PSYC 363
COGNITIVE PSYCHOLOGY
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Part VII
Short-Term/Working Memory
MEMORY BASICS

- Reaction against the time

- STM (Primary) vs. LTM (Secondary)

- Have we already talked about memory?
SINGLE-STORE

- Single Store Approach
  - Embedded Process Model
MULTI-STORE

- Multi-Store Approach
  - Atkinson and Shiffrin (1968) model
  - Components of Model
  - Distinction between STM and LTM
Atkinson & Shiffrin (1968)

- Environmental Input
  - Sensory Registers
    - Visual
    - Auditory
    - Haptic, etc.
  - Short-term Memory (STM)
    - Control Processes:
      - Rehearsal
      - Coding
      - Decisions
      - Strategies, etc.
  - Long-term Memory (LTM)
    - Permanent Memory
EVIDENCE FOR DISTINCTION

- Activity
  - Why is one more active than the other?

- Access
  - Questions about 30 years war

- Availability of info in STM vs. LTM

- Phone-number example
EVIDENCE FOR DISTINCTION

- Capacity
  - STM vs. LTM
- Maintenance
- Code
Clinical Evidence

- H.M.
- N.A.

Different abilities?

Conclusion
CAPACITY

- Leaky Bucket Metaphor of STM

- Memory Span
  - Miller’s (1956) Magic Number 7 ± 2

- Capacity & Chunking
  - 3.5 Nonsense Syl.
  - 5.5 Words
  - 7.8 Digits

- Examples (Falloon)
FORGETTING

- STM vs. LTM
- Speed
- Brown and Peterson Task
- Serial Position Effects
- Time?
Very Rapid Forgetting
Mutter (1980)
Sebrechts, Marsh, & Seamon (1989)
SERIAL POSITION EFFECTS
DOING TIME IN STM
FORGETTING IN STM

- 2 competing theories
- Rust and Time metaphor
- Back to Brown-Peterson task
  - Keppel & Underwood (1962)
  - New twist?
FORGETTING IN STM

- Methods to determine cause
  - Waugh & Norman (1965)
  - Probe Digit task (1 vs. 4 per second)

- Similarity (Reitman, 1973; 1974)
  - White noise
  - Syllable detection
  - Capacity?
MAINTENANCE

- Rehearsal and Coding

- Rehearsal of information in STM: Acoustic?

- Nature of Rehearsal/Coding?
  - Rehearsal Rate (Landauer, 1962)
    - Welsh Digits > English Digits (Ellis & Hennelly, 1980)
  - Back to perceptual confusions (Conrad, 1964)
Figure 3-2. Confusion matrices from memory test (top panel) and listening test (bottom panel) of a study by Conrad (1964). (Source: From Conrad, R. (1964). Acoustic confusions in immediate memory. British Journal of Psychology, 55, 75-84. Reprinted by permission of the author and the British Psychological Society.)
Alternate Type of Coding?

- Hierarchical Organization (Seamon & Chumbley, 1977)
- Back to ideas of chunking
  - Ericcson, Chase, & Falloon (1980): 80 digits!
- New conceptualization of STM?
WORKING MEMORY

- Role of Working Memory
- STM and its relationship with LTM
- Working Memory and STM
BADDELEY’S ORIGINAL MODEL OF WORKING MEMORY

Visuo-spatial sketchpad → Central executive → Phonological loop
BADDELEY’S REVISED MODEL OF WORKING MEMORY

Central Executive

Visuospatial Sketchpad

Phonological Loop

EPISODIC BUFFER

NEW!!

- Nine Digits, visually
- Three Conditions
  - Silence
  - Spoken Words
  - Nonsense Syllables

- Phonological Loop?
- New Experiment...
ARTICULATORY SUPPRESSION

- Vallar & Baddeley (1984)

THE

- Role of Phonological Loop
  - Recode
  - Subvocal Rehearsal
Evidence for existence

- 2 different strategies
- Recall for different strategies
- Selective interference
VISUOSPATIAL SKETCHPAD

Baddeley et al. (1975) & Brooks (1967)

Spatial material
In the starting square put a 1.
In the next square to the right put a 2.
In the next square up put a 3.
In the next square to the right put a 4.
In the next square down put a 5.
In the next square down put a 6.
In the next square to the left put a 7.
In the next square down put an 8.

Nonsense material
In the starting square put a 1.
In the next square to the quick put a 2.
In the next square to the good put a 3.
In the next square to the quick put a 4.
In the next square to the bad put a 5.
In the next square to the bad put a 6.
In the next square to the slow put a 7.
In the next square to the bad put an 8.
VISUOSPATIAL SKETCHPAD

More Selective Interference

![Graph showing average errors per participant with categories: Memory Alone, Memory & Tracking, Spatial, Nonsense. The graph illustrates a trend with higher errors in the Memory & Tracking condition compared to Memory Alone.]
CENTRAL EXECUTIVE

- Role

- Why is it hard to pin down?

- Back to Reason’s slips of action

- Attention
SUMMARY

- Memory Basics
- Two types of models
- STM vs. LTM
- Working Memory