

Notes on Intelligence and Testing – Chapter 8

Essential Questions:

- *How do psychologists define and study intelligence?*
- *How did the use of intelligence tests evolve throughout the last two centuries?*
- *How do testing scores differ between group administrations and individual administrations of intelligence tests? Between genders? Races? Socioeconomic groups?*
- *How do psychologists know whether a test is reliable and/or valid? Why are these qualities of tests important?*

Unit Objectives	
1	Compare and contrast Gardner’s and Sternberg’s theories of intelligence.
2	Evaluate Alfred Binet’s contribution to intelligence testing.
3	Evaluate Lewis Terman’s role in the development of intelligence testing.
4	Describe David Weschler’s contribution to intelligence testing.
5	Explain how group tests of intelligence differ from individual tests.
6	Differentiate between an aptitude test and an achievement test.
7	Explain the difference between reliability and validity.
8	Analyze the reasons for the differences in test scores among people of different genders, races, and ethnic groups.

I. Intelligence

- A. *Intelligence* – the capacity to think and reason clearly and to act purposefully and effectively in adapting to the environment and pursuing one’s goals
1. Extremes of intelligence

Level of Intelligence	IQ range	Capabilities of School-Age Children
Genius/Giftedness	(120+)	Not only have high intelligence scores but also tend to have other special talents such as musical or artistic ability
Above Average Intelligence	(106-120)	Have high intelligence scores but also have a high capacity to be able to learn independently
Normal Intelligence	(90-105)	Able to acquire reading and arithmetic skills to about college level
Below Normal Intelligence	(70-90)	Able to acquire reading and arithmetic skills to about tenth grade level and can later function independently and engage in productive work
Mild Mental Retardation	(50-69)	Able to acquire reading and arithmetic skills to about sixth grade level and can later function relatively independently and engage in productive work
Moderate Mental Retardation	(35-49)	Able to learn simple communication and manual skills but have difficulty acquiring reading and arithmetic skills
Severe Mental Retardation	(20-34)	Capable of basic speech and may be able to learn repetitive tasks in supervised settings
Profound Mental Retardation	(below 20)	Severe delays in all areas of development but some may learn simple tasks in supervised settings

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2. Stern calculated intelligence quotient (IQ) by dividing a child’s mental age by his/her chronological age and multiplying by 100.
1. Aspects of successful intelligence
 - a. analytical intelligence
 - a. creative intelligence
 - a. practical intelligence

A. *Theories of Intelligence –*

1. Wechsler’s Theory –
 - a. intelligence is more broad than just simply mathematical or problem solving ability but it is the ability to deal with the world.
1. Factor Theory (Spearman)–
 - a. intelligence involves general cognitive ability “g”
 - a. traditional intelligence tests are designed to measure “g” in the form of an IQ score
 - a. Thurstone –
 1. developed Spearman’s work further
 2. intelligence consists of seven primary mental abilities
 3. argued that a single IQ score cannot capture the broad range of mental abilities that constitutes intelligence
2. Jenson’s Two-Level Theory –
 - a. intellectual functioning consists of associative abilities and cognitive abilities
 - b. associative abilities – enables people to connect stimuli and events, they involve little reasoning or transformation
 - c. cognitive abilities – involve reasoning and problem solving
3. Vygotsky’s Theory –
 - a. a person’s early development and environment are especially important in shaping intelligence
 - b. social speech, egocentric speech, then inner speech allow children to problem solve
4. Gardner’s Multiple Intelligences –
 - a. multiple intelligences are needed to account for the range of mental abilities
 - b. Gardner’s theory has popular appeal but does not account for the interrelationship among the different intelligences. It also does not draw the line in determining how much separate intelligence is needed to account for the full range of mental abilities.
 - c. Gardner’s multiple intelligences:

Category	Description	Career	Example
<u>Linguistic</u>	The ability to use language, sensitivity, to the order of things. These people can argue, entertain, or instruct through the spoken word.	Poet, translator	T.S. Eliot
<u>Logical-Mathematical</u>	The ability to see the intelligence of numbers and logic, ability to handle chains of reasoning and to recognize patterns and order. These people think in terms of cause and effect and can create and test hypotheses.	Mathematician, scientist	Einstein
<u>Musical</u>	Sensitivity to pitch, melody, rhythm, and tone. These people can sing in tune, keep time with music and listen to musical selections with discernment.	Composer, singer	Stravinsky
<u>Bodily-Kinesthetic</u>	The ability to use the body skillfully and handle objects adroitly. These are hands on people with good tactile sensitivity.	Athlete, dancer, surgeon	Martha Graham

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<u>Spatial</u>	The ability to perceive the world accurately and to recreate or transform aspects of that world. These people often have acute sensitivity to visual details, can draw their ideas graphically, and can orient themselves easily in 3-D space.	Sculptor, architect, surveyor	Picasso
<u>Interpersonal</u>	The ability to understand people and relationships. These people can perceive and respond to moods, temperaments, intentions, and the desires of others.	Politician, salesperson, religious leader	Gandhi
<u>Intrapersonal</u>	Access to one's emotional life as a means of understanding oneself and others. These people can easily access their own feelings, discriminate among different emotional states, and use this to enrich and guide their own lives.	Therapist, social worker	Freud
<u>Naturalistic</u>	The ability to understand, categorize, and explain patterns encountered in the natural world. These people observe, interpret, and construct meaning from the natural world.	Botanist, farmer, rancher	Charles Darwin

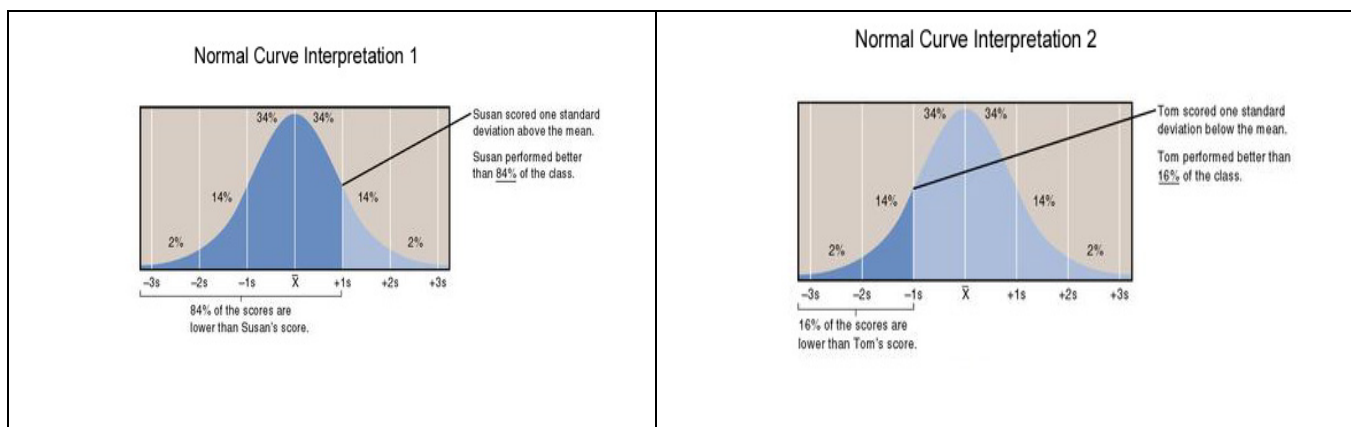
5. Sternberg's Triarchic Theory –
 - a. proposes three aspects of intelligence; analytic, creative, and practical
 - b. this theory is important because it provides a much needed focus on how people use their intelligence in everyday life
6. Emotional Intelligence (EQ)–
 - a. the ability to perceive, express, understand, and regulate emotions
 - b. critical part of social intelligence
 - c. components of EQ
 1. perceive emotions
 2. understand emotions
 3. regulate emotions
 4. Savant syndrome – a condition in which a person otherwise limited in mental ability has an exceptional specific skill such as computation or drawing.
 - a. Case Study: George and his identical twin brother Charles can give you the day of the week for any date over a span of 80,000 years. Ask them to identify the years in the next two centuries in which Easter will fall on March 23rd and they will give correct answers in lightening speed. The twin bothers can describe the weather on any day of their adult life. At the same time, they are unable to add or count to 30, and they cannot figure change from a \$10 bill for a \$6 purchase.
7. Creativity –
 - a. *expertise* – a well developed base of knowledge
 1. Pasteur said, “chance only favors the prepared mind”
 2. more chance individuals have to combine mental building blocks
 - b. *imaginative thinking skills* – ability to see things in new ways, to recognize patterns, to make connections
 - c. *a venturesome personality* –
 1. tolerates ambiguity and risk, preservers in overcoming obstacles, and seeks new experiences
 2. have a willingness to persist after failure
 3. ex. – Edison, Gates
 - d. *intrinsic motivation* –
 1. research shows that people will be most creative when they feel motivated primarily by the interest, enjoyment, satisfaction, and challenges of the work itself not deadlines, impressing people or making money

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- e. *a creative environment* –
 - 1. a creative environment sparks, supports, and refines creative ideas
- 8. Biological theories of intelligence
 - a. *brain size* –
 - 1. modern studies have revealed a slight (.15) correlation between head size and intelligence scores
 - 2. studies have not concluded if brain size is due to genetics or environmental causes like nutrition
 - b. *brain function*
 - 1. processing speed – researchers are taking a look at the speed of perception because those who perceive quickly have a higher score on intelligence tests
 - 2. neurological speed – researchers are looking at processing speed on simple tasks and seeing if that can predict individuals with higher intelligence scores

B. Intelligence Tests

- 1. what is being tested?
 - a. Crystallized intelligence – one’s accumulated knowledge as reflected in vocabulary and analogies tests. This increases up to old age.
 - b. Fluid intelligence – one’s ability to reason speedily and abstractly, as when solving novel logic problems. This ability decreases slowly up to 75.
- 2. characteristics of a good intelligence test
 - a. Standardization is the process of establishing norms for a test by administering the test numbers of people who constitute a standardization sample.
 - 1. *norms* are the scores and corresponding percentile ranks of a large and representative sample of individuals from the population for which the test is designed
 - 2. *representative sample* – a sample of individuals who match the population with whom they are to be compared with regard to key variables such as socioeconomic status and age
 - 3. *normal curve* – a bell-shaped graphic representation of data showing what percentage of the population falls under each part of the curve



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- b. Reliability is the stability of test scores over time
- c. Validity is the degree to which test scores accurately predict future behavior or performance
 - 1. content validity is the test's ability to measure the knowledge or behavior it is intended to measure
 - 2. predicative validity is the ability to predict a person's future achievements with at least some degree of accuracy
- d. Criticisms of test validity
 - 1. there is no way to measure intelligence because no clear definition of intelligence has been agreed upon
 - 2. intelligence tests items usually refer to learned information in that they reflect the quality of a child's schooling rather than the child's actual intelligence
 - 3. Halo effect – is the tendency for one characteristic of an individual to influence a test's evaluation of other characteristics. A test administrator can develop positive or negative feelings about a person or a test.
 - 4. some people are test-wise – some individuals make better use of their test time, guess the test's intentions, and find cues in the test.
 - 5. motivation to succeed – some individuals are more motivated to score well on the test than really measure their intelligence
 - 6. stereotype threat – people fear being reduced to a stereotype and then do worse because of fear
 - 7. economic and social opportunities heavily influenced by one's academic achievement and the ensuring opportunities that emerge from completing their education
 - 8. cultural bias of intelligence tests
 - 9. *The Bell Curve* by Herrnstein and Murray
 - a. IQ is genetically and environmentally determined
 - b. minority groups are trapped in an IQ lowering environment
 - c. US is ruled by a cognitive elite who create tests such as IQ and the SAT
 - 10. Reasons standardized tests need to updated
 - a. People have gotten smarter – **Flynn Effect**
 - b. The number of questions answered accurately has increased over the years
 - c. Changes that affect IQ tests scores of groups (e.g. social-cultural or technological)
 - d. Changes in educational practices or techniques (that affect knowledge)
 - e. Keep material culturally relevant, remove references to obsolete issues

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11. How to determine an intelligence test is biased
 - a. Two groups (not individuals) differ on IQ tests
 - b. Previous bias assessment (cultural – Ellis Island tests)
 - c. Compare IQ test performance to various groups to their performance on a separate, unbiased measure (criterion validity test)

3. Types of intelligence tests
 - a. Aptitude test – a test designed to predict a person’s future performance (aptitude is the capacity to learn)
 - b. Achievement test – a test designed to assess what a person has learned
 - c. Stanford-Binet Intelligence Scale
 1. can be used on individuals from age 2 to 23
 2. types of reasoning tested; verbal, quantitative, abstract visual, and short-term working memory
 - d. Wechsler Scales (WAIS, WISC-III)
 1. most commonly used intelligence test
 2. contains verbal and performance (non-verbal) – grouped by content
 - e. Kaufman Assessment Battery for Children (K-ABC)
 1. based on memory tasks for any children
 2. designed especially for assessment of school problems (mental processing abilities)

Notes based on information from the following sources:

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