

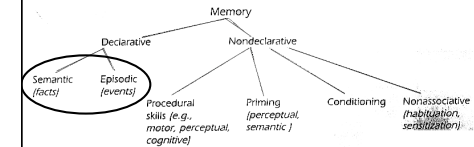
Multiple Memory Systems

- LTM isn't a single unitary system
- Different types of systems
 - Systems mediated by different areas of the brain
- Penfield (1955)

Recall in Penfield Experiment

- Recalled childhood events, not facts
- Penfield's interpretation
 - Long term memories may be permanent
- Other researcher's interpretations
 - Distinct memory systems
- Tulving
 - Proposed semantic/episodic distinction

Multiple Memory Systems



Semantic Memory

- Contains general world knowledge
- Not recalled in any temporal context
- Specifies what is generally true

Episodic Memory

- Memory for when events occurred and the relationship between those events
- Refers to personal experiences and the context within which they occurred

Flashbulb Memory

- Used to provide information about episodic memories
- Memory for a situation that is very arousing, surprising or emotional
- Good for research
 - Sometimes involve a dramatic public event

Flashbulb Memory: Characteristics

- High level of surprise
- High level of emotional arousal or perceived importance
- More likely to be rehearsed
 - Silently or in conversation
- Can involve positive as well as negative life events

Flashbulb Memory: Content

- 18% involve injuries or accidents
- Common flashbulb memories
 - Sports, love, animals, events from the first week of college
- Only 3% have any national importance

Flashbulb Memory: Research Weaver (1993)

- Start of the Gulf War
 - Students note details of a conversation with a roommate on day war started
- Day after Gulf War started
 - Had them recall prior day's events
- Later in semester
 - Tested memory

Flashbulb Memory: Research Weaver (1993)

- Found that memory for the two events was pretty much equivalent
- Flashbulb memories *feel* special because of emotions associated with memory
- Good memory may be due to rehearsal

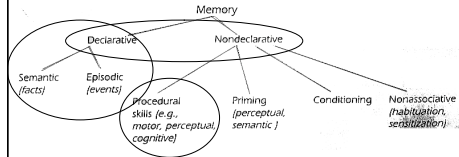
Distinctions

<u>CHARACTERISTIC</u>	<u>EPISODIC MEMORY</u>	<u>SEMANTIC MEMORY</u>
1. Source of the information	Sensory experiences	Comprehension
2. Units of information	Episodes and events	Concepts, ideas, and facts
3. Organization	Time-related	Conceptual
4. Emotional content of the memory	More important	Less important
5. Likelihood of forgetting	Great	Small
6. Time required to remember the information	Relatively long time	Relatively short time
7. How tested in the laboratory	Recall of particular episodes	General knowledge
8. General usefulness	Less useful	More useful

Memory Distinctions

- Clear **content** distinction between the types of memory
- Lack of strong support for a **functional** distinction
 - Might be on a continuum
- No evidence for different support structures
- No evidence that they involve different retrieval and encoding processes

Multiple Memory Systems

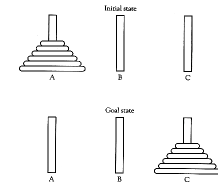


Procedural vs. Declarative Memory

- **Procedural memory**
 - Memory for how to perform certain actions and sequences of actions
- **Declarative memory**
 - Includes memory for information we can verbally report
 - Includes both episodic and semantic memory
- Research supports functional distinction between declarative and procedural memory

Amnesiac's Procedural Memory

- Tests of procedural memory
 - Retain high levels of performance
- Examples
 - Tower of Hanoi
 - H.M. and tennis lessons
- Involves a primitive memory system
 - Exists in animals



Explicit Memory

- Intentional recollection of previous experiences
 - Conscious
 - Accessed directly
- Best assessed through recall/ recognition tests

Implicit Memory

- No conscious memory of information or past events
- Behavior is influenced by the information or past events
- Non-conscious
- Concerned with perceptual identification

Amnesiacs

- Study word list
 - Performed poorly using recall and recognition measures
 - Savings in relearning
- Reading task
 - Read more quickly the second time
- Retain past without specifically recalling it

Implicit Memory in Non-Amnesiacs

- Anesthesia
 - “Fat Lady Syndrome”
- No conscious recollection
- Upset after surgery
- Spontaneous recovery of memory

Deeply Anesthetized Patients

- Levinson (1965)
- During operation
 - Anesthesiologists read statements to 10 anesthetized patients
- Following operation
 - Hypnosis
 - 4 verbatim memory
 - 4 displayed anxiety

Loftus (1985)

- Underwent abdominal surgery
 - Was read 100 unrelated words
- Testing after surgery
 - Recall words
 - 28 hrs, 53 hrs, 82 hours
- Performance
 - At chance levels

Bizarre Question Study (Eger & Sonner ?)

- Prior to surgery
 - Patients asked bizarre questions
- During surgery
 - ½ patients were provided the answers to the questions
 - ½ patients were not provided answers
- Following surgery
 - Significant improvement in scores of those given answers

Exemplar Generation Study

- Heard exemplars of semantic categories
 - Unusual exemplars included
- After recovery
 - Given exemplar generation task
 - Generated exemplars more quickly for categories heard during surgery
 - More likely to generate the unusual exemplars
 - Performed at chance levels on recall task

Pearson (1961): Positive Statement Study

- 39 hysterectomy patients
 - 19 in positive suggestion group
 - 20 in control (white noise) group
- Listened to tape during surgery
- Recovery significantly better in positive suggestion group
- Guessed condition at above-chance levels

Implications of Anesthesiology Studies

- Doctors should not be candid around patients
- Information unavailable to consciousness can affect behavior
- Need tests that do not require recall yet still reflect experience
 - Exemplar generation
 - Recovery

Implicit versus Explicit Memory

- Implicit memory
 - Incidental, unintentional and unconscious
- Explicit memory
 - Conscious
 - Accessed directly
 - Best assessed through recall and recognition measures

Implicit versus Explicit Memory Tasks

- Explicit memory tasks
 - Require conscious recollection of experiences
 - Recall
 - Recognition
- Implicit memory tasks
 - Show effects of experience without having to retrieve information from memory
 - Can be used to study implicit memory in normal subjects

Implicit Memory Tasks

- Word Fragment Completion
 - Will complete faster and more often when previously exposed to word
- Homophone Spelling
 - Previous exposure to uncommon spelling
 - More likely to provide that spelling on test

Implicit Memory Tasks (cont.)

- Category generation
 - More likely to list exemplars seen on previous task
- Word stem completion task
 - Door- Fire-
 - Given a word that with several possible endings
 - Will produce endings seen in a previous task

Implicit Memory Tasks (cont.)



- Perceptual identification task
 - Present degraded or quickly presented stimulus
 - Subject must identify the stimulus
- Performance improves if previously exposed to word

Jacoby & Dallas (1981)

- Presented list of 60 words
 - Meaning, rhyme, letters
- Tested with 80 words (20 new)
- ½ Ss given perceptual identification task
 - Word presented for 35 msec (1/3 sec)
- ½ Ss given recognition test
 - “Did you see any of the words on the previous list?”

Jacoby & Dallas Results

- Effect of previous exposure on perceptual identification task
 - List words - 80%; New words – 65%
- Type of processing had no effect on perceptual identification
 - Meaning – 80%; Rhyme – 82%; Letter – 78%
- Type of processing had an effect on recognition
 - Meaning – 95%; Rhyme – 72%; Letter – 51%

Jacoby & Dallas : Implications

- Functional distinction between implicit and explicit memory
 - Different cognitive processes
 - Different organization
- Implicit memory facilitates procedural and semantic memory
 - Improves ability to identify perceptual stimuli
