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Test Bank for Cognitive Psychology: Connecting Mind Research and Everyday Experience 6th Goldstein

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Chapter 01 - Introduction to Cognitive Psychology

1. Attention, perception, and memory are different mental processes in which the mind engages. These are called
- a. models.
 - b. cognition.
 - c. reaction times.
 - d. savings.

ANSWER: b

2. The branch of psychology concerned with the scientific study of the mind is called
- a. cognitive psychology.
 - b. introspection.
 - c. behaviorism.
 - d. memory consolidation.

ANSWER: a

3. Donders's primary objective in carrying out his choice reaction time experiment was to investigate
- a. sensation.
 - b. childhood attachment styles.
 - c. decision making.
 - d. personality development.

ANSWER: c

4. Donders interpreted the difference in reaction time between the simple and choice conditions of his experiment as signifying how the test subject
- a. perceived the stimulus.
 - b. processed the stimulus.
 - c. attended to the stimulus.
 - d. decided about the stimulus.

ANSWER: d

5. The objective of the Donders's reaction time experiments was to
- a. show that reaction times can be measured accurately.
 - b. measure the amount of time it takes to make a decision.
 - c. determine differences in how people react to stimuli.
 - d. show that cognitions are often based on unconscious inferences.

ANSWER: b

6. When participants were asked to press a button upon presentation of a light in Donders's experiment, they were engaged in a
- a. sensory memory task.
 - b. simple reaction time task.
 - c. choice reaction time task.
 - d. classical conditioning task.

ANSWER: b

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7. When measuring reaction time, which of the following describes the onset of the stimulus?

- a. Sensation
- b. Transduction
- c. Change in intensity
- d. Presentation

ANSWER: d

8. In Donders's experiment on decision making, when participants were asked to press one button if the light on the left was illuminated and another button if the light on the right was illuminated, they were engaged in which type of task?

- a. Memory recall
- b. Simple reaction time
- c. Choice reaction time
- d. Problem-solving

ANSWER: c

9. *"If you put your mind to it, I'm sure you can solve that math problem."* In this statement, the *mind* is

- a. involved in memory.
- b. a problem-solver.
- c. used to make decisions or consider possibilities.
- d. a valuable tool that should be used.

ANSWER: b

10. In Donders's research on human decision making, he found that the time it took to decide which of two buttons to push in response to a stimulus was

- a. less than one second.
- b. between one and two seconds.
- c. two to five seconds.
- d. more than five seconds.

ANSWER: a

11. Early experiments in cognitive psychology were based on the idea that mental responses can be

- a. measured directly.
- b. inferred from the participant's behavior.
- c. measured by comparing the presentation of the stimulus and the participant's response.
- d. measured by comparing responses among different participants.

ANSWER: b

12. Which topics would a cognitive psychologist most likely investigate?

- a. How personality affects behavior at a party
- b. Reaction time
- c. How the presence of others increases the likelihood of helping
- d. How babies change in height and weight through the first year of life

ANSWER: b

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13. How is the term *mind* used in this statement: “*When he talks about his encounter with aliens, it sounds like he is out of his mind*”?

- a. The mind is involved in memory
- b. The mind as a problem solver
- c. The mind is associated with atypical functioning
- d. The mind is valuable, something that should be used

ANSWER: c

14. According to Ebbinghaus’s memory research, *savings* is a function of

- a. word familiarity.
- b. sensory modality.
- c. elapsed time.
- d. reaction time.

ANSWER: c

15. Why were Ebbinghaus’s experiments significant?

- a. He described complex decision-making.
- b. He plotted functions that described the operation of the mind.
- c. He was the first scientist to combine basic elements of experience called sensations.
- d. He demonstrated how positive reinforcers strengthen memory.

ANSWER: b

16. *The mind is a system that creates representations of the world so we can act within it to achieve our goals.* Which elements of the mind does this definition emphasize?

- a. Functioning and survival
- b. Attention and cognition
- c. Routine and functioning
- d. Cognition and behavior

ANSWER: a

17. Which of the following aligns with how cognitive psychology defines the *mind*?

- a. The mind creates and controls mental processes such as language and emotions.
- b. The mind is designed explicitly for every function it performs.
- c. The mind is a problem solver only when in the presence of others.
- d. We can consider the mind extraordinary only if it is used for exceptional purposes.

ANSWER: a

18. Which of the following methods was used in the psychology laboratory established by Wilhelm Wundt?

- a. Analytic introspection
- b. Measuring reaction times
- c. Forgetting time and savings
- d. Classical conditioning

ANSWER: a

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19. Wundt's procedure, where participants describe their experiences and thought processes in response to stimuli presented under controlled conditions, is known as

- a. information processing.
- b. analytic introspection.
- c. functional analysis.
- d. behavioral analysis.

ANSWER: b

20. The study of mental processes that includes determining the characteristics, properties, and operation of the mind is

- a. psychology.
- b. cognitive psychology.
- c. sociology.
- d. psychopathology.

ANSWER: b

21. Which of the following is a criticism of analytic introspection?

- a. It infers mental processes based on objective data.
- b. It produces results that are too easy to verify.
- c. It produces variable results from person to person.
- d. It requires no training.

ANSWER: c

22. John Watson believed that psychology should focus on the study of

- a. observable behavior.
- b. mental processes.
- c. consciousness.
- d. attention.

ANSWER: a

23. Who founded the first laboratory of scientific psychology at the University of Leipzig in Germany?

- a. Erik Erikson
- b. Sigmund Freud
- c. Wilhelm Wundt
- d. Ivan Pavlov

ANSWER: c

24. The "Little Albert" study involving the presentation of a rat and a loud noise demonstrated which process?

- a. Reaction time
- b. Unconscious inference
- c. Classical conditioning
- d. Operant conditioning

ANSWER: c

25. Behaviorists believe that the frequency of behavior increased through the use of

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- a. positive reinforcers.
- b. discriminative stimuli.
- c. backward conditioning.
- d. inhibitory neurotransmitters.

ANSWER: a

26. Which of the following psychologists is known for research on operant conditioning?

- a. Franciscus Donders
- b. Wilhelm Wundt
- c. Ivan Pavlov
- d. B. F. Skinner

ANSWER: d

27. The investigation of how behavior is strengthened by presentation of positive reinforcers (e.g., food) or withdrawal of negative reinforcers (e.g., shock) is best known as

- a. classical conditioning.
- b. the method of savings.
- c. choice reaction time.
- d. operant conditioning.

ANSWER: d

28. Which psychologist developed the concept of the cognitive map?

- a. Raynor
- b. Sanders
- c. James
- d. Tolman

ANSWER: d

29. A mental layout of physical space is known as

- a. a cognitive map.
- b. a mental model.
- c. artificial intelligence.
- d. memory consolidation.

ANSWER: a

30. Regarding children's language development, Noam Chomsky noted that children generate many sentences they have never heard before. From this, he concluded that language development is driven largely by

- a. an inborn biological program.
- b. cultural influences.
- c. classical conditioning.
- d. operant conditioning.

ANSWER: a

31. Which scientist would claim that children's language development was caused by imitation and reinforcement?

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- a. Noam Chomsky
- b. John Watson
- c. Keller Breland
- d. B. F. Skinner

ANSWER: d

32. Which of the following events is closely associated with a resurgence in interest in psychology?

- a. Watson's "Little Albert" experiment
- b. Skinner's publication of the book, *Verbal Behavior*
- c. Development of the technique of analytic introspection
- d. Tolman's proposal of cognitive maps

ANSWER: b

33. Which characterizes the *information processing* (IP) approach to understanding cognition?

- a. IP depicts the mind as processing information in a sequence of stages.
- b. IP emphasizes actions and consequences in determining cognitive processes.
- c. IP involves the use of library bookshelves as a metaphor to understand human cognition.
- d. IP traces the sequence of physical operations involved in cognition.

ANSWER: a

34. The cognitive revolution occurred parallel to and in conjunction with which of the following?

- a. Cognitive psychology texts
- b. Analytic introspection
- c. Skinner boxes
- d. Computers

ANSWER: d

35. Wundt's approach was known as

- a. structuralism.
- b. analytic introspection.
- c. sensations.
- d. cognitive psychology.

ANSWER: a

36. Colin Cherry's experiment, in which participants listen to two messages simultaneously, one in each ear, demonstrated that

- a. people have trouble focusing on one message while ignoring the other one.
- b. people can only focus on the message they were told to ignore.
- c. people remember everything about the ignored message.
- d. people are aware of the ignored message but can focus on only one message when directed.

ANSWER: d

37. Donald Broadbent developed which of the following?

- a. A flow diagram depicting the mind as processing information in a sequence of stages

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- b. A computer program for solving logic problems
- c. An experimental procedure for studying the way people process information
- d. The first textbook of cognitive psychology

ANSWER: a

38. Who introduced the flow diagram to represent mental processes?

- a. Donald Broadbent
- b. Colin Cherry
- c. Newell and Simon
- d. Wilhelm Wundt

ANSWER: a

39. Research requires trained participants to describe their experiences and thought processes in response to stimuli. This investigation applies the technique of

- a. positive reinforcement.
- b. analytic introspection.
- c. savings to measure forgetting.
- d. simple reaction time.

ANSWER: b

40. Why did Watson reject analytic introspection?

- a. When the results were interpreted, they were according to operant conditioning.
- b. When the results were interpreted, they were in terms of invisible inner mental processes.
- c. When the results were interpreted, they were the same for most people.
- d. When the results were interpreted, they were easy to verify objectively.

ANSWER: b

41. The term *artificial intelligence* was coined by

- a. B. F. Skinner.
- b. Colin Cherry.
- c. Edward Tolman.
- d. John McCarthy.

ANSWER: d

42. Newell and Simon's computer used artificial intelligence to

- a. simulate human attention.
- b. create proofs for problems in logic.
- c. control presentation of visual stimuli.
- d. produce the first flow diagram.

ANSWER: b

43. At the *Massachusetts Institute of Technology Symposium on Information Theory*, George Miller presented a paper suggesting that

- a. positive reinforcement can be used to increase information processing efficiency.

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- b. the human ability to process information is limited.
- c. intelligent machines can be successfully created.
- d. memory consolidation is enhanced by REM sleep.

ANSWER: b

44. Why can we consider Tolman one of the early cognitive psychologists?

- a. He used behavior to infer mental processes.
- b. His work focused on measuring behavior.
- c. His work focused on the stimulus-response connections.
- d. His main interest was the application of operant conditioning.

ANSWER: a

45. The “cognitive revolution”

- a. occurred rapidly, within a period of a few years, in response to the attacks on Skinner and the development of computers.
- b. extended over a long time, beginning in the early part of the century, in reaction to Wundt’s introspection experiments.
- c. was a gradual process that unfolded over several decades, reflecting the complexities of evolving theories and methodologies within psychology.
- d. was not really necessary because the study of the mind has been a constant part of experimental psychology since the founding of the first psychology laboratory.

ANSWER: c

46. *Verbal Behavior* was written by

- a. Noam Chomsky.
- b. Watson.
- c. Tolman.
- d. B. F. Skinner.

ANSWER: d

47. The name of the text written by Thomas Kuhn is

- a. *Verbal Behavior*
- b. *The Structure of Scientific Revolutions*
- c. *Cognitive Psychology*
- d. *Sensory Memory*

ANSWER: b

48. *Pairing two stimuli* is central to the process of

- a. cognitive mapping.
- b. paradigm shift.
- c. classical conditioning.
- d. behaviorism.

ANSWER: c

49. The *creation within the rat’s mind of the maze’s layout* describes

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- a. cognitive mapping.
- b. paradigm shift.
- c. classical conditioning.
- d. behaviorism.

ANSWER: a

50. Gaps in the behaviorist paradigm led to the emergence of the cognitive paradigm in which decade?

- a. 1950s
- b. 1930s
- c. 1940s
- d. 1920s

ANSWER: a

51. Which of the following would a neuropsychologist study?

- a. The behavior of people with brain damage
- b. The evolutionary history of the stress response
- c. The importance of higher mental processes
- d. Sequences of mental operations in cognition

ANSWER: a

52. Most incoming information is held for a fraction of a second and then passed to short-term memory by

- a. long-term memory.
- b. sensory memory.
- c. episodic memory.
- d. semantic memory.

ANSWER: b

53. Which statement describes the contribution of positron emission tomography (PET)?

- a. It replaced functional magnetic resonance imaging (fMRI) because it was less expensive.
- b. It shows which areas of the human brain are not active while processing information.
- c. It provides a lower-resolution image as compared to fMRI.
- d. It involves placing one's head through a magnetic scanner.

ANSWER: c

54. Research journals in the 1990s devoted to neuroimaging studies represented a significant shift in

- a. science reporting.
- b. designing and conducting studies.
- c. interpretation and application of results.
- d. human learning.

ANSWER: b

55. Endel Tulving proposed that memory for skills is stored in

- a. short-term memory.
- b. procedural memory.

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- c. episodic memory.
- d. semantic memory.

ANSWER: b

56. According to Endel Tulving's model of memory, which memory is used for physical actions?

- a. Long-term memory
- b. Procedural memory
- c. Episodic memory
- d. Semantic memory

ANSWER: b

57. Which of the following processes is associated with pairing two stimuli together?

- a. Operant conditioning
- b. Introspection
- c. Savings
- d. Classical conditioning

ANSWER: d

58. Which behavioral response was conditioned in the famous "Little Albert" experiment?

- a. Crawl
- b. Blink
- c. Yawn
- d. Anger

ANSWER: a

59. When Bo gets an A on his report card, his parents decide to go out for ice cream. If Bo enjoys the ice cream trip, which type of conditioning are the parents using?

- a. Punishment
- b. Positive reinforcement
- c. Negative reinforcement
- d. Cognitive mapping

ANSWER: b

60. Taking medication to relieve a headache is an example of

- a. negative reinforcement.
- b. positive reinforcement.
- c. punishment.
- d. classical conditioning.

ANSWER: a

61. Which psychologist is known for his experiments on dogs to discover that pairing stimuli together can lead to unexpected responses?

- a. Watson
- b. Tolman

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- c. Pavlov
- d. Skinner

ANSWER: c

62. By immediately turning to the correct direction despite it being unfamiliar, Tolman's rats were demonstrating knowledge of what?

- a. Reinforcer
- b. Punisher
- c. Cognitive map
- d. Classical conditioning

ANSWER: c

63. What term is used to describe mental aptitude?

- a. Memory
- b. Intelligence
- c. Problem-solving
- d. Healthy

ANSWER: b

64. Reece says anyone can complete a task if they "put their mind to it." They are referencing

- a. problem-solving.
- b. intelligence.
- c. memory.
- d. survival.

ANSWER: a

65. Poppy *calls to mind* the feelings most prominent on the day a close friend was in a car accident. Which element of the mind is Poppy using?

- a. Problem-solving
- b. Decision making
- c. Vitality
- d. Memory

ANSWER: d

66. Ebbinghaus discovered that most newly learned information is lost

- a. during the first hour.
- b. during the first 30 days.
- c. during the first two days.
- d. during the first week.

ANSWER: c

67. Which theorist first attempted to observe the mind and how it functions?

- a. James
- b. Wundt

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- c. Pavlov
- d. Skinner

ANSWER: a

68. The most influential element of the cognitive revolution was
- a. a shift to a greater emphasis on how observable actions affect thoughts.
 - b. was laying emphasis on the study of behavior.
 - c. a shift to understanding how unobservable thoughts affect observable behavior.
 - d. trying to understand how stimuli affect observable responses.

ANSWER: c

69. Which scientist expanded on James's ideas about attention by studying selective listening?
- a. Cherry
 - b. Broadbent
 - c. Watson
 - d. Skinner

ANSWER: a

70. Which element is responsible for discovering that people can tune out unimportant information according to Broadbent?
- a. Input
 - b. Detector
 - c. Filter
 - d. Processor

ANSWER: c

71. Who coined the term *cognitive psychology*?
- a. Wundt
 - b. Pavlov
 - c. Skinner
 - d. Neisser

ANSWER: d

72. The main implication of Palmer's experiments with participant identification of target objects in a scene is that
- a. knowledge of the environment can influence perception.
 - b. knowledge of perception can influence our environment.
 - c. knowledge of a stimulus can influence our sensations.
 - d. knowledge of a response can influence our perception.

ANSWER: a

73. What was found by Palmer to be the most frequently recognized in the context of a kitchen scene?
- a. Drum
 - b. Mailbox
 - c. Hammer

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d. Bread

ANSWER: d

74. A person who sees a picture briefly flashed on the screen in the context of a concert will most likely remember which of the following?

- a. Knife
- b. Laptop
- c. Drum
- d. Hand

ANSWER: c

75. Lotti views an object briefly flashed on the screen in the context of a newspaper route and will mostly likely remember the

- a. mailbox.
- b. car.
- c. shoes.
- d. scissors.

ANSWER: a

76. Which technique records the activity of a single neuron?

- a. Functional magnetic resonance imaging (fMRI)
- b. Neurology
- c. Positron emission tomography (PET)
- d. Electrophysiology

ANSWER: d

77. Suri has suffered damage to the brain after an injury. To identify which region is most affected, which technique would be effective?

- a. Positron emission tomography (PET)
- b. Magnetic resonance imaging (MRI)
- c. Electroencephalogram (EEG)
- d. Electrocardiogram (EKG)

ANSWER: b

78. Which technique requires the injection of dye?

- a. Positron emission tomography (PET)
- b. Functional magnetic resonance imaging (fMRI)
- c. Electroencephalogram (EEG)
- d. Electrocardiogram (EKG)

ANSWER: a

79. Which type of memory lasts for the shortest amount of time?

- a. Episodic
- b. Semantic

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- c. Sensory
- d. Short-term

ANSWER: c

80. In Atkinson and Shiffrin's model, which process allows information to move from short- to long-term memory?

- a. Filter
- b. Rehearsal
- c. Repetition
- d. Attention

ANSWER: b

81. How long does sensory memory last?

- a. 30 seconds
- b. 3 seconds
- c. Less than 1 second
- d. 10 seconds

ANSWER: c

82. The duration of long-term memory is

- a. less than 1 second.
- b. 30 seconds.
- c. 1 minute.
- d. years.

ANSWER: d

83. Which of the following terms would accurately describe long-term memory?

- a. Episodic
- b. Short-term
- c. Iconic
- d. Echoic

ANSWER: a

84. Which term could be used to describe semantic memory?

- a. Episodic
- b. Procedural
- c. Long-term
- d. Sensory

ANSWER: c

85. Memory for repetitive physical actions is

- a. sensory.
- b. procedural.
- c. episodic.
- d. semantic.

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ANSWER: b

86. Which memory has multiple sub-types?

- a. Semantic
- b. Episodic
- c. Procedural
- d. Long-term

ANSWER: d

87. Neisser's text on cognitive psychology includes which of the following topics?

- a. Emotions
- b. Touch
- c. Senses
- d. Languages

ANSWER: c

88. Which topic is omitted from Neisser's text on cognitive psychology?

- a. Physiology
- b. Hearing
- c. Memory
- d. Vision

ANSWER: a

89. Which form of memory was Neisser most concerned with in his text on cognitive psychology?

- a. Long-term
- b. Episodic
- c. Sensory
- d. Semantic

ANSWER: c

90. Broadbent's model of attention MOST closely resembles a flow diagram of which?

- a. Sensation
- b. Perception
- c. Computer
- d. Library

ANSWER: c

91. How did the introduction of the digital computer influence cognitive psychology?

- a. Theorists began to model how the brain works in stages after the information-processing model of computers.
- b. Theorists began to understand how logically the brain processes information, just like a computer, free of errors.
- c. Theorists proposed that human mental processing was superior to that of digital computers in problem-solving speed.
- d. Theorists began to understand that, whereas digital computers can filter unnecessary information, the human

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brain cannot.

ANSWER: a

92. Which statement describes the cognitive revolution?

- a. Greater emphasis on operant conditioning
- b. Greater emphasis on classical conditioning
- c. Greater emphasis on unobservable mental processing
- d. Greater emphasis on nurture

ANSWER: c

93. Who offered a critique of Skinner's text on behaviorism?

- a. Noam Chomsky
- b. Wilhelm Wundt
- c. John Watson
- d. Ivan Pavlov

ANSWER: a

94. Einstein's proposition of a new way of understanding relativity is an example of

- a. cultural shift.
- b. paradigm shift.
- c. paradigm.
- d. new law.

ANSWER: b

95. There is one precise definition of the "mind."

- a. True
- b. False

ANSWER: False

96. Franciscus Donders is credited with performing one of the first behavioral psychology experiments.

- a. True
- b. False

ANSWER: False

97. Watson's most famous experiment studied rats and the rate of bar pressing.

- a. True
- b. False

ANSWER: False

98. The cognitive revolution began in the 1950s.

- a. True
- b. False

ANSWER: True

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99. The first computers were people.

- a. True
- b. False

ANSWER: True

100. Encoding materials in a way that will make it easier to retrieve them later is an effective study method.

- a. True
- b. False

ANSWER: True

101. It is easier to remember several facts if they are presented as part of a story than if they are presented as separate, unrelated facts.

- a. True
- b. False

ANSWER: True

102. Describe and differentiate between Donders's and Ebbinghaus's pioneering study methods and how each allowed the behavior to determine a property of the mind.

ANSWER: Donders's pioneering study method, known as the method of subtraction, used reaction time to infer the duration of individual mental processes by comparing the time taken to complete tasks with varying levels of cognitive complexity, while Ebbinghaus, using nonsense syllables, directly measured memory retention by observing how long it took to relearn a list after a period of forgetting, allowing both to indirectly study mental properties through observable behaviors.

103. Describe analytic introspection and explain two limitations to this method.

ANSWER: Analytic introspection is a psychological research method where participants are extensively trained to carefully observe and verbalize their own thoughts, feelings, and sensations in response to a given stimulus. Through this process, participants are essentially attempting to break down their conscious experience into its basic components. Two major limitations to this method are its high susceptibility to subjective bias and the difficulty in verifying the accuracy of reported internal experiences, as individuals may not always be aware of or accurately report all aspects of their mental processes.

104. Compare classical and operant conditioning. How might cognition play a role in operant conditioning? Give an example to support your thinking.

ANSWER: Classical conditioning involves associating an involuntary response with a stimulus and is very automatic and involuntary in nature. Operant conditioning focuses on associating voluntary behavior with its consequences and is more voluntary and active in nature. Cognition plays a role in operant conditioning as individuals can anticipate the consequences of their actions and consciously choose behaviors to achieve desired outcomes, like studying hard to get a good grade on a test to earn praise from a parent or teacher.

105. Describe Tolman's maze experiment. Describe the concept developed based on the results of this research, and its connection to the broader theme of cognitive psychology.

ANSWER: Tolman's maze experiment involved placing rats in a maze and observing their behavior. Tolman found that rats were not simply forming stimulus-response associations, but rather creating cognitive maps of the maze. This challenged the behaviorist view of learning and emphasized the role of cognitive processes in behavior.

106. Describe and compare Atkinson and Shiffrin's model and Tulving's memory components.

ANSWER: The Atkinson-Shiffrin model, also known as the multi-store model, is a memory model that describes how

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information is processed and stored in the human brain. Endel Tulving's theory of memory is based on three components: episodic, semantic, and procedural memory.

107. Describe the events that led to the cognitive revolution.

ANSWER: The Cognitive Revolution of the 1950s was sparked by a growing dissatisfaction with the limitations of behaviorism and the emergence of new perspectives from fields like linguistics, computer science, and neuroscience, which collectively allowed for a renewed focus on studying the internal mental processes of the mind rather than just observable behaviors.

108. Identify and describe two methods reviewed in this text that can improve your learning ability.

ANSWER: Two effective methods to improve your learning ability are spaced repetition which involves studying information over extended periods with intervals between sessions, and active recall where you test yourself by trying to retrieve information from memory without relying on direct reference to the source material, essentially quizzing yourself on the content.

Instructor Manual

Goldstein, Cognitive Psychology: Connecting Mind, Research, and Everyday Experience, 2026, 9798214143385; Chapter 1: Introduction to Cognitive Psychology

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PURPOSE AND PERSPECTIVE OF THE CHAPTER

The chapter aims to introduce cognitive psychology to students and discuss how scientists have attained their current understanding. Understanding cognition and mental processes in everyday life is also explored. The chapter begins with a summary of early research in cognitive psychology. Then, it provides students with an overview of the behaviorist period when the study of the mind was abandoned. The chapter next describes the paradigm shift in psychology that ushered in the study of cognition and the establishment of the cognitive perspective on behavior. It also explains how new technologies are driving and strengthening recent research.

LEARNING OBJECTIVES

- 1-1: Explain how cognitive psychology is relevant to everyday experience.
- 1-2: Describe the mind and cognition.
- 1-3: Understand early approaches to studying the mind, including structuralism and analytic introspection.
- 1-4: Explain why behaviorism was skeptical of the mind.
- 1-5: Explain how it is possible to study the inner workings of the mind when the mind is not directly observable.
- 1-6: Describe the history and relevance of the cognitive revolution.
- 1-7: Identify connections between digital computers and the human mind.
- 1-8: Apply concepts from the end of the chapter to improve study techniques.

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KEY TERMS

Analytic introspection: A procedure used by early psychologists in which trained participants described their experiences and thought processes in response to stimuli.

Artificial intelligence: The ability of a computer to perform tasks usually associated with human intelligence.

Behaviorism: Founded by John B. Watson, this approach states that observable behavior provides the only valid data for psychology. A consequence of this idea is that psychologists do not consider consciousness and unobservable mental processes worthy of study.

Brain imaging: Techniques such as functional magnetic resonance imaging (fMRI) result in images of the brain that represent brain activity. In cognitive psychology, activity is measured in response to specific cognitive tasks.

Choice reaction time: Time to respond to one of two or more stimuli. For example, in the Donders experiment, subjects had to give one response to one stimulus and a different response to another stimulus.

Classical conditioning: A procedure in which pairing a neutral stimulus with a stimulus that elicits a response causes the neutral stimulus to elicit that response.

Cognition: The mental processes involved in perception, attention, memory, language, problem-solving, reasoning, and decision making.

Cognitive map: Mental conception of a spatial layout.

Cognitive psychology: The branch of psychology concerned with the scientific study of the mental processes involved in perception, attention, memory, language, problem-solving, reasoning, and decision making. In short, cognitive psychology is concerned with the scientific study of the mind and mental processes.

Cognitive revolution: A shift in psychology, beginning in the 1950s, from the behaviorist approach to an approach in which the main thrust was to explain behavior in terms of the mind. One of the outcomes of the cognitive revolution was the introduction of the information-processing approach to studying the mind.

Electrophysiology: Techniques used to measure electrical responses of the nervous system.

Information-processing approach: Developed in the 1950s, this approach describes the mind as processing information through a sequence of stages.

Mind: A system that creates mental representations of the world and controls mental functions such as perception, attention, memory, emotions, language, deciding, thinking, and reasoning.

Neuropsychology: The study of the functioning of the nervous system, including behavioral effects of brain damage in humans.

Operant conditioning: A type of conditioning championed by B.F. Skinner, which focuses on strengthening behavior by presenting positive reinforcers, such as food or social approval, or withdrawal of negative reinforcers, such as a shock or social rejection.

Paradigm: A system of ideas that guide thinking in a particular field.

Paradigm shift: A shift in thinking from one paradigm to another.

Reaction time: The time it takes to respond to a stimulus. It is calculated by measuring the time between the stimulus presentation and reaction.

Savings: Ebbinghaus's measurement to determine the strength of memory left from initial learning. Higher savings indicate greater memory.

Savings curve: A plot of savings vs. time after original learning.

Scientific revolution: The change in scientific thought when a paradigm shift occurs.

Simple reaction time: Reacting to the presence or absence of a single stimulus (as opposed to having to choose between several stimuli before responding).

Structuralism: An approach to psychology that explains perception as the sum of small elementary units called sensations.

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WHAT'S NEW IN THIS CHAPTER

The following elements are improvements in this chapter from the previous edition:

- For the first time, cover art connects to an introductory example, providing continuity for the text overview.
- The history of the term *computer* and the transition from human to digital computers are presented.
- Virtual reality and augmented reality are presented as tools for studying cognition and the mind.

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CHAPTER OUTLINE

The following outline organizes activities (including any existing discussion questions in PowerPoints or other supplements) and assessments by chapter (and, therefore, by topic) so that you can see how all the content relates to the topics covered in the text.

1. Cognitive Psychology: Studying the Mind (LO 1.1, 1.2)
 - a. What Is the Mind? Like other psychological concepts, the mind, such as intelligence or emotion, can be thought of in several ways. Two definitions are commonly used to discuss it. One involves types of cognition—mental processes such as perception, attention, and memory. The other is more functional; the mind enables us to act and achieve goals. Notably, the cognitions referred to in the first definition play important roles in acting to achieve goals (the second one). Cognitive psychology is the study of mental processes, determining the characteristics and properties of the mind and how it operates.

2. Studying the Mind: Early Work in Cognitive Psychology (LO 1.2): In the 1800s, ideas about the mind were dominated by the belief that studying the mind was impossible. One reason for this belief was that the mind could not study itself, but there were other reasons, including the idea that the properties of the mind cannot be measured.
 - a. Donders's Pioneering Experiment: How Long Does It Take to Make a Decision? Donders was interested in determining how long it takes a person to decide. He measured simple reaction time (responding to a single stimulus) and choice reaction time, which is the time it takes to respond to a specific stimulus when two are presented.
 - b. Wundt's Psychology Laboratory: Structuralism and Analytic Introspection. Wilhelm Wundt founded the first laboratory of scientific psychology at the University of Leipzig in Germany. Wundt thought he could achieve the scientific description of the components of experience by using analytic introspection. He asked participants to describe their experiences (for example, hearing a chord played on a piano). These analyses were unsuccessful, but Wundt trained many individuals who founded university psychology departments worldwide.
 - c. Ebbinghaus's Memory Experiment: What Is the Time Course of Forgetting? Ebbinghaus was interested in determining the nature of memory and forgetting. Ebbinghaus used savings to determine how much was forgotten after a particular delay. The reduction in savings enabled the measurement of forgetting. Smaller savings means more forgetting. A curve could be plotted based on the decline in savings, demonstrating that memory could be quantified, and that functions like the savings curve could describe a property of the mind.
 - d. James's Principles of Psychology. William James taught Harvard's first psychology course and made significant observations about the mind in his textbook *Principles of Psychology*. His observation that paying attention to one thing involves withdrawing from others resonates today and remains the basis of contemporary attention studies.
3. Abandoning the Study of the Mind (LO 1.3)
 - a. Watson Founds Behaviorism. Watson rejected introspection as a method and focused on observable behavior, not consciousness, as the main topic of study. He wanted to restrict psychology to behavioral data and rejected going beyond those data to make inferences about unobservable mental events. Watson eliminated the mind as a topic for investigation.
 - b. Skinner's Operant Conditioning. Skinner also focused his work exclusively on behavior. He examined how stimuli controlled behavior and introduced operant conditioning, which focused on how the presentation of positive reinforcers strengthens behavior.
 - c. Setting the Stage for the Reemergence of the Mind in Psychology. Tolman's research on latent learning introduced the idea of cognitive

maps, which, together with other developments, led to a resurgence of the mind in psychology. He placed rats in mazes and allowed them to explore freely. The rats learned to run the mazes for rewards after their free exploration. Tolman's explanation of this result was that when the rat initially experienced the maze, it developed a cognitive map—a mental conception of its layout. His references to cognition and the idea that something other than stimulus-response connections might occur in the rat's mind placed him outside mainstream behaviorism.

4. The Rebirth of the Study of the Mind (LO 1.4): The cognitive revolution began in the 1950s. It was a shift in psychology from the behaviorists' focus on stimulus-response relationships to an approach whose main thrust was understanding how the mind works.
 - a. Paradigms and Paradigm Shifts. What precisely is a scientific revolution? Thomas Kuhn's (1962) book *The Structure of Scientific Revolutions* describes them as a shift from one paradigm to another—for example, a change from a Newtonian to a Quantum framework in physics. Some psychologists, inspired by the computer stage approach, proposed the information-processing approach to studying the mind. Analogously, in psychology, using computers to analyze data led to new ways of thinking about the mind. During the first half of the 20th century, psychology was dominated by behaviorism and stimulus-response research. Some valuable discoveries arose from this work, including effective behavioral therapies that are still in use today. However, this paradigm did not allow any consideration of the mind's role in creating behavior.
 - b. Introduction of the Digital Computer. The first computers were people. In the 20th century, advances in automation and mechanical engineering allowed the introduction of machines to assist with complex computations, reducing the likelihood of human error. The information-processing approach to understanding mental operations arose from this model.
 - c. Conferences on Artificial Intelligence and Information Theory. The Summer Research Project on Artificial Intelligence was the first use of the term artificial intelligence (AI). The artificial intelligence approach was defined as “making a machine behave in ways that would be called intelligent if a human were so behaving.” Researchers from various disciplines—psychologists, mathematicians, computer scientists, linguists, and experts in information theory—attended conferences and shared ideas that promoted information theory.
 - d. The Cognitive “Revolution” Took Awhile. Although we have called this shift the cognitive revolution, it is worth noting that the revolutionary change from Skinner's behaviorism to the cognitive approach occurred over time. Long after these conferences, a textbook on psychology's history did not mention the cognitive approach. It was not until the late

1960s that Ulrich Neisser published a textbook titled Cognitive Psychology (Neisser, 1967).

5. The Evolution of Cognitive Psychology (LO 1.5)
 - a. What Neisser Wrote. Neisser's cognitive psychology textbook considered "higher mental processes" such as thinking, problem-solving, and long-term remembering.
 - b. Studying Higher Mental Processes. Richard Atkinson and Richard Shiffrin's model of memory, introduced a year after Neisser's book was published, was a big step toward studying higher mental processes. Tulving's model of long-term memory describes it as having three distinct types: episodic (autobiographical), semantic (informational), and procedural (memory for motor skills).
 - c. Studying the Physiology of Cognition. Physiological advances were made, and they provided important insights into the nervous system's behind-the-scenes activity that creates the mind. The two techniques used in this research are neuropsychology (the study of traumatic brain injury and its results) and electrophysiology (recording and measuring nervous system responses), including brain imaging.
 - d. New Perspectives on Behavior. In addition to developing more research on higher-level processes and physiology that we knew little about in 1967, researchers began conducting research outside the laboratory. New technologies have allowed scientists to study the physiology of thinking in the lab using PET scans and fMRI. VR/AR has also facilitated research with more generalizable conclusions, as these technologies allow individuals to interact with realistic environments while psychologists assess their behavior and physiological reactions.

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DISCUSSION QUESTIONS

The following are discussion questions that do not appear in the text, PPTs, or courseware—they are for you to use as you wish. You can assign these questions in several ways: in a discussion forum in your LMS, as whole-class discussions in person, or as a partner or group activity in class.

1. Introduction to Cognitive Psychology Discussion: (LO 1.1) (Duration 10 minutes)
 - a. To introduce course themes, ask students to answer a simple question the instructor writes on the board. (Many general knowledge questions will work well. An example might be, "On what date did the first human walk on the moon?")
 - b. Ask students to indicate what cognitive/mental processes are necessary to answer the question. Most likely, they will omit many processes. The instructor can outline a variety of these, both explicit and implicit, including

- the perception of familiar patterns/letters, memory and language comprehension processes, and judgment-making (including ideas relevant to the context but beyond the answer we seek, such as “Why is the instructor asking us this silly question in a cognition course?”). Point out to students how our knowledge guides us toward answers and solutions, even when the information we’re working with could be ambiguous. The instructor can highlight how unconscious and complex so much of cognition is and ask students to discuss the challenges these aspects of cognition pose for cognitive researchers. How can cognition be studied “indirectly”?
- c. Divide the class into small groups, ask each group to produce a general knowledge question, and list the cognitive processes required to formulate and solve it.
2. The Impact of the Computer on Cognitive Psychology: (LO 1.4) (Duration 10 minutes)
 - a. To reinforce the impact of the invention of the computer on the start of the “Cognitive Revolution,” have students generate/diagram ideas about a human/computer analogy in terms of information processing. Ask students to develop ideas about how humans and computers are similar and different in processing information. How does the analogy suggest ways for cognitive psychologists to study the mind? What are the limitations of this analogy and, thus, the challenges that will be faced when studying cognition of the mind?
 3. Measuring Mental Responses: (LO 1.5) (Duration 10 minutes)
 - a. Discuss the concept that mental responses cannot be measured directly but must be inferred from behavioral measures. Briefly discuss Donders’s decision-making experiment.
 - b. Ask students to generate basic ideas about how humans read letters or familiar words.
 - c. Ask students to extrapolate from Donders’s methodology to design a simple experiment to study the timed course of reading text.
 4. Models of Memory: (LO 1.5) (Duration 10 minutes)
 - a. Have students develop a model of memory based on the concepts of Atkinson, Shiffrin, and Tulving, describing how information is received and processed.
 - b. Ask students to generate examples for each component of long-term memory.

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ADDITIONAL ACTIVITIES AND ASSIGNMENTS

The following are activities and assignments developed by Cengage but not included in the text, PPTs, or courseware—they are for you to use if you wish.

1. Identifying Cognitive Activities in Daily Life (LO 1.1)

- a. Ask students to identify one cognitive activity they engage in during the day (e.g., studying for a test, using various apps on their phone, navigating using GPS, and driving a car).
- b. Have students identify the different processes (e.g., pattern identification, short-term/working memory, and attention) that must occur to engage in that process successfully. Suggest they use the different chapters to identify possible processes they may use.

2. Learning Paired Associations (LO 1.3)

- a. Give students a paired-associate learning task. Instruct students that they will learn words in pairs (e.g., tree boat). During the recall portion of the experiment, they will be presented with one of the words from each pair and asked to report the other word of each pair.
- b. Have students perform their “analytical introspection experiment” describing their experiences and thought processes about how they tried to remember the word pairs. Discuss the students’ results from this introspection procedure. Highlight major points of introspection obtained, such as how self-report experiments generate variable results from one person to another.

3. Simple Memory Experiment (LO 1.3)

- a. Demonstrate a simple memory experiment such as a delayed recognition task. At the beginning of class, present to the class a series of 20 common nouns (e.g., *pot* and *bike*). Tell the class that you will explain the “experiment” further at a later point in the lecture. Sometime later during the class, distribute a recognition test of 40 words (20 that had been presented earlier and 20 that had not).
- b. Instruct students to circle only the words they remember as having been presented earlier. Then, present students with an answer key showing the 20 words that should have been circled and ask them to score their tests. You can calculate a mean accuracy for the class. Discuss how accuracy, in addition to reaction time, is used as a measure of cognition.

4. Reaction Time Experiment (LO 1.4)

- a. Present students with some stimuli using a presentation software (e.g., PowerPoint).
- b. Have students use the “stopwatch” function on their phones to measure their reaction times to the stimuli you present.

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ADDITIONAL RESOURCES

EXTERNAL VIDEOS OR PLAYLIST

- [**The Cognitive Revolution \(Time: 24:25\)**](#)
 - A walk through the Cognitive Revolution, which transformed the study of the mind into a rigorous scientific enterprise.
- [**Structuralism vs. Functionalism \(Time: 22:53\)**](#)
 - Video compares and contrasts structuralism and functionalism on seven fronts.
- [**Early Reaction Time Research in Psychology \(Time: 5:49\)**](#)
 - Exploring the history of reaction time experiments and different methods and instruments used to measure time.
- [**Measuring Reaction Time \(Time: 6:08\)**](#)
 - This video explains how to measure and calculate reaction time with a ruler in a practical experiment
- [**Noam Chomsky vs. B. F. Skinner Debate of the Century \(Time: 58:04\)**](#)
 - A compilation of short video segments of Chomsky and Skinner and their thoughts on psychology.

INTERNET RESOURCES

- [**Reaction Test Pro \(Free\)**](#)
 - A simple reaction time app with timing to the millionths of a second.
- [**Cognitive Approach In Psychology**](#)
 - From Simply Psychology, an overview of the history and domains of cognitive psychology.
- [**Classics in the History of Psychology**](#)
 - Resource for students interested in the history of psychology.

PRIMARY SOURCES

- [**The Method of Investigation**](#), Hermann Ebbinghaus (1885)

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APPENDIX

GENERIC RUBRICS

Providing students with rubrics helps them understand expectations and components of assignments. Rubrics help students become more aware of their learning process and progress, and they improve students' work through timely and detailed feedback.

You can customize these rubric templates as you wish. The writing rubric indicates 40 points, and the discussion rubric indicates 30 points.

STANDARD WRITING RUBRIC

Criteria	Meets Requirements	Needs Improvement	Incomplete
Content	The assignment clearly and comprehensively addresses all questions in the assignment. 15 points	The assignment partially addresses some or all questions in the assignment. 8 points	The assignment does not address the questions in the assignment. 0 points
Organization and clarity	The assignment presents ideas in a clear manner and with strong organizational structure. The assignment includes an appropriate introduction, content, and conclusion. Coverage of facts, arguments, and conclusions are logically related and consistent. 10 points	The assignment presents ideas in a mostly clear manner and with a mostly strong organizational structure. The assignment includes an appropriate introduction, content, and conclusion. Coverage of facts, arguments, and conclusions are mostly logically related and consistent. 7 points	The assignment does not present ideas in a clear manner and with strong organizational structure. The assignment includes an introduction, content, and conclusion, but coverage of facts, arguments, and conclusions are not logically related and consistent. 0 points
Research	The assignment is based upon appropriate and adequate academic literature, including peer-reviewed journals and other scholarly work. 5 points	The assignment is based upon adequate academic literature but does not include peer-reviewed journals and other scholarly work. 3 points	The assignment is not based upon appropriate and adequate academic literature and does not include peer-reviewed journals and other scholarly work. 0 points

Citations	The assignment follows the required citation guidelines. 5 points	The assignment follows some of the required citation guidelines. 3 points	The assignment does not follow the required citation guidelines. 0 points
Grammar and spelling	The assignment has two or fewer grammatical and spelling errors. 5 points	The assignment has three to five grammatical and spelling errors. 3 points	The assignment is incomplete or unintelligible. 0 points

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STANDARD DISCUSSION RUBRIC

Criteria	Meets Requirements	Needs Improvement	Incomplete
Participation	Submits or participates in discussion by the posted deadlines. Follows all assignment. Instructions for initial post and responses. 5 points	Does not participate or submit discussion by the posted deadlines. Does not follow instructions for initial post and responses. 3 points	Does not participate in discussion. 0 points
Contribution quality	Comments stay on task. Comments add value to discussion topic. Comments motivate other students to respond. 20 points	Comments may not stay on task. Comments may not add value to discussion topic. Comments may not motivate other students to respond. 10 points	Does not participate in discussion. 0 points
Etiquette	Maintains appropriate language. Offers criticism in a constructive manner. Provides both positive and negative feedback. 5 points	Does not always maintain appropriate language. Offers criticism in an offensive manner. Provides only negative feedback. 3 points	Does not participate in discussion. 0 points

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