

Unit 7: Cognition and Language

Big Questions: How does the process of memory create a unique experience for each individual? How do language and cognitive processes work to influence our ability to think and problem solve?

Cognition and Language Unit Objectives:

- Explain memory in terms of information processing and distinguish between short-term and long-term memory.
- Describe the nature of iconic and echoic memory.
- Explain the process of encoding and distinguish between automatic and effortful processing.
- Explain the importance of meaning, imagery, and organization in the encoding process.
- Describe the capacity and duration of long-term memory and discuss the synaptic changes that may underlie memory formation and storage.
- Distinguish between implicit and explicit memory and describe the role of the hippocampus in explicit memory.
- Contrast recall, recognition, and relearning measures of memory.
- Describe the importance of retrieval cues and explain what is meant by state-dependent memory.
- Explain what is meant by retrieval failure and discuss the effects of interference and repression on retrieval.
- Describe the nature of concepts and the role of prototypes in concept formation.
- Discuss how we use means of trial and error, algorithms, heuristics, and insight to solve problems.
- Describe how the confirmation bias and fixation can interfere with effective problem solving.
- Explain how the representativeness and availability heuristics influence our judgments.
- Describe the effects that overconfidence and framing can have on our judgments and decisions.
- Discuss how our beliefs distort logical reasoning and describe the belief perseverance phenomenon.
- Describe artificial intelligence and contrast the human mind and the computer as information processors.
- Describe the structure of language.
- Trace the course of language acquisition and discuss alternative theories of language development.
- Describe the research on animal communication and discuss the controversy over whether animals have language.
- Discuss the relationship between thought and language. (Whorf's linguistic relativity)

Cognition and Language Overview:

The cognition and language unit explores human memory as a system that processes information in three steps. Encoding refers to the process of putting information into the memory system. Storage is the purely passive mechanism by which information is maintained in memory. Retrieval is the process by which information is accessed from memory through recall or recognition.

This unit also discusses the important role of meaning, imagery, and organization in encoding new memories, how memory is represented physically in the brain, and how forgetting may result from failure to encode or store information or to find appropriate retrieval cues. The chapter discusses the issue of memory construction. How “true” are our memories of events? A particularly controversial issue in this area involves children’s memories of sexual abuse.

Most of the cognition and language unit deals with thinking, with emphasis on how people logically-or at times illogically—use tools such as algorithms and heuristics when making decisions and solving problems. Also discussed are several common obstacles to problem solving, including fixations that prevent us from taking a fresh perspective on a problem and our bias to search for information that confirms rather than challenges existing hypotheses.

The unit also explores how computer systems have been constructed to simulate the neural networks of the human brain. By mimicking the ways in which human neural networks interconnect, computers enable scientists to study how human systems process sensations and memories and how the thought process works.

The rest of the unit is concerned with language, including its structure, development in children, use by animals, and relationship to thinking. Two theories of language acquisition are evaluated: Skinner’s theory that language acquisition is based entirely on learning, and Chomsky’s theory that humans have a biological predisposition to acquire language.

Key Terms

Using your own words, write a brief definition or explanation of each of the following. Feel free to be as succinct as possible as long as the definition makes sense to you. Do this after or while reading the assigned pages for class.

1. Encoding -

- a. Visual Encoding -
- b. Acoustic Encoding -
- c. Semantic Encoding -
- d. Hippocampus -
- e. Effortful Processing -
- f. Automatic Processing -
- g. Rehearsal -
- h. Mnemonics -
- i. Chunking -
- j. Spacing Effect -
- k. Serial Position Effect -
 - i. Primacy Effect -
 - ii. Recency Effect -

2. Storage -

- a. Sensory Memory -
 - i. Iconic Memory -
 - ii. Echoic Memory -
- b. Short-Term (Working) Memory -
- c. Long-Term Memory -
- d. Long-Term Potentiation (LTP) -

e. Flashbulb Memories -

f. Explicit Memories -

g. Implicit Memories -

3. Retrieval -

a. Curve of Forgetting -

b. Amnesia -

c. Priming -

d. Context Effects -

e. Mood-Congruent Memory -

f. Recall -

g. Recognition -

h. Proactive Memory Interference -

i. Retroactive Memory Interference -

4. Fallacies of Memory -

a. Repression -

b. Misinformation Effect -

c. Imagination Effect -

d. Polygraph -

e. Source Amnesia -

5. Language -

a. Phonemes -

b. Morphemes -

c. Semantics -

d. Syntax -

- e. Language Development Stages -
- f. Chomsky's Theory of Inborn Universal Grammar -
- g. Skinner's Theory of Operant Learning -
- h. Whorf's Linguistic Relativity Hypothesis (Linguistic Determinism) -
- i. Artificial Intelligence -

6. Cognition -

- a. Concept -
- b. Prototype -
- c. Algorithm -
- d. Heuristic -
- e. Insight -

7. Obstacles to Problem Solving -

- a. Hindsight Bias -
- b. Confirmation Bias -
- c. Fixation -
 - i. Mental Set -
 - ii. Functional Fixedness -
- d. Representativeness Heuristic -
- e. Availability Heuristic -
- f. Overconfidence -
- g. Framing -
- h. Belief Perseverance -
- i. Barnum Effect -