

Intelligence

- What is intelligence
- Theories of Intelligence
- Assessment
- Culture and Intelligence
- Genetic and Environmental Influences

What is intelligence?

- Learn from experiences
- Problem Solving
- Use knowledge to adapt to new situations
- (Test Performance)

Intelligence Testing

- Alfred Binet: 1904 commissioned by the French Govt to assess children's level of ability for school
- Mental Age – the level of performance typically associated with a certain chronological age.

- Terman: Stanford-Binet test
widespread use of intelligence testing
- Stern: IQ
$$\frac{\text{MA} \times 100}{\text{CA}}$$
- Adults – Age norms

*“High-grade or border-line deficiency... is very, very common among Spanish-Indian and Mexican families of the Southwest and also among negroes. Their dullness seems to be racial, or at least inherent in the family stocks from which they come... Children of this group should be segregated into separate classes... They cannot master **abstractions** but they can often be made into efficient workers... from a eugenic point of view they constitute a grave problem because of their unusually prolific breeding” (The Measurement of Intelligence, 1916, p. 91-92).*

Theories of Intelligence

- **Spearman** - g factor – general ability
s factor – specific factor

Factor Analysis – analyzed the correlations among the s factors

g factor is the underlying factor

- **Thurstone** – 56 different tests
- identified seven clusters

(word fluency, verbal comprehension, spatial ability, perceptual speed, numerical ability, inductive reasoning and memory)

- **Kanazawa** – general intelligence evolved as a form of intelligence that helps people solve novel problems.
- how to stop a fire from spreading
how to reunite with members of one's band on the other bank of a river.
- novel problems vs everyday problems

Theories of Multiple Intelligences

- **Gardner's Eight Intelligences**

Linguistic – T S Elliot

Logical-mathematical – Einstein

Musical – Stravinsky

Spatial – Picasso

Bodily-Kinesthetic – Martha Graham

Intrapersonal - Freud

Interpersonal – Gandhi

Naturalist - Darwin

Sternberg's Three Intelligences

Triarchic Theory

- Analytical (Academic problem-solving)
- Creative (Adaptive problem solving)
- Practical (Everyday tasks with multiple solutions)

- **Information Processing Theories**

Intelligence broken down into
skills

to take in information

process it

use it to reason and solve problems

Sternberg

“components” & “metacomponents”

Can Intelligence be measured neurologically?

- Brain Size - .33 correlation with intelligence
- Frontal and Parietal lobe
- Synapses- development of neural connections in response to the environment

- Perceptual Speed

perceiving quickly .3 to .5 correlation with intelligence

- Neurological Speed:

their brain waves indicate that intelligent people register a simple stimulus more quickly and with greater complexity

Pushing a button when x appears on screen

Two ends of the continuum

- Mental Retardation
below 70 on intelligence tests
adaptive skills are inadequate
mild, moderate, severe, profound
- Causes
Down's Syndrome
maternal rubella, anoxia
Training

- Gifted

IQ Above 130

Gifted and Talented Programs

- Consistency over time

Deary et al (2004) 80 year old Scots were tested .66 correlation with scores as 11 year olds

Assessment

- Wechsler Tests
- WAIS-R (1981) adult intelligence scale
- WISC-R (1974) intelligence scale for children
- Verbal — Information, Comprehension, Memory Span, Arithmetic, Similarities, Vocabulary
- Performance — Picture arrangement, Picture completion, block design, object assembly, digit symbol

Genetic and Environmental Influences

- Twin & Adoption Studies

Identical Twins	reared together	.8
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	reared apart	.7
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Fraternal Twins		.6
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Siblings		.4
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Adopted Children		.3
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Environmental Influences

Group Differences

Gender

- girls superior verbal, nonverbal memory,
- spatial ability – male advantage
- Math - computing – female
reasoning – males

Most studies in the US

- Math – over a 100 different studies – (Hyde et al, 2008) nearly identical average scores
- Gap nonexistent in Sweeden & Iceland as compared to Turkey and Korea

- Race

Average IQ difference between Blacks and Whites in the U.S.

Asian students outperform N American students on math achievement

- Ethnicity

- Caste

- Nationality
- ***IQ and the Wealth of Nations*** – Lynn & Vanhanen (Correlation with GDP - .82)
185 countries
data on IQ scores of 81 countries

Culture and Intelligence

- Brazilian street children
- Berkeley housewives

Sternberg & Grigorenko (2004)

More abstract and removed from the real world the problems were the worse the performance

The Theory of Successful Intelligence

Sternberg

- **Successful Intelligence**
ability to achieve success in life in terms of one's personal standards within one's socio cultural context.
- the construct has been defined in terms of measurement
- Success – capitalizing on strengths and correcting/compensating for weaknesses

- According to the theory,
balancing of abilities is achieved so as to adapt to, shape and select environments.
- modify oneself to suit the envt – adapt
- Modify the envt to suit oneself – shape
- Find a new envt that is a better match to one's skills, values or desires (selection).

- Success – balance of analytical, creative and practical abilities
- Importance of *Context* in understanding human intelligence

- Cultural studies
 - children may develop contextually important skills at the expense of academic ones
 - children have substantial practical skills that go unrecognized in academic tests
 - Dynamic testing may reveal cognitive skills not revealed by static testing

- Intelligence different things in different cultures
Taiwanese Chinese conceptions (Yang & Sternberg, 1997) 5 factors
general cognitive factor
interpersonal
intrapersonal
intellectual self assertion
intellectual self effacement

- Kenya (Grigorenko et al, 2001)

Luo

reiko – knowledge and skills

luoro – respect

winjo – understand how to handle real life problems

paro - initiative

Sternberg's 5 Components for Creativity

- Creativity
 - expertise
 - imagination
 - openness
 - intrinsic motivation
 - creative environment

“The difference between a simpleton and an intelligent man, according to the man who is convinced that he is of the latter category, is that the former wholeheartedly accepts all things that he sees and hears while the latter never admits anything except after a most searching scrutiny. He imagines his intelligence to be a sieve of closely woven mesh through which nothing but the finest can pass. ”

— R.K. Narayan