

## Unit 2 Notes: Memory

### Process of Memory

- *implicit memory*--our recollection of information that was not consciously encoded and stored
- *explicit memory* is our recollection of information that has been consciously encoded, stored and retrieved
- includes three components:
  - *encoding*--processing information and integrating it into our existing storehouse of memory
  - *storage*--the process of keeping information in memory
  - *retrieval*--recalling information from memory when it is required
  - for these processes to be activated, the organism must attend to certain information for further processing--called *attention*
- information is moved into memory is through:
  - *rote rehearsal* which involves repeating the information over and over again
  - *elaborative rehearsal* in which information is made meaningful by linking it to information already in our long term memory stores
- the *serial position effect* involves both the primacy and recency effect
- the *primacy effect*--words at the beginning of a list will be remembered better because more rehearsal is taking place
- the *recency effect*--words at the end of a list will be remembered best of all because they are most recently placed in memory

(insert diagram of the three stages of memory here)

### Stage 1: Sensory Memory

- Stage 1-- *sensory memory* involves storing information for a very short period of time:
  - *iconic* (visual) memory lasts about one half second.
  - *echoic* (auditory) memory last about three to five seconds
- the initial tests of sensory memory involved looking at visual display like this for a fraction of a second and then being asked to recall all the letters:

|   |   |   |
|---|---|---|
| F | B | Y |
| H | T | Q |
| N | K | P |
- subjects could consistently only remember about four letters
- this is called the *whole-report method*

- George Sperling used the same 3 x 3 matrix but played a high, medium or low tone when the letters were flashed--these tones corresponded to the top, middle or bottom line of letters

|   |   |   |
|---|---|---|
| F | B | Y |
| H | T | Q |
| N | K | P |

- subjects consistently remembered all three letters, regardless of what tone was played during the experiment
- Sperling's method is called the *partial-report method*
- this helped to establish nine items as the capacity for sensory memory
- the whole-report method failed because, by the time subjects reported four letters, the rest of the letters had faded from memory
- the partial-report method eliminated this memory fade

### **Stage 2: Short Term Memory**

- Stage 2-- *short term memory*, or "working memory", briefly stores and processes selected information from the sensory registers
- research indicates:
  - STM has limited storage capacity
  - STM can store 5-9 chunks of information.
    - *chunking* involves grouping information into meaningful units for easier handling, like area codes or zip codes
  - information in STM is forgotten in 15-20 seconds if it is not rehearsed
  - phonological (or acoustical) encoding is the predominant means by which information is stored in STM

### **Stage 3: Long Term Memory**

- Stage 3-- *long term memory* stores information indefinitely and has an unlimited capacity.
- research has indicated specific qualities of long term memory:
  - some psychologists believe the information is never truly forgotten but that it just cannot be accessed in LTM
  - some psychologists believe that our memories about specific events are fused with our hopes, expectations and unique perspectives so that they are often quite different from the actual event

*(insert diagram of long term memory here)*

### **Types of Memory**

- there are four types of LTM:
  - *procedural memory*--contains learned associations between stimuli and responses, like how to tie your shoes or drive a car
  - *semantic memory*--stores general facts and information, like information you need

- to learn for a test
- *episodic memory*--stores more specific information that has personal meaning, like going on your first date
  - *declarative memory*--our memory of day-to-day conversations and events

### **Eidetic and Flashbulb Memory**

- *eidetic imagery*--commonly called photographic memory, this is the ability to recall specific details of information
- *flashbulb memory*--this is a vivid recollection of a significant event from episodic memory

### **Explicit Encoding and Retrieval**

- *explicit methods* of retrieval from LTM:
  - include recognition and recall
  - usually entail information in semantic memory
- *recognition*--identifying previously learned material
  - for example, multiple choice tests where there is a question followed by four or five possible answers
  - easier than recall because most or all of the retrieval cues are present
- *recall*--coming up the information purely from memory
  - more difficult because fewer retrieval cues are available
- two types of recall tasks:
  - *free recall* allows the subject to recall information in any order (e.g. words memorized from a list in any order)
  - *serial recall* requires the subject to recall information in a specific order (e.g. words memorized from a list in the order in which they appear on the list)

### **Implicit Encoding and Retrieval**

- *implicit methods*--involve the inner workings of memory organization and recall that are not so overt
- one foundation of learning theory is that memory will increase the more you review the material--subsequent learning of the material is easier and takes less time
- research has also found that subjects that have suffered *retrograde amnesia* have still shown recall abilities from procedural memory--their episodic memory surrounding the event is what is typically affected

### **Research on Encoding and Retrieval**

- *semantic priming*--an activity in which the individual must decide if there is semantic consistency of information
  - one classic experiment involved indicating whether two word pairs were semantically linked (e.g. teacher-student) or not (e.g. pepper-student)
- *semantic verification*--determining whether something is true or false
  - one experiment involved a series of statements in which the subject had to determine if it was a true or false statement
  - the *response latency* (lag time) in responding was longer with false statements

- Collins and Loftus have proposed the *spreading activation model*
- the closer two words are semantically related, the quicker the connection that will be made between them
- Smith, Shoben and Rips have proposed the *semantic feature-comparison model*
- concepts (e.g. an automobile) contain certain common features, some required for the concept (e.g. has a motor and wheels) and others typical to the concept (e.g. has four wheels and at least two doors)

### **Factors Influencing Memory**

- *attention*--information that is the result of selective attention or periods of inattention will not be properly encoded
- *biological state*-- whether the person is feeling well or ill can influence concentration which will influence learning and memory ability
- *environmental state*-- room environments that are too hot, too cold, too distracting or too cluttered can affect memory ability and recall
- *encoding specificity principle*--memory is better if the retrieval cues that were used to memorize the material are present at the time of recall
- *state-dependent learning*--memory retrieval is optimal if the individual is in the same physiological state at the time of recall as at the time of original learning
- *schemas*--these are sets of beliefs or expectations about something based on past experiences
  - Bartlett stated this helps us define a current situation
  - modern psychologists feel we have schemas for most situations, like going to the mall or eating in a restaurant
- *motivation*--to a certain degree, an individual must have some motivation to encode and recall material
  - there are instances of *incidental learning* in which information is remembered without a conscious attempt to memorize it
- *substance use*--the jury is still out on memory-enhancing drugs but research does indicate that memory recall is generally impaired if the individual is using a controlled substance
- *categorization*--information is more easily encoded and recalled if it is organized
- *distributed versus massed practice*:
  - distributed practice involves spreading out learning
  - massed practice involves attempting to learn all the material at once (i.e. "cramming")
  - research indicates that distributed practice will produce more consistent and longer-lasting recall abilities than massed practice
- use of *mnemonics*--songs, tricks and jingles used to help remember information (e.g. ROY G BIV = red, orange, yellow, green, blue, indigo and violet, the spectrum of colors)
- *the loci method*--a memory technique where the individual imagines a journey from point A to point B; there are typically ten places in between the two points and items to be remembered are linked to these ten locations (or loci)
- *the Zeigarnik effect*--we tend to remember incompleted tasks better than completed ones

### **Other Theories on Memory**

- *the levels of processing theory* (or *depth-of-processing theory*)--proposed by Craik and Lockart, memory is not dependent on length of time but on how it is processed into memory
- information can be processed three ways:
  - physically--size, shape, appearance
  - acoustically--combinations of sounds
  - semantically--the meaning of the words
- *Pavio's dual-code hypothesis*--information is encoded in one of two ways, verbally and visually
  - concrete information is stored both verbally and visually
  - abstract information is stored verbally

### **Surface and Deep Structure**

- most information is encoded based on its meaning
- we tend to recall more the *deep structure*--the meaning conveyed by verbal information
- the *surface structure*--the particular arrangement of verbal information--helps us recognize and interpret the deep structure

### **Theories of Forgetting**

- *interference theory*--focuses on the interference of new and old material
  - *proactive interference*--when old information interferes with new information
    - if someone is an avid tennis player and then switches to racquetball (which requires the player to break their wrist rather than keep it straight as in tennis), their tennis experience will cause them not to break their wrist
  - *retroactive interference*--when new information interferes with previously learned information
    - if the individual switches back to tennis from playing racquetball, they may have a tendency to break their wrist playing tennis
- *decay theory*--forgetting is the result of disuse
  - the more information is not recalled from memory, the more difficult it is to access it
- *consolidation theory*--information cannot be recalled because it has been improperly encoded
  - may be a result of linking it to other material in LTM during elaborative rehearsal
  - may be a result of faulty encoding because the material was incomplete and therefore difficult to link to LTM material