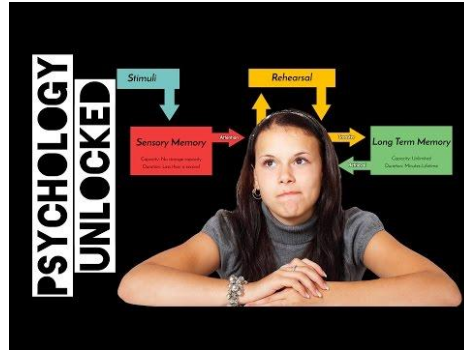


Models of Memory





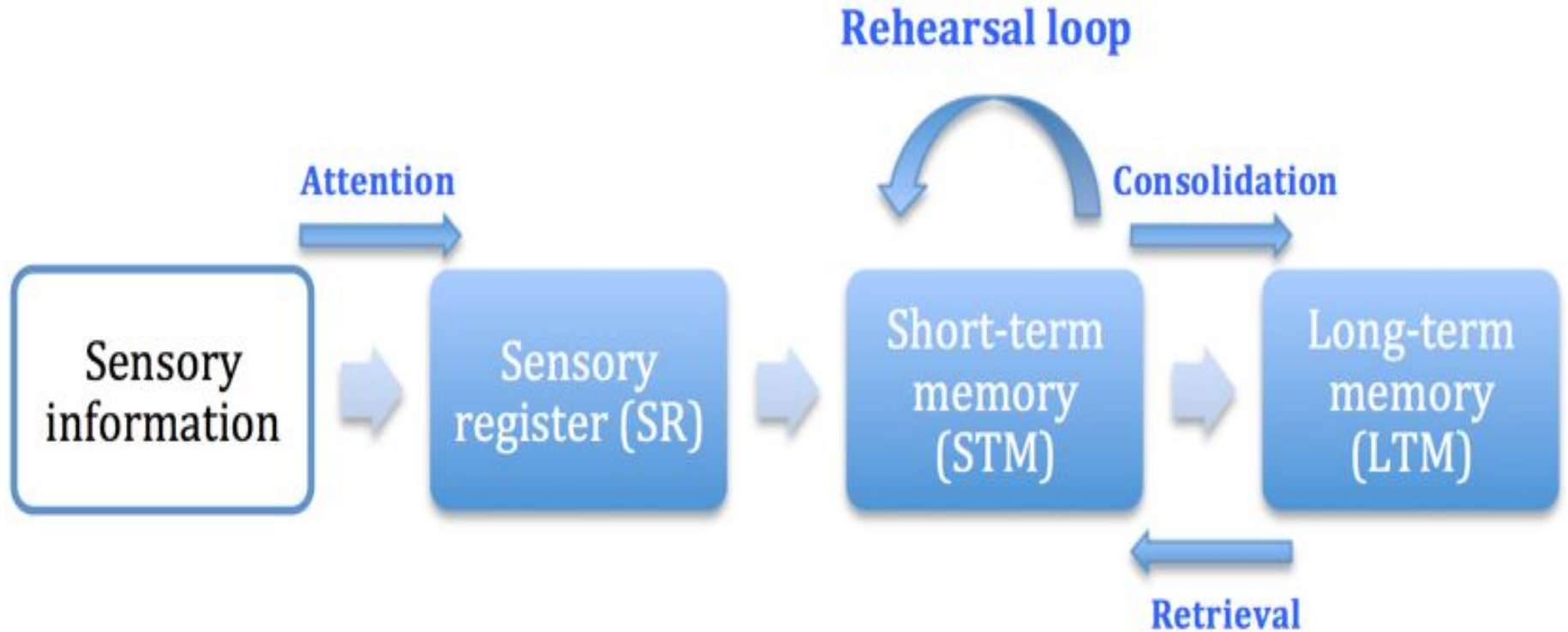
Atkinson and Shiffrin (1968)



3 components of memory: Each component is characterized by:

- Sensory memory
 - Short-term (STM)
 - Long-term (LTM)
- Duration (how long it can hold info)
 - Capacity (how much info it can hold)

Multi-store Model of Memory



Sensory Memory Store

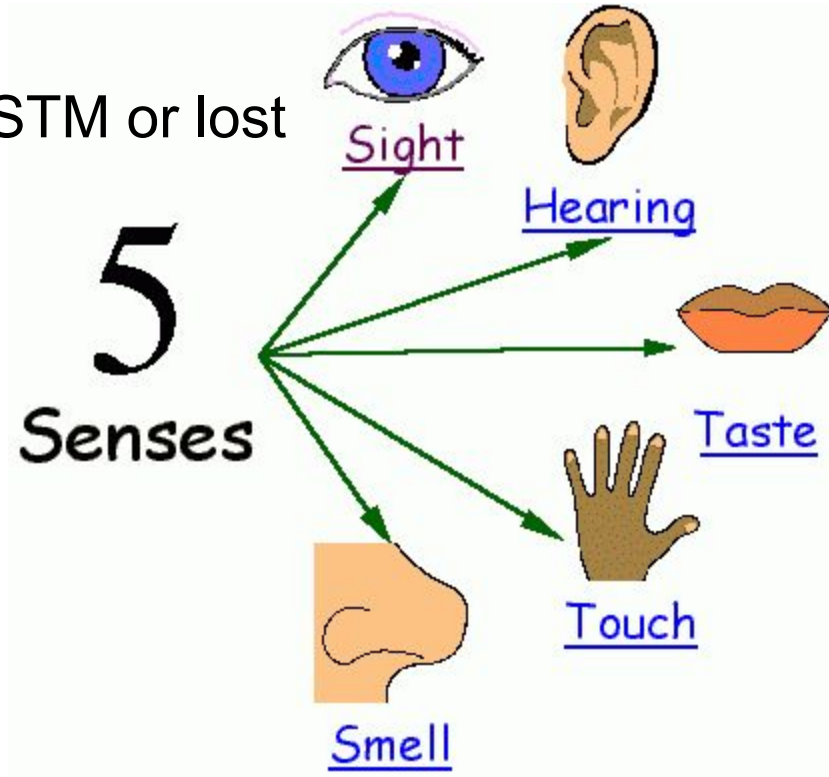
Does not process information

Detects info; holds until transferred to STM or lost

Visual, auditory, olfactory, etc.

Capacity is limited to our perception

Duration is short (just a few seconds)



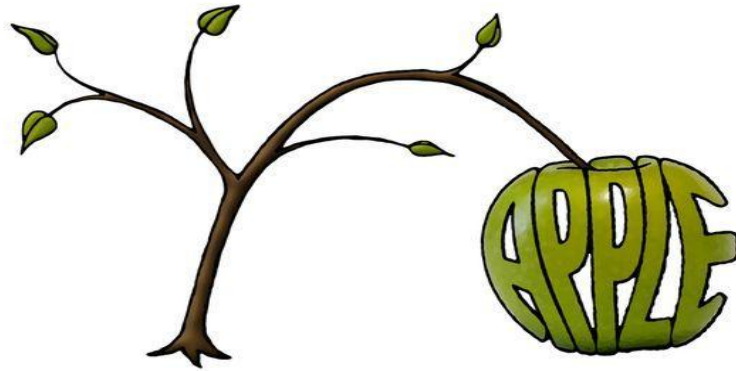
Short-term Memory (STM)

Attention brings info out of sensory memory

Modal differences of input is erased

Capacity: 7 +/- 2 chunks of information

Duration: generally less than 30 seconds



Long-term Memory (LTM)

Rehearsal increases duration of STM; brings traces to LTM

Capacity: large amounts of information (potentially unlimited)

Duration: indefinite

Retrieval (not storage) is problematic



Support for the Multi-Store Model

Partial Report Technique - **Sperling (1960)**

Participants flashed a grid of alphanumeric characters

Whole-report- fill in all characters (35% accuracy)

Partial-Report- fill in one row (75-100% accuracy)

Stimuli data contained in memory temporarily and accessible



50 ms (1/20 second)

Low Tone

Medium Tone

High Tone

"Recall"

J R S

(100% recall)

Support for the Multi-Store Model

Serial Position Effect - **Glanzer and Cunitz (1966)**

Tendency to recall first and last items of a list (not the middle)

- Primacy effect and recency effect

Participants asked to memorize list of 20 words (free-recall)

- 1st group started immediately after words were read
- 2nd group were delayed by filler task (counting, etc)

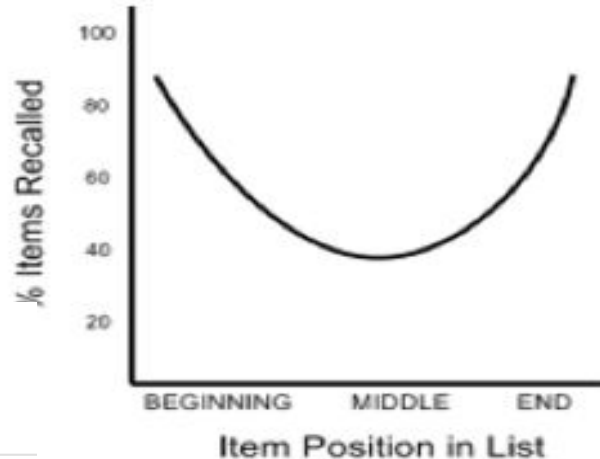


Figure 1. Typical Serial Position Effect curve

Support for the Multi-Store Model

Glanzer and Cunitz (1966) Continued

1st group (started immediately)

- Primacy and recency effect occur

2nd group (delayed)

- Primacy effect preserved
- Recency effect disappeared

Rehearsal explains results

Without it STM decays in 30 sec.

STM and LTM must be separate

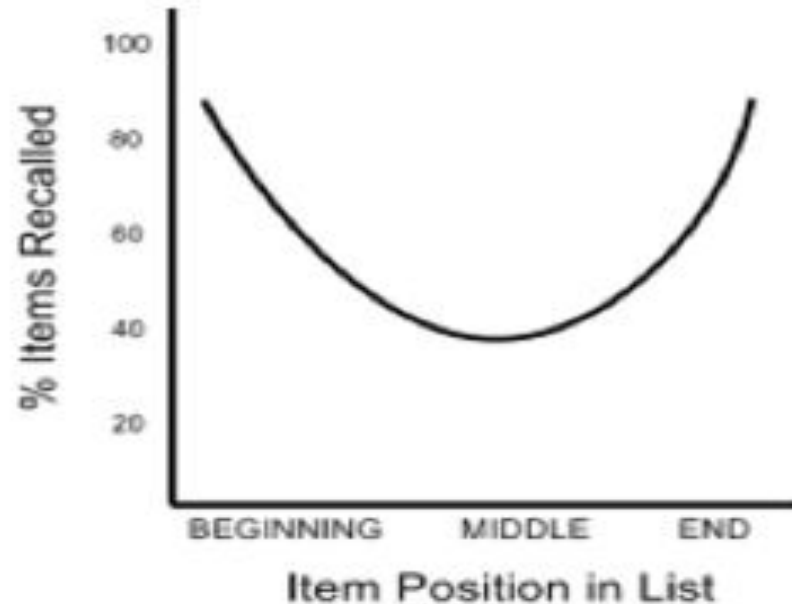
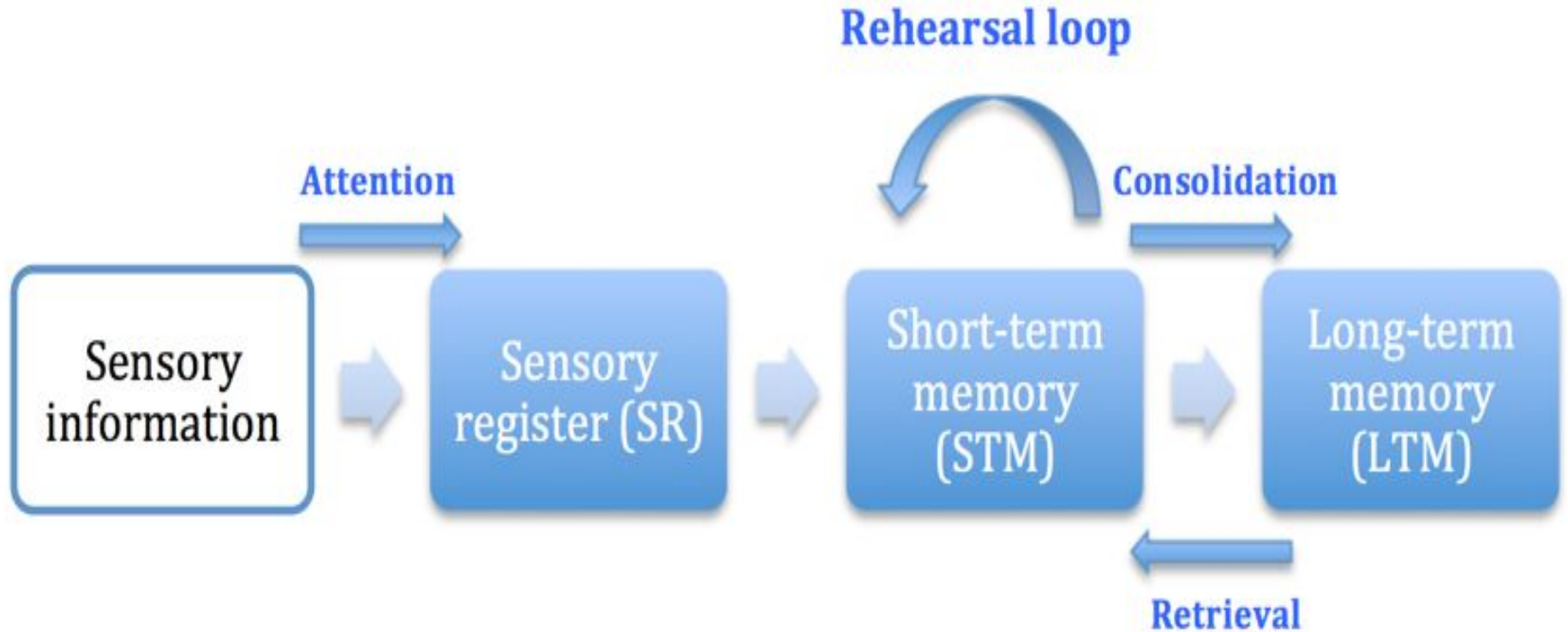


Figure 1. Typical Serial Position Effect curve

Any problems/criticisms of this model of memory?



Questions about Multi-store Memory

1. Are the memory stores really distinct and separate?
2. Are there really three memory stores, not more, not less?
3. Are sensory modalities within sensory memory just modalities?
Why not separate memory stores?
4. Is there a physiological basis for the memory stores or are they just constructs?
5. Is rehearsal necessary and sufficient for the transfer of information from STM to LTM? Can it succeed without? Fail with?
6. Does information only flow in one direction? For example, can LTM influence what pieces of data are selected from sensory memory?

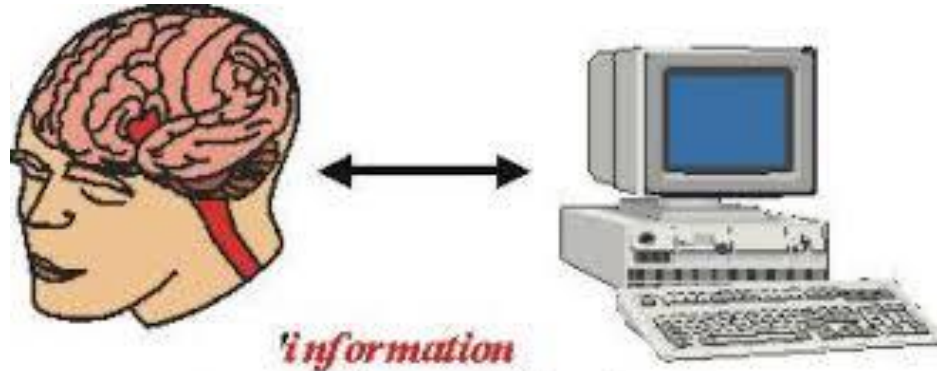
Criticism of Multi-Store Model

Levels of Processing - **Craik and Lockhart (1972)**

Recall is a function of the depth of our processing

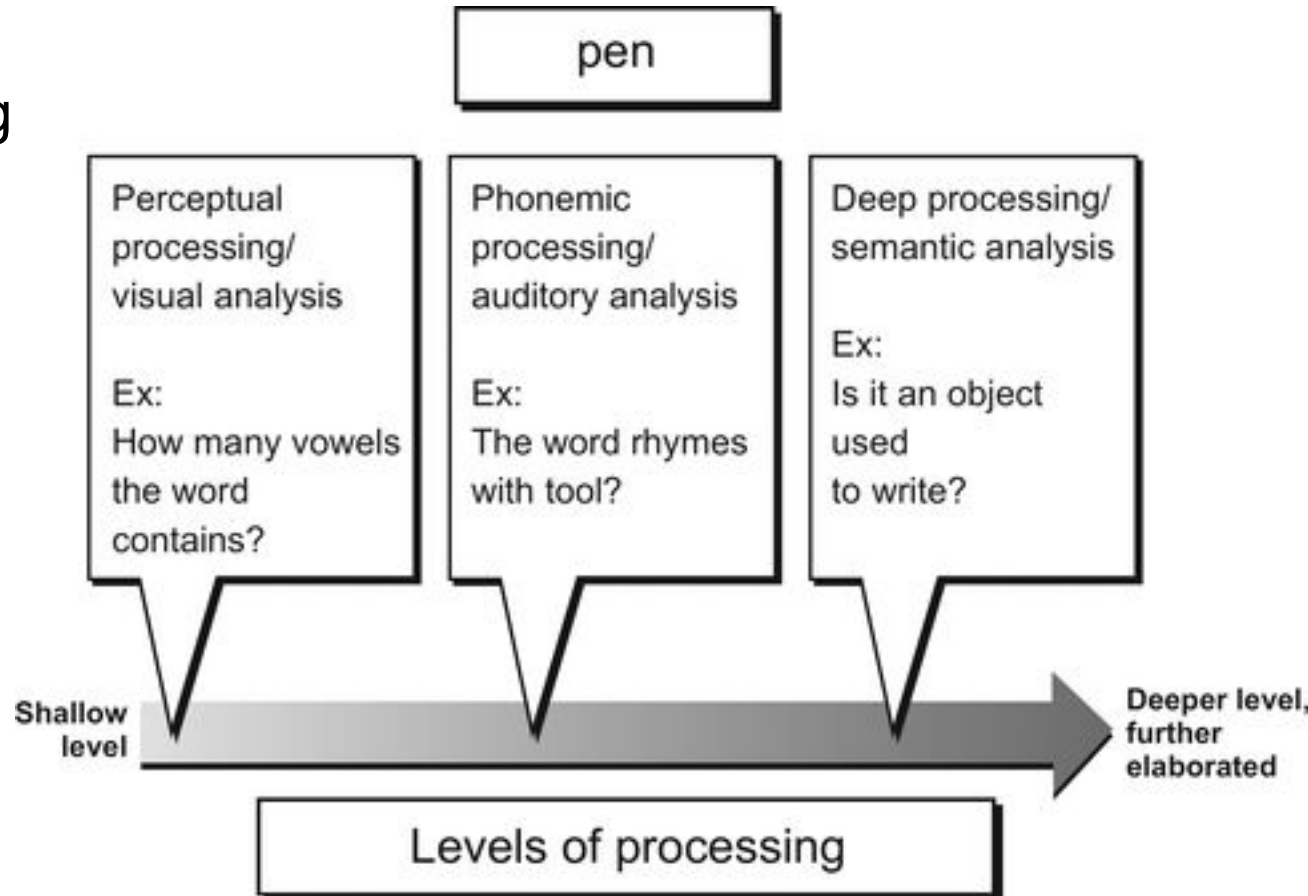
The deeper our processing, the stronger its trace in LTM

Deep processing involves building the stimulus into a structure of meaningful connections and associations (linking to prior knowledge)



Criticism of Multi-Store Model

Levels of Processing Model (con't)



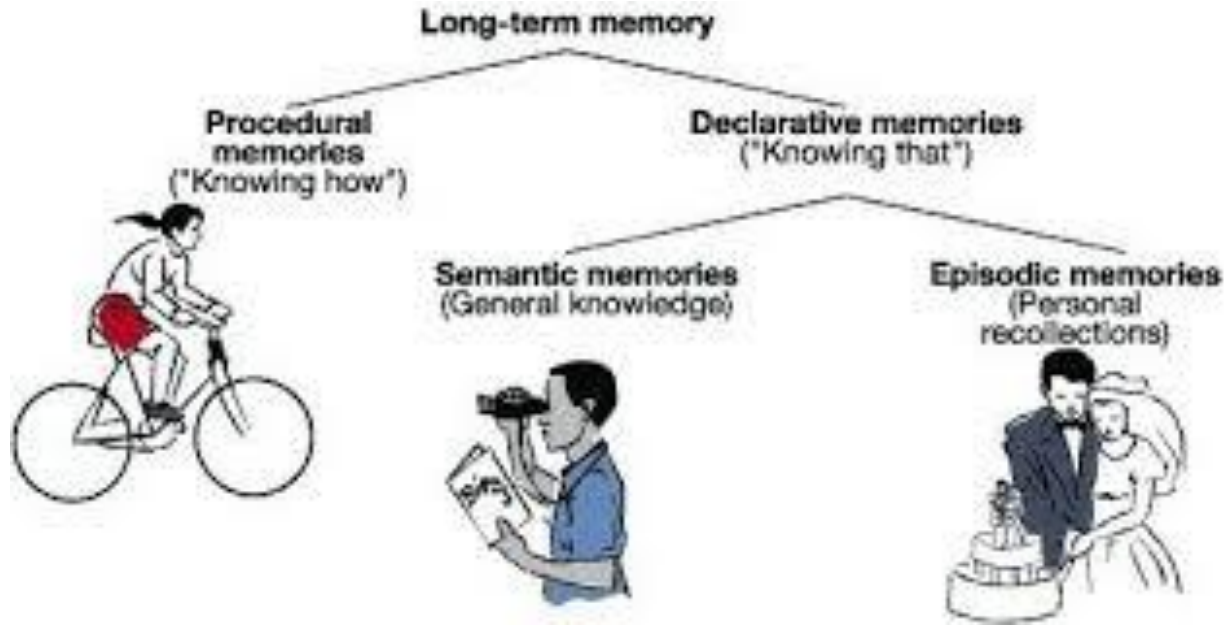
Criticism of Multi-Store Model

LTM might not be a unitary store

- procedural, episodic and semantic memory

STM may have more components

- working memory model



Criticism of Multi-Store Model

Levels of Processing - **Craik and Tulvig (1975)**



Working Memory Model Baddeley and Hitch (1974)

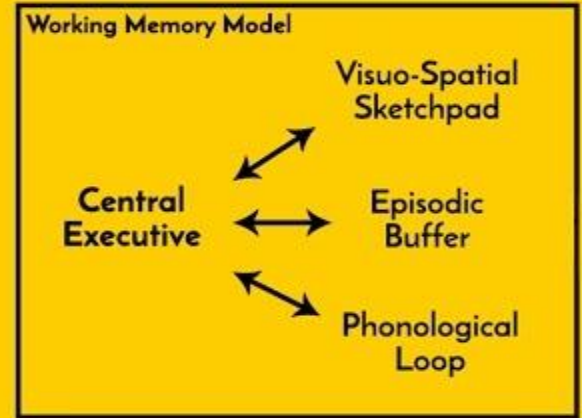


Focuses on structure of STM

Dual-task technique- subjects asked to perform simultaneous tasks (auditory and visual)

STM should be distracted and/or unable to perform both tasks

**PSYCHOLOGY
UNLOCKED**

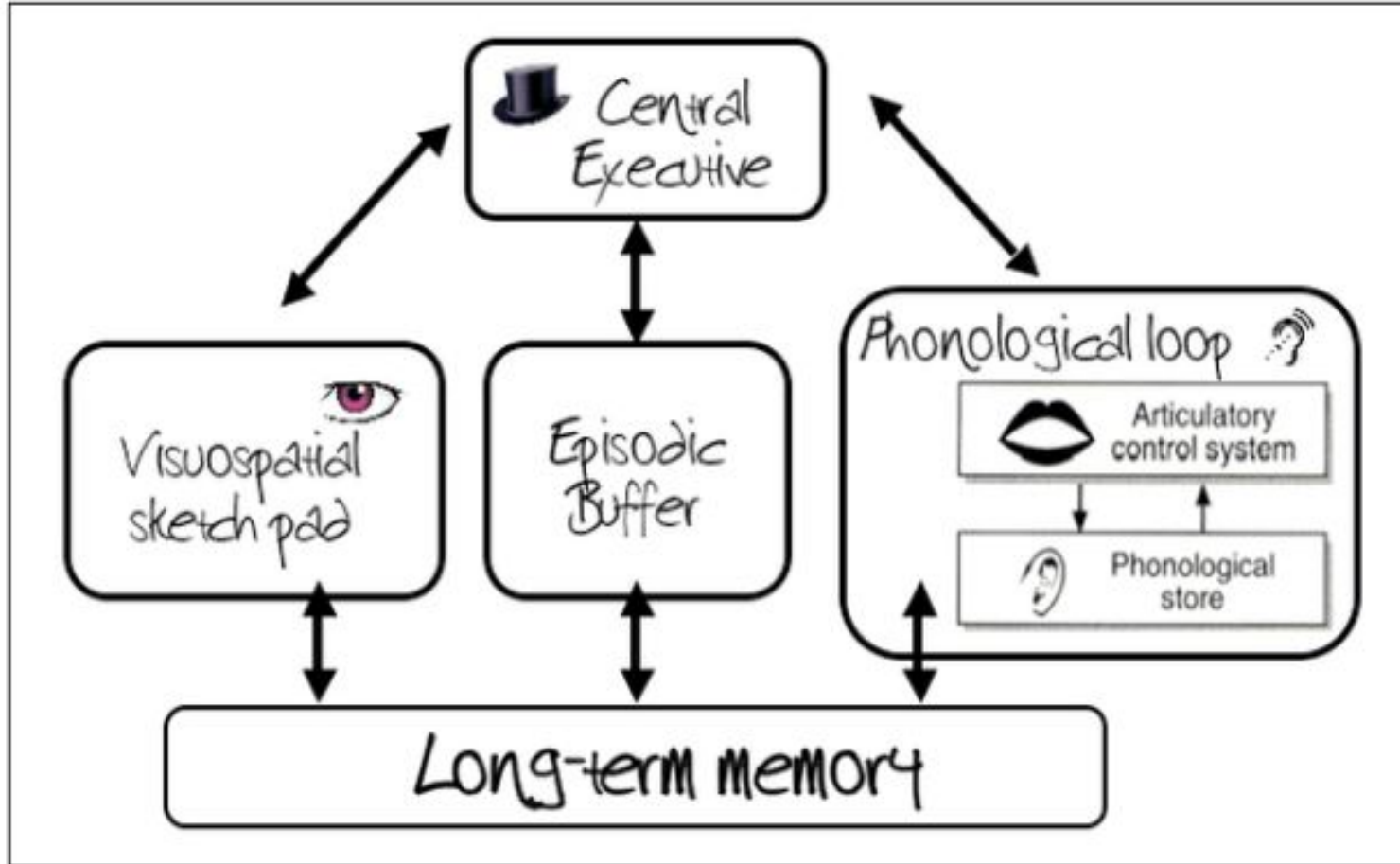


Working Memory Model

Working memory= central executive and manager

Visuospatial- holds visual and spatial info

Phonological loop- inner ear and inner voice



Support for Working Memory Model

Phonological similarity effect - Conrad and Hull (1964)

Participants to recall one of two lists of letters

- Phonetically similar: BDCGP
- Phonetically different: FHPRX

Rhyming lists were more difficult to remember

Traces of similarly sounding letters easier to confuse

Supports idea that speech material uses a sound-based storage

Support for Working Memory Model

Articulatory suppression - Baddeley, Lewis and Vallar (1984)

Participants to block “inner voice” rehearsal

- Repeat a sequence of sounds (ie. the-the-the or one-two-three)

Auditory inputs can enter but rehearsal impossible

Rhyming words difficult to remember

Visual inputs cannot be recoded into sounds

Recalling rhyming/non-rhyming words no different

Criticism of Working Memory Model

Strengths:

More sophisticated model of memory

Explains wider range of memory phenomena

Does not overemphasize role of rehearsal in memory

Criticisms:

Complex models are difficult to empirically test

Testing complexity makes model difficult to falsify

Exact role of components remains unclear (esp. central executive and episodic buffer)

Ignores other memory structures (sensory and LTM)