

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.

6. The current view is that children with mild retardation should be integrated, or _____, into regular classrooms.
7. 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.

1. The position that both heredity and environment exert some influence on intelligence is _____ (controversial/generally accepted) among psychologists.
2. 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.

3. By inserting an extra gene that engineers a neural receptor involved in _____ into fertilized mouse eggs, researchers have created smarter mice.
4. 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.
5. 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.
6. 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.
7. 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.

8. 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."
9. 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/remains stable) during the school year and _____ (rise/fall/remains 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.