

## Chapter 7: Cognition

### 1. Overview

#### 1. Memory

1. Any indication that learning has persisted over time

### 2. Three Box/ Information Processing Model of Memory

#### 1. Sensory Memory

1. The first stop for external events
2. Contains all of the information processed by senses for less than a second
3. George Sperling's Experiment
  1. flashed a 3x3 grid for one twentieth of a second to participants
  2. had to recall one of the rows immediately after
  3. indicated which to remember with a tone
  4. participants could recall any perfectly
  5. demonstrated that the entire grid must be held in sensory memory for a split second
4. Iconic memory
  1. a split second perfect photograph of a scene
5. Echoic memory
  1. a brief (3-4 second) perfect memory for sounds
6. Not all information in sensory memory is encoded into short term memory
7. Selective attention determines which sensory messages get encoded

#### 2. Short-Term/ Working Memory

1. Holds everything you are currently thinking
2. If we do nothing with short term memories, they usually fade in 10-30 seconds
3. Memories we are currently working with and aware of in our consciousness
4. Capacity limited to seven items
  1. chunking
    1. can be used to expand this limit
    2. group items
    3. includes most mnemonic devices
5. To retain information:
  1. rehearse (repeat) it

#### 3. Long-Term Memory

1. Our permanent storage
2. Unlimited
3. Once information is there, its usually there forever

4. Episodic memory
    1. memories of specific events
    2. stored in a sequential series
  5. Semantic memory
    1. general knowledge of the world
    2. stored as facts, meanings, or categories
  6. Procedural memory
    1. memory of skills and how to perform them
    2. stored sequentially but difficult to describe with words
  7. Explicit memories
    1. conscious memories of facts or events we tried to remember
  8. Implicit memories
    1. unintentional memories that we might not even realize we have
  9. Eidetic (photographic) memory
    1. very rare
    2. seems to use very powerful and enduring visual images
3. Levels of Processing Model of Memory
    1. Principles
      1. Examines how deeply the memory was processed
        1. deeply (elaboratively) processed
          1. more likely to remember
        2. shallowly (maintenance) processed
          1. you will forget quickly
      2. Memories are neither short nor long term
4. Retrieval
  1. Definition
    1. Getting information out of memory so we can use it
  2. Types
    1. Recognition
      1. the process of matching a current event or fact with one already in memory
    2. Recall
      1. retrieving a memory with an external cue
  3. Factors that Influence Retrieval
    1. The order in which the information is presented
      1. primacy effect
        1. predicts that we are more likely to recall items presented at the beginning of a list

2. recency effect
  1. demonstrated by our ability to recall the items at the end of a list
3. serial position effect
  1. recall of a list is affected by the order of items ~ first/last

## 2. Context

1. tip-of-the-tongue phenomenon
  1. temporary inability to remember information
2. semantic network theory
  1. our brain forms new memories by connecting their meaning and context with meanings already in memory
3. flashbulb memories
  1. powerful because the importance of the events caused us to encode the context surrounding the event

## 3. Emotional or situational context

1. mood-congruent memory
  1. the greater likelihood of recalling an item when our mood matches the mood we were in when the event happened
2. state-dependent memory
  1. recalling events encoded while in particular states of consciousness

## 5. Constructive Memory

1. "Recovered Memory" Phenomenon
  1. Individuals claim to suddenly remember events they have "repressed" for years
  2. Elizabeth Loftus
    1. often they are constructed or false memories of events
2. Constructed (or Reconstructed) Memory
  1. Can report false details of a real event
  2. Can be a recollection of an event that never occurred
  3. Leading questions can influence us to recall false details
  4. Constructed memories feel accurate to the person recalling them
  5. Need physical evidence for confirmation

## 6. Forgetting

1. Causes
  1. Decay
    1. we do not use a memory or connections to it for a long time
    2. relearning effect
      1. relearning information takes less time and effort than learning it
  2. Interference

1. other information in your memory competes with what you're trying to recall
2. retroactive interference
  1. learning new information interferes with the recall of older information
3. proactive interference
  1. older information interferes with the recall of information learned more recently

## 7. How Memories are Physically Stored in the Brain

### 1. Anterograde Amnesia

1. Can't encode new memories
2. Can recall events already in memory
3. Caused by damage to the hippocampus
4. Can learn new skills, but won't remember learning them
  1. suggests that procedural memory is located elsewhere in the brain

### 2. Long-Term Potentiation

1. Neurons can strengthen connections between each other
  1. repeated firings strengthen connections, and the receiving neuron is more sensitive to messages from the sending neuron
  2. may be related to connections we make in long term memory

## 8. Language

### 1. Elements of Language

1. Phonemes
  1. the smallest units of sound used in a language ~ English has about 44
2. Morphemes
  1. the smallest unit of meaningful sound
  2. can be words or parts of words
3. Language consists of phonemes that make up morphemes that make up words
4. Syntax
  1. the order in which words are spoken or written

### 2. Language Acquisition

1. Independent of which language, all babies progress through the same basic stages
2. Stages
  1. babbling
    1. occurs around six months of age
    2. represents experimentation with phonemes
    3. babies in this stage can produce any phoneme in any language
  2. holophrastic stage
    1. babies speak in single words

### 3. telegraphic speech

1. toddlers will combine the words they can say into simple commands
2. meaning is clear, but syntax is absent
3. children begin to learn grammar and syntax rules, often misapplying them (ex: overgeneralization)

### 3. Controversy: how we acquire language

#### 1. behaviorists

1. language, like all behaviors, is learned through operant conditioning and shaping
2. when kids use language correctly, they are rewarded with a smile/encouragement

#### 2. Noam Chomsky

1. theorized that humans are born with language acquisition devices (ability to learn language rapidly as children)
2. critical period for learning language may exist
3. nativist theory of language acquisition

#### 3. modern psychologists agree with both

### 3. Language and Cognition

#### 1. Linguistic relativity hypothesis

1. psychologist Benjamin Whorf
2. the language we use might control, and in some ways limit, our thinking

## 9. Thinking and Creativity

### 1. Describing Thought

#### 1. Concepts

1. the cognitive rules we apply to stimuli from our environment
2. allow us to categorize and think about the objects, people, and ideas we encounter
3. may be based on prototypes

#### 2. Prototype

1. what we think is the most typical example of a particular concept

#### 3. Images

1. the mental pictures we create in our minds of the outside world
2. can involve any sense

### 2. Problem Solving

#### 1. Algorithms

1. a rule that guarantees the right solution by using a formula or other fool proof method
2. ex: try every possible solution

#### 2. Heuristics

1. rules of thumb
  2. a rule that is generally true that we can use to make a judgment in a situation
  3. availability heuristic
    1. judging a situation based on examples of similar situations that come to mind initially
    2. may lead to incorrect conclusions due to variability in personal experience
  4. representativeness heuristic
    1. judging a situation based on how similar the aspects are prototypes the person holds in his mind
3. Problems in judgments
    1. overconfidence
      1. the tendency to overestimate the accuracy of our judgments
    2. belief bias
      1. we make illogical conclusions in order to confirm our preexisting beliefs
    3. belief perseverance
      1. our tendency to maintain a belief even after the evidence we used to form it has been contradicted
  4. Impediments to problem solving
    1. rigidity (mental set)
      1. the tendency to fall into established thought patterns
      2. functional fixedness- the inability to see a new use for an object
    2. not breaking the problem into parts
    3. confirmation bias
      1. the tendency to look for evidence that confirms our beliefs and ignore evidence that contradicts them
    4. framing
      1. the way the problem is presented
      2. can drastically change the way we view a problem
3. Creativity
    1. Criteria generally involves originality and appropriateness
    2. Convergent thinking
      1. thinking pointed toward one solution
    3. Divergent thinking
      1. thinking that searches for multiple possible answers to a question ~ associated with creativity
    4. Usually involves:
      1. thinking of new ways to use what we are all familiar with
      2. new ways to express emotions or ideas we share