Unit XIII Testing and Individual Differences

Modules 60-64

There is a controversy over explanations of intelligence.

1. Is Intelligence inborn capacity?
2. Can intelligence be quantified?
3. Are intelligence tests fair?
4. Do these test have meaning for real world applications?
5. How does nature or nurture effect intelligence?

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## Module 60 Introduction to Intelligence

How is intelligence defined?
Intelligence has many aspects.
"People assign the term intelligence to the qualities that enable success."

Intelligence- is the ability to learn from experience solve problems and use knowledge to adapt to new situations.

Intelligence tests assess people's mental abilities and compares them with others, using numerical scores.
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Is Intelligence one general ability or several specific abilities?
One scale or multiple?

### Charles Spearman

- Said we have one General Intelligence (g)
- He developed Factor Analysis
- Factor Analysis- "a statistical procedure that identifies clusters of related items."
- He found that those who score high in one area- typically score above average in other areas.
- He said the (g) factor underlies all intelligent behavior.

Kanazawa (researcher) supports Spearman
Talked about (g) and evolution
Intelligence originates from the ability solve novel problems, which leads to general intelligence.

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## Theories of Multiple Intelligence

Gardner and Sternberg

## Gardner found 8 intelligences

(Reinforces (g) factor)

1. Spatial
2. Musical
3. Logical/mathematical
4. Linguistic
5. Naturalist
6. Interpersonal
7. Intrapersonal
8. Body Kinesthetic

Savant Syndrome-
A condition in which a person limited in mental ability has an exceptional specific skill, such as computation.

Gardner

## Emotional Intelligence

4 components of Emotional Intelligence
Social (other people) Intelligence – Edward Thorndike
Mayer, Salovey, Caruse- Identified Emotional Intelligence Test of 4 Components

1. Perceiving Emotions
2. Understanding Emotions
    a. Predicting emotions
    b. Predict ow they change
3. Managing Emotions
    a. Expressing them appropriately
4. Using Emotions
    a. To enable thinking
    b. To use emotions appropriately

Social awareness and Self-Awareness are key.

## Managing emotions = better relationships

Intelligence is Neurologically Measured (Bio-aspects)
Brain + Intelligence
Bigger Brains? Yes
Communications = more connections
Frontal Lobes + Parietal Lobes
Brain Function
Processing speed, yes. Verbal tasked measured speed of connections and memory (associated)

## Module 61 Assessing Intelligence

History of Intelligence testing deals with Aptitude vs. Achievement
Standardized + the Curve
Reliability + Validity

History of Intelligence Testing
Plato- "no two persons are born exactly alike; but each differs from the other in natural endowments, one being suited for one occupation and the other for another."

Individual Differences
(Eugenics)

### Scientist- Francis Galton

Tried to measure intelligence
Identified nature/nurture debate

### Alfred Binet

Predicting school achievement
20th Century, France
Public School Issue
French Government wanted objective measure of intelligence
Binet figured out matching a child's chronological age with mental age
Mental Age- the level of performance typically associated with a certain chronological age.
9-year-old should know what 9 year olds can do
9-year-old can do only what a 7-year-old can do
Binet believed in a general capacity that shows up in various ways
Testing reasoning + Problem Solving
Binet did not try to explain why kids were or underperforming.
He believed in nurture or environmental experiences
Recommended low scoring children be allowed to develop attention span and self-discipline

Lewis Terman: Innate IQ
Modified Binet
Identified Genetic Intelligence = Nature

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William Stern created IQ
A person's Mental Age divided by chronological age x 100

The IQ test represents the test taker performance relative to the average performance of others of the same age…

Modern Tests of Mental Abilities: Achievement vs. Aptitude
Achievement=measures what you have learned
Aptitude = predicts your ability to learn a new skill= SAT

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## WAIS: Weschler Adult Intelligence Scale

Individual Intelligence test topics

1. Similarities-reasoning + commonality
2. Vocab-name the object/define word
3. Block Design- visual abstract + processing
4. Letter Numbering Sequence- repeats #s in ascending order + alphabetical order

### WAIS Offers:

IQ score
Verbal comprehension
Perceptual organization
Working memory
Processing speed= Shows cognitive strength and weaknesses

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## Principles of Test Construction

Standardization
Reliability
Validity

Tests have 3 criteria: Standardization, Reliability, Validity

### Standardization:

Need a basis for comparing results with others' performance
1st give test to reprehensive sample
2nd Standard procedures (really defining meaningful scores)
Normal Curve
Midpoint is average score is 100
A person's score represents whether they fall above or below the average

### Reliability:

Test has dependability consistent scores
People are tested + retested & scores match

### Validity

The test measures what it aims to measure or predicts what it says it should predict

### Predictive Validity

The test can predict the criteria of future performance or specific behavior

### Flynn Effect

Intelligence scores and assessments are rising

## Module 62 The Dynamics of Intelligence

Stability or Change?

Cross sectional or Longitudinal studies offer contrasting data

### Cross Section=

"Research at one point in time, test and compare people of various ages."

### Longitudinal Studies

Same people are tested and retested over years

Intelligence (cognitive ability) is so complex:
"It all depends on what we assess and how we assess it."

- Speed of thinking
- Wisdom
    - Expert knowledge
    - Good judgement

1. Crystallized Intelligence
    a. Accumulated knowledge
    b. Vocabulary
    c. Analogies
    d. Increases up to old age
2. Fluid Intelligence
    a. Ability to reason speedily
    b. Abstract reasoning
    c. Decreases with age
    d. Older adults
        i. Decisions less emotional
        ii. Increased social reasoning (multiple perspectives)
    e. Wisdom in social conflict

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### Stability Over the Life Span

By age 4 performance on intelligence tests predicts adolescent and adult scores.

Consistency of scores over time increases with age

Research on dreary Scotland

### Explanations for why intelligent people might live longer.

1. Intelligence facilitates more education, better jobs, and healthier environment
2. Intelligence encourages healthy living
3. Prenatal events or early childhood illnesses might influence both intelligence and health
4. A "well wired body" as evidence by fast reaction speeds, perhaps fosters both intelligence and longevity.

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## Extremes of Intelligence

What are the traits of those at the low and high intelligence extremes?

Lowest intelligence on curve= intellectual Disability (formerly mental retardation)

### Intellectual Disability:

"a person must have both a 1. Low test score and 2. Difficulty adapting to the normal demands of independent living."

Performance is 2 standard deviations below average = average = 100 then SD of 15 = IQ of 70.

Results in limited adaptive ability (life skill)

### Conceptual Skill

Language, literacy, the concept of money, time and number

### Social Skill

Interpersonal skills, social responsibility and the ability to follow basic rules and laws and to be able to avoid being victimized

### Practical Skills:

Such as daily care, occupational skill, and travel and health care

Example: Down Syndrome
Extra chromosome 21
Genetic issue

Discussion of policy -> death penalty and intellectual disability

### High Extreme Intelligence:

### Lewis Terman

1921

Termites, 1500 CA children, Longitudinal Study of children with IQ over 135.

Children were well adjusted

Found most high functioning

Highly intelligent gifted people are greatly successful. It's a trend, early giftedness leads to greatness."

Sometimes more isolated, introverted in their own worlds, however most thrive."

## Module 63 Studying Genetic and Environmental Influences on Intelligence

Evidence of Genetic Influence

Nature v Nurture debate.

### Twin Studies

Same genetic mental abilities

Identical twins raised together = identical scores

Fraternal Twins = much less similar

### Heritability

"The extent to which intelligence test score variation can be attributed to genetic variation."

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## Bio Similarities of Twins

Gray matter, white matter, verbal and spatial intelligence, similar brain activity.

## Genes for Intelligence

- Chromosomal regions for intelligence
- Pin point specific genes
- Still polygenetic = many genes are involved
- Environment makes a difference
- Parenting makes a difference

## Enrichment + Deprivation

### *Early Environment*

Extreme deprivation limits native intelligence
Deprivation can depress cognitive development
Malnutrition
Sensory deprivation
Social Isolation… all hinder normal brain development

## Schooling and Intelligence

- School helps intelligence
- Disciplined effort
- Sustained effort is key

# Module 64 “Group Differences and the Question of Bias”

Gender Similarities and Differences
Girls –
Better h a