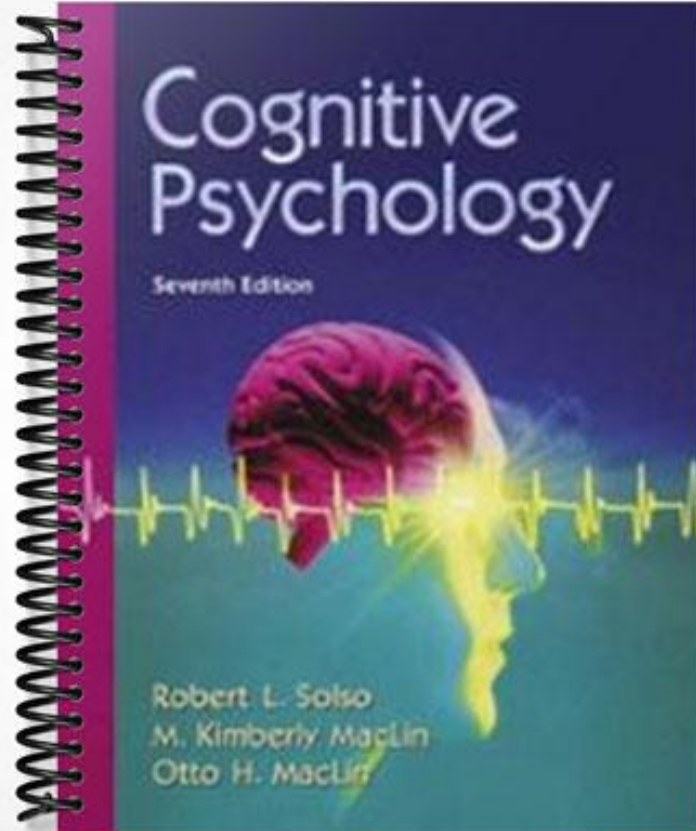


**TEST BANK**



# Chapter 2 Cognitive Neuroscience

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## Multiple Choice Questions

1) "Mind" in the context of cognitive psychology is:

- A) a PDP system
- B) the actions that occur within the brain
- C) the same as the brain
- D) the mental aspect of the soul
- E) nonexistent

Answer: B

*Page Ref: 35*

2) How is MEG different from other neurological sensing techniques?

- A) MEG provides the most accurate resolution of nerve cell activity
- B) MEG is much less expensive to use
- C) MEG is much more expensive to use
- D) MEG is very simple to use
- E) MEG is no different from the other techniques

Answer: A

*Page Ref: 53*

3) The areas of the brain related to functions such as sensory feelings, motor function, and vision are:

- A) constantly changing
- B) generally agreed upon by scientists
- C) unable to be accurately studied
- D) irrelevant to cognitive neuroscience
- E) subject to personal opinion

Answer: B

*Page Ref: 36*

4) Transcranial magnetic stimulation (TMS) is used with EEG or MEG to:

- A) evaluate whether the EEG or MEG worked
- B) simulate strokes to see their effects
- C) evaluate cortical activity
- D) simulate realistic problem solving experiences
- E) evaluate the effects of changes in brain activity on perceiving and thinking

Answer: E

*Page Ref: 38*

5) Cognitive neuroscience originated in the 1970s by:

- A) Michael Gazzaniga
- B) George Miller
- C) James Watson
- D) Endel Tulving
- E) William James

Answer: A

*Page Ref: 35*

6) The basic building blocks of the central nervous system (CNS) are:

- A) neutrons
- B) protons
- C) neurons
- D) electrons
- E) phonemes

Answer: C

*Page Ref: 38*

7) Cognitive neuroscience is defined as:

- A) the science that combines imaging technology and cognition
- B) a discipline that combines cognitive psychology and neuroscience
- C) a new science that involves neurology and neuropathology
- D) the study of neurons, their function, and morphology
- E) the study of neutrons and cognitive psychology

Answer: B

*Page Ref: 36*

8) The reasons psychologists use information from the neurosciences include:

- A) the need to find physical evidence for theories of the mind
- B) the development of techniques (e.g., CAT scans) which allows for a better look at the brain
- C) the need to find correlates between brain pathology and behavior
- D) the work of computer scientists who are attempting to simulate human cognition
- E) all of the above

Answer: E

*Page Ref: 37*

- 9) A perceptron is:
- A) the smallest unit of a neuron
  - B) a noninvasive scanning technique
  - C) neural net architectures
  - D) a chess playing computer
  - E) a microchip used for artificial vision

Answer: C

*Page Ref: 38*

- 10) Techniques that allow scientists to peer into the human brain include:
- A) PET
  - B) CAT
  - C) MRI
  - D) EEG
  - E) all of the above

Answer: E

*Page Ref: 38*

- 11) The central nervous system (CNS) consists of:
- A) the brain and eyes
  - B) the cerebellum and Broca's Area
  - C) the spinal cord and brain
  - D) the cerebellum and the brain stem
  - E) the corpus callosum and the brain stem

Answer: C

*Page Ref: 38*

- 12) The earliest writings of the brain may be traced to:
- A) the Middle Ages
  - B) the ancient Greeks
  - C) the ancient Egyptians
  - D) the ancient Polynesians
  - E) the Han Dynasty of China

Answer: C

*Page Ref: 39*

13 ) Some estimates of the number of neurons in the human brain place the number at more than:

- A) 100,000
- B) 10 million
- C) 1 billion
- D) 100 billion
- E) 1 trillion

Answer: D

*Page Ref: 40*

14 ) Each cubic inch of the human cortex contains:

- A) about 100 yards of nerve fibers
- B) about 10 miles of nerve fibers
- C) about 10 meters of nerve fibers
- D) about 100 miles of nerve fibers
- E) about 10,000 miles of nerve fibers

Answer: E

*Page Ref: 38*

15 ) There are \_\_\_\_\_ different types of neurons.

- A) 3
- B) 7
- C) about 100
- D) about 1000
- E) about 10,000

Answer: D

*Page Ref: 40*

16 ) Which of the following is not a region of the neuron?

- A) the receptor
- B) the axon
- C) the dendrites
- D) presynaptic terminals
- E) all of the above are regions of a neuron

Answer: A

*Page Ref: 40*

17) The \_\_\_\_\_ gather(s) neural impulses from other neurons.

- A) dendrites
- B) synapses
- C) the myelin sheath
- D) neurotransmitters
- E) axon

Answer: A

*Page Ref: 40*

18) An axon is:

- A) part of a neuron
- B) a long tubular transmitting pathway
- C) a carrier of neural signals
- D) sometimes wrapped in a myelin sheath
- E) all of the above

Answer: E

*Page Ref: 40*

19) The junctures between neurons are called:

- A) myelin sheath
- B) terminal buttons
- C) axons
- D) synapses
- E) nodes

Answer: D

*Page Ref: 40*

20) The fatty substance surrounding large axons is called:

- A) the myelin sheath
- B) terminal buttons
- C) axons
- D) synapses
- E) the ranvier sheath

Answer: A

*Page Ref: 40*

21 ) How many different chemical substances are known or suspected to function as neurotransmitters?

- A) 6
- B) 16
- C) 26
- D) 46
- E) 60

Answer: E

*Page Ref: 40*

22 ) At the synapse neurotransmission is achieved by means of:

- A) a direct physical link between neurons
- B) a chemical neurotransmitter which changes the polarity of the receiving dendrite
- C) a change in the organic composition of the axon
- D) a partial reduction of the carbon 12 between neurons
- E) electrical signals which arc across the synapse

Answer: B

*Page Ref: 40*

23 ) What Egyptologist identified the hieroglyphic character for the brain?

- A) Edwin Smith
- B) Donald Hebb
- C) James Breasted
- D) Pierre Flourens
- E) King Tut

Answer: C

*Page Ref: 60*

24 ) Neuronal firing can be measured using:

- A) transitory potentials
- B) event-related potential recordings
- C) chronic electrode implants
- D) impulse monitors
- E) they cannot be measured accurately

Answer: B

*Page Ref: 41*

25 ) Two general classes of neurotransmitters have been identified. They are:

- A) inhibitory and excitatory types
- B) emotional and non-emotional types
- C) organic and inorganic types
- D) Alpha and Beta types
- E) active and inert types

Answer: A

*Page Ref: 42*

26 ) The speed of neurotransmission along the axon is:

- A) a good measure of human intelligence
- B) related to the size of the neuron
- C) slow for large neurons and fast for small neurons
- D) unmeasurable
- E) related to the strength the impulse

Answer: B

*Page Ref: 42*

27 ) A parallel processing model of brain functioning allows for:

- A) limbic intervention
- B) processing of higher order information and sensory information at the same time
- C) the simultaneous processing of information in both hemispheres
- D) alternative pathways to be used if part of the pathways are destroyed
- E) all of the above

Answer: D

*Page Ref: 40*

28 ) If part of the pathways in the brain are destroyed:

- A) the system breaks down
- B) alternative pathways take over some functions
- C) motor functions break down, but speech is usually spared
- D) vision is usually the first attribute to show a deficit
- E) they are usually able to grow back

Answer: B

*Page Ref: 41*



- 29 ) Knowledge is thought to:
- A) be localized to a single neuron
  - B) be spread over clusters of neurons
  - C) be distributed throughout the brain
  - D) involve tens of thousands of neurons in the parietal lobe
  - E) exist independent of the brain

Answer: C

*Page Ref: 42*

- 30 ) Phrenologists believed that bumps on the head represented areas pertaining to:
- A) personal character, aptitude, and emotions
  - B) tumors
  - C) memory loss
  - D) advanced brain activity
  - E) an individual's astrological sign

Answer: A

*Page Ref: 43*

- 31 ) The idea of "localization" as applied to the brain suggests that:
- A) the brain operates like a government bureau
  - B) blood flow is concentrated in a few places when thinking takes place
  - C) some functions (e.g., language processing) are associated with specific areas
  - D) all of the above
  - E) none of the above

Answer: C

*Page Ref: 44*

- 32 ) The current view of the localization vs. holistic theory of the brain is that:
- A) the brain is divided into well-defined areas which carry out specific functions
  - B) no single function is isolated
  - C) some mental attributes are localized but many functions are distributed
  - D) it is presently impossible to make an intelligent conclusion as there are vast individual differences in the way brains function
  - E) none of the above

Answer: C

*Page Ref: 44*

- 33 ) The cerebral cortex is:
- A) divided into two hemispheres
  - B) about 1.5 to 5 millimeters thick
  - C) gray
  - D) in the forebrain
  - E) all of the above

Answer: E

*Page Ref: 45*

- 34 ) The \_\_\_\_\_ helps to give the brain a "walnut" appearance.
- A) sulci
  - B) gyri
  - C) fissures
  - D) folds
  - E) all of the above

Answer: E

*Page Ref: 45*

- 35 ) The surface of the brain (if spread out) would measure about:
- A) 324 square inches
  - B) 745 square inches
  - C) 1032 square inches
  - D) 5690 square inches
  - E) 10,000 square inches

Answer: A

*Page Ref: 45*

- 36 ) The motor side of the left hemisphere controls:
- A) movements on the left side of the body
  - B) movements on the right side of the body
  - C) movements for the entire body
  - D) hand and arm movements on the right side and leg and feet movements on the left side of the body
  - E) movements below the waist

Answer: B

*Page Ref: 46*

- 37) When we say that "information is processed in the brain contralaterally" we mean that:
- A) sensory information from one side of the body is initially processed by the opposite cerebral hemisphere
  - B) left-handed people process sensory information in the opposite cerebral hemisphere that right-handed people do
  - C) one hemisphere processes one type of information; the other, another type of information
  - D) sensory information is processed in one hemisphere, and motor information is processed in the other hemisphere
  - E) all of the above

Answer: A

*Page Ref: 46*

- 38) The four major lobes of each cerebral hemisphere are:
- A) frontal, posterior, anterior, and occipital
  - B) temporal, frontal, anterior, and somasthetic
  - C) parietal, language, motor, and occipital
  - D) sensory, motor, visual, and associative
  - E) frontal, temporal, parietal, and occipital

Answer: E

*Page Ref: 46*

- 39) In humans, the motor cortex:
- A) is located below the visual cortex
  - B) is not ipsilateral
  - C) is divided equally in all areas devoted to motor sensory activities
  - D) has more area devoted to hand movement
  - E) has less area devoted to tongue movement

Answer: D

*Page Ref: 46*

- 40) Wernicke's area of the brain seems to involve:
- A) language production
  - B) imagery
  - C) thinking and problem solving
  - D) language comprehension
  - E) control of fine motor movements

Answer: D

*Page Ref: 48*

41 ) One of the earliest scientists to recognize that some brain functions operated in parallel was:

- A) Wernicke
- B) Broca
- C) Newell
- D) McClelland
- E) Lashley

Answer: A

*Page Ref: 47*

42 ) Support for the notion that the nervous system is made up of discrete elements, or neurons, was found by:

- A) Lashley
- B) Solso & Short
- C) Newell & Simon
- D) Ramon y Cajal
- E) Wernicke & Broca

Answer: D

*Page Ref: 48*

43 ) By studying the behavior of rats, Karl Lashley discovered that learning was:

- A) confined to only a few, well-defined neurons
- B) highly dependent on emotions
- C) not confined to specific neurons
- D) a function of the number of times a rat ran down a maze and the magnitude of the reward
- E) independent of the quality of the reward

Answer: C

*Page Ref: 49*

44 ) The theory of mass action holds that:

- A) memories seem to be distributed throughout the brain
- B) learning is confined to a local region of the brain
- C) learning is more effective if done in groups
- D) learning and memory are subject to variations in blood flow
- E) memories are located in clusters based on their associations with other memories

Answer: A

*Page Ref: 50*

45 ) According to Lashley the brain operates:

- A) independently from the spine
- B) in a compartmentalized manner
- C) sequentially
- D) faster than some computers
- E) holistically

Answer: E

*Page Ref: 50*

46 ) Damage to the brain:

- A) always leads to a decrease in abilities
- B) leads to a decrease of abilities in the case of motor performance
- C) is always devastating to speech if in the left hemisphere
- D) does not always lead to a diminution of functions
- E) is always more handicapping when it occurs at an early age

Answer: D

*Page Ref: 50*

47 ) It is now possible with MRI and fMRI, to capture images in as little as:

- A) 30 milliseconds
- B) 30 seconds
- C) 60 milliseconds
- D) 60 seconds
- E) 3 minutes

Answer: A

*Page Ref: 52*

48 ) What questions can MEG answer?

- A) How big is each part of the brain?
- B) What color is the brain?
- C) Why was the use of a CT scan ineffective?
- D) Which part of the brain undertakes different tasks?
- E) How evolved is the brain?

Answer: D

*Page Ref: 53*

49 ) Electroencephalograph (EEG) records electrical signals from the brain via electrodes placed on the:

- A) wrists
- B) ear lobes
- C) neck
- D) scalp
- E) face

Answer: D

*Page Ref: 52*

50 ) CAT scans:

- A) are similar to PET scans in that they both use radioactive particles introduced into the blood stream
- B) emit less x-rays than PET scans
- C) are another term for PET scans
- D) are different from PET scans because CAT scans use x-rays
- E) none of the above

Answer: D

*Page Ref: 53*

51 ) The four stages in conducting an experiment using PET scans (Peterson et al., 1988) includes all but:

- A) a resting stage
- B) the appearance of a word on a screen
- C) the reading of the word by the research participant
- D) the spelling of the word
- E) the production of each word

Answer: D

*Page Ref: 54*

52 ) PET scans of experienced computer game players shows that their brains:

- A) use less energy than a novice
- B) use more energy than a novice
- C) use about the same amount of energy as a novice
- D) use less energy in the left hemisphere than a novice
- E) use more energy than a novice in certain areas, but about the same in others

Answer: A

*Page Ref: 55*

- 53 ) MANSCAN is a:
- A) faster version of a PET scan
  - B) system of imagining using x-ray transmission
  - C) gender-analysis computer program
  - D) device used in conjunction with MRI
  - E) company that makes Scantrons

Answer: D

*Page Ref: 52*

- 54 ) The corpus callosum:
- A) connects the right and left hemispheres
  - B) is a massive bundle of nerves
  - C) is sometimes cut to reduce the symptoms of epilepsy
  - D) if cut, "traps" information on either side of the hemispheres
  - E) all of the above

Answer: E

*Page Ref: 61*

- 55 ) Commissurotomized patients were studied by:
- A) Karl Lashley
  - B) Steven Petersen
  - C) Paul Broca
  - D) Rumelhart and McClelland
  - E) Roger Sperry

Answer: E

*Page Ref: 62*

- 56 ) Studies on commissurotomized patients indicate that the left side of the brain is involved in all but which of the following cognitive process:
- A) language
  - B) conceptualization
  - C) spatial tasks
  - D) analysis
  - E) classification

Answer: C

*Page Ref: 62*

57) Studies on commissurotomy patients indicate that the right side of the brain is involved in:

- A) spelling
- B) face recognition
- C) performing mathematics
- D) speech analysis
- E) all of the above

Answer: B

Page Ref: 62

58) Visual information connected to the right hemisphere is received from \_\_\_\_\_.

- A) the right side of the retina
- B) the left side of the retina
- C) right side of the right eye and the left side of the left eye
- D) both sides of the retina
- E) none of the above

Answer: A

Page Ref: 62

59) Which of the following is NOT true of chimeric faces?

- A) they are always recognized as female when flashed at high speeds
- B) they are half man and half woman
- C) they are used in lateralization studies
- D) they are used in studies with split-brain patients
- E) they are used to reveal the independence of the two hemispheres

Answer: A

Page Ref: 64

60) According to Corballis (1989):

- A) humans evolved right-handedness in the use of tools
- B) humans evolved left-hemisphere mechanisms for language
- C) language use began 2 to 3 millions years ago
- D) the evolution of hemisphere specialization may be associated with the ability to create new associations
- E) all of the above

Answer: E

Page Ref: 65



61 ) The left hemisphere is primarily responsible for:

- A) language and verbal processing
- B) music and nonverbal memory
- C) tactile recognition
- D) spatial processing
- E) face processing

Answer: A

*Page Ref: 67*

62 ) The right hemisphere is primarily responsible for:

- A) complex, voluntary movement
- B) language and verbal processing
- C) spatial processing
- D) verbal memory
- E) surrealistic art

Answer: C

*Page Ref: 67*

63 ) The cerebellum is involved with:

- A) basic life support functions such as heart rate, breathing and blood pressure
- B) control of motivation and emotional processes
- C) speech production and speech comprehension
- D) planning and coordination of complex motor skills
- E) eating behavior

Answer: D

*Page Ref: 45*

64 ) Within the hindbrain, basic life support functions such as heart rate, breathing, and blood pressure are associated with:

- A) the cerebellum
- B) the medulla
- C) the reticular formation
- D) the hippocampus
- E) the thalamus

Answer: B

*Page Ref: 53*

65) The thalamus:

- A) relays sensory information to the cerebral cortex
- B) plays an important role in the regulation of eating, drinking, and sexual behavior
- C) has been linked to a variety of motivational and emotional behaviors
- D) is thought to be critically involved in the formation of memories
- E) controls the limbic system

Answer: A

Page Ref: 45

66) The pituitary gland is:

- A) relays information between the cerebral cortex and the cerebellum
- B) the master gland of the endocrine system
- C) controls thinking and sensing
- D) regulates temperature
- E) coordinates muscle movement

Answer: B

Page Ref: 45

## Essay Questions

1) Trace the history of the mind/body issue. Cite both philosophic and physiological sources.

- Answer:
- Physical world
  - Mental world
  - Distinction between mind and body is obvious but so is their interaction
  - Mind—things done by the brain
  - Physical world → laws and objects → brain → body
  - Psychological world → laws and thoughts → cognition → mind

Page Ref: 39

2) How have recent discoveries in brain sciences helped cognitive psychology understand more about the human mind?

- Answer:
- Development of sophisticated equipment
  - Increased understanding of brain pathology and effects on behavior
  - Neural network approaches

Page Ref: 38

3) Identify and discuss neurophysiological monitoring techniques.

- Answer:
- PET
  - CAT
  - MRI
  - EEG

Page Ref: 38

4) Sketch and label the neuron.

Answer: • See figure in book

*Page Ref: 39*

5) Recount the development of the localization of the brain to the concept of mass action. Be sure to identify the principle characters in this debate.

Answer: • Some functions are localized to specific areas of the brain

• Phrenologists claimed to locate many attributes to certain areas of the head/brain

• Pierre Flourens thought this was nonsense and studied the effects of surgery on behavior

• Motor and sensory functions are not localized to specific regions—but also distributed

• Higher-order cognitive processes are distributed throughout the brain

*Page Ref: 44*

6) Discuss the "two hemispheres—two functions" proposition. What support has been gathered in this area?

Answer: • Called contralaterality

• Tumors and excision in one hemisphere or the other produced different effects on behavior

• Severed corpus callosum demonstrated functional asymmetry

• Split brain research—Roger Sperry

• Visual field, optic chiasm, opposite hemisphere

• Cognitive studies with intact subjects—use of chimeric faces

• See table in book for a summary of left and right hemisphere functions

*Page Ref: 61*

7) How does cognitive psychology fit into the investigation of the brain?

Answer: • Efforts to understand the human mind better

• Aids in models of human information processing

• Knowledge of brain structures and functioning (i.e., neural networks) aids in cognitive psychology's model building

*Page Ref: 35*

8) What ecological advantage would exist for the division of the retinal image into separate visual fields and separate cerebral hemispheres?

Answer: • Laterality developed 2–3 million years ago and set the stage for the development of more complex functions

• Corballis—evolution of hemisphere specialization may be associated with flexibility of thought

*Page Ref: 65*

9) Given the results of Haier's PET study of game playing, how can the consumption of oxygen and blood in the brain still be used as an indicator of cognitive processes?

Answer: • Learning seems to be a function of greater efficiency not greater effort

*Page Ref: 57*

10) Many lateralization studies select right-handed males. Why would this be so? Should a psychology of hemispherical specialization be based on right-handed males?

Answer:

- Males tend to show more clear distinctions of lateralization and thus are easier to study
- Various opinions will be expressed regarding whether the research should be solely based on right-handed males

*Page Ref: 60*