

Chapter 11 Review Guide

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Intelligence: mental quality consisting of the ability to learn from experience, solve problems, and use knowledge to adapt to new situations.

Intelligence Test: a method for assessing an individual's mental aptitudes and comparing them with those of others, using numerical scores.

Factor Analysis: a statistical procedure that identifies clusters of related items (called *factors*) on a test; used to identify different dimensions of performance that underlie one's total score.

Reification: When we view an abstract concept (like intelligence) as if it were a concrete thing, we have made the error of reification.

Theories of Intelligence

Francis Galton (late 1800's): He believed that some people were more superior than others with respect to intelligence. He felt those people should be encouraged to mate and that less superior people should not be allowed to produce offspring (eugenics movement). He felt you could determine one's intelligence by measuring his/her head size, body proportions, and reaction time.

Charles Spearman (1930's): Noted that people "smart" in one area were often skilled in other areas. Thus, he believed in an underlying general intelligence or **g-factor**.

g-factor: a general intelligence factor that Spearman and others believed underlies specific mental abilities and is therefore measured by every task on an intelligence test.

L.L. Thurstone (1930's): Disagreed with Spearman. He identified "*8 Primary Mental Abilities*" and believed they were all independent from each other. They included: perceptual speed, numerical ability, verbal meaning, memory, spatial skills, reasoning, word fluency, & comprehension. The existence of **Savant Syndrome** supports his viewpoint.

Savant Syndrome: a condition in which a person otherwise limited in mental ability has an exceptional specific skill, such as in computation or music.

Alfred Binet: Along with Theodore Simon developed the first intelligence test in France in 1904. It was designed to measure a child's mental age in order to predict future school performance. The test was called the **Simon-Binet Intelligence Test**. It was later revised at Stanford University by Lewis Terman and is now known today as the **Stanford-Binet**.

Intelligence Quotient (IQ): defined originally (Stern) as the ratio of mental age (MA) to chronological age

Howard Gardner (1980--): agreed with Thurstone in that intellectual skills were independent of one another. He identified 8 independent **multiple intelligences:** logical/mathematical, spatial, linguistic, body-kinesthetic, musical, intrapersonal, interpersonal, & naturalist.

Robert Sternberg (1980--): believed there are 3 general types of IQ. He called this the **Triarchic Theory of Intelligence**.

Academic (or analytic): intelligence which is assessed by intelligence tests, which present well-defined problems with a single correct answer (i.e., school smarts).

Creative: intelligence demonstrated by reacting adaptively to new situations and generating novel ideas.

Practical: intelligence required for everyday tasks, which are frequently ill-defined with multiple solutions (i.e., street or business smarts).

Other Types of Intelligence

Emotional Intelligence: the ability to perceive, express, understand, and regulate emotions.

Creativity: the ability to produce novel and valuable ideas.

Brain Functions and Intelligence

While Galton was incorrect and you cannot determine IQ from head size, there is a moderate correlation (+.44) between *brain volume* and IQ (i.e., more cortical tissue and 17% more synapses in educated versus less educated people). Also, we find moderate correlations between IQ and (1) *processing speed*; (2) *perceptual speed* and; (3) *neurological speed*.

ASSESSING INTELLIGENCE

Aptitude Test: a test designed to predict a person's future performance. Aptitude refers to the *capacity* to learn (IQ tests are considered to be aptitude tests).

Achievement Test: a test designed to assess what a person has already learned (e.g., AP exams, driver's license test).

**While the SAT is designed to predict future performance (and is thus an aptitude test), it is clearly also an achievement test.

test scores and the criterion behavior (also called criterion-related validity).

Criterion: the behavior (such as college grades) that a test (such as the SAT) is designed to predict.

Extremes of Intelligence

Mental Retardation: a condition of limited mental ability, indicated by an IQ score below 70 and difficulty in adapting to the demands of life; varies from mild to profound.

(CA) multiplied by 100 (thus, $IQ = MA/CA * 100$). On contemporary intelligence tests, the average performance for a given age is assigned a score of 100.

Wechsler Adult Intelligence Scale (WAIS) & Wechsler Intelligence Scale for Children (WISC): These are the 2 most frequently used IQ tests in the US. They provide a verbal IQ along with a non-verbal or performance IQ. They also provide an overall or full-scale IQ score. The Wechsler tests have a mean of 100 and a standard deviation of 15.

Principles of Test Construction

Standardization: defining meaningful scores by comparison with the performance of a pretested "standardization group".

Normal Curve: the symmetrical bell-shaped curve that describes the distribution of many physical and psychological traits (including intelligence). Most scores fall near the average, and fewer and fewer scores lie near the extremes.

Reliability: the extent to which a test yields consistent results, as assessed by the consistency of scores on two halves of the test (split-half reliability) or on retesting at a later date (test-retest reliability).

Validity: the extent to which a test measures or predicts what it is supposed to.

a) **Face Validity:** the extent to which questions on a test appear to measure the construct of interest.

b) **Content Validity:** extent to which a test actually measures the construct of interest.

c) **Predictive Validity:** the success with which a test predicts the behavior it is designed to predict. This is assessed by computing the correlation between

Down Syndrome: a condition of retardation and associated physical disorders caused by an extra chromosome in one's genetic makeup.

GENETICS & ENVIRONMENT

Heritability: the proportion of variation among individuals on a particular trait that can be attributed to the differences in their genes.

Twin & adoption studies show that genetics do play a role in intelligence (e.g., IQ's of identical twins correlate at about .85, while fraternal twins at about .60).

However, the same studies show how important environment is in that identical twins reared together correlate at .85, while those raised in different homes correlate at .71.

Most psychologists agree that differences in group IQ scores based on ethnic background or gender are due to environmental differences not genetics.