Chapter 8

Intelligence

An Intelligence Test

1. Removing an appendix is called an appendectomy, removing tonsils is called a tonsillectomy. What is it called when they remove a growth from your head?
2. What 2 things that you can eat can never have for breakfast?
3. If a farmer raises wheat in dry weather, what does he raise in wet weather?
4. What would you call a person who did not have all his fingers on one hand?
5. Which is greater: six dozen dozen or half a dozen dozen?
6. Could one get down from a camel?
7. How could a man be severely injured being hit by some tomatoes?

Can you describe someone who is intelligent?

Can people be intelligent in different ways?

So what is intelligence?
Measuring Intelligence: A Brief History

- Alfred Binet (1905)
  - A Test to determine “Mental age”
  - Why would one want to do this?
- Lewis Terman (1916)
  - Stanford-Binet Intelligence Scale
  - Intelligence Quotient (IQ) = MA/CA x 100
- David Wechsler (1955)
  - Wechsler Adult Intelligence Scale (WAIS)
  - Verbal IQ, Performance IQ (non-verbal)
  - Scores are “normalized” (score refers to a place in “normal distribution”)

Subtests on the Wechsler Adult Intelligence Scale (WAIS):

- Scales yield separate verbal and performance (nonverbal) IQ scores.
- The verbal scale consists of six subtests.
- The performance scale is made up of five subtests.
- Examples of low-level (easy) test items that closely resemble those on the WAIS are shown on the right.

What’s Normally Distributed (Bell Curve)?

- The Bell Shaped Curve
- What kinds of characteristics are normally distributed
- IQ scores tend to be too!
- Implications?
  - Comparison of individual against what is known about the population (others)
  - Deviation IQ Scores and Std Deviations
  - Percentiles
**Interpretation:**

What Do Modern IQ Scores Mean?

- Deviation IQ
  - Based on the normal distribution and the standard deviation
    - Mean (average score) set at 100
    - Standard deviation (average variability of scores around mean) set at 15
    - IQ score indicates where you fall in the normal distribution
    - Percentile indicates percentage of people who score at or below the score one has obtained
- What does it mean your IQ score was 85, 115, 130, 145 on a normalized test?
  - Where would you be "in line"?

**Are IQ Tests “Reliable”?**

- If you took an IQ test and scored 85 one day and 145 the next?
  - What you say about the test?

![Reliability (Consistency of Measurement)](image)

Most normalized tests are exceptionally reliable
- correlations into the .90s (r=.90)

**Understanding Correlation Coefficients**

- The closer the correlation coefficient gets to either −1.00 or +1.00, the stronger the relationship.
- At a minimum, reliability estimates for psychological tests must be moderately high positive correlations (r=.70 and .95).
- NOTE: Correlations measuring reliability assess consistency
- NOTE: Correlations of validity measure accuracy/predictive strength
Are IQ Tests “Valid”?

If people who scored of 145 on an IQ test were typically less successful in school than people who scored 85,....

What would you say about the IQ Test? Why?

Are IQ Tests “Valid”?

- **Validity**: Does it accurately measure what it is supposed to and can it predict (“valid predictor”)?

- **General Conclusions**: IQ tests are valid indicators of academic/verbal intelligence
  1. **Academic Success**: Correlation moderately to strongly with school performance variables
     - $r = .50s$ with grades
  2. **Vocational Success**: Predictive of occupational attainment, but not strongly predictive of performance ($r = .27$)

What Determines of Intelligence

- **Heredity**
  - Family and twin studies
  - Heritability estimates

- **Environment**
  - Adoption studies
  - Cumulative deprivation hypothesis

- **Interaction**
  - The concept of the reaction range
What Determines of Intelligence

- **Heredity**/
  - Heritability estimates
  - Family and twin studies

- **Environment**
  - Heritability estimates from adoption studies
  - Cumulative deprivation hypothesis

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What Determines of Intelligence

- **Interaction of Heredity & Environment**
  - Reaction Range
  - Socioeconomic Disadvantage—Explanations for Cultural Variations
    - Independent of one’s race ("race factored out") those from lower SES do about 15 points worse on IQ tests

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New Directions in the Assessment and Study of Intelligence

- **Exploring Biological Indexes of Intelligence**
  - Reaction time and inspection time

- **Cognitive Processes and Intelligence**
  - Sternberg’s triarchic theory and “successful intelligences” (practical, analytical, creative)

- **Expanding the Concept of Intelligence**
  - Gardner’s multiple intelligences
  - Salovey’s Emotional Intelligence
Table 8.4

<table>
<thead>
<tr>
<th>Intelligence</th>
<th>Left</th>
<th>Core Components</th>
</tr>
</thead>
<tbody>
<tr>
<td>Logical</td>
<td>Mathematically</td>
<td>Sensitivity to, and capacity for, abstract numerical patterns, ability to handle long chains of reasoning</td>
</tr>
<tr>
<td>Linguistic</td>
<td>Verbal</td>
<td>Sensitivity to the sounds, rhythms, and meanings of words, sensitivity to the rules and structure of language</td>
</tr>
<tr>
<td>Musical</td>
<td>Rhythmic</td>
<td>Ability to produce and appreciate rhythm, pitch, and melody in the context of music or music performance</td>
</tr>
<tr>
<td>Spatial</td>
<td>Concrete</td>
<td>Capacity to perceive the visual spatial world accurately and to perform transformations on one's initial perceptions</td>
</tr>
<tr>
<td>Bodily</td>
<td>Kinesthetic</td>
<td>Ability to control one's body movements and to handle objects skillfully</td>
</tr>
<tr>
<td>Interpersonal</td>
<td>Interpersonal</td>
<td>Capacity to discuss and express appropriate roles to the needs, feelings, motivations, and desires of other people</td>
</tr>
<tr>
<td>Intrapersonal</td>
<td>Introspective</td>
<td>Access to one's own feelings and the ability to differentiate among them, and clear vision into one's own strengths, weaknesses, desires, and intelligences</td>
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</tbody>
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