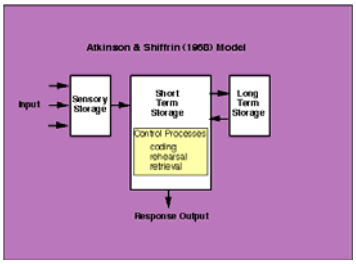
Short-term or Working Memory

- Limited consciousness related but not identical to idea of short-term memory
- System that allows us to hold and manipulate information for brief periods of time

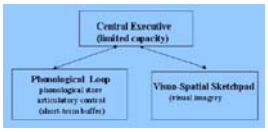
Memory for Recent Events

- Capacity Limitations
- Short Duration
- Rapid Forgetting

Modal Model/Store Model



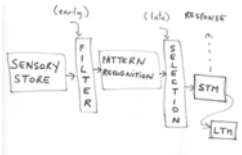
Working Memory

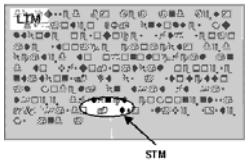


- STM not a separate system
- "STM" most active info in LTM
- Memory doing work
  - Storage & Processing
- Multiple Components

STM vs. LTM: 1 System or 2?

- Older View
- 2 Systems w/Distinct Characteristics
- Newer View
- Different States in a Single System



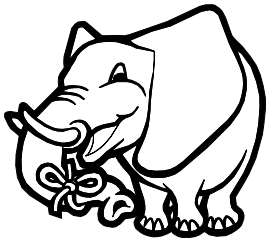


STM vs. LTM: 1 System or 2?

- Capacity
- Duration
- Forgetting
- Coding
- Retrieval

Capacity

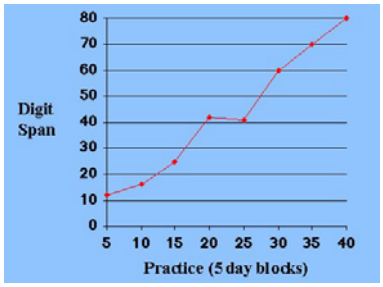
- 5 2 7
- 8 1 3 9 1
- 7 3 8 6 9 8 1
- 2 5 1 9 2 4 7 5 3
- 9 6 2 8 1 5 8 2 9 3 7



Memory Span Tasks

- Forwards Memory Span
  - Experimenter: 8 1 3 9 1
  - Subject: 8 1 3 9 1
  - 5-7 Digits
- Backwards Memory Span
  - Experimenter: 8 1 3 9 1
  - Subject: 1 9 3 1 8
  - 5-7 Digits
- People can only store a small amount of unrelated information temporarily

The Power of Chunking



Chess champions chunking

- Chess boards from the middle of actual chess games
  - Experts WAAAY better than Novices
  - 91% vs. 41% correct
- Chess pieces randomly arranged on the board
  - Experts = Novices

Proactive Interference

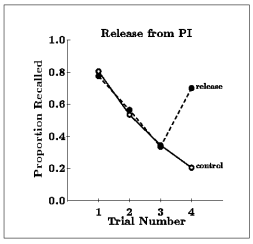
E: chair, sofa, rug, painting
S: chair, sofa, rug, painting

E: lamp, bureau, desk, bed
S: lamp, bureau, desk, painting

E: bookcase, stool, bench, table
S: bookcase, lamp, sofa, table

- Memory impairment that results when words from previous trials maintain their high level of activation in LTM and inhibit words on the current trial

Release from PI

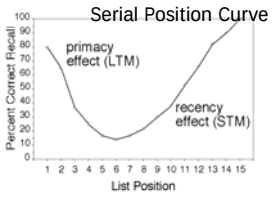


- Recall improvement that results when recall category is switched
- E: shirt, socks, tie, blazer
- S: shirt, socks, tie, blazer

Capacity: 1 System or 2?

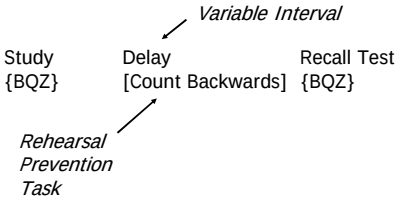
- Capacity Varies
- Variability Related to LTM Memory Organization
- STM & LTM different uses of one memory system

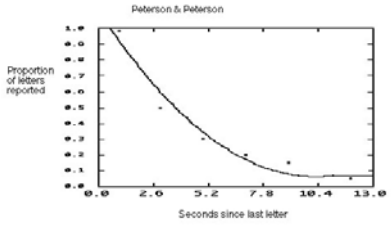
Duration



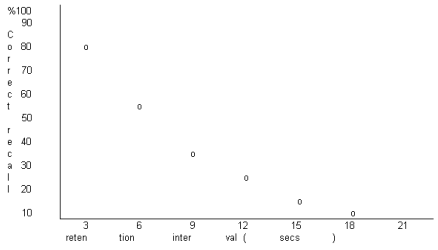
- Apparent Duration in STM: short
  - seconds
- Apparent Duration in LTM: long
  - years

Brown-Peterson Task





Murdock (1961)

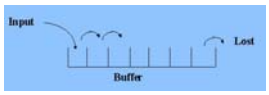


BUT

- Digits forgotten faster when distractor activity is counting backwards than alphabet backwards
- Structure in LTM affects *duration* in STM
  - STM Not Completely Autonomous

Forgetting

- Apparent Cause of Forgetting in LTM
  - Interference
- Apparent Cause of Forgetting in STM
  - Displacement



BUT

- Forgetting depends on how quickly information is rehearsed
- Rehearsal prevention tasks cause interference
- Experiment itself causes interference

Other Problems with Displacement

- Proactive Interference?
- Why do distractor activities cause faster forgetting when they're more similar?
- *Displacement, Decay, and Interference ALL contribute to forgetting in both STM and LTM*

Coding

- Apparent coding in LTM: Semantic
- Apparent coding in STM: Phonological

C Conrad (1964)

HBKLMW V for B (NOT V for W)

BCTHVZ vs. HBKLMW

- First establish visual vs. acoustic confusability
- Visual letter strings presented on Brown-Peterson Task
- Visual vs. Acoustic Code?

R Conrad (1972)

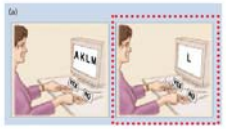
- Replicated Conrad's expt w/deaf subjects
- Visual Confusion
- Short-term memory not *necessarily* acoustically coded
- Other evidence?

Retrieval

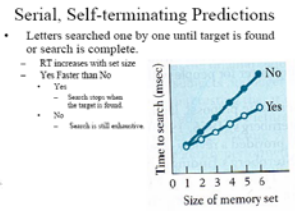
- Apparent: STM Serial
- Apparent: LTM Parallel
- Sternberg Set Size Effect

Retrieval from STM

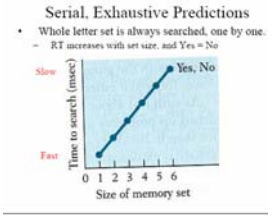
- Serial, self-terminating search
- Serial, exhaustive search
- Parallel search



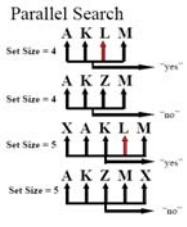
Serial, self-terminating

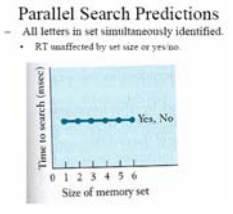


Serial, exhaustive search

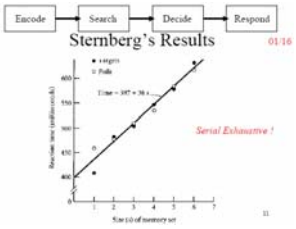


Parallel Search





Sternberg's Findings



Memory Search Data: Reinterpretation

- Parallel Theory (Baddely & Ecob)
- Limited Capacity Parallel Retrieval Models
- Set size effects occur even in LTM when material is weakly established information.

Parallel Theory (Baddely & Ecob)

- Rate to perform comparisons depends on how active items are in WM
- Activity level depends on how many items in WM
  - A B C D (.25, .25, .25, .25)
  - A B (.5, .5)

Limited Capacity Parallel Retrieval

- Retrieval done in parallel
- "Strategic resources" available for task limited
- Processing time increases w/set size because resources distributed over the entire set
  - Larger sets, less resources for any given item

Set size effects in LTM

- Show people a list of words
- Do distracter activity until words have decayed
- Was word on list? Y/N
- RT larger for longer lists
- Set size effects due to weakly established nature of information rather than inherent architecture of STM

The Fall of STM

- Many similarities in operation of STM & LTM
- STM better explained as 1 system
- STM just most active information in LTM
- New Explanations
  - Rehearsal
  - Interference
  - Multiple Codes