

11:

Intelligence

CHAPTER OVERVIEW

An enduring controversy in psychology involves attempts to define and measure intelligence. Chapter 11 discusses whether intelligence is a single general ability or several specific ones as well as research that attempts to assess the neurological basis of intelligence. It also describes the historical origins of intelligence tests and discusses several important issues concerning their use. These include the methods by which intelligence tests are constructed and whether such tests are valid, reliable, and free of bias. The chapter also explores the stability of intelligence and the extent of genetic and environmental influences on intelligence.

NOTE: Answer guidelines for all Chapter 11 questions begin on page 298.

CHAPTER REVIEW

First, skim each section, noting headings and boldface items. After you have read the section, review each objective by answering the fill-in and essay-type questions that follow it. As you proceed, evaluate your performance by consulting the answers beginning on page 298. Do not continue with the next section until you understand each answer. If you need to, review or reread the section in the textbook before continuing.

What Is Intelligence? (pp. 431–442)

David Myers at times uses idioms that are unfamiliar to some readers. If you do not know the meaning of any of the following words, phrases, or expressions in the context in which they appear in the text, refer to pages 304–305 for an explanation: *sparked debate; dumbfounded; island of brilliance; street-smart adolescent; how to read people; add spice to life; out of the blue; on the shoulders of others; quick-witted; in its heyday.*

Objective 1: Discuss the difficulty of defining intelligence, and explain what it means to “reify intelligence.”

1. Psychologists _____ (do/do not) agree on a definition of intelligence.
2. To regard an abstract concept as a concrete entity is to commit the error known as _____.
3. Intelligence is a _____ constructed concept.
4. In any context, intelligence can be defined as _____.
5. One controversy regarding the nature of intelligence centers on whether intelligence is one _____ ability or several _____ abilities.

Objective 2: Present arguments for and against considering intelligence as one general mental ability.

6. The statistical procedure used to identify groups of items that appear to measure a common ability is called _____.
7. Charles Spearman, one of the developers of this technique, believed that a factor called *g*, or _____, runs through the more specific aspects of intelligence.
8. Opposing Spearman, _____ identified seven clusters of _____.
9. Some psychologists believe that general intelligence evolved as a means of helping people solve _____.

Objective 3: Compare Gardner's and Sternberg's theories of intelligence.

10. People with _____ score at the low end of intelligence tests but possess extraordinary specific skills.
11. Howard Gardner proposes that there are _____, each independent of the others. However, critics point out that the world is not so just: People with mental disadvantages often have lesser _____ abilities as well, and that some abilities, such as _____ and _____ skills, are more crucial than others. General intelligence scores _____ (do/do not) predict performance on complex tasks and in various jobs.
12. Sternberg's _____ theory distinguishes three types of intelligence: _____ intelligence, _____ intelligence, and _____ intelligence.

Objective 4: Describe the three aspects of emotional intelligence, and discuss criticisms of this concept.

13. Cantor and Kihlstrom distinguish between _____ intelligence and _____ intelligence. Support for this distinction comes from evidence that college

grades _____ (accurately/only modestly/do not) predict later work achievement.

14. A critical part of social intelligence is _____—the ability to _____, _____, and _____ emotions.
15. One research study found that 5-year-olds who could most accurately recognize and label _____ later more easily made friends and effectively managed their emotions.

Briefly describe emotionally intelligent people.

16. A test that measures overall emotional intelligence also measures its components: the ability to _____ emotions in faces, the ability to _____ them and how they change and blend, the ability to _____ them correctly in varied situations, and the ability to use them to enable _____ or creative thinking.
17. Some scholars believe that the concept of _____ intelligence stretches the idea of multiple intelligences too far.
18. Although general intelligence is most important in occupations that are mentally demanding, successful people usually have other traits as well, such as _____ and being well connected and extremely energetic.

Objective 5: Identify the factors associated with creativity, and describe the relationship between creativity and intelligence.

19. The ability to produce ideas that are both novel and valuable is called _____. The relationship between intelligence and creativity holds only up to a certain point—an intelligence score of about _____.

20. Standard intelligence tests, which demand single correct answers to questions, measure _____ thinking. Tests that allow multiple possible answers to problems measure _____ thinking.

Describe five components of creativity other than intelligence.

21. Teresa Amabile's research demonstrates that people are more creative when they are unconcerned about _____.

Objective 6: Describe the relationship between intelligence and brain anatomy.

22. Earlier studies _____ (did/did not) reveal a clear-cut correlation between head size (relative to body size) and intelligence score.
23. Newer studies that measure brain _____ using _____ scans reveal a _____ (more/less) significant correlation between brain size (adjusted for body size) and intelligence score.
24. Autopsies reveal that the brains of highly educated people have more _____ than do those of people with less education. Other evidence suggests that highly intelligent people differ in their neural _____. Higher intelligence scores have also been linked with more _____ in brain areas known to be involved in _____, _____, and _____.
25. A study of Einstein's brain revealed that it was 15 percent larger in the the lower _____ lobe—known to be an important neural center for processing _____ and _____ information.

Objective 7: Discuss findings on the correlations between perceptual speed, neural processing speed, and intelligence.

26. When people ponder intelligence test questions, an area in the brain's _____ becomes especially active in the _____ (left/right) brain for verbal questions and _____ (in the right brain/in the left brain/on both sides of the brain) for spatial questions.
27. Studies looking at a range of tasks have found that people with high intelligence scores tend to process and retrieve information _____ (faster/more slowly) than people with low intelligence scores.
28. Other studies have found that the brain waves of highly intelligent people register stimuli more _____ and with greater _____.

Assessing Intelligence (pp. 442–450)

If you do not know the meaning of any of the following words, phrases, or expressions in the context in which they appear in the text, refer to pages 305–306 for an explanation: *heirs*; . . . *pondered*; "dull" child; "mental orthopedics"; *feeble-mindedness*; *clear-cut*; *clustered*; *tape measure*.

Objective 8: Define *intelligence test*, and discuss the history of intelligence testing.

- The early Greek philosopher _____ concluded that individuals differed in their natural endowments.
- Tests that assess a person's mental capacities and compare them to those of others, using numerical scores, are called _____ tests.
- The French psychologist who devised a test to predict the success of children in school was _____. Predictions were made by comparing children's chronological ages with their _____ ages, which were determined by the test. This test _____ (was/was not) designed to measure inborn intelligence.

4. Lewis Terman's revision of Binet's test is referred to as the _____ . This test enables one to derive a(n) _____ for an individual.

Give the original formula for computing IQ, and explain any items used in the formula.

5. Today's tests compute _____ (IQ/ a mental ability score) by comparing the individual's performance to the average performance of people of _____ (the same/ different) age(s). These tests are designed so that a score of _____ is considered average.
6. When given intelligence tests in the early 1900s, immigrants arriving in the United States often scored _____ (above/below) average. This is because the tests were based on a particular _____ background.

Objective 9: Distinguish between aptitude and achievement tests, and describe modern tests of mental abilities such as the WAIS.

7. Tests designed to predict your ability to learn something new are called _____ tests. Tests designed to measure what you already have learned are called _____ tests.
8. The most widely used intelligence test is the _____ . Consisting of 11 subtests, it provides not only a general intelligence score but also separate scores for _____ ,

_____ , _____ , and _____ .

Objective 10: Discuss the importance of standardizing psychological tests, and describe the distribution of scores in a normal curve.

9. One requirement of a good test is the process of defining meaningful scores relative to a pretested comparison group, which is called _____ .
10. When scores on a test are compiled, they generally result in a bell-shaped pattern, or _____ distribution.

Describe the normal curve, and explain its significance in the standardization process.

11. The Stanford-Binet and the Wechsler Scales _____ (are/are not) periodically restandardized, thereby keeping the average score near _____ .
12. During the 1960s and 1970s, college entrance aptitude scores showed a steady _____ (increase/decline). At the same time, intelligence test performance _____ (improved/decreased). This phenomenon is called the _____ .
13. Although the actual cause of this effect is unknown, one explanation is that is due to improved _____ . The recent performance gains on the WAIS are greatest among people at the lowest _____ levels.

Objective 11: Explain what it means to say a test is reliable.

14. If a test yields consistent results, it is said to be _____.
15. When a test is administered more than once to the same people, the psychologist is determining its _____ - _____ reliability.
16. When a person's scores for the odd- and even-numbered questions on a test are compared, _____ - _____ reliability is being assessed.
17. The Stanford-Binet, WAIS, and WISC have reliabilities of about _____.

Objective 12: Explain what it means to say a test is valid, and describe two types of validity.

18. The degree to which a test measures or predicts what it is supposed to is referred to as the test's _____.
19. The degree to which a test measures the behavior it was designed to measure is referred to as the test's _____.
20. The degree to which a test predicts future performance of a particular behavior, called the test's _____, is referred to as the test's _____.

Choose a specific example and use it to illustrate and explain the concept of criterion and its relationship to predictive validity.

21. Generally speaking, the predictive validity of general aptitude tests _____ (is/is not) as high as their reliability. The predictive validity of these tests _____ (increases/diminishes) as individuals move up the educational ladder.

The Dynamics of Intelligence (pp. 450–454)

If you do not know the meaning of any of the following words, phrases, or expressions in the context in which they appear in the text, refer to page 306 for an explanation: *have left few stones unturned; the pendulum of opinion . . . complete swing.*

Objective 13: Describe the stability of intelligence scores over the life span.

1. Some studies have found that 2- to 7-month-old infants who quickly become bored when looking at a picture score _____ (higher/lower) on tests of brain speed and intelligence up to 11 years later.
2. Traditional intelligence tests before age _____ generally do not predict future scores.
3. During childhood, the stability of intelligence scores _____ (increases/decreases) with age. After about age _____, intelligence scores stabilize. A long-term study of mental ability in Scottish children revealed that this _____ (holds/does not hold) through late adulthood.

Objective 14: Discuss the two extremes of the normal distribution of intelligence.

4. Individuals whose intelligence scores fall below 70 and who have difficulty adapting to life may be labeled _____. This label applies to approximately _____ percent of the population.
5. Mental retardation sometimes has a physical basis, such as _____, a genetic disorder caused by an extra chromosome.

- The current view is that children with mild retardation should be integrated, or _____, into regular classrooms.
- At the high extreme, Lewis Terman's "gifted children" turned out to be _____, well-_____, and unusually successful _____.

Discuss criticisms of programs that sort children into gifted and nongifted tracks.

Genetic and Environmental Influences on Intelligence (pp. 454–466)

If you do not know the meaning of any of the following words, phrases, or expressions in the context in which they appear in the text, refer to page 306 for an explanation: *bludgeoning native intelligence; more newsworthy; sharpest at the extremes; computer camps.*

Objective 15: Discuss the evidence for the genetic contribution to individual intelligence, and explain what psychologists mean by the heritability of intelligence.

- The position that both heredity and environment exert some influence on intelligence is _____ (controversial/generally accepted) among psychologists.
- The intelligence scores of identical twins reared together are _____ (more/no more) similar than those of fraternal twins. Brain scans also reveal that identical twins have similar volume to their brain's _____, and those areas associated with _____ and _____ intelligence.

- By inserting an extra gene that engineers a neural receptor involved in _____ into fertilized mouse eggs, researchers have created smarter mice.
- The intelligence test scores of fraternal twins are _____ (more alike/no more alike) than the intelligence test scores of other siblings. This provides evidence of a(n) _____ (genetic/environmental) effect because fraternal twins, being the same _____, are treated more alike.
- Studies of adopted children and their adoptive and biological families demonstrate that with age, genetic influences on intelligence become _____ (more/less) apparent. Thus, children's intelligence scores are more like those of their _____ (biological/adoptive) parents than their _____ (biological/adoptive) parents.
- The amount of variation in a trait within a group that is attributed to genetic factors is called its _____. For intelligence, this has been estimated at _____ percent.
- If we know a trait has perfect heritability, this knowledge _____ (does/does not) enable us to rule out environmental factors in explaining differences between groups.

Objective 16: Discuss the evidence for environmental influences on individual intelligence.

- Studies indicate that neglected children _____ (do/do not) show signs of recovery in intelligence and behavior when placed in more nurturing environments. Although normal brain development can be retarded by _____, _____ deprivation, and _____, there is no sure environment that will produce a "superbaby."
- High-quality programs for disadvantaged children, such as the government-funded _____ program, increase children's school readiness; that is, they increase their _____.

_____, creating better attitudes toward learning.

10. Intelligence scores _____ (rise/fall/remain stable) during the school year and _____ (rise/fall/remain stable) over the summer. The Flynn effect of rising IQ scores is partly due to the increasing years of _____ over the last 50 years.

Objective 17: Describe ethnic similarities and differences in intelligence test scores, and discuss some genetic and environmental factors that might explain them.

11. Research evidence suggests that group differences in intelligence may be entirely _____ (genetic/environmental).

Explain why heredity may contribute to individual differences in intelligence but not necessarily contribute to group differences.

12. Group differences in intelligence scores _____ (do/do not) provide an accurate basis for judging individuals. Individual differences within a race are _____ (greater than/less than) between-race differences. Furthermore, race _____ (is/is not) a neatly defined biological category.
13. Although Asian students on the average score _____ (higher/lower) than North American students on math tests, this difference may be due to the fact that _____
14. On an infant intelligence measure (preference for looking at novel stimuli), black infants score _____ (lower than/higher than/as well as) white infants.

Objective 18: Describe gender differences in abilities.

15. Girls tend to outscore boys on _____ tests and are more _____ fluent.
16. Although girls have an edge in math _____, boys score higher in math _____. Boys tend to outscore girls on tests of _____.
17. Working from an _____ perspective, some theorists speculate that these gender differences in spatial manipulation helped our ancestors survive.
18. There is evidence that spatial abilities are enhanced by high levels of _____ during prenatal development.
19. According to many, boys' and girls' interests and abilities are shaped in large part by _____ and divergent opportunities.

Objective 19: Discuss whether intelligence tests are biased, and describe the stereotype threat phenomenon.

20. In the sense that they detect differences caused by cultural experiences, intelligence tests probably _____ (are/are not) biased.
21. Most psychologists agree that, in terms of predictive validity, the major aptitude tests _____ (are/are not) racially biased.
22. When women and members of ethnic minorities are led to expect that they won't do well on a test, a _____ may result, and their scores may actually be lower.

PROGRESS TEST 1*Multiple-Choice Questions*

Circle your answers to the following questions and check them with the answers beginning on page 299. If your answer is incorrect, read the explanation for why it is incorrect and then consult the appropriate pages of the text (in parentheses following the correct answer).

- Studies of adopted children and their biological and adoptive families demonstrate that with age, genetic influences on intelligence:
 - become more apparent.
 - become less apparent.
 - become more difficult to disentangle from environmental influences.
 - become easier to disentangle from environmental influences.
- A 6-year-old child has a mental age of 9. The child's IQ is:

a. 96.	c. 125.
b. 100.	d. 150.
- Which of the following is *not* true?
 - In math grades, the average girl typically equals or surpasses the average boy.
 - The gender gap in math and science scores is increasing.
 - Women are better than men at detecting emotions.
 - Males score higher than females on tests of spatial abilities.
- Most psychologists believe that racial gaps in test scores:
 - have been exaggerated when they are, in fact, insignificant.
 - indicate that intelligence is in large measure inherited.
 - are in large measure caused by environmental factors.
 - are increasing.
- Standardization refers to the process of:
 - determining the accuracy with which a test measures what it is supposed to.
 - defining meaningful scores relative to a representative pretested group.
 - determining the consistency of test scores obtained by retesting people.
 - measuring the success with which a test predicts the behavior it is designed to predict.
- Down syndrome is normally caused by:
 - an extra chromosome in the person's genetic makeup.
 - a missing chromosome in the person's genetic makeup.
 - malnutrition during the first few months of life.
 - prenatal exposure to an addictive drug.
- Which of the following is *not* a requirement of a good test?

a. reliability	c. reification
b. standardization	d. validity
- First-time parents Geena and Brad want to give their baby's intellectual abilities a jump-start by providing a super enriched learning environment. Experts would suggest that the new parents should:
 - pipe stimulating classical music into the baby's room.
 - hang colorful mobiles and artwork over the baby's crib.
 - take the child to one of the new "superbaby" preschools that specialize in infant enrichment.
 - relax, since there is no surefire environmental recipe for giving a child a superior intellect.
- Which of the following statements is true?
 - The predictive validity of intelligence tests is not as high as their reliability.
 - The reliability of intelligence tests is not as high as their predictive validity.
 - Modern intelligence tests have extremely high predictive validity and reliability.
 - The predictive validity and reliability of most intelligence tests is very low.
- Before about age _____, intelligence tests generally do not predict future scores.

a. 1	c. 5
b. 3	d. 10
- Sorting children into gifted and nongifted educational groups:
 - creates a self-fulfilling prophecy.
 - increases social isolation between the groups.
 - promotes racial segregation and prejudice.
 - has all of the above effects.

12. Which of the following best describes the relationship between creativity and intelligence?
- Creativity appears to depend on the ability to think imaginatively and has little if any relationship to intelligence.
 - Creativity is best understood as a certain kind of intelligence.
 - The more intelligent a person is, the greater his or her creativity.
 - A certain level of intelligence is necessary but not sufficient for creativity.
13. Studies of 2- to 7-month-old babies show that babies who quickly become bored with a picture:
- often develop learning disabilities later on.
 - score lower on infant intelligence tests.
 - score higher on intelligence tests several years later.
 - score very low on intelligence tests several years later.
14. The existence of _____ reinforces the generally accepted notion that intelligence is a multidimensional quality.
- adaptive skills
 - mental retardation
 - general intelligence
 - savant syndrome
15. Which of the following provides the strongest evidence of the role of heredity in determining intelligence?
- The IQ scores of identical twins raised separately are more similar than those of fraternal twins raised together.
 - The intelligence scores of fraternal twins are more similar than those of ordinary siblings.
 - The intelligence scores of identical twins raised together are more similar than those of identical twins raised apart.
 - The intelligence scores of adopted children show relatively weak correlations with scores of adoptive as well as biological parents.
16. Current estimates are that _____ percent of the total variation among intelligence scores can be attributed to genetic factors.
- less than 10
 - approximately 25
 - between 50 and 75
 - over 75
17. Over the past 80 years, college aptitude test scores have _____ and WAIS scores have _____.
- declined; remained stable
 - remained stable; declined
 - risen; declined
 - declined; risen
18. Reported racial gaps in average intelligence scores are most likely attributable to:
- the use of biased tests of intelligence.
 - the use of unreliable tests of intelligence.
 - genetic factors.
 - environmental factors.
19. The bell-shaped distribution of intelligence scores in the general population is called a:
- g distribution.
 - standardization curve.
 - bimodal distribution.
 - normal distribution.
20. Research on the effectiveness of Head Start suggests that enrichment programs:
- produce permanent gains in intelligence scores.
 - improve school readiness and may provide a small boost to emotional intelligence.
 - improve intelligence scores but not school readiness.
 - produce temporary gains in intelligence scores.

Matching Items

Match each term with its definition or description.

Terms

- _____ 1. mental ability score
- _____ 2. *g*
- _____ 3. eugenics
- _____ 4. savant syndrome
- _____ 5. factor analysis
- _____ 6. aptitude test
- _____ 7. achievement test
- _____ 8. Stanford-Binet
- _____ 9. criterion
- _____ 10. content validity
- _____ 11. reliability

Definitions or Descriptions

- a. a test designed to predict a person's ability to learn something new
- b. a test designed to measure current knowledge
- c. the consistency with which a test measures performance
- d. the degree to which a test measures what it is designed to measure
- e. Terman's revision of Binet's original intelligence test
- f. the behavior that a test is designed to predict
- g. an underlying, general intelligence factor
- h. a person's score on an intelligence test based on performance relative to the average performance of people the same age
- i. a very low intelligence score accompanied by one extraordinary skill
- j. a program for the selective breeding of the most intelligent individuals
- k. a statistical technique that identifies related items on a test

PROGRESS TEST 2

Progress Test 2 should be completed during a final chapter review. Answer the following questions after you thoroughly understand the correct answers for the section reviews and Progress Test 1.

Multiple-Choice Questions

1. The test created by Alfred Binet was designed specifically to:
 - a. measure inborn intelligence in adults.
 - b. measure inborn intelligence in children.
 - c. predict school performance in children.
 - d. identify mentally retarded children so that they could be institutionalized.
2. Which of the following provides the strongest evidence of environment's role in intelligence?
 - a. Adopted children's intelligence scores are more like their adoptive parents' scores than their biological parents'.
 - b. Children's intelligence scores are more strongly related to their mothers' scores than to their fathers'.
 - c. Children moved from a deprived environment into an intellectually enriched one show gains in intellectual development.
 - d. The intelligence scores of identical twins raised separately are no more alike than those of siblings.
3. If a test designed to indicate which applicants are likely to perform the best on the job fails to do so, the test has:
 - a. low reliability.
 - b. low content validity.
 - c. low predictive validity.
 - d. not been standardized.
4. By creating a label such as "gifted," we begin to act as if all children are naturally divided into two categories, gifted and nongifted. This logical error is referred to as:
 - a. rationalization.
 - b. nominalizing.
 - c. factor analysis.
 - d. reification.
5. The formula for the intelligence quotient was devised by:

a. Sternberg.	c. Terman.
b. Binet.	d. Stern.

6. Current intelligence tests compute an individual's intelligence score as:
- the ratio of mental age to chronological age multiplied by 100.
 - the ratio of chronological age to mental age multiplied by 100.
 - the amount by which the test-taker's performance deviates from the average performance of others the same age.
 - the ratio of the test-taker's verbal intelligence score to his or her nonverbal intelligence score.
7. J. McVicker Hunt found that institutionalized children given "tutored human enrichment":
- showed no change in intelligence test performance compared with institutionalized children who did not receive such enrichment.
 - responded so negatively as a result of their impoverished early experiences that he felt it necessary to disband the program.
 - thrived intellectually and socially on the benefits of positive caregiving.
 - actually developed greater intelligence than control subjects who had lived in foster homes since birth.
8. The concept of a *g* factor implies that intelligence:
- is a single overall ability.
 - is several specific abilities.
 - cannot be defined or measured.
 - is both a. and c.
9. Gerardeen has superb social skills, manages conflicts well, and has great empathy for her friends and co-workers. Peter Salovey and John Mayer would probably say that Gerardeen possesses a high degree of:
- g*.
 - social intelligence.
 - practical intelligence.
 - emotional intelligence.
10. By what age does a child's performance on an intelligence test stabilize?
- | | |
|------|------|
| a. 2 | c. 6 |
| b. 3 | d. 7 |
11. The Flynn effect refers to the fact that:
- white and black infants score equally well on measures of infant intelligence.
 - Asian students outperform North American students on math achievement tests.
 - The IQ scores of today's better fed and educated population exceed that of the 1930s population.
 - Individual differences within a race are much greater than between-race differences.
12. In his study of children with high intelligence scores, Terman found that:
- the children were more emotional and less healthy than a control group.
 - the children were ostracized by classmates.
 - the children were healthy and well-adjusted, and did well academically.
 - later, as adults, they nearly all achieved great vocational success.
13. When highly skilled people are performing a task, their brains:
- retrieve information from memory more quickly.
 - register simple stimuli more quickly.
 - demonstrate a more complex brain-wave response to stimuli.
 - do all of the above.
14. Most experts view intelligence as a person's:
- ability to perform well on intelligence tests.
 - innate mental capacity.
 - ability to learn from experience, solve problems, and adapt to new situations.
 - diverse skills acquired throughout life.
15. Which of the following statements is true?
- About 1 percent of the population is mentally retarded.
 - More males than females are mentally retarded.
 - A majority of the mentally retarded can learn academic skills.
 - All of the above are true.
16. High levels of male hormones during prenatal development may enhance:
- verbal reasoning.
 - spatial abilities.
 - overall intelligence.
 - all of the above.

17. Which of the following is *not* cited as evidence of the reciprocal relationship between schooling and intelligence?
- Neither education level nor intelligence scores accurately predict income.
 - Intelligence scores tend to rise during the school year.
 - High school graduates have higher intelligence scores than do those who drop out early.
 - High intelligence scores correlate with prolonged schooling.
18. Originally, IQ was defined as:
- mental age divided by chronological age and multiplied by 100.
 - chronological age divided by mental age and multiplied by 100.
 - mental age subtracted from chronological age and multiplied by 100.
 - chronological age subtracted from mental age and multiplied by 100.
19. Tests of _____ measure what an individual can do now, whereas tests of _____ predict what an individual will be able to do later.
- aptitude; achievement
 - achievement; aptitude
 - reliability; validity
 - validity; reliability
20. Which of the following statements most accurately reflects the text's position regarding the relative contribution of genes and environment in determining intelligence?
- Except in cases of a neglectful early environment, each individual's basic intelligence is largely the product of heredity.
 - With the exception of those with genetic disorders such as Down syndrome, intelligence is primarily the product of environmental experiences.
 - Both genes and life experiences significantly influence performance on intelligence tests.
 - Because intelligence tests have such low predictive validity, the question cannot be addressed until psychologists agree on a more valid test of intelligence.
- _____ 2. Intelligence scores in the United States have been dropping over the past 50 years.
- _____ 3. Most of the major aptitude tests have higher validity than reliability.
- _____ 4. People with high intelligence scores tend to process sensory information more quickly.
- _____ 5. The gap in intelligence scores between black and white children is increasing.
- _____ 6. The intelligence scores of adopted children are more similar to those of their adoptive parents than their biological parents.
- _____ 7. The consensus among psychologists is that most intelligence tests are extremely biased.
- _____ 8. Most psychologists agree that intelligence is mainly determined by heredity.
- _____ 9. The Stanford-Binet test and the Wechsler scales are periodically restandardized.
- _____ 10. The variation in intelligence scores within a racial group is much larger than that between racial groups.
- _____ 11. Telling students they are unlikely to succeed often erodes their performance on aptitude tests.

True-False Items

Indicate whether each statement is true or false by placing *T* or *F* in the blank next to the item.

- _____ 1. In the current version of the Stanford-Binet intelligence test, one's perfor-

- mance is compared only with the performance of others the same age.

PSYCHOLOGY APPLIED

Answer these questions the day before an exam as a final check on your understanding of the chapter's terms and concepts.

Multiple-Choice Questions

- Vanessa is a very creative sculptress. We would expect that Vanessa also:
 - has an exceptionally high intelligence score.
 - is quite introverted.
 - has a venturesome personality and is intrinsically motivated.
 - lacks expertise in most other skills.
- To say that the heritability of a trait is approximately 50 percent means:
 - that genes are responsible for 50 percent of the trait in an individual, and the environment is responsible for the rest.
 - that the trait's appearance in a person will reflect approximately equal genetic contributions from both parents.

- c. that of the variation in the trait within a group of people, 50 percent can be attributed to heredity.
- d. all of the above.
3. Twenty-two-year-old Dan has an intelligence score of 63 and the academic skills of a fourth-grader, and is unable to live independently. Dan probably:
- has Down syndrome.
 - has savant syndrome.
 - is mentally retarded.
 - will eventually achieve self-supporting social and vocational skills.
4. At age 16, Angel's intelligence score was 110. What will her score probably be at age 32?
- 125
 - 110
 - 115
 - There is no basis for predicting an individual's future IQ.
5. A school psychologist found that 85 percent of those who scored above 115 on an aptitude test were "A" students and 75 percent of those who scored below 85 on the test were "D" students. The psychologist concluded that the test had high:
- content validity because scores on it correlated highly with the criterion behavior.
 - predictive validity because scores on it correlated highly with the criterion behavior.
 - content validity because scores on it correlated highly with the target behavior.
 - predictive validity because scores on it correlated highly with the target behavior.
6. Amelia recently took a test that assessed her ability to perform at the college level. The test she took was the:
- WAIS.
 - WISC.
 - SAT.
 - None of the above, because they are all achievement tests.
7. Benito was born in 1937. In 1947, he scored 130 on an intelligence test. What was Benito's mental age when he took the test?
- 9
 - 10
 - 11
 - 13
8. Melvin has been diagnosed as having savant syndrome, which means that he:
- has an IQ of 120 or higher.
 - would score high on a test of analytical intelligence.
 - is limited in mental ability but has one exceptional ability.
 - was exposed to high levels of testosterone during prenatal development.
9. The contribution of environmental factors to racial gaps in intelligence scores is indicated by:
- evidence that individual differences within a race are much greater than differences between races.
 - evidence that white and black infants score equally well on certain measures of infant intelligence.
 - the fact that Asian students outperform North American students on math achievement and aptitude tests.
 - all of the above.
10. Hiroko's math achievement score is considerably higher than that of most American students her age. Which of the following is true regarding this difference between Asian and North American students:
- It is a recent phenomenon.
 - It may be due to the fact that Asian students have a longer school year.
 - It holds only for girls.
 - Both a. and b. are true.
11. Jack takes the same test of mechanical reasoning on several different days and gets virtually identical scores. This suggests that the test has:
- high content validity.
 - high reliability.
 - high predictive validity.
 - been standardized.
12. You would not use a test of hearing acuity as an intelligence test because it would lack:
- content reliability.
 - predictive reliability.
 - predictive validity.
 - content validity.

13. Before becoming attorneys, law students must pass a special licensing exam, which is an _____ test. Before entering college, high school students must take the SAT, which is an _____ test.
- achievement; aptitude
 - aptitude; achievement
 - achievement; achievement
 - aptitude; aptitude
14. If you compare the same trait in people of similar heredity who live in very different environments, heritability for that trait will be _____; heritability for the trait is most likely to be _____ among people of very different heredities who live in similar environments.
- low; high
 - high; low
 - environmental; genetic
 - genetic; environmental
15. A high-school psychologist who is looking at a student's intelligence score finds a jump of 30 points between the earliest score at age 2 and the most recent at age 17. The psychologist's knowledge of testing would probably lead her to conclude that such a jump:
- indicates that different tests were used, creating an apparent change in intelligence level, although it actually remained stable.
 - signals a significant improvement in the child's environment over this period.
 - is unsurprising, since intelligence scores do not become stable until late adolescence.
 - is mainly the result of the age at which the first test was taken.
16. If you wanted to develop a test of musical aptitude in North American children, which would be the appropriate standardization group?
- children all over the world
 - North American children
 - children of musical parents
 - children with known musical ability
17. Don's intelligence scores were only average, but he has been enormously successful as a corporate manager. Psychologists Sternberg and Wagner would probably suggest that:
- Don's verbal intelligence exceeds his performance intelligence.
 - Don's performance intelligence exceeds his verbal intelligence.
 - Don's academic intelligence exceeds his practical intelligence.
 - Don's practical intelligence exceeds his academic intelligence.
18. According to the text, what can be concluded from early intelligence testing in the United States?
- Most European immigrants were "feeble-minded."
 - Army recruits of other than West European heritage were intellectually deficient.
 - The tests were biased against people who did not share the culture assumed by the test.
 - Both a. and b. could be concluded.
19. If asked to guess the intelligence score of a stranger, your best guess would be:
- 75.
 - 100.
 - 125.
 - "I don't know, intelligence scores vary too widely."
20. Which of the following is true of people who score high on aptitude tests?
- They achieve greater career success.
 - They are likely to be happier.
 - They always do well in college.
 - None of the above is true.

Essay Question

You have been asked to devise a Psychology Achievement Test (PAT) that will be administered to freshmen who declare psychology as their major. What steps will you take to ensure that the PAT is a good intelligence test? (Use the space below to list the points you want to make, and organize them. Then write the essay on a separate sheet of paper.)

KEY TERMS

Writing Definitions

Using your own words, write on a separate piece of paper a brief definition or explanation of each of the following terms.

1. intelligence
2. factor analysis
3. general intelligence (*g*)
4. savant syndrome
5. emotional intelligence
6. creativity
7. intelligence test
8. mental age
9. Stanford-Binet
10. intelligence quotient (IQ)
11. aptitude tests
12. achievement tests
13. Wechsler Adult Intelligence Scale (WAIS)
14. standardization
15. normal curve (normal distribution)
16. reliability
17. validity
18. content validity
19. criterion
20. predictive validity
21. mental retardation
22. Down syndrome
23. stereotype threat

Cross-Check

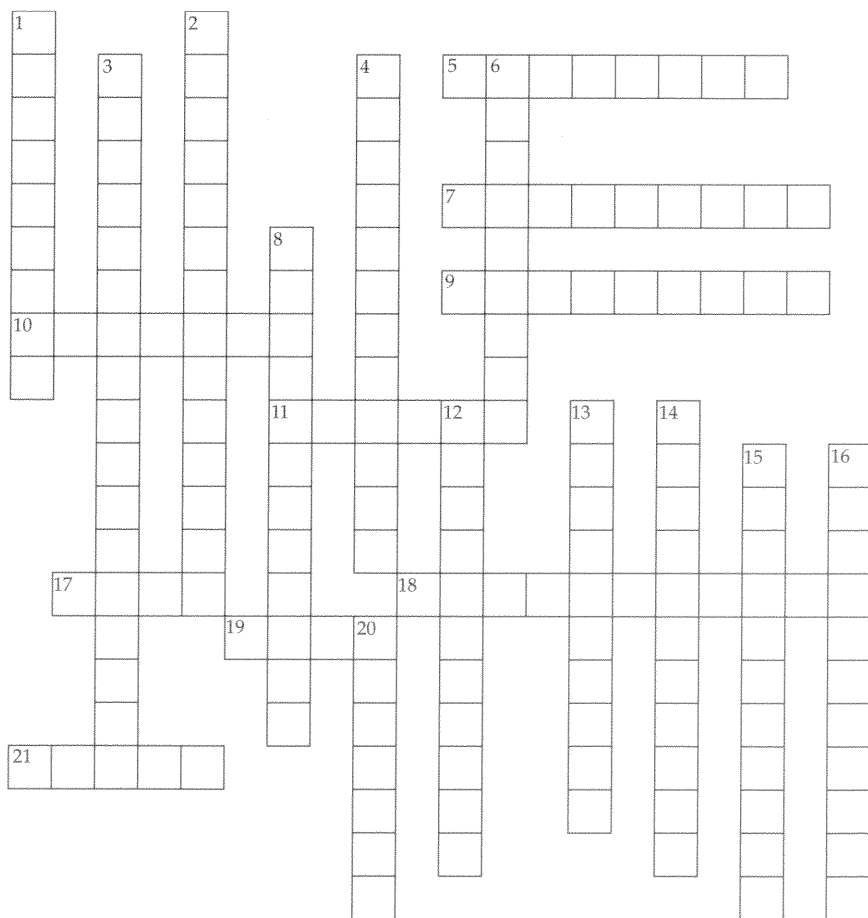
As you learned in the Prologue, reviewing and overlearning of material are important to the learning process. After you have written the definitions of the key terms in this chapter, you should complete the crossword puzzle to ensure that you can reverse the process—recognize the term, given the definition.

ACROSS

5. Type of intelligence assessed by standard intelligence tests.
7. Theorist who distinguished among three intelligences.
9. Type of intelligence often required for everyday tasks.
10. Theorist who proposed a large number of distinct types of intelligence.
11. Psychologist who revised Binet's original intelligence test.
17. The most widely used adult intelligence test.
18. Term that refers to viewing an abstract concept as if it were a real, concrete thing.
19. Most widely used intelligence test for children.
21. French psychologist who initiated the modern intelligence-testing movement.

DOWN

1. The age that typically corresponds to a given level of performance.



2. Statistical procedure that identifies clusters of related items on a test.
3. A condition of limited mental ability, as indicated by an IQ score below 70.
4. A condition of limited mental ability caused by an extra chromosome.
6. The behavior that a test is designed to predict.
8. The proportion of variation among individuals that is attributed to genes.
12. Type of test that is designed to measure what a person has already learned.
13. The success with which a test predicts the behavior it is designed to predict is its _____ validity.
14. Bell-shaped distribution that describes many physical and psychological traits.
15. The extent to which a test yields consistent results.
16. The phenomenon of rising intelligence-test performance.
20. The extent to which a test samples the behavior that is of interest is its _____ validity.

ANSWERS

Chapter Review

What Is Intelligence?

1. do not
2. reification
3. socially
4. the ability to learn from experience, solve problems, and use knowledge to adapt to new situations
5. overall (general); specific
6. factor analysis
7. general intelligence
8. Thurstone; primary mental abilities
9. novel problems
10. savant syndrome
11. multiple intelligences; physical; verbal; reasoning; do
12. triarchic; academic; practical; creative; academic
13. academic; social; only modestly
14. emotional intelligence; perceive; understand; manage; use
15. facial emotions

Emotionally intelligent people are self-aware. They can manage their emotions and they can delay gratification. They handle others' emotions skillfully. They also exhibit modestly better job performance.

16. recognize; predict; express; adaptive
17. emotional
18. conscientiousness
19. creativity; 120
20. 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.

21. social approval (or evaluation)
22. did not
23. volume; MRI; more
24. synapses; plasticity; gray matter; memory; attention; language
25. parietal; mathematical; spatial
26. frontal lobe; left; on both sides of the brain
27. faster
28. quickly; complexity

Assessing Intelligence

1. Plato
2. intelligence
3. Binet; mental; was not
4. Stanford-Binet; intelligence quotient

In the original formula for IQ, measured mental age is divided by chronological age and multiplied by 100. "Mental age" refers to the chronological age that most typically corresponds to a given level of performance.

5. a mental ability score; the same; 100
6. below; cultural
7. aptitude; achievement
8. Wechsler Adult Intelligence Scale; verbal comprehension; perceptual organization; working memory; processing speed
9. standardization
10. normal

The normal curve describes the distribution of many physical phenomena and psychological attributes (including IQ scores), with most scores falling near the average and fewer near the extremes. When a test is standardized on a normal curve, individual scores are assigned according to how much they deviate above or below the distribution's average.

11. are; 100
12. decline; improved; Flynn effect
13. nutrition; economic
14. reliable
15. test-retest
16. split-half
17. +.9
18. validity
19. content validity
20. criterion; predictive validity

The criterion is the particular behavior a predictive test, such as an aptitude test, is intended to predict. For example, performance in a relevant job situation would be the criterion for a test measuring managerial aptitude. The criterion determines whether a test has predictive validity. For example, the on-the-job success of those who do well on a job aptitude test would indicate the test has predictive validity.

21. is not; diminishes

The Dynamics of Intelligence

1. higher
2. 3
3. increases; 7; holds
4. mentally retarded; 1
5. Down syndrome
6. mainstreamed
7. healthy; adjusted; academically

Critics of ability tracking contend that it lowers students' self-esteem and sometimes creates self-fulfilling prophecies and that it promotes racial segregation and prejudice.

Genetic and Environmental Influences on Intelligence

1. generally accepted
2. more; gray matter; verbal; spatial
3. memory
4. more alike; environmental; age
5. more; biological; adoptive
6. heritability; 50 to 75
7. does not
8. do; malnutrition; sensory; social isolation
9. Head Start; emotional intelligence
10. rise; fall; schooling
11. environmental

Because of the impact of environmental factors such as education and nutrition on intelligence test perfor-

mance, even if the heritability of intelligence is high within a particular group, differences in intelligence among groups may be environmentally caused. One group may, for example, thrive in an enriched environment while another of the same genetic predisposition may falter in an impoverished one.

12. do not; greater than; is not
13. higher; Asian students have a longer school year and spend more time studying math
14. as well as
15. spelling; verbally
16. computation; problem solving; mental rotation
17. evolutionary
18. male sex hormones
19. social expectations
20. are
21. are not
22. stereotype threat

Progress Test 1

Multiple-Choice Questions

1. a. is the answer. (p. 456)
c. & d. Separating genetic from environmental influences is difficult *at any age*.
2. d. is the answer. If we divide 9, the measured mental age, by 6, the chronological age, and multiply the result by 100, we obtain 150. (p. 444)
3. b. is the answer. As social expectations have changed, the gender gap in math and science scores is narrowing. (p. 464)
4. c. is the answer. (pp. 459–460)
a. On the contrary, many *group* differences are highly significant, even though they tell us nothing about specific *individuals*.
b. Although heredity contributes to individual differences in intelligence, it does not necessarily contribute to group differences.
d. In fact, the difference has diminished somewhat in recent years.
5. b. is the answer. (p. 446)
a. This answer refers to a test's content validity.
c. This answer refers to test-retest reliability.
d. This answer refers to predictive validity.
6. a. is the answer. (p. 452)
b. Down syndrome is normally caused by an extra, rather than a missing, chromosome.
c. & d. Down syndrome is a genetic disorder that is manifest during the earliest stages of prenatal

development, well before malnutrition and exposure to drugs would produce their harmful effects on the developing fetus.

7. **c.** is the answer. Reification is a reasoning error, in which an abstract concept such as IQ is regarded as though it were real. (p. 431)
8. **d.** is the answer. (p. 458)
9. **a.** is the answer. (p. 449)
 - c. & d.** Most modern tests have high reliabilities of about +.9; their validity scores are much lower.
10. **b.** is the answer. (p. 451)
11. **d.** is the answer. (p. 453)
12. **d.** is the answer. Up to an intelligence score of about 120, there is a positive correlation between intelligence and creativity. But beyond this point the correlation disappears, indicating that factors other than intelligence are also involved. (p. 438)
 - a.** The ability to think imaginatively and intelligence are *both* components of creativity.
 - b.** Creativity, the capacity to produce ideas that are novel and valuable, is related to and depends in part on intelligence but cannot be considered simply a kind of intelligence.
 - c.** Beyond an intelligence score of about 120 there is no correlation between intelligence scores and creativity.
13. **c.** is the answer. (p. 450)
14. **d.** is the answer. That people with savant syndrome excel in one area but are intellectually retarded in others suggests that there are multiple intelligences. (p. 433)
 - a.** The ability to adapt defines the capacity we call intelligence.
 - b.** Mental retardation is at the lower end of the range of human intelligence.
 - c.** A general intelligence factor was hypothesized by Spearman to underlie each specific factor of intelligent behavior, but its existence is controversial and remains to be proved.
15. **a.** is the answer. Identical twins who live apart have the same genetic makeup but different environments; if their scores are similar, this is evidence for the role of heredity. (p. 455)
 - b.** Because fraternal twins are no more genetically alike than ordinary siblings, this could not provide evidence for the role of heredity.
 - c.** That twins raised together have more similar scores than twins raised apart provides evidence for the role of the environment.
 - d.** As both sets of correlations are weak, little evidence is provided either for or against the role of heredity.
16. **c.** is the answer. Recent estimates are generally in the range of 50 to 75 percent. (p. 455)
17. **d.** is the answer. College aptitude tests are complex tests that are not periodically restandardized. The WAIS, a more basic test that is periodically restandardized so that the average is always 100, also reflects the performance of a more diverse group. (p. 447)
18. **d.** is the answer. Findings from a range of studies—including studies related to the Flynn effect and adoption studies—have led experts to focus on the influence of environmental factors. (pp. 460–461)
 - a.** Most experts believe that in terms of predictive validity, the major tests are not racially biased.
 - b.** The reliability of the major tests is actually very high.
 - c.** The bulk of the evidence on which experts base their findings points to the influence of environmental factors.
19. **d.** is the answer. (p. 447)
 - a.** *g* is Spearman's term for "general intelligence"; there is no such thing as a "*g* distribution."
 - b.** There is no such thing.
 - c.** A bimodal distribution is one having two (bi-) modes, or averages. The normal distribution has only one mode.
20. **b.** is the answer. Enrichment programs do improve school readiness, create better attitudes toward learning, and reduce school dropouts and criminality. (p. 458)

Matching Items

- | | | |
|---------------|---------------|----------------|
| 1. h (p. 444) | 5. k (p. 432) | 9. f (p. 448) |
| 2. g (p. 432) | 6. a (p. 444) | 10. d (p. 448) |
| 3. j (p. 444) | 7. b (p. 444) | 11. c (p. 448) |
| 4. i (p. 433) | 8. e (p. 443) | |

Progress Test 2

Multiple-Choice Questions

1. **c.** is the answer. French compulsory education laws brought more children into the school system, and the government didn't want to rely on teachers' subjective judgments to determine which children would require special help. (p. 443)
 - a. & b.** Binet's test was intended for children, and Binet specifically rejected the idea that his test measured inborn intelligence, which is an abstract capacity that cannot be quantified.
 - d.** This was not a purpose of the test, which dealt with children in the school system.

2. **c.** is the answer. (p. 457)
a., b., & d. None of these is true.
3. **c.** is the answer. Predictive validity is the extent to which tests predict what they are intended to predict. (p. 448)
a. Reliability is the consistency with which a test samples the particular behavior of interest.
b. Content validity is the degree to which a test measures what it is designed to measure.
d. Standardization is the process of defining meaningful test scores based on the performance of a representative group.
4. **d.** is the answer. Reification is the error of creating a concept and then assuming the created concept has a concrete reality. (p. 431)
a. To rationalize is to develop self-satisfying explanations of one's behavior.
b. The term "nominalizing" has no relevance to psychology.
c. Factor analysis is a statistical procedure that identifies clusters of related items, or factors, on a test.
5. **d.** is the answer. (p. 444)
6. **c.** is the answer. (p. 444)
a. This is William Stern's original formula for the intelligence quotient.
b. & d. Neither of these formulas is used to compute the score on current intelligence tests.
7. **c.** is the answer. Enrichment led to dramatic results and thereby testified to the importance of environmental factors. (p. 457)
a. & d. The study involved neither intelligence tests nor comparisons with control groups.
b. The children showed a dramatic positive response.
8. **a.** is the answer. (p. 432)
9. **d.** is the answer. (p. 436)
a. The concept of general intelligence pertains more to academic skills.
b. Although emotional intelligence *is* a key component of social intelligence, Salovey and Mayer coined the newer term "emotional intelligence" to refer to skills such as Gerardeen's.
c. Practical intelligence is that which is required for everyday tasks, not all of which involve emotions.
10. **d.** is the answer. Intelligence test performances begin to become predictive at about age 4 and become stable by about age 7. (p. 451)
11. **c.** is the answer. (p. 457)
12. **c.** is the answer. (p. 453)
a. & b. There was no evidence of either in the individuals studied by Terman.
d. Vocational success in adulthood varied.
13. **d.** is the answer. (pp. 440–441)
14. **c.** is the answer. (p. 431)
a. Performance ability and intellectual ability are separate traits.
b. This has been argued by some, but certainly not most, experts.
d. Although many experts believe that there are multiple intelligences, this would not be the same thing as diverse acquired skills.
15. **d.** is the answer. (pp. 452–453)
16. **b.** is the answer. (p. 463)
17. **a.** is the answer. Both schooling and intelligence enhance later income. (p. 458)
18. **a.** is the answer. (p. 443)
19. **b.** is the answer. (p. 444)
c. & d. Reliability and validity are characteristics of good tests.
20. **c.** is the answer. (p. 457)
a. & b. Studies of twins, family members, and adopted children point to a significant hereditary contribution to intelligence scores. These same studies, plus others comparing children reared in neglectful or enriched environments, indicate that life experiences also significantly influence test performance.
d. Although the issue of how intelligence should be defined is controversial, intelligence tests generally have predictive validity, especially in the early years.

True-False Items

- | | | |
|---------------|----------------|----------------|
| 1. T (p. 444) | 6. F (p. 456) | 11. T (p. 453) |
| 2. F (p. 447) | 7. F (p. 465) | |
| 3. F (p. 449) | 8. F (p. 455) | |
| 4. T (p. 441) | 9. T (p. 447) | |
| 5. F (p. 459) | 10. T (p. 460) | |

Psychology Applied

Multiple-Choice Questions

1. **c.** is the answer. (p. 439)
a. Beyond an intelligence score of about 120, creativity and intelligence scores are not correlated.
b. & d. There is no evidence that creative people are more likely to be introverted.

2. **c.** is the answer. Heritability is a measure of the extent to which a trait's variation within a group of people can be attributed to heredity. (p. 456)
a. & b. Heritability is *not* a measure of how much of an *individual's* behavior is inherited, nor of the relative contribution of genes from that person's mother and father. Further, the heritability of any trait depends on the context, or environment, in which that trait is being studied.
3. **c.** is the answer. To be labeled mentally retarded a person must have a test score below 70 and experience difficulty adapting to the normal demands of living independently. (p. 452)
a. Down syndrome is a common cause of *severe* mental retardation; Dan's test score places him in the range of mild retardation.
b. There is no indication that Dan possesses one extraordinary skill, as do people with savant syndrome.
d. The text does not suggest that mentally retarded people eventually become self-supporting.
4. **b.** is the answer. Intelligence scores become quite stable during adolescence. (p. 451)
5. **b.** is the answer. (p. 448)
a., c., & d. Content validity is the degree to which a test measures what it claims to measure. Furthermore, "target behavior" is not a term used by intelligence researchers.
6. **c.** is the answer. (p. 449)
a. & b. The WAIS is a general aptitude test, and the WISC is for children.
d. None of these tests are achievement tests; they are all aptitude tests.
7. **d.** is the answer. At the time he took the test, Benito's chronological age (CA) was 10. Knowing that $IQ = 130$ and $CA = 10$, solving the equation for mental age yields a value of 13. (p. 443)
8. **c.** is the answer. People with savant syndrome tend to score low on intelligence tests but have one exceptional ability. (p. 433)
9. **d.** is the answer. These reasons, along with other historical and cross-cultural reasons, all argue for the role of environment in creating and perpetuating the gap. (pp. 460–461)
10. **d.** is the answer. (p. 460)
c. The racial gap is found in both girls and boys.
11. **b.** is the answer. (p. 448)
12. **d.** is the answer. Because the hearing acuity test would in no way sample behaviors relevant to intelligence, it would not have content validity as a test of intelligence. (p. 448)
a. & b. There is no such thing as content reliability or predictive reliability.
- c.** There is nothing to indicate that, used to test hearing, this test would lack predictive validity.
13. **a.** is the answer. An exam for a professional license is intended to measure whether you have gained the overall knowledge and skill to practice the profession. The SAT is designed to predict ability, or aptitude, for learning a new skill. (p. 444)
14. **a.** is the answer. If everyone has nearly the same heredity, then heritability—the variation in a trait attributed to heredity—must be low. If individuals within a group come from very similar environments, environmental differences cannot account for variation in a trait; heritability, therefore, must be high. (p. 456)
15. **d.** is the answer. It is not until after age 4 that intelligence-test performance begins to predict adult scores. (p. 451)
a. Such a conclusion is unlikely, given the high validity of the commonly used intelligence tests.
b. No such conclusion is possible, because intelligence-test performance before age 4 does not predict later aptitude.
c. Stability in intelligence scores is generally established by age 7—long before adulthood.
16. **b.** is the answer. A standardization group provides a representative comparison for the trait being measured by a test. Because this test will measure musical aptitude in North American children, the standardization group should be limited to North American children but should include children of all degrees of musical aptitude. (p. 446)
17. **d.** is the answer. Sternberg and Wagner distinguish among *academic* intelligence, as measured by intelligence tests; *practical* intelligence, which is involved in everyday life and tasks, such as managerial work; and *creative* intelligence. (p. 435)
a. & b. Verbal and performance intelligence are both measured by standard intelligence tests such as the WAIS and would be included in Sternberg and Wagner's academic intelligence.
c. Academic intelligence refers to skills assessed by intelligence tests; practical intelligence applies to skills required for everyday tasks and, often, for occupational success.
18. **c.** is the answer. (p. 444)
a. & b. Although at the time the tests were administered some individuals reached these conclusions, they were, of course, misled.
19. **b.** is the answer. Modern intelligence tests are periodically restandardized so that the average remains near 100. (p. 444)

20. **d.** is the answer. As we move up the educational ladder, the predictive validity of aptitude tests diminishes. The narrower the range, the less predictive the test. Also, intelligence tests have nothing to do with happiness. (p. 449)

Essay Question

The first step in constructing the test is to create a valid set of questions that measure psychological knowledge and therefore give the test content validity. If your objective is to predict students' future achievement in psychology courses, the test questions should be selected to measure a criterion, such as information faculty members expect all psychology majors to master before they graduate.

To enable meaningful comparisons, the test must be standardized. That is, the test should be administered to a representative sample of incoming freshmen at the time they declare psychology to be their major. From the scores of your pretested sample you will then be able to assign an average score and evaluate any individual score according to how much it deviates above or below the average.

To check your test's reliability you might retest a sample of people using the same test or another version of it. If the two scores are correlated, your test is reliable. Alternatively, you might split the test in half and determine whether scores on the two halves are correlated.

Key Terms

Writing Definitions

- Most experts define **intelligence** as the ability to learn from experience, solve problems, and use knowledge to adapt to new situations. (p. 431)
- Factor analysis** is a statistical procedure that identifies factors, or clusters of related items, that seem to define a common ability. Using this procedure, psychologists have identified several clusters, including verbal intelligence, spatial ability, and reasoning ability factors. (p. 432)
- General intelligence (g)**, according to Spearman and others, is a general factor that underlies each of the more specific mental abilities identified through factor analysis. (p. 432)
- A person with **savant syndrome** has a very low intelligence score, yet possesses one exceptional ability, for example, in music or drawing. (p. 433)
- Emotional intelligence** is the ability to perceive, manage, understand, and use emotions. (p. 436)
- Most experts agree that **creativity** refers to an ability to produce novel and valuable ideas. People with high IQs may or may not be creative, which indicates that intelligence is only one component of creativity. (p. 438)
- Intelligence tests** measure people's mental aptitudes and compare them to others' through numerical scores. (p. 442)
- A concept introduced by Binet, **mental age** is the chronological age that most typically corresponds to a given level of performance. (p. 443)
- The **Stanford-Binet** is Lewis Terman's widely used revision of Binet's original intelligence test. (p. 443)
- The **intelligence quotient (IQ)** was defined originally as the ratio of mental age to chronological age multiplied by 100. Contemporary tests of intelligence assign a score of 100 to the average performance for a given age and define other scores as deviations from this average. (p. 444)
- Aptitude tests** are designed to predict future performance. They measure your capacity to learn new information, rather than measuring what you already know. (p. 444)
- Achievement tests** measure a person's current knowledge. (p. 444)
- The **Wechsler Adult Intelligence Scale (WAIS)** is the most widely used intelligence test. It is individually administered, contains 11 subtests, and yields separate verbal and performance intelligence scores, as well as an overall intelligence score. (p. 445)
- Standardization** is the process of defining meaningful scores by comparison with a pretested standardization group. (p. 446)
- The **normal curve** is a bell-shaped curve that represents the distribution (frequency of occurrence) of many physical and psychological attributes. The curve is symmetrical, with most scores near the average and fewer near the extremes. (p. 447)
- Reliability** is the extent to which a test produces consistent results. (p. 448)
- Validity** is the degree to which a test measures or predicts what it is supposed to. (p. 448)
- The **content validity** of a test is the extent to which it samples the behavior that is of interest. (p. 448)
- A test's **criterion** is the behavior the test is designed to predict. (p. 448)

20. **Predictive validity** is the extent to which a test predicts the behavior it is designed to predict; also called *criterion-related validity*. (p. 448)
21. The two criteria that designate **mental retardation** are an IQ below 70 and difficulty adapting to the normal demands of independent living. (p. 452)
22. A common cause of severe retardation and associated physical disorders, **Down syndrome** is usually the result of an extra chromosome in the person's genetic makeup. (p. 452)
23. **Stereotype threat** is the phenomenon in which a person's concern that he or she will be evaluated based on a negative stereotype (as on an aptitude test, for example) is actually followed by lower performance. (p. 465)

Cross-Check

ACROSS

5. academic
7. Sternberg
9. practical
10. Gardner
11. Terman
17. WAIS
18. reification
19. WISC
21. Binet

DOWN

1. mental age
2. factor analysis
3. mental retardation
4. Down syndrome
6. criterion
8. heritability
12. achievement
13. predictive
14. normal curve
15. reliability
16. Flynn effect
20. content

FOCUS ON VOCABULARY AND LANGUAGE

Page 419: Three huge controversies have *sparked debate* in and beyond psychology. The topic of intelligence (along with gender differences and the nature of repressed, recovered, and false memories) has provoked emotionally charged discussions (*sparked debate*) not only within psychology but in the larger community as well.

What Is Intelligence?

Page 432: You may also know a talented artist who is *dumbfounded by* the simplest mathematical problems Researchers have used a statistical approach (factor analysis) to identify groups of test items that measure a common ability. So, someone who has a group, or cluster, of abilities in one area may be very puzzled by and completely unable to solve (*dumbfounded by*) a relatively simple problem in a different area. Spearman argued that there was a common factor (*general intelligence*, or *g*) underlying particular abilities.

Page 433: People with **savant syndrome**, for example, often score low on intelligence tests but have an *island of brilliance*—some incredible ability, as in computation, drawing, or musical memory. Some people are functionally retarded in almost every aspect except for one very specific ability (*island of brilliance*) in which they are exceptionally gifted (**savant syndrome**). Despite having very poor language skills and other cognitive dysfunctions, they may be capable of outstanding performance in computation, memory for music heard only once, draw-

ing, etc. Some psychologists argue that this is evidence for the notion of multiple intelligences.

Page 434: . . . *the street-smart* adolescent who becomes a *crafty* executive. Myers is attempting to simplify Howard Gardner's eight intelligences. As an example of one of these intelligences, he uses the adolescent who has the ability to survive in urban environments (he is *street smart*) becoming a clever (*crafty*) executive.

Page 435: . . . *how to read people* . . . People who have good practical managerial intelligence may not score high on academic ability but will be good at motivating people; assigning work to others appropriately; and knowing and understanding peoples' needs, desires, and ambitions (*knowing how to read people*). Other people may demonstrate different types of intelligences (for example, academic, creative, or emotional intelligence).

Page 435: They also agree that the differing *varieties of giftedness add spice to life* and challenges to education. The expression "variety adds spice to life" suggests that having many different experiences tends to make life more interesting (*adds spice to life*). The fact that people differ in their talents and gifts not only makes life more interesting but also poses opportunities for teachers to capitalize on the variety of abilities that students possess and to apply multiple intelligence in the classroom.

Page 438: . . . *out of the blue* . . . The solution to a very complex problem can occur unexpectedly and suddenly (*out of the blue*). This happened to Andrew

Wiles when he eventually solved Fermat's last theorem after thinking hard and long (*pondering*) about the problem for over 30 years. This example illustrates the creative process, the ability to produce novel and valuable ideas.

Page 439: Even Wiles *stood on the shoulders of others* and *wrestled* his problem with the collaboration of a former student. Don't take this literally. Wiles made use of the knowledge and wisdom of colleagues and a former student (*he stood on the shoulders of others*) when he was working hard and struggling to find the solution to Fermat's theorem (*he wrestled with the problem*).

Page 441 . . . *quick-witted*? This means being able to rapidly assess a situation or problem and respond appropriately without delay. (*Dim-witted* means to be slow and unintelligent.) Research shows that there is a positive correlation between intelligence-test scores and the speed demonstrated on a number of perceptual and neurological tests.

Page 441: The neurological approach to understanding intelligence (and so many other things in psychology) is currently *in its heyday*. Today, neurological psychology is enjoying unprecedented prosperity and growth (is *in its heyday*) and is vigorously researching many areas in psychology, including intelligence. Myers wonders if we will ultimately be able to describe and explain general intelligence (*g* factor) in pure biological terms, or if we are simply clinging obstinately to mistaken or inaccurate notions (are we *wrongheaded*). Perhaps intelligence is not a single trait but a combination of multiple abilities. The intense debate about what intelligence really is still continues.

Assessing Intelligence

Page 442: As *heirs* to Plato's individualism, people in Western societies have *pondered* how and why individuals differ. Western culture has inherited Plato's individualism. Thus, we are the recipients (*heirs*) of his ideas regarding the origins of individual differences and we think carefully and deeply (*ponder*) about how and why these differences occur. The scientific attempt to investigate this phenomenon began seriously (*in earnest*) about a century ago.

Page 443: On tests, therefore, a "*dull*" child should perform as does a typical younger child, and a "*bright*" child as does a typical older child. Children develop intellectually at different rates and so Binet and Simon developed the concept of **mental age**. Children who performed below the average level of

other children the same age (e.g., a 10-year-old who performed as the average 8-year-old did) would be considered retarded or slow in development ("*dull*"). Those who performed above the average (e.g., a 10-year-old who scored as the average 12-year-old did) would be considered developmentally advanced or precocious ("*bright*").

Page 443: To raise the capacities of low-scoring children, he recommended "*mental orthopedics*" that would train them to develop their attention span and self-discipline. Binet did not believe that intellectual capacity was wholly genetic. Rather, he believed that intellectual capacity could be improved with remedial work. Once children who were likely to have problems in school were identified, he suggested the use of "*mental orthopedics*." (*Orthopedics* is concerned with the prevention and cure of physical deformities of bones, joints, and muscles, especially in children; "*mental orthopedics*" would apply the same principles to the mind.)

Page 444: In sympathy with *eugenics*, . . . Terman (1916, pp. 91–92) envisioned that the use of intelligence tests would "*ultimately result in curtailing the reproduction of feeble-mindedness* and in the elimination of an enormous amount of crime, *pauperism*, and *industrial inefficiency*" (p. 7). Terman's belief that mental capacity was inherited and that only the smartest should be allowed to procreate (*eugenics*) led him to speculate that the use of intelligence tests could result in reducing the number of children who are born with low intelligence (*curtailing the reproduction of feeble-mindedness*). He also believed that the widespread use of intelligence tests would get rid of, or reduce, crime, poverty (*pauperism*), and low worker productivity (*industrial inefficiency*).

Page 445: Actually, the differences between *aptitude* tests and *achievement* tests are not so *clear-cut*. Some tests measure your present ability and knowledge (*achievement*), as well as predict your future capacity to learn and develop (*aptitude*). Because what you know influences what you can learn in the future and what you are capable of learning is related to what you already know, there is no definite (*clear-cut*) distinction between aptitude and achievement tests. It is a practical matter; a test can be used either to predict future progress or to measure your present ability and skill.

Page 447: . . . scores often form a roughly symmetrical, bell-shaped distribution *clustered* around the average. Many variables that we measure (weight, height, intelligence, etc.) follow a bell-shaped curve when plotted on a frequency distribution. On intelli-

gence tests, the average is 100; most scores (68%) are between 85 and 115, so they are gathered close together (*clustered*) near the mean (*average*).

Page 448: If you use an inaccurate *tape measure* to measure people's heights, your height report would have high *reliability* (consistency) but low *validity*. In order for a test to be *reliable*, the instrument should have consistent results over numerous tests. So, if you use a ruler (*tape measure*) that is not precise (*inaccurate*), it will meet the *reliability* criterion because it will always give you the same result; it will not, however, be valid. To be valid it should *accurately* measure what it is supposed to measure.

The Dynamics of Intelligence

Page 450: Developmental researchers have left few stones unturned in their search for indicators of infants' later intelligence. Can we predict later level of intelligence from observing the behavior of infants and very young children? Researchers have examined every possible variable (*they have left few stones unturned*) for accurate predictors. One test, which provides a rough (*crude*) indicator of later intelligence, involves observing how quickly children habituate to (*get bored with*) looking at a previously seen picture compared to a new one.

Page 452: During the last two centuries, *the pendulum of opinion* about how best to care for people with mental retardation has made a *complete swing*. Over time and in different ways we have taken care of the mentally retarded—first at home, then in small residential schools, then in massive institutions (*warehouses* for keeping people), and now back to a more normal situation in which they are integrated (mainstreamed) into regular classrooms. Our views about how people with mental retardation should be looked after have moved from one extreme to the other (*the pendulum of opinion . . . has made a complete swing*).

Genetic and Environmental Influences on Intelligence

Page 457: Extreme deprivation was *bludgeoning native intelligence*. In this investigation of a destitute

orphanage, Hunt (1982) found that the effect of extreme neglect was severe depression and a general mental and physical passivity (the children became "glum lumps"). Their inborn (*native*) intellectual capacity was taking a severe beating (*bludgeoning*) due to the *physical and emotional neglect*. As Myers notes, severe life experiences do leave footprints on the brain; that is, they can affect brain development and subsequent cognitive ability. Hunt's intervention program had dramatic results. This points to the strong influence of environment.

Page 461: Similarly, in the psychological domain, gender similarities vastly outnumber gender differences, but most people find the differences *more newsworthy*. Males and females are alike in many more ways than they are different. Although the similarities overwhelm (*vastly outnumber*) the dissimilarities, we are more intrigued by the dissimilarities, and gender differences are more likely to be reported by the media (*we find them more newsworthy*).

Page 463: The score differences are *sharpest* at the *extremes*. Although the variability in ability is greater within the two groups, people tend to focus on the between-group male-female differences. The differences in scores between males and females on the SAT test are more noticeable (*sharpest*) at the high and low ends of the distribution (*extremes*) than in the middle. Thus, among the very highest scorers in math, the majority are likely to be male.

Page 464: . . . *computer camps* . . . Because math and science have historically been viewed as male subjects, boys have been encouraged to become involved in special science activities and computer workshops (*computer camps*), whereas girls have been urged to take an interest in English. Today, a greater and greater number of females are involved in math and science, and the male-female difference in scores in these subjects is becoming smaller and smaller (*the gender gap is narrowing*).