Thinking & Language

- Thinking (cognition)
  - Concepts
    - categories (schemata)
    - prototypes
    - hierarchies
  - problem solving
    - trial & error
    - algorithms
    - heuristics
    - insight
    - obstacles to problem solving
      - confirmation bias
      - fixation
        * mental set
        * functional fixedness
  - decision making
    - representativeness heuristic
    - availability heuristic
    - overconfidence
    - framing
belief bias

belief perseverance

artificial intelligence

Language

language structure

phonemes

morphemes

grammar

- semantics

- syntax

language development

- acquisition
  - babbling stage
  - one-word stage
  - two-word stage
    - telegraphic speech

theories of language development

Skinner: operant learning

Chomsky: inborn universal grammar

Cognitive neuroscience: statistical learning
Thinking & Language

- language influences thinking
  - linguistic relativity hypothesis
- thinking without language
  - mental images

Animal Studies

- animal cognition
  - simple counting
  - insight
  - tool usage
    - cultural transmission
- theory of mind?

- language ability in animals
  - communication vs language
    - honeybees
    - apes
      - * Washoe
      - * Koko
      - * Lana
      - * Kanzi
  - criticisms
1. Describe the nature, function, and formation of concepts.

2. Discuss the major problem-solving strategies, and describe the nature of insight.

3. Identify obstacles to problem solving.

4. Describe the heuristics that guide decision making, and explain how overconfidence and framing can affect judgment.

5. Describe how our beliefs influence our logical reasoning.

6. Contrast the human mind and the computer as information processors, and describe the recent advances in artificial intelligence.

7. Explain how the availability heuristic and the representativeness heuristic may lead us to make judgmental errors.
8. Describe the structure of language.

9. Trace the course of language acquisition, and discuss alternative theories of language development.

10. Discuss the impact of early experience on language development as revealed by cognitive neuroscience.

11. Discuss the relationship between thought and language.

12. Describe the research on animal communication, and discuss the controversy over whether animals have language.
1. Thinking, or _____________, can be defined as _____________
   Scientists who study these mental activities are called _____________.

2. People tend to organize specific items into mental groupings called _____________, and many such groupings often are further organized into _____________. Animals such as pigeons _____________(are/are not) capable of forming such mental groupings.

3. Concepts are typically formed through the development of a best example, or _____________, of a category. For example, people more easily detect _____________(male/female) prejudice against _____________(men/women) than vice versa.

4. Humans are especially capable of using their reasoning powers for coping with new situations, and thus for _____________.

5. Finding a problem's solution by trying each possibility is called _____________.

6. Logical, methodical, step-by-step procedures for solving problems are called _____________.

7. Rule-of-thumb strategies that provide us with problem-solving shortcuts are referred to as _____________.

8. When you suddenly realize a problem's solution, _____________ has occurred.

9. The tendency of people to look for information that verifies their preconceptions is called the _____________.

10. Not being able to take a new perspective when attempting to solve a problem is referred to as _____________. One example of this obstacle to problem solving is the tendency to repeat solutions that have worked previously; this phenomenon is known as the development of a _____________.

11. When a person is unable to envision using an object in an atypical way, _____________ is operating.

12. People judge how well something matches a particular prototype; this is the _____________.

13. When we judge the likelihood of something occurring in terms of how readily it comes to mind, we are using the _____________.

   Explain how these two heuristics may lead us to make judgmental errors.

14. (Thinking Critically) Many people fear _____________ more than _____________, and _____________ more than _____________, despite the fact that these fears are not supported by death and injury statistics. This type of faulty thinking occurs because we fear:
   a. _____________
   b. _____________
   c. _____________
   d. _____________

15. The tendency of people to overestimate the accuracy of their knowledge results in _____________. Warning people against this tendency _____________(does/does not) reduce it. Exposing people to other's differing judgments about events _____________(does/does not) reduce this tendency.

16. Overconfidence has _____________ value because self-confident people tend to live _____________(more/less) happily and find it _____________(easier/harder) to make tough decisions. Furthermore, research has shown that when subjects are given feedback on
1. The basic sound units of language are its ___________. English has approximately ___________ of these units. Considering all languages that have been studied, ___________ (how many?) of these units have been identified. The basic units of sign language are defined by ___________ and ___________.

2. Phonemes are grouped into units of meaning called ________________.

3. The system of rules that enables us to use our language to speak to and understand others is called ________________.

17. Decision making can be significantly affected by the phrasing, or ______________, of an issue.

18. The tendency for our beliefs to distort logical reasoning is called ______________. This phenomenon makes it ______________ (easier/more difficult) for us to see the illogic of conclusions that run counter to our beliefs.

19. Research has shown that once we form a belief or a concept, it may take more convincing evidence for us to change the concept than it did to create it; this is because of ______________.

20. The science involving the development of computers and programs that mimic human thinking is called ______________. As a theory, this science was pioneered by psychologist ______________.

21. Unlike the computer, which processes information ______________ (serially/simultaneously), humans can process many bits of information ______________ (serially/simultaneously).

22. Computer systems that imitate the brain's neural organization are called ______________. Such systems increase the computer's capacity for processing ______________ (and so/but do not) enable the computer to "learn" simple concepts.

the accuracy of their judgments, such feedback generally ______________ (does/does not) help them become more realistic about how much they know.
4. The system by which meaning is derived from morphemes, words, and sentences is the _____________ of a language.

5. The system of rules we use to combine words into grammatically sensible sentences is called _____________.

6. The first stage of language development, in which children spontaneously utter different sounds, is the _____________ stage. This stage typically begins at about ___________ months of age. The sounds children make during this stage ___________ (do/do not) include only the phonemes of the language that they hear.

7. Deaf infants ___________ (do/do not) babble. Many natural babbling sounds are ___________. pairs formed by _____________.

8. At 6 months, infants ___________ (can/cannot) perceive phoneme differences from other languages. By about ___________ months of age, infant babbling begins to resemble the household language. By ___________ months, the ability to perceive phoneme differences is ___________ (lost/acquired).

9. During the second stage, called the ___________ stage, children convey complete thoughts using single words. This stage begins at about ___________ year(s) of age.

10. During the ___________ stage children speak in sentences containing mostly nouns and verbs. This type of speech is called ___________ speech.

11. After this stage, children quickly begin to utter longer phrases that ___________ (do/do not) follow the rules of syntax.

12. Skinner believed that language development follows the general principles of learning, including _____________, _____________, and _____________. When there is minimal reinforcement for speaking, as is the case for children whose parents are ___________, the learning of spoken language proceeds ___________ (more slowly/at a normal pace).

13. Other theorists believe that humans are biologically predisposed to learn language. One such theorist is ___________, who believes that we all are born with a ___________, in which ___________ switches are thrown as children experience their language.

Give several examples of linguistic behavior in children that support the argument that humans are biologically predisposed to acquire language.

14. With no “inborn” linguistic rules, computer neural networks ___________ (can/are unable) to learn a language’s statistical structure.

15. Research by Jenny Saffran has demonstrated that even before ___________ year(s) of age, infants are able to discern ___________ by analyzing which syllables most often go together.

16. Research studies of infants' knack for soaking up language ___________ (challenges/supports) Chomsky's concept of an inborn ___________. On the other hand, a study of twins indicates that genes ___________ (do/do not) play a role in determining how quickly children learn language.

17. Those who learn a second language as adults usually speak it with the ___________ of their first language. Moreover, they typically show ___________ (poorer/better)
mastery of the ____________ of the second language.

18. The window for learning language gradually begins to close after age _____________. When a young brain doesn’t learn any language, its language-learning capacity ____________ (never/may still) fully develops.

19. Considering the two theories together, we can say that although we are born with a readiness to learn language, ____________ is also important, as shown in linguistically stunted children who have been isolated from language during the ____________ for its acquisition.

1. According to the ____________ hypothesis, language shapes our thinking. The linguist who proposed this hypothesis is ____________.

2. Many people who are bilingual report feeling a different sense of ____________, depending on which language they are using. There are an estimated ____________ languages in the world today.

3. In several studies, researchers have found that using the pronoun “he” (instead of “he or she”) ____________ (does/does not) influence people’s thoughts concerning gender.

4. Bilingual children outperform monolinguals on ____________ tests. Bilingual education may also improve the ____________ of children who are in a linguistic minority.

5. It appears that thinking ____________ (can/cannot) occur without the use of language. Athletes often supplement physical with ____________ practice.

6. In one study of psychology students preparing for a midterm exam, the greatest benefits were achieved by those who visualized themselves ____________ (receiving a high grade/studying effectively).
1. Recent research has shown that monkeys can learn a simple form of ____________, in which they touch pictures of objects in ascending ____________ order. Wolfgang Köhler demonstrated that chimpanzees also exhibit the "aha" reaction that characterizes reasoning by ____________.

2. Forest-dwelling chimpanzees learn to use branches, stones, and other objects as ____________. These behaviors, along with behaviors related to grooming and courtship, ____________ (vary / do not vary) from one group to another, suggesting the transmission of ____________ customs.

3. Deception and mirror usage by chimpanzees and other apes suggests to some researchers that these animals may possess a rudimentary understanding of mental states called a _____________.

Researchers estimate apes' capacity for reasoning as similar to that of children at age ____________.

4. Honeybees communicate by means of a ____________, which researchers ____________ (do / do not) consider to have the complexity and flexibility of human language.

5. The Gardners attempted to communicate with the chimpanzee Washoe by teaching her ____________.

6. Human language appears to have evolved from ____________ communications.

Summarize some of the arguments of skeptics of the "talking apes" research.
1. In her research, Professor Kyoto seeks to identify circumstances in which confirmation bias is especially likely to impede effective problem solving. Which specialty area does her research best represent? a) biological psychology  b) developmental psychology  c) personality psychology  d) clinical psychology  e) cognitive psychology

2. Arnold had difficulty recognizing that bullfighting was a sport because it failed to resemble his ________ of a sport. a) phoneme  b) prototype  c) algorithm  d) heuristic

3. In attempting to solve difficult sexual assault cases, a police detective frequently reminds himself to focus investigative suspicion on the victims' friends and acquaintances. This strategy best illustrates the use of: a) an algorithm. b) a heuristic. c) telegraphic speech. d) the framing effect.

4. Because he erroneously believes that older workers are not as motivated as younger workers to work hard, a factory foreman is especially vigilant for any signs of laziness among his senior workers. His supervision strategy best illustrates: a) the framing effect. b) the availability heuristic. c) functional fixedness. d) confirmation bias. e) the representativeness heuristic.

5. People are often unable to come up with the simple solutions to some of the three-jugs problems presented in the text because they repeat more complicated solutions that worked in the past. This best illustrates the dynamics of: a) the framing effect. b) functional fixedness. c) the availability heuristic. d) artificial intelligence. e) a mental set.

6. A defense attorney emphasizes to a jury that her client works full-time, supports his family, and enjoys leisure-time hobbies. Although none of this information is relevant to the trial, it is designed to make the defendant appear to be a typical member of the local community. The lawyer is most clearly seeking to take advantage of: a) confirmation bias. b) functional fixedness. c) belief perseverance. d) the representativeness heuristic.

7. Prompt feedback regarding your performance on psychology practice tests is most likely to inhibit: a) overconfidence. b) the framing effect. c) functional fixedness. d) the representativeness heuristic. e) the availability heuristic.

8. Brutus believes that men enjoy watching professional football and that women are categorically distinct from men. His gender stereotypes are so strong, however, that he mistakenly reasons from these premises the illogical conclusion that women do not enjoy watching professional football. His reasoning difficulty best illustrates: a) confirmation bias. b) the framing effect. c) the availability heuristic. d) belief bias. e) functional fixedness.

9. Maintaining one's conceptions even after the basis on which they were formed has been discredited is known as: a) the representativeness heuristic. b) belief perseverance. c) confirmation bias. d) functional fixedness. e) the availability heuristic.

10. The word “chimps” contains ________ phoneme(s) and ________ morpheme(s). a) 5; 1  b) 6; 2  c) 1; 5  d) 2; 6

11. Adding -ed to the word “laugh” means that the action took place in the past. This illustrates one of the rules of English: a) semantics. b) algorithms. c) syntax. d) phonemes.

12. Vocal sounds that are not included in one's native language first begin to disappear from usage during the ________ stage of language development. a) one-word  b) two-word  c) telegraphic  d) babbling

13. Which language theorist would have been most likely to emphasize that children master the rule for forming the past tense of regular verbs like “push” before they learn common past tense constructions of irregular verbs like “go”? a) Skinner  b) Whorf  c) Chomsky  d) Frisch

14. To simulate the learning of the statistical relationships among language terms, researchers are likely to make use of: a) telegraphic speech. b) the framing effect. c) computer neural networks. d) the representativeness heuristic.

15. Your ability to recall which direction you turn the faucet handle in your bathroom in order to get cold water best illustrates the importance of: a) algorithms. b) the framing effect. c) thinking without language. d) the representativeness heuristic. e) the belief perseverance phenomenon.

16. We more quickly recognize that a blue jay is a bird than that a penguin is a bird because a blue jay more closely resembles our_______ of a bird. a) heuristic  b) prototype  c) algorithm  d) phoneme

17. Prototype is to category as ________ is to ________. a) wheel; car  b) milk; beverage  c) waiter; restaurant  d) comedian; laughter

18. To find Tabasco sauce in a large grocery store, you could systematically search every shelf in every store aisle. This best illustrates problem solving by means of: a) the availability heuristic. b) functional fixedness. c) an algorithm. d) belief perseverance. e) the representativeness heuristic.
19. Max is so used to thinking that a tough competitive style of behavior is the best way to impress others that he fails to recognize that the most effective way to impress his girlfriend is with cooperative tenderness. Max's oversight best illustrates: a) fixation. b) the framing effect. c) the representativeness heuristic. d) functional fixedness. e) overconfidence.

20. Pablo vainly searches for a screwdriver while failing to recognize that a readily available coin in his pocket would turn the screw. His oversight best illustrates: a) functional fixedness. b) the availability heuristic. c) belief perseverance. d) the framing effect. e) the representativeness heuristic.

21. The easier it is for people to remember an instance in which they were betrayed by a friend, the more they expect such an event to recur. This best illustrates the impact of: a) framing. b) belief perseverance. c) the representativeness heuristic. d) functional fixedness. e) the availability heuristic.

22. College students are more likely to judge a condom as effective when informed that it has a 95 percent success rate than when told it has a 5 percent failure rate. This best illustrates the impact of: a) framing. b) confirmation bias. c) functional fixedness. d) belief perseverance. e) the representativeness heuristic.

23. Professor Chadwick evaluated a graduate student's research proposal negatively simply because he had heard a rumor about the student's incompetence. When later informed that the rumor had been patently false, the professor's assessment of the student's research proposal remained almost as negative as ever. This best illustrates: a) the representativeness heuristic. b) functional fixedness. c) belief perseverance. d) functional fixedness. e) the availability heuristic.

24. A computer program designed to process the information in a psychology textbook and correctly answer multiple-choice questions regarding the text contents illustrates an application of: a) linguistic determinism. b) functional fixedness. c) the framing effect. d) artificial intelligence. e) telegraphic speech.

25. In the English language, adjectives are typically placed before nouns, as in “white house.” This illustrates a rule of English: a) semantics. b) algorithms. c) syntax. d) phonemes.

26. The two-word stage of language development typically begins at the age of ________ months. a) 6 b) 10 c) 14 d) 24 e) 36

27. The fact that children speak with an accent that is similar to their peers is best explained by ________ theory of language acquisition. a) Skinner's b) Whorf's c) Chomsky's d) Frisch's.

28. Learning a spoken language during childhood ________ the learning of sign language during adolescence. Learning sign language during childhood ________ the learning of a spoken language during adolescence. a) inhibits; facilitates b) facilitates; inhibits c) inhibits; inhibits d) facilitates; facilitates

29. Using different words for two very similar objects enables people to recognize conceptual distinctions between the objects. This illustrates: a) telegraphic speech. b) linguistic determinism. c) functional fixedness. d) the representativeness heuristic.

30. When choosing who should retrieve food for them, humans prefer someone who has witnessed it being hidden. Chimps do not. This best illustrates that chimps have a more limited: a) prototype. b) confirmation bias. c) theory of mind. d) representativeness heuristic.

31. Chimpanzees are capable of learning to: a) understand spoken words. b) string signs together into a meaningful sequence. c) use computer keyboards to communicate with other chimps. d) do all of the above.

32. Syntax refers to the: a) orderly arrangement of words into grammatically sensible sentences. b) derivation of meaning from morphemes, words, and sentences. c) smallest speech unit that carries meaning. d) most logical and methodical procedure for solving a problem.

33. The principles of learning emphasized by behaviorists would be most helpful in explaining why children: a) master the complicated rules of grammar with ease. b) add new words to their vocabulary. c) make systematic speech errors because they overgeneralize grammatical rules. d) babble even when they have deaf parents.

34. According to Chomsky, the fact that young children overgeneralize certain rules of grammatical structure suggests that: a) language skills are not developed simply through the processes of imitation and reinforcement. b) language acquisition does not proceed in an orderly sequence. c) language acquisition develops normally even in the absence of social interaction. d) parents overemphasize correct grammatical usage.

35. At 17 months of age, Julie says “wada” whenever she wants a drink of water. Julie is most likely in the ________ stage of language development. a) semantic b) babbling c) one-word d) telegraphic speech e) phonetic
36. Jahmal cites his cousin Luana’s many car accidents as evidence that women are worse drivers than men. He overlooks the fact that his wife and three daughters have had far fewer car accidents than he and his two sons. Jahmal’s prejudicial conclusion about women’s driving skills best illustrates the effects of: a) functional fixedness. b) algorithms. c) confirmation bias. d) the framing effect. e) the representativeness heuristic.

37. People more easily detect male prejudice against women than female prejudice against men because the former more closely resembles their ________ of prejudice. a) syntax b) heuristic c) algorithm d) prototype e) mental set

38. Framing refers to: a) the way in which a problem or issue is phrased or worded. b) a methodical step-by-step procedure for solving problems. c) the grouping of similar objects, events, or people into a category. d) a simple thinking strategy for solving problems efficiently. e) prototype.

39. In the words “lightly,” “neatly,” and “shortly,” the “ly” ending is a(n): a) algorithm. b) phenotype. c) phoneme. d) morpheme. e) prototype.

40. Judging the likelihood that things fall into a certain category on the basis of how well they seem to match a particular prototype refers to the use of the: a) framing effect. b) availability heuristic. c) confirmation bias. d) belief perseverance phenomenon. e) representativeness heuristic.

41. A mental set is a: a) methodical step-by-step procedure for solving problems. b) mental grouping of similar objects, events, or people. c) tendency to approach a problem in a way that has been successful in the past. d) group of conclusions derived from certain assumptions or general principles.

42. Research on the language capabilities of apes indicates that they cannot: a) translate spoken words into signs. b) acquire a vocabulary of more than two dozen signs. c) use signs to communicate with other members of their own species. d) grammatically order language symbols as well as most 3-year-old children.

43. To promote cognitive efficiency, concepts are typically organized into: a) mental sets. b) algorithms. c) neural networks. d) hierarchies.

44. Jamilla systematically tried each successive key on her dad’s key ring until she found the one that unlocked his office door. This best illustrates problem solving by means of: a) belief perseverance. b) an algorithm. c) the representativeness heuristic. d) the availability heuristic. e) functional fixedness.

45. Encouraging people to explain why their own personal views on an issue are correct is most likely to promote: a) functional fixedness. b) use of the representativeness heuristic. c) linguistic relativity. d) belief perseverance. e) the framing effect.

46. Business managers are more likely to track the career achievements of those they once hired than the accomplishments of those they once rejected. This best illustrates: a) the representativeness heuristic. b) functional fixedness. c) the framing effect. d) confirmation bias. e) neural networks.

47. Most people take less time to identify a cow as a mammal than a mouse as a mammal because a cow more closely resembles their ________ of a mammal. a) prototype b) mental set c) heuristic d) algorithm

48. The tendency to conclude that a person who likes to read poetry is more likely to be a college professor of classics than a truck driver illustrates the use of: a) the availability heuristic. b) confirmation bias. c) the framing effect. d) belief perseverance. e) the representativeness heuristic.

49. Professor Thompson’s research activities involve the use of computers to simulate human decision-making strategies. Which specialty area does this research best represent? a) personality psychology b) cognitive psychology c) biological psychology d) clinical psychology e) developmental psychology

50. Psychologists are most likely to question whether chimps have the capacity to: a) infer another chimp’s mental states. b) discern numerical order. c) invent and transmit customs. d) form concepts.
Answer Key

1. e  
cognitive psychology
2. b  
prototype
3. b  
a heuristic.
4. d  
confirmation bias.
5. e  
a mental set.
6. d  
the representativeness heuristic.
7. a  
overconfidence.
8. d  
belief bias.
9. b  
belief perseverance.
10. a  
5; 1
11. a  
semantics.
12. d  
babbling
13. c  
Chomsky
14. c  
computer neural networks.
15. c  
thinking without language.
16. b  
prototype
17. b  
milk; beverage
18. c  
an algorithm.
19. a  
a fixation.
20. a  
functional fixedness.
21. e  
the availability heuristic.
22. a  
framing.
23. d  
belief perseverance.
24. d  
artificial intelligence.
25. c  
syntax.
26. d  
24
27. a  
 Skinner's
28. d  
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29. b  
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30. c  
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