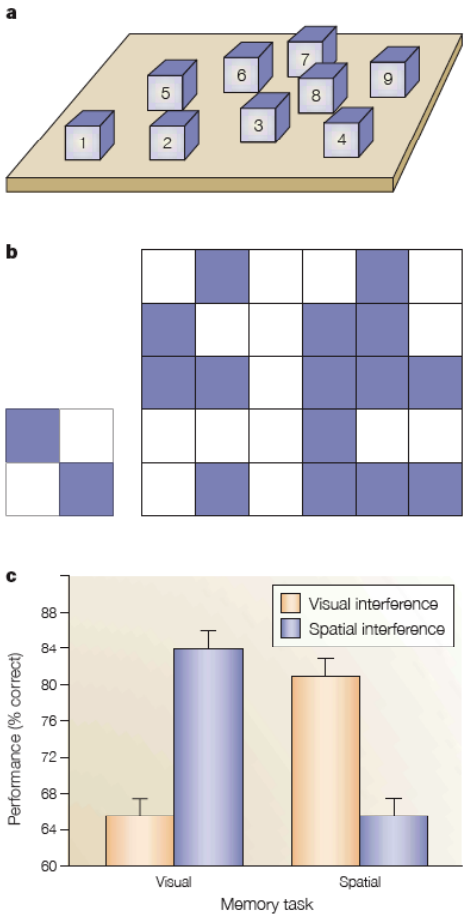
Articulatory Loop Effects

- Phonological confusions:
  - similar sounding words are more confusable
- Word length effect:
  - Memory for multi-syllabic words is worse than single syllable words
- Unattended speech effect:
  - Involuntary access to the articulatory loop shown by comparing digits in silence vs. digits with nonsense syllables vs. digits with words

Articulatory Loop

- Assumed that articulatory rehearsal was using **subvocalization**: "silent speech"
- **Articulatory suppression**: a technique for occupying the vocal musculature
  - During encoding of either visually or auditorially presented words, repeat nonsense items simultaneously (e.g., *cola cola cola*)
  - Suppression while encoding visually presented info wipes out recoding, and thus wipes out phonological similarity effect, unattended speech effect, and word length effect
  - For auditory memory items, AS does not abolish the PSE, because there is no need to recode auditory items

Visuo-Spatial Sketch Pad (VSSP)



- √ a system specialized for visual and spatial information
- √ distinction between spatial and visual information
- √ double dissociation observed

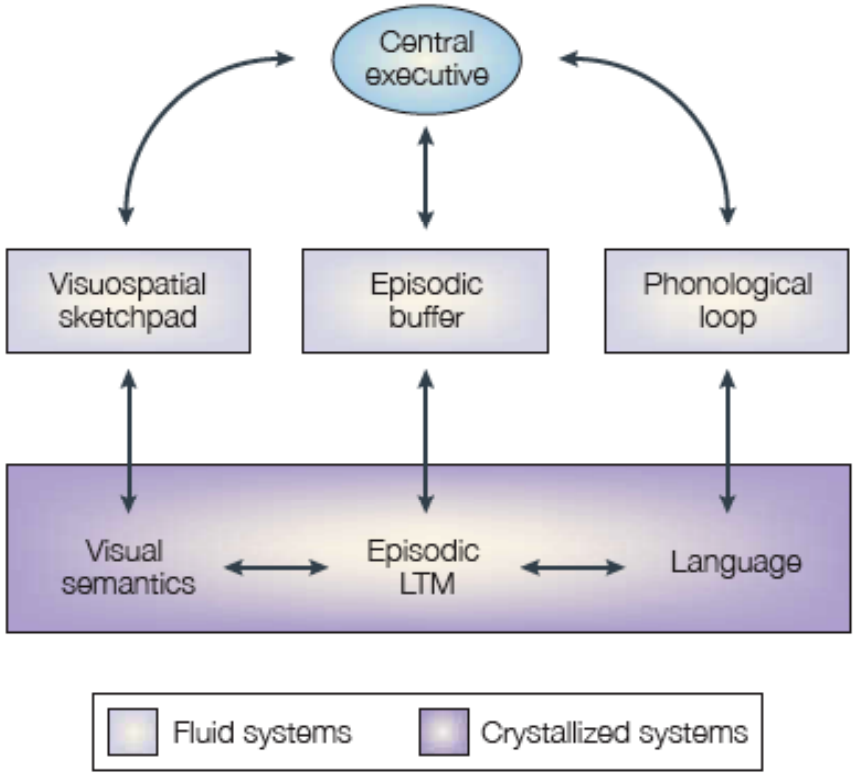
Central Executive (CE):

- In charge of planning future actions, initiating retrieval and decision processes as necessary, and integrating information coming into the system

- Random generation task:
    - pretend you are pulling letters out of a hat randomly and say out loud these letters while avoiding common series (e.g., FBI, CIA)

A New Component: The Episodic Buffer

- Revised WM model (Baddeley, 2000)
- To integrate original attention-based model with LTM effects
- Separate storage component that is multi-modal
- Accomodates novel combinations of info



Working Memory

- academic performance
- depression
- ADHD

Superior autobiographical memory

- https://www.youtube.com/watch?v=2zTkBgHNsWM

- https://www.youtube.com/watch?v=fRXGV5NeYCM