CHAPTER 1 The Science of the Mind

LEARNING OBJECTIVES

1.1. Describe the scope and goals of cognitive psychology.

1.2. Understand the case of H.M., and the many ways that memory influences our lives.

1.3. Describe the limitations of introspection as a method for scientific inquiry.

1.4. Compare and contrast classical (Watsonian) behaviorism and cognitive psychology.

1.5. Kant's "transcendental method" is sometimes called "inference to best explanation." Explain this method and how it works.

1.6. Describe the role, in the emergence of cognitive psychology, that was played by computer science and the development of "computer intelligence."

MULTIPLE CHOICE

1. Which of the following topics is NOT commonly studied within cognitive psychology?
   a. anger management
   b. decision making
   c. memory
   d. attention

   ANS: A DIF: Easy REF: The Scope of Cognitive Psychology
   OBJ: 1.1 MSC: Understanding

2. Cognitive processes are NOT necessary for which daily activity?
   a. reading a newspaper
   b. studying for a test
   c. talking on the phone
   d. breathing

   ANS: D DIF: Easy REF: The Scope of Cognitive Psychology
   OBJ: 1.1 MSC: Applying

3. Alyssa wants to be a psychologist but is unsure which topic within psychology most interests her. Which of the following topics would be LEAST likely to lead her into cognitive psychology?
   a. amnesia
   b. language acquisition
   c. Lyme disease
   d. problem-solving strategies

   ANS: C DIF: Easy REF: The Scope of Cognitive Psychology
   OBJ: 1.1 MSC: Applying

4. Consider the sequence "Betsy wanted to bring Jacob a present. She shook her piggy bank." Most people, after hearing this sequence, believe Betsy was checking her piggy bank to see if she had money to spend on the gift. This inference about Betsy's goals depends on the fact that
   a. our previous knowledge fills in background information whenever we're understanding an event or conversation.

b. readers are likely to know someone named Jacob.
c. English, unlike other languages, requires speakers to mention all of the people involved in an event.
d. the individual sentences are short.

ANS: A DIF: Easy REF: The Broad Role for Memory
OBJ: 1.1 MSC: Understanding

5. Which of the following statements is LEAST likely to apply to patient H.M.?
a. "He cannot remember what he did earlier today, including events that took place just an hour ago."
b. "He read this story last month, but he was still surprised by how the story turned out."
c. "Even though he has encountered the nurse many times, he is still unable to recognize her."
d. "He remembered that it was only a week ago that he'd heard the sad news that his uncle had died."

ANS: D DIF: Moderate REF: Amnesia and Memory Loss
OBJ: 1.2 MSC: Applying

6. Research with H.M. provides an illustration for which major theme of the chapter?
a. Introspection is an important research tool for cognitive psychologists.
b. Cognitive psychology can help us understand a wide range of activities that depend on someone's ability to remember.
c. Memory is not very important.
d. The disruption caused by brain damage depends on how widespread the damage is, and not on the specific sites that are damaged.

ANS: B DIF: Moderate REF: The Scope of Cognitive Psychology
OBJ: 1.2 MSC: Evaluating

7. Patients suffering from clinical amnesia are characterized by
a. memory dysfunction.
b. an inability to recognize patterns.
c. inarticulate speech.
d. impaired language comprehension.

ANS: A DIF: Easy REF: Amnesia and Memory Loss
OBJ: 1.2 MSC: Remembering

8. The term "introspection" refers to the
a. process by which one individual seeks to infer the thoughts of another individual.
b. procedure of examining thought processing by monitoring the brain's electrical activity.
c. process of each person looking within, to observe his or her own thoughts and ideas.
d. technique of studying thought by interpreting the symbols used in communication.

ANS: C DIF: Easy REF: The Limits of Introspection
OBJ: 1.3 MSC: Remembering

9. A participant is asked to look within himself or herself and report on his or her own mental processes. This method is called
a. logical inference.
b. reconstruction.
c. introspection.
d. mentalistic study.

ANS: C DIF: Easy REF: The Limits of Introspection
OBJ: 1.3 MSC: Remembering

10. Of the following, introspection is LEAST useful for studying
a. topics that are strongly colored by emotion.
b. mental events that are unconscious.
c. processes that involve conceptual knowledge.
d. events that take a long time to unfold.

ANS: B DIF: Moderate REF: The Limits of Introspection
OBJ: 1.3 MSC: Understanding

11. Which of the following statements about introspection is FALSE?
a. It is the only way to observe conscious events directly.

b. It is subjective.
c. It provides strong evidence for hypothesis-testing.
d. It was a technique used historically to study cognition.

ANS: C DIF: Moderate REF: The Limits of Introspection
OBJ: 1.3 MSC: Understanding

12. Genie wonders why she can never remember the names of new acquaintances. In search of an answer, she examines and reflects on her feelings about meeting new people. Genie is engaged in which process?
a. practical rehearsal
b. introspection
c. learning history analysis
d. goal retrieval

ANS: B DIF: Moderate REF: The Limits of Introspection
OBJ: 1.3 MSC: Applying

13. Introspection was employed as a research tool in the late 1800s because
a. it was regarded as the only way to observe the mind's contents directly.
b. it provided data from individuals without any specialized training.
c. conscious events are just as important as unconscious events.
d. it provided cognitive psychology's first testable claims.

ANS: A DIF: Moderate REF: The Limits of Introspection
OBJ: 1.3 MSC: Analyzing

14. Which of the following statements about introspection is FALSE?
a. A verbal report based on introspection may provide a distorted picture of mental processes that are nonverbal in nature.
b. Different participants might be using different terms to describe similar experiences.
c. Introspection provides valuable scientific data, but only after the person doing the introspection has received many hours of training.
d. Participants cannot possibly introspect about events that are unconscious.

ANS: C DIF: Difficult REF: The Limits of Introspection
OBJ: 1.3 MSC: Evaluating

15. Which of the following statements provides the most serious obstacle to the use of introspection as a source of scientific evidence?
a. When facts are provided by introspection, we have no way to assess the facts themselves, independent of the reporter's perspective.
b. Introspection is only effective for children, because children have not yet learned to inhibit their own self-reports.
c. Introspection is a valid method only if the person doing the introspection goes into a trancelike state.
d. The process of reporting on one's own mental events is too slow to be scientifically useful.

ANS: A DIF: Difficult REF: The Limits of Introspection
OBJ: 1.3 MSC: Evaluating

16. In cognition, as in other sciences, we develop claims that can be tested. These claims are generally referred to as
a. research proposals.
b. empirical models.
c. statistical comparisons.
d. hypotheses.

ANS: D DIF: Moderate REF: The Limits of Introspection
OBJ: 1.3 | 1.4 MSC: Understanding

17. A behaviorist, like John Watson, is LEAST likely to believe which of the following statements?
a. Our learning history powerfully influences our behaviors.
b. Children are a good source for data.
c. The mind is not amenable to scientific inquiry because it is not easily observed.
d. When it comes to collecting data, introspection is as valuable as behavior.

ANS: D DIF: Moderate REF: The Years of Behaviorism

OBJ: 1.3 | 1.4 MSC: Analyzing

18. Historically, the movement known as behaviorism was to a large extent encouraged by scholars' concerns regarding
    a. psychotherapy.
    b. an exaggerated focus on participants' responses.
    c. research based on introspection.
    d. a focus on brain mechanisms and a corresponding inattention to mental states.

    ANS: C DIF: Easy REF: The Years of Behaviorism
    OBJ: 1.4 MSC: Understanding

19. Behaviorists study organisms'
    a. expectations.
    b. desires and motivations.
    c. dreams.
    d. responses.

    ANS: D DIF: Easy REF: The Years of Behaviorism
    OBJ: 1.4 MSC: Remembering

20. Of the following, behaviorists argued that _____ were most important in analyzing behavior.
    a. expectations
    b. beliefs
    c. wishes
    d. learning histories

    ANS: D DIF: Easy REF: The Years of Behaviorism
    OBJ: 1.4 MSC: Remembering

21. Which of the following would a classical behaviorist be LEAST likely to study?
    a. a participant's response to a regularly occurring situation
    b. a participant's beliefs
    c. changes in a participant's behavior that follow changes in the environment
    d. principles that apply equally to human behavior and to the behavior of other species

    ANS: B DIF: Moderate REF: The Years of Behaviorism
    OBJ: 1.4 MSC: Applying

22. Modern psychology turned away from behaviorism in its classic form for many reasons, including the fact that
    a. classical behaviorism failed to consider the mental processes underlying cognition.
    b. humans are more similar to computers than to other species studied in the laboratory.
    c. psychology rejected behaviorism's emphasis on an organism's subjective states.
    d. an organism's behavior can be changed by learning.

    ANS: A DIF: Difficult REF: The Years of Behaviorism
    OBJ: 1.4 MSC: Analyzing

23. If Sheila says, "Pass the salt, please," you are likely to pass her the salt. You'll probably respond in the same way if Sheila (a chemistry major) instead asks, "Could you please hand me the sodium chloride crystals?" This observation seems to indicate that our behavior is
    a. primarily controlled by the physical characteristics of the stimuli we encounter.
    b. shaped by the literal meanings of the stimuli we encounter.
    c. determined by simple associations among the stimuli we encounter.
    d. governed by what the stimuli we encounter mean to us.

    ANS: D DIF: Difficult REF: The Years of Behaviorism
    OBJ: 1.4 MSC: Evaluating

24. The process of taking observable information and inferring a cause is known as
    a. mentalistic inference.
    b. the transcendental method.
    c. cause and effect.
    d. introspection.

    ANS: B DIF: Moderate
    REF: The Intellectual Foundations of the Cognitive Revolution
    OBJ: 1.4 MSC: Remembering

25. One important difference between classical behaviorism and cognitive psychology is that cognitive psychology
    a. argues that unobservable mental states can be scientifically studied.
    b. rejects the use of human participants.
    c. insists on studying topics that can be directly and objectively observed.
    d. emphasizes the evolutionary roots of human behavior.

    ANS: A DIF: Easy
    REF: The Intellectual Foundations of the Cognitive Revolution
    OBJ: 1.4 MSC: Analyzing

26. Cognitive psychology often relies on the transcendental method, in which
    a. mental events are explained by referring to events in the central nervous system.
    b. information from introspection transcends behavioral data.
    c. researchers seek to infer the properties of unseen events on the basis of the observable effects of those events.
    d. theories are tested via computer models.

    ANS: C DIF: Easy
    REF: The Intellectual Foundations of the Cognitive Revolution
    OBJ: 1.4 MSC: Remembering

27. The philosopher Immanuel Kant based many of his arguments on transcendental inferences. A commonplace example of such an inference is a
    a. physicist inferring what the attributes of the electron must be on the basis of visible effects that the electron causes.
    b. computer scientist inferring what the attributes of a program must be on the basis of his or her long-range goals for the program's functioning.
    c. biologist inferring how an organism is likely to behave in the future on the basis of assessment of past behaviors.
    d. behaviorist inferring how a behavior was learned on the basis of a deduction from well-established principles of learning.

    ANS: A DIF: Difficult
    REF: The Intellectual Foundations of the Cognitive Revolution
    OBJ: 1.4 MSC: Analyzing

28. Cognitive psychologists try to make inferences about causes, based on the observed effects. In this way, cognitive psychologists use methods like those commonly employed by
    a. crime scene investigators.
    b. garbage collectors.
    c. chefs.
    d. construction workers.

    ANS: A DIF: Moderate
    REF: The Intellectual Foundations of the Cognitive Revolution
    OBJ: 1.4 MSC: Applying

29. The "cognitive revolution" is named as such because
    a. the focus changed from behaviors to the processes underlying those behaviors.
    b. the change was accompanied by violence.
    c. the focus changed from animals to humans.
    d. philosophers such as Kant were strongly opposed to the change.

    ANS: A DIF: Easy
    REF: The Intellectual Foundations of the Cognitive Revolution
    OBJ: 1.4 MSC: Understanding

30. The branch of psychology concerned with the scientific study of knowledge is
    a. cognitive psychology.
    b. humanistic psychology.
    c. neuropsychology.
    d. behaviorism.

    ANS: A DIF: Easy REF: The Scope of Cognitive Psychology
    OBJ: 1.1 MSC: Remembering

31. Wilhelm Wundt would be LEAST interested in an individual's
    a. feelings.
    b. perception of temperature.
    c. reaction to a conditioned stimulus.
    d. recollections.

    ANS: C DIF: Moderate REF: The Limits of Introspection
    OBJ: 1.3 MSC: Evaluating

32. The seminal work of _____ was instrumental in the development of experimental psychology.
    a. Donald Broadbent
    b. Wilhelm Wundt
    c. John Watson
    d. Immanuel Kant

    ANS: B DIF: Easy REF: The Limits of Introspection
    OBJ: 1.3 MSC: Remembering

33. Which technique was commonly used in Wilhelm Wundt's laboratory?
    a. introspection
    b. physiological analysis
    c. operant conditioning
    d. classical conditioning

    ANS: A DIF: Easy REF: The Limits of Introspection
    OBJ: 1.3 MSC: Remembering

34. What evidence supports Edward Tolman's belief that it is possible for rats to acquire new knowledge?
    a. development of a cognitive map
    b. increased physiological response to a reward
    c. decreased avoidance of punishment
    d. observational introspection

    ANS: A DIF: Difficult
    REF: The Path from Behaviorism to the Cognitive Revolution OBJ: 1.4
    MSC: Evaluating

35. Who proposed the concept of a "cognitive map"?
    a. Ulric Neisser
    b. Frederic Bartlett
    c. Noam Chomsky
    d. Edward Tolman

    ANS: D DIF: Easy
    REF: The Path from Behaviorism to the Cognitive Revolution OBJ: 1.4
    MSC: Remembering

36. For 10 days, a group of rats is simply allowed to explore a maze. On Day 11, food is introduced at a specific location within the maze, and the rats find it. On Day 12, the rats move to the food's location just as quickly as rats who had been trained for many days with food in that location. The most plausible explanation for this result is that
    a. the rats permitted only to explore learned the layout of the maze.
    b. the reward of food was not sufficient to shape the trained rat's behavior.
    c. the ability of rats to locate food is innate.
    d. the rats trained to locate food learned the layout of the maze.

    ANS: A DIF: Moderate
    REF: The Path from Behaviorism to the Cognitive Revolution OBJ: 1.4
    MSC: Analyzing

37. Noam Chomsky criticized _____ and noted that it failed to explain _____.
    a. Gestalt psychology; visual perception
    b. introspection; individual differences
    c. behaviorism; language development
    d. direct observations; abstract thinking

    ANS: C DIF: Moderate
    REF: The Path from Behaviorism to the Cognitive Revolution OBJ: 1.4
    MSC: Applying

38. Contemporary cognitive psychologists are MOST interested in examining the relationship between _____ and _____.
    a. stress hormones; behavior
    b. memory capacity; lifetime achievement
    c. introspection; self-awareness
    d. cognitive processes; behavior

    ANS: D DIF: Difficult
    REF: Research in Cognitive Psychology: The Diversity of Methods
    OBJ: 1.1 MSC: Analyzing

39. _____ techniques allow us to scrutinize the precise structure and moment-by-moment pattern of activation in the brain.
    a. Introspection
    b. Neuropsychological
    c. Neuroimaging
    d. Observational

    ANS: C DIF: Easy
    REF: Research in Cognitive Psychology: The Diversity of Methods
    OBJ: 1.1 MSC: Remembering

40. A Gestalt psychologist is likely to focus on which of the following?
    a. individual elements of an experience
    b. differences in reaction time
    c. how elements of an experience interact to form new wholes
    d. objective and subjective experiences

    ANS: C DIF: Moderate REF: European Roots of the Cognitive Revolution
    OBJ: 1.5 MSC: Remembering

41. A(n) _____ is general knowledge about what is typically involved in a type of situation or event.
    a. schema
    b. response set
    c. cognitive map
    d. instinct

    ANS: A DIF: Easy REF: European Roots of the Cognitive Revolution
    OBJ: 1.5 MSC: Remembering

42. Schemas reflect a(n) _____ that _____ comprehension of a specific experience.
    a. objective appraisal; inhibits
    b. mental framework; facilitates
    c. pattern of thought; inhibits
    d. habit; facilitates

    ANS: B DIF: Moderate REF: European Roots of the Cognitive Revolution
    OBJ: 1.5 MSC: Applying

43. The development of computers facilitated research in cognition by
    a. suggesting hypotheses that framed the steps of cognition as stages of information processing.
    b. more accurately capturing reaction time.
    c. integrating elements of subjective experiences.
    d. discrediting behavioral principles.

    ANS: A DIF: Moderate REF: Computers and the Cognitive Revolution
    OBJ: 1.6 MSC: Understanding

44. Who used the language of computer science to describe human cognition?
    a. Donald Broadbent
    b. Colin Cherry
    c. Frederic Bartlett
    d. Wilhelm Wundt

    ANS: A DIF: Easy REF: Computers and the Cognitive Revolution
    OBJ: 1.6 MSC: Remembering

45. An information processing approach to understanding cognition does NOT
    a. propose a sequence of mental operations to explain cognition.
    b. use computer models to describe cognitive processes.
    c. describe cognition as processing information in stages.
    d. rely on behavioral principles to explain specific stimulus-response relationships.

ANS: D DIF: Moderate REF: Computers and the Cognitive Revolution
OBJ: 1.6 MSC: Understanding

ESSAY

1. You've just ordered your lunch and are waiting for your food to be delivered when your friend Jill says, "I don't understand why you would need to take a whole class on cognitive psychology. It doesn't seem that important to our everyday lives." Describe to Jill all the ways she will rely on cognitive processing during this meal.

   ANS:
   Answers will vary.

   DIF: Difficult REF: The Scope of Cognitive Psychology
   OBJ: 1.1 MSC: Creating

2. Describe the case of H.M. What does his story tell us about the role that memory plays in our sense of self?

   ANS:
   Answers will vary.

   DIF: Moderate REF: Amnesia and Memory Loss OBJ: 1.2
   MSC: Analyzing

3. Compare and contrast the introspection, behaviorist, and cognitive approaches to studying mental activities. Which approach do you find most compelling, and why?

   ANS:
   Answers will vary.

   DIF: Difficult REF: The Cognitive Revolution OBJ: 1.3 | 1.4
   MSC: Evaluating

4. Mikey is 4 years old and has begun acting out. Every time he throws a tantrum, his mother rushes over to console him. In analyzing this behavior, what sort of factors would most interest a behaviorist? On what factors would a cognitive psychologist using the transcendental method focus? What conclusions will each psychologist reach?

   ANS:
   Answers will vary.

   DIF: Difficult REF: The Years of Behaviorism | European Roots of the Cognitive Revolution
   OBJ: 1.4 | 1.5 MSC: Applying

5. Despite the fact that we cannot directly observe mental activity, cognitive psychologists are able to scientifically study these processes. Explain why this is possible by describing Kantian logic. Next, provide at least three measurable variables and explain why they could be reliably used as proxies for mental behavior.

   ANS:
   Answers will vary.

   DIF: Moderate REF: European Roots of the Cognitive Revolution
   OBJ: 1.4 | 1.5 MSC: Understanding

6. Describe introspection and then describe two limitations to this method.

   ANS:
   Answers will vary.

   DIF: Moderate REF: The Limits of Introspection OBJ: 1.3

MSC: Understanding

7. Define “schema.” Describe how schemas shape and organize our experiences.

   ANS:
   Answers will vary.

   DIF: Moderate REF: European Roots of the Cognitive Revolution
   OBJ: 1.5 MSC: Understanding

8. Cognitive psychologists utilize different methods to understand cognitive processes. Describe three different methods to investigate memory functioning.

   ANS:
   Answers will vary.

   DIF: Moderate REF: Research in Cognitive Psychology: The Diversity of Methods
   OBJ: 1.1 MSC: Understanding

CHAPTER 2 The Neural Basis for Cognition

LEARNING OBJECTIVES

2.1. Describe the disorder of Capgras syndrome, including the behavioral and neural correlates.

2.2. Explain what we can learn about the relationship between the mind and the brain by studying the effects of brain disorders and trauma.

2.3. Describe the distinct functions of the hindbrain, midbrain, and forebrain regions.

2.4. Describe the functions of these subcortical structures: the hypothalamus, the hippocampus, and the amygdala.

2.5. Explain the role that the corpus callosum plays in the brain, and how lesioning that structure affects behavior.

2.6. Explain what is meant by the terms “lateralization” and “localization of function.”

2.7. Describe the various imaging and recording techniques that can be used to study brain activity.

2.8. Explain what is meant by the word “projection” in describing the brain’s “projection areas.”

2.9. Explain the different functions of the motor and sensory areas of cortex.

2.10. Name and describe main parts of a neuron.

2.11. Describe the events that occur at the synapse, and describe the differences between within-cell and between-cell neural communication.

MULTIPLE CHOICE

1. Which of the following statements is LEAST likely to be true of a person with Capgras syndrome?
   a. She thinks that her mother has been replaced by a look-alike alien.
   b. She cannot recognize that her father looks like her father.
   c. She also has Alzheimer's syndrome.
   d. She has no warm sense of familiarity when she sees a close friend.

   ANS: B DIF: Moderate REF: Explaining Capgras Syndrome
   OBJ: 2.1 MSC: Applying

2. Some researchers explain Capgras syndrome as
   a. a failure of visual recognition.
   b. the result of a disconnection between cognitive appraisal and sense of familiarity.
   c. a subtype of schizophrenia.
   d. a failure of long-term memory, because patients cannot remember what close family members look like.

   ANS: B DIF: Moderate REF: The Neural Basis for Capgras Syndrome
   OBJ: 2.1 MSC: Understanding

3. Neuroimaging techniques such as PET suggest a link between Capgras syndrome and abnormalities in each of the following brain regions EXCEPT the
   a. prefrontal cortex.
   b. amygdala.
   c. temporal lobe.
   d. fusiform face area.

   ANS: D DIF: Moderate REF: The Neural Basis for Capgras Syndrome
   OBJ: 2.1 MSC: Analyzing

4. For most people, encountering a family member who looks a little bit different may elicit a response like "He must have gotten a haircut!" However, that same experience will elicit a response like _____ from someone with Capgras syndrome.
   a. "He lost weight!"
   b. "He is mad at me."
   c. "He is an impostor!"
   d. "He looks like a hat!"

   ANS: C DIF: Moderate REF: The Neural Basis for Capgras Syndrome
   OBJ: 2.1 MSC: Applying

5. Capgras syndrome suggests there are two parts to recognition. These parts are
   a. factual and auditory.
   b. factual and emotional.
   c. visual and factual.
   d. visual and auditory.

   ANS: B DIF: Moderate REF: What Do We Learn from Capgras Syndrome?
   OBJ: 2.1 MSC: Understanding

6. Capgras syndrome provides an illustration of several important themes in Chapter 2. All of the following are true of Capgras EXCEPT
   a. damage to a specific part of the brain is likely to produce specific symptoms.
   b. the brain has many interconnected and interacting systems.
   c. cognitive disorders often co-occur, such as Alzheimer's syndrome and Capgras syndrome.
   d. damage to the amygdala will result in an inability to recognize impostors.

   ANS: D DIF: Difficult REF: What Do We Learn from Capgras Syndrome?
   OBJ: 2.2 MSC: Evaluating

7. Capgras syndrome teaches us many things, but is LEAST informative about which of the following?
   a. the function of the temporal lobe in memory
   b. the function of the amygdala in people without Capgras syndrome
   c. the function of the frontal lobe in schizophrenia
   d. the function of visual area V1

   ANS: D DIF: Difficult REF: What Do We Learn from Capgras Syndrome?

OBJ: 2.2 MSC: Evaluating

8. Capgras syndrome and other cognitive disorders are useful to consider because they
   a. provide information about normal cognitive functioning.
   b. highlight the importance of proper nutrition and health care.
   c. provide evidence that people with Capgras syndrome need medication.
   d. show that all brain damage is irreversible.

   ANS: A DIF: Difficult REF: What Do We Learn from Capgras Syndrome?
   OBJ: 2.2 MSC: Analyzing

9. Which of the following statements about Phineas Gage is FALSE?
   a. He had Capgras syndrome.
   b. A rod went through his face and head, removing part of his frontal lobe.
   c. His personality changed after his trauma.
   d. He was able to perform basic cognitive tasks (talking, remembering, etc.) after his trauma.

   ANS: A DIF: Moderate REF: The Study of the Brain
   OBJ: 2.2 MSC: Understanding

10. Damage to the brain can be caused in many ways, but in general the damage is referred to as a
    a. stroke.
    b. lesion.
    c. syndrome.
    d. problem.

    ANS: B DIF: Easy REF: Data from Neuropsychology
    OBJ: 2.2 MSC: Understanding

11. Research has suggested that, among its other functions, the amygdala serve as a(n)
    a. important relay station between the eye and occipital cortex.
    b. storage location for information received from the skin.
    c. "emotional evaluator" or threat detector.
    d. "index" for locating memories in the brain.

    ANS: C DIF: Easy REF: The Neural Basis for Capgras Syndrome
    OBJ: 2.4 MSC: Understanding

12. Mike has damage to his hindbrain. He is likely to experience problems with which of the following?
    a. rhythm of breathing, level of alertness, and posture
    b. complex thought and long-term memory
    c. planned motor activity
    d. perception and visual imagery

    ANS: A DIF: Easy REF: Hindbrain, Midbrain, Forebrain
    OBJ: 2.4 MSC: Applying

13. Lisa has recently suffered a brain injury. Her symptoms include deficits in coordination and interpretation of pain. Which structure is most likely damaged?
    a. primary motor area
    b. midbrain
    c. forebrain
    d. hindbrain

    ANS: B DIF: Moderate REF: Hindbrain, Midbrain, Forebrain
    OBJ: 2.4 MSC: Applying

14. The cerebral cortex makes up the surface of what brain structure?
    a. hindbrain
    b. midbrain
    c. thalamus
    d. forebrain

    ANS: D DIF: Easy REF: Hindbrain, Midbrain, Forebrain
    OBJ: 2.4 MSC: Remembering

15. Damage to the _____ is likely to cause problems with precise eye movements.
    a. forebrain
    c. hindbrain

b. midbrain
d. amygdala

ANS: B DIF: Moderate REF: Hindbrain, Midbrain, Forebrain
OBJ: 2.4 MSC: Understanding

16. Which of the following is included in the limbic system?
a. thalamus
b. amygdala
c. cerebellum
d. hypothalamus

ANS: B DIF: Moderate REF: Subcortical Structures
OBJ: 2.4 MSC: Remembering

17. Commissures are
a. blood vessels that carry blood to all areas of the brain.
b. brain areas associated with various types of sensory information.
c. pockets of oxygen found throughout the brain.
d. thick bundles of fibers that allow communication between the brain's hemispheres.

ANS: D DIF: Easy REF: Subcortical Structures
OBJ: 2.4 MSC: Remembering

18. Most of the brain's structures are hidden deep underneath the _____, which is the outer, visible layer.
a. cerebellum
b. cortex
c. midbrain
d. hindbrain

ANS: B DIF: Easy REF: Hindbrain, Midbrain, Forebrain
OBJ: 2.3 MSC: Understanding

19. Which of the following structures is NOT visible when viewing an image of an intact brain?
a. occipital lobe
b. cortex
c. primary motor cortex
d. amygdala

ANS: D DIF: Moderate REF: Hindbrain, Midbrain, Forebrain
OBJ: 2.3 MSC: Analyzing

20. Which lobe or cortex is closest to someone's forehead?
a. frontal
b. parietal
c. occipital
d. temporal

ANS: A DIF: Moderate REF: Hindbrain, Midbrain, Forebrain
OBJ: 2.3 MSC: Analyzing

21. Which of the following statements about the association cortex is FALSE?
a. These areas of the brain are involved in higher-level sensory processing.
b. These areas contain specialized subregions.
c. There are association areas for both sensory and motor areas.
d. The visual association cortex is located in the subcortical parts of the brain.

ANS: D DIF: Difficult REF: The Cerebral Cortex
OBJ: 2.4 MSC: Understanding

22. We know that the amygdala is especially activated when someone is looking at an emotional scene. This result on its own does not allow us to make _____ statements.
a. causal
b. important
c. scientific
d. functional

ANS: A DIF: Moderate REF: The Power of Combining Techniques
OBJ: 2.4 | 2.7 MSC: Analyzing

23. Lindsie participated in an fMRI experiment. The researchers found high activity levels in visual areas when she was looking at a photograph and similar activity in many of those same areas when she was
a. sleeping.
b. imagining the scene shown in the photograph.

c. drawing the scene shown in the photograph.
d. speaking.

ANS: B DIF: Moderate REF: Localization of Function
OBJ: 2.6 | 2.7 MSC: Applying

24. When a photograph is shown in the right visual field, the signal will be sent to the _____ hemisphere.
a. right
b. left
c. visual
d. cortical

ANS: B DIF: Moderate REF: Hindbrain, Midbrain, Forebrain
OBJ: 2.5 MSC: Remembering

25. Kareena has undergone a split-brain procedure. Her doctor briefly presents the word "hammer" to only her left visual field and then asks her what she saw. Which set of responses is Kareena most likely to give?
a. She will say she doesn't know what word appeared, but she will be able to draw a picture of the object with her right hand.
b. She will say she doesn't know what word appeared, but she will be able to draw a picture of the object with her left hand.
c. She will say she doesn't know what word appeared, and she will not be able to identify the object using either hand.
d. She will say "hammer."

ANS: B DIF: Difficult REF: Lateralization
OBJ: 2.6 MSC: Applying

26. The corpus callosum serves what major function?
a. processing sensory information
b. long-term memory
c. communication between hemispheres
d. emotion

ANS: C DIF: Easy REF: Lateralization
OBJ: 2.5 | 2.6 MSC: Remembering

27. A patient might elect to have split-brain surgery, which involves
a. severing the corpus callosum.
b. removing the amygdala.
c. removing one hemisphere of the brain.
d. removing a section of the frontal lobe.

ANS: A DIF: Moderate REF: Lateralization
OBJ: 2.5 | 2.6 MSC: Remembering

28. The corpus callosum is a large
a. muscle.
b. neuron.
c. commissure.
d. damaged area of the brain.

ANS: C DIF: Moderate REF: Lateralization
OBJ: 2.5 MSC: Applying

29. Patients who have epilepsy often experience a decreased seizure frequency after a split-brain procedure. But these patients have also provided evidence for scientists. Specifically,
a. this procedure has led to the well-supported notion that someone can be "left-brained" or "right-brained."
b. research with these patients suggests that there is not significant localization of function in the brain.
c. research with these patients suggests that someone cannot live without an intact corpus callosum, indicating its importance in survival and functioning.
d. research with these patients has provided evidence for some degree of localization of function of the right and left hemispheres.

ANS: D DIF: Moderate REF: Lateralization
OBJ: 2.5 | 2.6 MSC: Analyzing

30. Transcranial magnetic stimulation (TMS) uses a strong magnetic pulse to

a. record the amount of glucose a specific brain region used during a cognitive task.
b. measure the blood flow using blood oxygenation level dependent (BOLD) signals.
c. produce a temporary disruption to the brain area, and thus brain function, where it is applied.
d. create a detailed "map" of the different brain areas.

ANS: C DIF: Moderate REF: Data from Neuroimaging
OBJ: 2.7 MSC: Understanding

31. Researchers using functional magnetic resonance imaging (fMRI) find activity in the fusiform face area (FFA) when participants view faces. This result on its own tells us that the FFA
a. is responsible for recognizing faces.
b. is necessary to recognize faces.
c. is activity correlated with recognizing faces.
d. has no role in recognizing faces.

ANS: C DIF: Difficult REF: Data from Neuroimaging
OBJ: 2.7 MSC: Evaluating

32. Magnetic resonance imaging (MRI) and functional MRI (fMRI)
a. are less useful than other types of neuroimaging for the study of brain function.
b. create three-dimensional representations of the brain's structure and function.
c. are useful only for studying features on the outer surface of the brain.
d. make self-report data unnecessary.

ANS: B DIF: Easy REF: Data from Neuroimaging
OBJ: 2.7 MSC: Understanding

33. A number of techniques have been developed that allow us to examine the activation of specifically defined brain areas. These techniques are called
a. fMRI.
b. neuroimaging techniques.
c. chronometric techniques.
d. psychometric assessment.

ANS: B DIF: Easy REF: Data from Neuroimaging
OBJ: 2.7 MSC: Understanding

34. A CT or computerized axial tomography scan
a. can only be performed on a cadaver.
b. uses X-rays to study the living brain's anatomy.
c. is primarily useful for measuring blood flow in the brain.
d. can detect the activity taking place in different brain areas in real time.

ANS: B DIF: Moderate REF: Data from Neuroimaging
OBJ: 2.7 MSC: Analyzing

35. Positron emission tomography (PET) scans show
a. continuous details of brain anatomy.
b. what a participant is thinking the moment the scan is taken.
c. brain areas that are currently consuming a particularly high level of glucose.
d. whether a participant is learning something new or remembering prior learning.

ANS: C DIF: Moderate REF: Data from Neuroimaging
OBJ: 2.7 MSC: Analyzing

36. Doctors suspect that Paolo has a tumor in his brain, and they hope to learn the exact position of the tumor. For this purpose, they are likely to rely on
a. TMS.
b. fMRI.
c. EEG.
d. MRI.

ANS: D DIF: Moderate REF: Data from Neuroimaging
OBJ: 2.7 MSC: Applying

37. The electroencephalogram (EEG) provides an estimate of brain activity by measuring

a. glucose consumption.
b. blood flow.
c. neurotransmitter release.
d. electrical signals recorded at the surface of the scalp.

ANS: D DIF: Easy REF: Data from Electrical Recording
OBJ: 2.7 MSC: Remembering

38. Researchers have used fMRI to investigate activation in the FFA and the parahippocampal place area (PPA). When participants are shown a picture of a face to one eye and a picture of a house to the other eye (producing binocular rivalry), we expect to see
a. no increase in activation in either the FFA or the PPA relative to a baseline level of activation.
b. equal activation in the FFA and the PPA.
c. activation only in the brain region linked to the picture in the dominant eye (e.g., if a picture of a face is presented to the dominant eye, then only the FFA will show increased activation).
d. an increase in activation in the FFA when the participant is consciously aware of the face and similarly increased activation in the PPA when the participant is consciously aware of the house.

ANS: D DIF: Difficult REF: The Power of Combining Techniques
OBJ: 2.7 MSC: Analyzing

39. Dr. Hout has fMRI evidence that the FFA is especially activated when people are engaged in a face recognition task. As a plausible next research step, she might think about
a. combining this result with other evidence before trying to make any cause-and-effect claims.
b. confirming the result by measuring activation levels with MRI or a CT scan.
c. confirming the exact location of the activation through EEG recording.
d. combining this result with other evidence examining FFA activation levels when someone is listening to music.

ANS: A DIF: Moderate REF: The Power of Combining Techniques
OBJ: 2.7 MSC: Applying

40. The primary motor projection area is located
a. in the cerebellum.
b. in the occipital cortex.
c. toward the rear of the frontal lobe.
d. in the midbrain.

ANS: C DIF: Easy REF: Motor Areas OBJ: 2.8
MSC: Remembering

41. If a researcher applies mild electric current to a specific area of an animal's right hemisphere primary motor projection area, which of the following is likely to happen?
a. a specific movement of a body part on the right side of the animal
b. a specific movement of a body part on the left side of the animal
c. a chaotic movement of the entire animal
d. no movement at all

ANS: B DIF: Moderate REF: Motor Areas OBJ: 2.8
MSC: Applying

42. The auditory cortex follows the principle of contralateral control. Thus, the
a. right temporal lobe receives most of its input from the left ear.
b. right temporal lobe receives most of its input from the right ear.
c. right temporal lobe receives equal input from both ears.
d. information received by the right temporal lobe depends on whether the listener favors his or her right or left ear.

ANS: A DIF: Easy REF: Sensory Areas
OBJ: 2.9 MSC: Applying

43. The primary motor projection area forms a "map" of the body. The amount of cortical tissue dedicated to different parts of the body correlates with
a. the size of the body part.

b. the distance of the body part from the brain.
c. the precision of movement for the body part.
d. The cortical area does not vary; it is the same for all body parts.

ANS: C DIF: Moderate REF: Sensory Areas
OBJ: 2.8 MSC: Analyzing

44. Olivia has sustained damage to the prefrontal area. As a result, she is most likely to have
a. neglect syndrome.
b. a variety of problems, including problems planning and implementing strategies.
c. primarily memory problems.
d. primarily language problems.

ANS: B DIF: Moderate REF: Association Areas
OBJ: 2.9 MSC: Applying

45. A patient with visual agnosia will probably show an inability to
a. remember a list of words heard 1 hour before.
b. detect brief flashes of light.
c. recall the color of familiar objects (e.g., that stop signs are red).
d. identify common objects in plain view.

ANS: D DIF: Easy REF: Association Areas
OBJ: 2.9 MSC: Applying

46. Ben and Quinn both have lesions in their left frontal lobes. Ben has trouble producing speech; Quinn has difficulties comprehending speech. Both Ben and Quinn are likely to receive a diagnosis of
a. neglect syndrome.
b. apraxia.
c. agnosia.
d. aphasia.

ANS: D DIF: Moderate REF: Association Areas
OBJ: 2.9 MSC: Applying

47. Motor and sensory cortices combined make up what portion of the cerebral cortex?
a. less than 5%
b. roughly 25%
c. just over 50%
d. nearly 85%

ANS: B DIF: Moderate REF: Association Areas
OBJ: 2.9 MSC: Remembering

48. Communication between neurons is _____, while communication within a neuron is _____.
a. electrical; chemical
b. chemical; electrical
c. electrical; neurotransmitter-based
d. simple; difficult

ANS: B DIF: Easy REF: Neurons and Glia
OBJ: 2.10 MSC: Understanding

49. A neuron is
a. a group of cells specialized for a particular type of information storage.
b. one of the fibers connecting the eye to the visual cortex.
c. one of the individual cells within the nervous system.
d. a region within the brain dedicated to a single function.

ANS: C DIF: Easy REF: Neurons and Glia
OBJ: 2.10 MSC: Remembering

50. Which of the following is NOT a primary function of glial cells?
a. provide support for neurons
b. facilitate the development of the nervous system
c. release neurotransmitters
d. clean up waste

ANS: C DIF: Moderate REF: Neurons and Glia

OBJ: 2.10 MSC: Evaluating

51. When a neuron fires, the portion of the cell that carries the signal to the presynaptic membrane is called the
    a. dendrite.
    b. cell body.
    c. axon.
    d. nucleus.

    ANS: C DIF: Moderate REF: Neurons and Glia
    OBJ: 2.10 MSC: Understanding

52. The _____ contains the metabolic machinery necessary to keep a neuron alive and functioning properly.
    a. cell body
    b. dendrite
    c. axon
    d. myelin

    ANS: A DIF: Easy REF: Neurons and Glia
    OBJ: 2.10 MSC: Remembering

53. Complete the analogy: Incoming is to outgoing as _____ is to _____.
    a. dendrite; cell body
    b. dendrite; axon
    c. axon; cell body
    d. cell body; axon

    ANS: B DIF: Moderate REF: Neurons and Glia
    OBJ: 2.10 MSC: Analyzing

54. Which of the following statements about neurons is FALSE?
    a. Neurons communicate with each other through chemical signals.
    b. A neuron can have many dendrites.
    c. Neurons throughout the body have a reasonably consistent shape.
    d. The axon of one neuron can communicate across the synapse with the dendrite of another neuron.

    ANS: C DIF: Moderate REF: Neurons and Glia
    OBJ: 2.10 MSC: Analyzing

55. Neuron A communicates with neuron B. The _____ of neuron A releases a signal that activates a(n) _____ of neuron B.
    a. cell body; soma
    b. axon terminal; axon terminal
    c. axon terminal; dendrite
    d. soma; dendrite

    ANS: C DIF: Moderate REF: Neurons and Glia
    OBJ: 2.10 MSC: Understanding

56. A synapse is
    a. a message sent from one neuron to another.
    b. part of a neuron's cell body.
    c. made up of the end of one neuron's axon, another neuron's receiving membrane, and the gap between these two.
    d. the name of the electric signal that occurs when a cell reaches its threshold.

    ANS: C DIF: Easy REF: The Synapse OBJ: 2.10
    MSC: Remembering

57. A neuron's initial, internal response to an incoming signal can vary in size. The ultimate, external response of the cell, however, does not vary in size. If the signal is sent, it is always of the same magnitude. This effect is called the
    a. whole-firing potential.
    b. all-or-none law.
    c. uniform response law.
    d. threshold potential.

    ANS: B DIF: Easy REF: The Synapse OBJ: 2.10
    MSC: Understanding

58. Neuron X sends a signal that is picked up and processed by Neuron Y. This between-cell communication generally occurs via
    a. chemical transmission between Neuron X and Neuron Y.

b. electrical stimulation of Neuron Y by Neuron X.
c. fibers that connect Neuron X and Neuron Y.
d. the diffusion of water between Neuron X and Neuron Y.

ANS: A DIF: Moderate REF: The Synapse OBJ: 2.11
MSC: Applying

59. One of the disadvantages of synaptic communication is that it takes time for chemicals to pass from one side of the synapse to another. Which of the following is a benefit of synaptic transmission?
a. It allows a single neuron to compare multiple signals from many sources.
b. Chemicals in our food can be broken down to influence between-cell communication.
c. It is simple, because each neuron can only receive signals from a single neuron.
d. Chemicals are more reliable than electrical energy.

ANS: A DIF: Difficult REF: The Synapse OBJ: 2.11
MSC: Analyzing

60. At the synapse, a neurotransmitter is released from a _____ and is likely to bind to a _____.
a. vesicle; presynaptic membrane
b. vesicle; receptor site
c. receptor; presynaptic membrane
d. receptor; vesicle

ANS: B DIF: Moderate REF: The Synapse OBJ: 2.11
MSC: Understanding

61. A primary function of the thalamus is to
a. produce emotional experiences.
b. regulate the flow of sensory information.
c. maintain a constant body temperature.
d. regulate eating behaviors.

ANS: B DIF: Moderate REF: Subcortical Structures
OBJ: 2.4 MSC: Remembering

62. Compared to computerized axial tomography (CT scans), electroencephalogram (EEG)
a. detects changes in blood flow.
b. has greater ability to detect brain lesions.
c. offers a moment-by-moment recording of brain activity.
d. assists in understanding how anatomical structures function.

ANS: C DIF: Moderate REF: Data from Electrical Recording
OBJ: 2.7 MSC: Remembering

63. A child in preschool is touching a bumpy surface. Tactile signals associated with this activity are received by the _____ lobe.
a. frontal
b. parietal
c. occipital
d. temporal

ANS: B DIF: Easy REF: Sensory Areas
OBJ: 2.7 MSC: Understanding

64. Damage to Broca's area in the brain may result in which of the following?
a. detailed dreams
b. disruption of language use
c. memory difficulties
d. visuospatial difficulties

ANS: B DIF: Difficult REF: Data from Neuropsychology
OBJ: 2.2 MSC: Analyzing

65. The largest area of the hindbrain is the _____, which plays a role in _____.
a. pons; respiration
b. thalamus; processing sensory impulses
c. medulla; maintaining a consistent heart rate
d. cerebellum; coordinating physical activity

ANS: D DIF: Difficult REF: Hindbrain, Midbrain, Forebrain
OBJ: 2.3 MSC: Analyzing

66. Visualizing your bedroom results in
    a. activation in the occipital cortex.
    b. decreased activation of the cingulate cortex.
    c. activation of a single neuron.
    d. increased activation of somatosensory regions.

    ANS: A DIF: Easy REF: Coding OBJ: 2.9
    MSC: Understanding

67. All of the following are true of primary projection areas EXCEPT
    a. they play a key role in movement and sensation.
    b. the largest parts of the body correspond with the largest projection area.
    c. the primary motor projection area is located in the frontal lobe.
    d. the primary projection area for hearing is located in the temporal lobe.

    ANS: B DIF: Difficult REF: Association Areas
    OBJ: 2.8 MSC: Evaluating

ESSAY

1. Describe Capgras syndrome and one possible explanation (physiological or cognitive) for the disorder. What does this disorder tell us about the interactive nature of the brain's various parts?

   ANS:
   Answers will vary.

   DIF: Difficult REF: The Neural Basis for Capgras Syndrome
   OBJ: 2.1 MSC: Understanding

2. As it pertains to the development and testing of theories, what are the benefits of studying neuropsychology and neuroscience for cognitive psychologists?

   ANS:
   Answers will vary.

   DIF: Moderate REF: The Power of Combining Techniques
   OBJ: 2.2 | 2.7 MSC: Evaluating

3. Is it fair to say that someone is "left-brained" or "right-brained"? Why or why not? Give examples to support your answer.

   ANS:
   Answers will vary.

   DIF: Moderate REF: Lateralization OBJ: 2.3 | 2.4 | 2.6
   MSC: Evaluating

4. Explain the relevance of studying patients who undergo split-brain procedures in psychology by answering the following questions.
   a. What area of the brain is lesioned in these patients? Why do these patients elect to have this surgery?
   b. How does behavior change after the surgery? How does it stay the same?
   c. What have we learned about the brain and behavior as a result of this procedure?

   ANS:
   Answers will vary.

   DIF: Difficult REF: Lateralization OBJ: 2.5 | 2.6
   MSC: Analyzing

5. Compare and contrast the use of fMRI and TMS and describe their applications in psychology. What sort of information does each approach give us? Which technique can be used to make causal statements about the link between brain activity and behavior?

   ANS:
   Answers will vary.

   DIF: Difficult REF: Data from Neuroimaging OBJ: 2.7
   MSC: Evaluating

6. Evaluate the use of fMRI to gather information about activity in the brain. What are the advantages and shortcomings of this approach?

   ANS:
   Answers will vary.

   DIF: Moderate REF: Association Areas OBJ: 2.7
   MSC: Evaluating

7. Judy has sustained damage to her visual association area, but not her primary association area. Describe the behavioral changes you would expect to see, given this trauma. What behaviors or mental processes would not be affected?

   ANS:
   Answers will vary.

   DIF: Moderate REF: Association Areas OBJ: 2.8
   MSC: Applying

8. Describe the relationship between the cortical area in the primary somatosensory cortex and the corresponding surface area of the body part. Name two parts of the body that have large cortical representations and two that have small representations.

   ANS:
   Answers will vary.

   DIF: Moderate REF: Association Areas OBJ: 2.9
   MSC: Understanding

9. Explain how a signal would be processed and sent from one neuron to another. Include in your answer a description of the relevant components in the cell and synaptic activity.

   ANS:
   Answers will vary.

   DIF: Moderate REF: Neurons and Glia OBJ: 2.10 | 2.11
   MSC: Applying

10. Many neurons communicate with Neuron X. Describe the process by which Neuron X determines if a message will be sent to Neuron Y. If a message is sent, what possible effects will this signal have on the firing of Neuron Y?

    ANS:
    Answers will vary.

    DIF: Difficult REF: Neurons and Glia OBJ: 2.11
    MSC: Applying

11. What regions of the brain show similar activation during related perception and imagery tasks? What regions differ in activation during related perception and imagery tasks?

ANS:
Answers will vary.

DIF: Difficult REF: Localization of Function OBJ: 2.6
MSC: Analyzing