

## STUDY GUIDE – Answers

# 11: Testing and Individual Differences

---

### What Is Intelligence?

1. do not
  2. reification; intelligence test
  3. socially
  4. a mental quality consisting of 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. L. L. Thurstone; primary mental abilities
  9. novel problems
  10. savant syndrome
  11. multiple intelligences; do
  12. triarchic; analytical (academic problem solving); practical; creative
  13. emotional intelligence; perceive; understand; manage; use
  14. recognize; predict; express; adaptive
- 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.
15. emotional
  16. did not
  17. volume; MRI; more; genes; environmental stimulation
  18. parietal; mathematical; spatial
  19. synapses; plasticity; gray matter; memory; attention; language
  20. frontal lobe; left; on both sides of the brain; verbal
  21. faster
  22. quickly; complexity

### Assessing Intelligence

1. Plato
2. statistical; nature; nurture
3. Alfred Binet; mental; was not; environmental
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. an intelligence test score; the same; 100
6. eugenics
7. below; cultural
8. achievement; aptitude
9. Wechsler Adult Intelligence Scale; verbal comprehension; perceptual organization; working memory; processing speed
10. standardization
11. normal

The normal curve describes the distribution of many physical phenomena and psychological attributes (including intelligence test 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.

12. are; 100
13. decline; improved; Flynn effect
14. nutrition; economic
15. reliable
16. test-retest
17. split-half
18. +.9
19. validity
20. content validity
21. 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.

22. is not; diminishes

## **The Dynamics of Intelligence**

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

Critics of ability tracking contend that it sometimes creates self-fulfilling prophecies and that it promotes racial segregation and prejudice. Denying lower ability students opportunities for enriched education widens the achievement gap between ability groups.

## **Genetic and Environmental Influences on Intelligence**

1. more; gray matter; verbal; spatial
2. polygenetic
3. more alike; environmental; age
4. more; biological; adoptive
5. heritability; 50
6. does not
7. do; malnutrition; sensory; social isolation
8. Head Start; emotional intelligence
9. spelling; verbally; remembering; locating; emotion

10. computation; problem solving; mental rotation
11. evolutionary
12. male sex hormones
13. social expectations; more
14. do not; greater than

Because of the impact of environmental factors such as education and nutrition on intelligence test performance" 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.

15. are; is not
16. higher; Asian students have a longer school year and spend more time studying math
17. as well as
18. are
19. are not
20. stereotype threat

## Progress Test 1

### *Multiple-Choice Questions*

1. a. is the answer. (p. 545)  
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. 534)
3. b. is the answer. As social expectations have changed, the gender gap in math and science scores is narrowing. (p. 551)
4. c. is the answer. (pp. 552-553)  
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. 536)  
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. 542)  
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. (pp. 524, 536-538)
8. d. is the answer. (p. 547)
9. a. is the answer. (p. 538) co & d. Most modern tests have high reliabilities of about +.9; their validity scores are much lower.
10. b. is the answer. (p. 540)
11. d. is the answer. (p. 543)

12. c. is the answer. (p. 540)
13. d. is the answer. That people with savant syndrome excel in one area but are intellectually disabled in others suggests that there are multiple intelligences. (p. 525)
  - a. The ability to adapt defines the capacity we call intelligence.
  - b. Intellectual disability 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.
14. 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. 544)
  - 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. '
15. c. is the answer. (p.546)
16. 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. 537)
17. d. is the answer. (p. 537)
  - 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.
18. b. is the answer. Enrichment programs do improve school readiness, create better attitudes toward learning, and reduce school dropouts and criminality. (p. 548)

## 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.533)
  - c. & 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. 547) 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. 538)
  - 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. 524)
  - 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~ 534)
6. c. is the answer. (p. 534)
  - 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. 547)
  - 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. 524)
9. d. is the answer. (p. 528)
  - 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 Gerard'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. 548)
11. c. is the answer. (p. 537)
12. c. is the answer. (p. 543)
  - 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. 530-531)
14. c. is the answer. (p. 524)
  - 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. (p. 543)
16. b. is the answer. (p. 550)
17. a. is the answer. Both schooling and intelligence enhance later income. (p. 548)
18. a. is the answer. (p. 534)
19. b. is the answer. (p. 535)
  - c. & d. Reliability and validity are characteristics of good tests.
20. c. is the answer. (p. 548)
  - 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. 534) | 6. F (p. 545)  | 11. T (p. 555) |
| 2. F (p. 537) | 7. F (p. 556)  |                |
| 3. F (p. 538) | 8. F (p. 548)  |                |
| 4. T (p. 531) | 9. T (p. 537)  |                |
| 5. F (p. 532) | 10. T (p. 553) |                |

## **Psychology Applied**

### *Multiple-Choice Questions*

1. 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. 546)

- 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.
2. c. is the answer. To be labeled intellectually disabled a person must have a test score below 70 and experience difficulty adapting to the normal demands of living independently. (p. 542)
- a. Down syndrome is a common cause of severe intellectual disability; Dan's test score places him in the range of mild disability.
- b. There is no indication that Dan possesses one extraordinary skill, as do people with savant syndrome.
- d. The text does not suggest that people with intellectual disability eventually become self-supporting.
3. b. is the answer. Intelligence scores become quite stable during adolescence. (p. 534)
4. b. is the answer. (p. 538) 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.
5. 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. 534)
6. c. is the answer. People with savant syndrome tend to score low on intelligence tests but have one exceptional ability. (p. 525)
7. 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. 552-553)
8. b. is the answer. (p. 553)
- a. It is a recent phenomenon.
- c. The gap is found in both girls and boys.
9. b. is the answer. (p. 538)
10. 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. 538)
- 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.
11. 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.535)
12. 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. 546)
13. d. is the answer. It is not until after age 4 that intelligence-test performance begins to predict adult scores. (p. 540)
- 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.
14. 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. 536)
15. 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.527)
- a. & b. Verbal and performance intelligence are both measured by standard intelligence tests such as the W AIS 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.

16. c. is the answer. (p. 534)
  - a. & b. Although at the time the tests were administered some individuals reached these conclusions, they were, of course, misled.
17. b. is the answer. Modern intelligence tests are periodically restandardized so that the average remains near 100. (p. 537)
18. 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. (pp. 538-539)

### *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 fresh men 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**

1. Intelligence tests measure people's mental aptitudes and compare them with those of others, using numerical scores. (p. 524)
2. Most experts define intelligence as a mental quality consisting of the ability to learn from experience, solve problems, and use knowledge to adapt to new situations. (p. 524)
3. General intelligence (*g*), according to Spearman and others, is a general intelligence factor that underlies each of the more specific mental abilities identified through factor analysis. (p. 524)
4. 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. 524)
5. A person with savant syndrome has a very low intelligence score, yet possesses one exceptional ability, for example, in music or drawing. (p. 525)
6. Emotional intelligence is the ability to perceive, manage, understand, and use emotions. (p. 528)
7. A concept introduced by Binet, mental age is the chronological age that most typically corresponds to a given level of performance. (p. 533)
8. The Stanford-Binet is Lewis Terman's widely used revision of Binet's original intelligence test. (p.534)
9. 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. 534)
10. Achievement tests measure a person's current knowledge. (p. 535)
11. Aptitude tests are designed to predict future performance. They measure your capacity to learn new information, rather than measuring what you already know. (p. 535)
12. 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. 535)

13. Standardization is the process of defining meaningful scores by comparison with a pretested standardization group. (p. 536)
14. 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. 536)
15. Reliability is the extent to which a test produces consistent results. (p. 538)
16. Validity is the degree to which a test measures or predicts what it is supposed to. (p. 538)
17. The content validity of a test is the extent to which it samples the behavior that is of interest. (p.538)
18. Predictive validity is the extent to which a test predicts the behavior it is designed to predict; also called criterion-related validity. (p. 538)
19. The two criteria that designate intellectual disability (formerly called mental retardation) are an IQ below 70 and difficulty adapting to the normal demands of independent living. (p. 542)
20. 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. 542)
21. 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. 555)