

STUDY GUIDE – ANSWERS

7B: Thinking, Problem-Solving, Creativity, and Language

Thinking

1. thinking; the mental activities associated with thinking, knowing, remembering, and communicating
2. cognitive psychologists
3. concepts; hierarchies
4. prototype; male; females
5. problem solving
6. trial and error
7. algorithms
8. heuristics
9. insight; frontal lobe; right temporal lobe
10. creativity; aptitude; is not
11. convergent; divergent

Creative people tend to have expertise, or a solid base of knowledge; imaginative thinking skills, which allow them to see things in new ways, to recognize patterns, and to make connections; intrinsic motivation, or the tendency to focus on the pleasure and challenge of their work; and a venturesome personality that tolerates ambiguity and risk and seeks new experiences. Creative people also have generally benefited from living in creative environments.

12. confirmation bias
13. verifies; refute
14. fixation; mental set
15. functional fixedness
16. representativeness heuristic
17. availability heuristic

Using these heuristics often prevents us from processing other relevant information; because we overlook this information, we make judgmental errors. Thus, in the text example, the representativeness heuristic leads people to overlook the fact that there are many more truck drivers than Ivy League classics professors and, as a result to wrongly conclude that the poetry reader is more likely to be an Ivy League classics professor ...

18. flying; terrorism
 - a. what our ancestral history has prepared us to fear.
 - b. what we cannot control.
 - c. what is immediate.
 - b. what is most readily available in memory.
19. overconfidence
20. adaptive; more; easier; more

22. belief perseverance
23. consider the opposite
24. quickly; adaptive; heuristics; learned associations
25. framing; may not

Language

1. phonemes; 40; hand shapes; movements
2. morphemes
3. grammar
4. semantics
5. syntax
6. 4; receptive language; productive language
7. babbling; 4; do not
8. do; consonant-vowel; bunching the tongue in the front of the mouth
9. 10; lost
10. one-word; 1
11. two-word; telegraphic; does
12. association; imitation; reinforcement
13. Noam Chomsky; language acquisition device; grammar; universal grammar
14. 1; word breaks; statistically
15. grammatical rules
16. critical period; accent; poorer; grammar
17. 7; never
18. experience; critical period

Thinking and Language

1. linguistic determinism; Benjamin Whorf
2. self
3. does
4. attention; bilingual advantage
5. immersed; aptitude
6. can; mental
7. studying effectively The relationship is probably a two-way one: the linguistic determinism hypothesis suggests that language helps shape thought; that words come into the language to express new ideas indicates that thought also shapes language.

Progress Test 1

Multiple-Choice Questions

1. c. is the answer. (p. 298)

- a. A prototype is the best example of a particular category, or concept.
- c. & d. Algorithms and heuristics are problem-solving strategies.
3. c. is the answer. (p. 299)
- a. There is no such thing as a “denoter.”
- b. & :d. Heuristics and algorithms are problem-solving strategies.
4. d. is the answer. It is a major obstacle to problem solving. (pp. 302-303)
- a. & b. These refer to belief bias and belief perseverance, respectively.
- c. This is trial-and-error problem solving.
5. c. is the answer. (p. 313)
6. a. is the answer. Babbling is not the imitation of adult speech since babbling infants produce phonemes from languages they have not heard and could not be imitating. (p. 315)
7. c. is the answer. Both involve failing to see a problem from a new perspective. (p. 303)
- a. & b. Algorithms and heuristics are problem-solving strategies.
- d. Insight is the sudden realization of a problem’s solution.
8. d. is the answer. (p. 301)
- a. The ability to think imaginatively and intelligence are both components of creativity.
- b. & c. Creativity, the capacity to produce ideas that are novel and valuable, requires a certain level of aptitude, but creative people do not necessarily score higher on intelligence tests than their less creative peers.
9. d. is the answer. (p. 319)
- a. This is Skinner’s position regarding language development.
- b. This is Chomsky’s position regarding language development.
- c. The linguistic determinism hypothesis is concerned with the content of thought, not intelligence.
10. c. is the answer. (p. 317)
- a. This is Skinner’s position.
- b. According to Chomsky, although the *ability* to acquire language is innate, the child can only acquire language in association with others.
- d. Cultural influences are an important example of the influence of learning on language development, an influence Chomsky fully accepts.
11. b. is the answer. Functional fixedness is the tendency to think of things only in terms of their usual functions. (p. 303)
- a. Mental set is the tendency to approach a problem in a particular way that worked previously.
- c. Framing refers to the way an issue is posed; this often influences our judgment.
- d. Belief perseverance is the tendency to cling to one’s
- d. is the answer. Heuristics are simple thinking strategies—such as playing chess defensively that are based on past successes in similar situations. (p. 300) a., b., & c. These are all algorithms.
- d. is the answer. Sultan suddenly arrived at a novel solution to his problem, thus displaying apparent insight. (p. 300)
- a. Sultan did not randomly try various strategies of reaching the fruit; he demonstrated the “light bulb” reaction that is the hallmark of insight.
- b. Heuristics are simple thinking strategies.
- c. Functional fixedness is an impediment to problem solving. Sultan obviously solved his problem.
14. c. is the answer. Your conclusion is based on sex stereotypes, that is, athletic ability and participation are for you more *representative* of boys. Your conclusion is by no means necessarily right, however, especially because the Smiths have four daughters and only one son! (p.304)
- a. The confirmation bias is the tendency to look for information that confirms one’s preconceptions.
- b. The availability heuristic involves judging the probability of an event in terms of how readily it comes to mind.
- d. Belief perseverance is the tendency to cling to beliefs, even when the evidence has shown that they are wrong.
15. d. is the answer. Compared with deaf children exposed to sign language from birth, those who learn to sign as teens have the same grammatical difficulties as do hearing adults trying to learn a second spoken language.(p. 318)
16. c. is the answer. Children are biologically prepared to learn language as they and their caregivers interact. (p. 318)
- a. This is Skinner’s position.
- b. No psychologist, including Chomsky, believes’ that language is entirely a product of biological maturation.
- d. Although language acquisition is not completely understood, research has shed sufficient light on it to render it less than a complete mystery.
- 17.a. is the answer. (p. 317)
- b. & c. This research is unrelated to infants’ ability to detect different pitches of voices or distinguish between male and female voices.
18. b. is the answer. The evidence that absence of a term for a color does not affect ability to perceive the color challenges the idea that language always shapes thought. (p. 320)
- a. & d. These findings are not relevant to the linguistic determinism hypothesis, which addresses the relationship between language and thought.
- c. This finding is in keeping with the linguistic determinism hypothesis.

19. c. is the answer. The generic pronoun *he* evidently tends, for both adults and children, to conjure up images of males. (p. 320)

Matching Items

- | | | |
|---------------|----------------|----------------|
| 1. f (p. 313) | 6. j (p. 306) | 11. b (p. 314) |
| 2. i (p. 311) | 7. k (p. 303) | 12. l (p. 301) |
| 3. a (p. 314) | 8. d (p. 300) | |
| 4. g (p. 314) | 9. h (p. 300) | |
| 5. e (p. 305) | 10. c (p. 303) | |

Progress Test 2

Multiple-Choice Questions

- a. is the answer. Reasoning in daily life is often distorted by our beliefs, which may lead us, for example, to accept conclusions that haven't been arrived at logically. (pp. 302-303) b., c., & d. These are just the opposite of what we tend to do.
- a. is the answer. (p. 313) .
b. Morphemes are the basic units of meaning.
c. & d. The text does not refer to basic units of grammar or semantics.
- b. is the answer. (p. 314)
a. Phonemes are the sounds in a word.
c. Such rules are known as semantics.
d. Such rules are the language's grammar, which would include its syntax as well as its semantics.
- d. is the answer. These are all basic principles of learning and, according to Skinner, explain language development. (p. 316)
- d. is the answer. Both are simple thinking strategies that allow us to make quick judgments. (pp. 304, 305)
a. Mental sets are obstacles to problem solving, in which the person tends to repeat solutions that have worked in the past and is unable to conceive of other possible solutions.
b. Belief bias is the tendency for preexisting beliefs to distort logical reasoning.
c. Algorithms are methodical strategies that guarantee a solution to a particular problem.
- b. is the answer. (p. 299)
a. & d. Phonemes and morphemes are units of sound and meaning in language, respectively.
c. Prototypes are the best examples of specific categories.
- d. is the answer. If we use the availability heuristic, we base judgments on the availability of information in our memories, and more vivid information is often the most readily available. (p. 305)
a. This would exemplify use of the trial-and-error approach to problem solving.
b. This would exemplify a mental set.
- b. is the answer. Because they involve the systematic examination of all possible solutions to a problem, algorithms guarantee that a solution will be found. (p. 299) a., c., & d. None of these methods guarantees that a problem's solution will be found.
- b. is the answer. The morpheme *-ed* changes the *meaning* of a regular verb to form its past tense; the phoneme *sh* is a unique *sound* in the English language. (pp. 313, 314) .
c. & d. Syntax, which specifies rules for combining words into grammatical sentences, is one aspect of the grammar of a language.
- d. is the answer. Chomsky believes that the inborn capacity for language acquisition must be activated by exposure to language. And, in fact, children raised in isolation will *not* begin to speak spontaneously. (p. 317)
- c. is the answer. (p. 316)
- c. is the answer. Although the child's utterances are only two words long, the words are placed in a sensible order. In English, for example, adjectives are placed before nouns. (p. 316)
a. & b. Syntax specifies rules for *combining* two or more units in speech.
d. There is no three-word stage.
- b. is the answer. (pp. 318,319)
- d. is the answer. (p. 322)
- d. is the answer. Semantic rules are directly concerned with the derivation of meaning from morphemes- words, and sentences. (p. 314)
a. Syntax is the set of rules for a language that permits the combination of words into sentences.
b. Grammar is the overall system of rules for using a language and, as such, includes syntax as well as semantics.
c. Phonemic structure concerns the basic sounds, or phonemes, of a language.
- b. is the answer. (p. 321)
a. Researchers do not make a distinction between "real" and other thinking, nor do they consider nonlinguistic thinking less valid than linguistic thinking.
c. As indicated by several studies cited in the text, this is not true.
d. Research shows that the words we use do make a difference.
- d. is the answer. Following the babbling stage, the child's ability to produce all phonemes becomes in a sense shaped and limited to the ability to produce those phonemes he or she hears. (p.315)
a. The vocal tract of *Homo sapiens* does not develop in specialized ways for different languages.
b. & c. English and Russian differ significantly in both their phonemes and their morphemes. Nor is there any reason why differences in morphemes

would in and of themselves cause pronunciation difficulties.

True-False Items

- | | |
|--------------------|----------------|
| 1. F (pp. 315-316) | 6. T (p. 303) |
| 2. T (pp. 302-303) | 7. F (p. 313) |
| 3. T (p. 300) | 8. T (313) |
| 4. F (p. 306) | 9. P (p.321) |
| 5. T (p. 300) | 10. F (p. 318) |

Psychology Applied

Multiple-Choice Questions

- a. is the answer. Each sound of the word is a phoneme (note that the second letter “e” does not itself represent a sound); the morphemes are “pre,” which means before; “date”; and “s,” which indicates the plural. (pp. 313, 314)
- c. is the answer. (pp. 301-302)
 - Beyond a certain level of aptitude, creativity and intelligence scores are not correlated.
 - & d. There is no evidence that creative people are more likely to be introverted or that they lack expertise in other areas.
- a. is the answer. (p. 315)
- a. is the answer. (p. 307)
 - & c. These may very well occur, but they do not define belief perseverance.
 - This is the confirmation bias.
- b. is the answer. A rose is a prototypical example of the concept *flower*. (p.299) . c- & d. Hierarchies are organized clusters of concepts. In this example, there is only the single concept *flower*.
- d. is the answer. The availability heuristic is the judgmental strategy that estimates the likelihood of events in terms of how readily they come to mind, and the most vivid information is often the most readily available.
- b is the answer. Follow the directions precisely and you can't miss! (p. 299)
 - A prototype is the best example of a concept.
 - Heuristics are simple thinking strategies that help solve problems but, in contrast to a recipe that is followed precisely, do not guarantee success.
 - A mental set is a tendency to approach a problem in a way that has been successful in the past.
- c. is the answer. By simply following a strategy that has worked well in the past, Marilyn is hampered by the type of fixation called mental set. (p.303)
 - Functional fixedness is being unable to conceive of an unusual function for an object.
 - Overconfidence is exhibited by the person who
 - Prototypes are best examples of categories, not strategies for solving problems.
- a. is the answer. Cognitive psychologists study how we process, understand, and communicate knowledge. Problem solving involves processing information and is therefore a topic explored by cognitive psychologists. (p. 298)
 - Cognitive psychologists often use experimentation to study phenomena but, because not all experimental psychologists study cognition, a. is the best answer.
 - Organizational psychologists study behavior in the workplace.
 - Developmental psychologists study the ways in which behavior changes over the life span.
- d. is the answer. (p. 299)
 - & c. If Boris always attacks his opponent's queen when playing chess, he is a victim of mental set; prototypes, however, have nothing to do with chess playing.
- d. is the answer. Confirmation bias is the tendency to search for information that confirms one's preconceptions. In this example, the politicians' preconceptions are biasing their interpretation of the survey results. (pp. 302-303)
 - Functional fixedness is the inability to perceive an unusual use for a familiar object.
 - Mental set is the tendency to approach a problem in a particular way. There is no problem per se in this example.
 - Belief perseverance is the tendency to cling to one's beliefs despite evidence to the contrary.
- b. is the answer. Such utterances, characteristic of a child of about 2 years, are like telegrams, in that they consist mainly of nouns and verbs and show use of syntax. (p. 316)
 - & c. Babbling consists of phonemes, not words.
 - Semantics refers to the rules by which meaning is derived from sentences; this speech example indicates nothing in particular about the child's understanding of semantics.
- c is the answer. (p. 299) a., b., & d. Heuristics do not guarantee solutions or prevent mental sets.
- d. is the answer. Your conclusion is based on the stereotype that muscular build is more *representative* of athletes than computer programmers. (p.304)
 - Belief perseverance is the tendency to cling to one's beliefs despite evidence to the contrary.
 - Mental set is the tendency to repeat solutions that have worked in the past.
 - Functional fixedness is the tendency to think of things only in terms of their usual functions.
- d. is the answer. (p. 303)
- b. is the answer. The publicity surrounding disasters makes such events vivid and seemingly more probable

- a. Belief perseverance is the tendency to cling to one's beliefs despite evidence to the contrary.
 - c. The representativeness heuristic operates when we judge the likelihood of things in terms of how well they represent particular prototypes. This example does not involve such a situation.
 - d. Functional fixedness operates in situations in which effective problem solving requires using an object in an unfamiliar manner.
17. c. is the answer. This is referred to as overconfidence. (p. 306)
 18. a. is the answer. In this example, the way the issue is posed, or framed, has evidently influenced consumers' judgments. (p. 311)
 - b. Confirmation bias is the tendency to search for information that confirms one's preconceptions.
 - c. Mental set is the tendency to approach a problem in a particular way.
 - d. Overconfidence is the tendency to be more confident than correct.
 19. d. is the answer. This sentence, although semantically meaningless, nevertheless follows the grammatical rules of English syntax for combining words into sentences. (p. 314)
 - a. & b. The phonemes (smallest units of sound) and morphemes (smallest units of meaning) of this sentence are equally correct.
 20. c. is the answer. This fact challenges the linguistic determinism hypothesis; it neither supports nor refutes Chomsky's concept of an inborn universal grammar. (p. 320)

Essay Question

You should point out that the rate at which children acquire words and grammar is too extraordinary to be explained solely according to principles of learning. Children also utter all sorts of word forms they have never heard and could not, therefore, be imitating. Furthermore, children begin using morphemes in a predictable order, which learning theorists would not expect since each child experiences a unique linguistic environment. It therefore seems clear that children are biologically prepared to acquire language and that the behaviorist position is incorrect.

Key Terms

1. Cognition refers to all the mental activities associated with thinking, knowing, remembering, and communicating information. (p. 298)
2. A concept is a mental grouping of similar objects, events, and people. (p. 299)
3. A prototype is the best example of a particular category. (p. 299)
4. An algorithm is a methodical, logical procedure that, while sometimes slow, guarantees success. (p.300)
5. A heuristic is a simple thinking strategy that often allows us to make judgments and solve problems efficiently. Although heuristics are more efficient than algorithms, they do not guarantee success and sometimes even impede problem solving. (p. 300)
6. Insight is a sudden and often novel realization of the solution to a problem. Insight contrasts with trial and error and, indeed, may often follow an unsuccessful episode of trial and error. (p. 300)
7. Most experts agree that creativity refers to an ability to produce novel and valuable ideas. A certain level of aptitude is necessary but not sufficient for creativity. (p. 301)
8. Continuation bias is an obstacle to problem solving in which people tend to search for information that supports their preconceptions. (pp.302-303)
9. Fixation is an inability to approach a problem in a new way. (p. 303)
10. Mental set refers to the tendency to continue applying a particular problem-solving strategy even when it is no longer helpful. (p. 303)
11. Functional fixedness is a type of fixation in which a person can think of things only in terms of their usual functions. (p. 303)
12. The representativeness heuristic is the tendency to judge the likelihood of things in terms of how well they match particular 'prototypes. (p. 304)
13. The availability heuristic is based on estimating the probability of certain events in terms of how readily they come to mind. (p. 305)
14. Another obstacle to problem solving, overconfidence refers to the tendency to overestimate the accuracy of our beliefs and judgments. (p. 306)

15. Belief perseverance is the tendency for people to cling to a particular belief even after the information that led to the formation of the belief is discredited. (p. 307)
16. Intuition is an immediate, automatic, and effortless feeling or thought. (p. 308)
17. Framing refers to the way an issue or question is 'posed. It can affect people's perception of the issue or answer to the question. (p. 311)
18. Language refers to spoken, written, or signed words and how we combine them to communicate meaning. (p. 313)
19. Phonemes are the smallest units of sound in a language that are distinctive for speakers of the language. (p. 313)
20. Morphemes are the smallest units of language that carry meaning. (p.314) *Example:* The word "dogs," which contains four phonemes, contains only two morphemes – "dog" and "-s." Although most morphemes are combinations of two or more phonemes, the plural "-s." conveys a distinctive meaning of "more than one."
21. Grammar is a system of rules that enables us to communicate with and. understand others. (p. 314) .
22. Semantics is the set of rules used to derive meaning from morphemes, words, and sentences in a given language. (p. 314)
Example: One semantic rule of English is that adding *-ed* to a verb gives the verb a past-tense meaning.
23. Syntax is the rules for combining words into grammatically sensible sentences in a given language. (p. 314)
Example: One syntactic rule of English is that adjectives are positioned before nouns.
24. The babbling stage of speech development, which begins around 4 months, is characterized by the spontaneous utterance of speech sounds. During the babbling stage, children the world over sound alike. (p. 315)
25. Between 1 and 2 years of age, children speak mostly in single words; they are therefore in the one-word stage of linguistic development. (p.316)
26. Beginning about age 2, children are in the two-word stage and speak mostly in two-word sentences. (p. 316)
27. Telegraphic speech is the economical telegram-like speech of children in the two-word stage. Utterances consist mostly of nouns and verbs; however, words occur in the correct order, showing that the child has learned some of the language's syntactic rules. (p. 316)
28. Linguistic determinism is Benjamin Whorf's hypothesis that language determines the way we think. (p. 319)