8. Memory

Objectives

- **Identify the three tasks in memory formation**
- **Learn the various systems of memory formation and storage**
- **Explain forgetting**
- **Describe memory and learning**

Vocabulary

amnesia	**encoding**	**recall**	**sensory memory**
chunking	**interference**	**recognition**	**short-term memory (STM)**
decay	**long-term memory (LTM)**	**rehearsal**	**storage**
elaboration	**memory**	**retrieval**	

Background

In this chapter, students learn about memory, the mental process responsible for encoding, storage, and retrieval of information.

They begin by looking at memory through the Three-Stage Model of Memory Formation, based on three main stages of memory: sensory memory, short-term (or working) memory, and long-term memory.

Students learn that encoding, storage, and retrieval are important to memory and forgetting, and that there are reasons one might forget something: decay, interference, and the different forms and causes of amnesia. Students find detailed information on the parts of the brain involved in memory formation, and information on enhancing your memory retrieval and learning.

The chapter begins by defining memory and the various stages of memory, including sensory memory, short-term memory (STM), and long-term memory (LTM). Each of these is examined in detail. In sensory memory, two pertinent factors are visual memory and auditory memory. Factors relating to short-term memory are encoding, time duration, capacity, storage, and output. Long-term memory is broken down into several different types of memory: explicit and implicit memory, procedural and declarative memories, and semantic and episodic memories.

Students next learn about memory retrieval, including recall and recognition, tip of the tongue recall, and cueing memory. Students will be fascinated to learn such things as the concept of state dependence memory, in which the mood you were in at the time you memorized something will affect your recall of that material.

Students next examine why humans forget things, including decay and interference. Finally students consider memory and learning, examining four approaches to improving and understanding how people learn—principle learning, schemas, mnemonics, and learning curves. The chapter closes with a list of issues in memory research.

Further Resources

Anderson, J. R., and G. H. Bower. *Human Associative Memory.* New York: L. Erlbaum Associates, 1980.

Estes, William K., ed. *Models of Learning, Memory, and Choice.* New York: Greenwood, 1982.

For Discussion

Review

1. What are the three stages of memory?
2. What terms are important in learning about memory retrieval?
3. If you've properly encoded and stored information to be remembered and there are no problems with the retrieval process, what other reasons might cause forgetting?
4. What are the four approaches to improving and understanding how we learn in relation to memory?

Critical Thinking

1. Why are encoding, storage, and retrieval important to the memory process?
2. Is there any event that you have remembered through iconic images (flashbulb memory) or as eidetic imagery (photographic memory)? Explain.
3. How are acoustic, visual, semantic and episodic memories important to long-term memories?
4. Do you find that, the more time you spend on processing information, the more easily the information is retained and retrieved later? Explain.
5. Do you think there has been enough research on the subject of memory or do you think there should be more? If so, in what areas?

Activities

1. **Types of Memories**

   Ask members of the class to give examples of the types of things that they recall as pictures, as sounds, and as meanings. Make a list on the board and look for patterns.

2. **Interviews: Studying for Tests**

   Invite students to form teams to conduct interviews with other students regarding ways that they study for tests. Ask students to collect tips for memorizing material. Compare results.

3. **Internet: Memory Techniques**

   Ask students to use the Internet to collect information on memory techniques such as rehearsal and elaboration for remembering a person's name. Try these techniques out in the classroom with ten other students and test the results.

4. **Special Sources: Classroom Notes**

   Ask each student to choose one class they attended last week. Without looking at their classroom notes or textbooks, ask them to retrieve from their memories as much information on what they've learned in class as possible. Compare results.

Name _____

8. Memory

As you read Chapter 8, write an answer to each question below.

1. Describe chunking and its benefits to the process of remembering. What kinds of things can be chunked together?

2. According to the nonsense syllable list study, what are serial learning and free recall, primacy effect and recency effect?

3. What are some tips for improving your memory? Give examples.

4. What happens in the region of the prefrontal cortex?

5. List the possible causes and forms of amnesia. Explain why the study of amnesia might be important to learning about memory.

Name _____

8. Memory

Find the best answer for each item. Then circle that answer.

1. What is chunking?
   a. repetition of information to hold it in STM
   b. process of grouping pieces of unrelated information
   c. knowing if you've encountered something before
   d. any event that prevents rehearsal or elaboration of information in STM

2. What is short-term memory?
   a. working memory where information is consciously and actively processed
   b. contains information you store for later use
   c. short-lived visual representation of what you see
   d. memories that are difficult to put into words

3. What is encoding?
   a. memories of perceptual and motor skills
   b. items linked to one another in multiple ways
   c. process of converting input into a form that can be stored in long-term memory
   d. the number of things your memory will store

4. What is amnesia?
   a. temporary or permanent inability to remember
   b. a hierarchy that lets you make more complex connections
   c. an environment in which you find something
   d. memory that is not activated over time

5. What is long-term memory?
   a. the ability to retrieve information more easily in the context in which it was learned
   b. holding on to information just long enough for it to be recognized or acknowledged
   c. place where information is stored for later use
   d. working memory

6. What is decay?
   a. any event that prevents rehearsal or elaboration of information in STM
   b. memory held for a very brief time
   c. retrieving information from STM
   d. condition in which unrehearsed or unretrieved information is lost from memory

7. What is memory?
   a. adding meaning to something by connecting it
   b. a mental process responsible for encoding, storage, and retrieval of information
   c. anything you are aware of at any given time
   d. information associated with familiar patterns

8. What is retrieval?
   a. process of getting stored information through recall or recognition
   b. the accumulation of information
   c. techniques based on information processing
   d. learning basic principles and recalling details

9. What is sensory memory?
   a. permanent retention of information in memory
   b. areas where information perceived by the senses is stored prior to entering STM
   c. addition of meaning to make it more relevant
   d. converting input into a form that can be stored

10. What is storage?
    a. addition of meaning to information to organize it or make it more relevant
    b. concentration of mental effort on sensory or mental events
    c. process of taking input and converting it into a form that the brain can process
    d. temporary or permanent retention of information in memory

Name _____

8. Memory

Read each description, and write the letter of the correct term on the line.

1. If information stayed in our sensory memories for very long, we would experience _____.
   a. hallucinations
   b. blurred images, discordant blends of sound, or mixtures of tastes or odors
   c. irrational thoughts
   d. hallucinations and obsessive thoughts

2. Your visual memory holds information for _____.
   a. less than a second
   b. one second
   c. three seconds
   d. ten minutes

3. Attention and recognition determine whether ____.
   a. something is logical and reasonable
   b. something warrants more input from the brain
   c. something that enters sensory memory is ignored (forgotten) or sent to STM
   d. the senses establish its validity

4. One possible explanation for the acoustic preference in short-term memory is that _____.
   a. humans had spoken language before written language and so developed an efficient storage mechanism for sounds
   b. humans prefer written over spoken language
   c. humans retain sound memories well
   d. humans have a natural affinity for sounds

5. Procedural and declarative memories are also known as _____.
   a. short-term and long-term memories
   b. semantic and episodic memories
   c. implicit and explicit memories
   d. acoustic and visual memories

6. The number of things that your long-term memory will store is _____.
   a. in the thousands
   b. in the hundreds of thousands
   c. approximately one hundred
   d. infinite

7. Recognition is easier than recall because _____.
   a. recognition happens without any information
   b. you are given a cue about where to look in memory
   c. those memories are always stored together
   d. recall wasn't properly encoded

8. A network is one form of hierarchy that _____.
   a. can be pictured as a collection of items linked to one another in multiple ways
   b. holds sensory information briefly
   c. separates regions for each of the five senses
   d. actively processes information in LTM

9. Some reasons that children may recall things that didn't happen are _____.
   a. psychological, emotional, and physiological
   b. immaturity and inability to articulate
   c. lack of knowledge
   d. interviewer bias, stereotypes, peer pressure, and authority

10. The left side of the brain seems to be involved in storing memories in _____.
    a. short-term memory
    b. long-term memory
    c. the visual cortex
    d. sensory memory

Essay Question

How do you think that you can improve your memory?