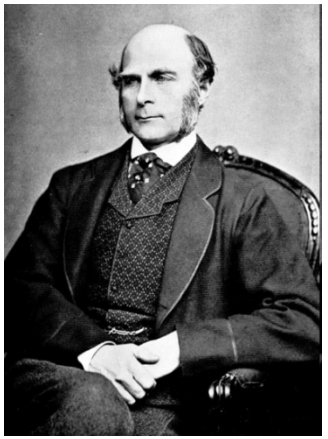
Intelligence

Lecture 24

“Psychology’s Most Telling Contribution To Date”

Herrnstein (1973, p. 62)

- Francis Galton
  - *Hereditary Genius* (1869)
  - Anthropometrics
    - Correlation Coefficient
  - Eugenics Movement
- Alfred Binet
  - Binet-Simon Test (1905)
    - Theodule Simon



The Binet-Simon "Scale for Measuring Intelligence"

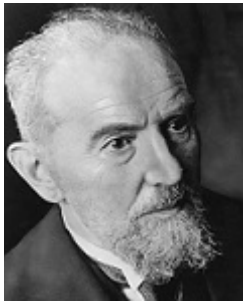
Matarazzo (19721), after Binet & Simon (1905)

- Following a Moving Object With the Eyes
- Finding and Eating a Square of Chocolate Wrapped in Paper
- Comparing Two Lines of Unequal Length
- Repeating a Sentence of 15 Words
- Telling How Two Common Objects are Different
- Telling How Two Common Objects are Similar
- Making Rhymes
- Repeating Spoken Digits
- Sentence Completion
- Using Three Nouns in a Single Sentence
- Paper Folding and Cutting
- Defining Abstract Terms

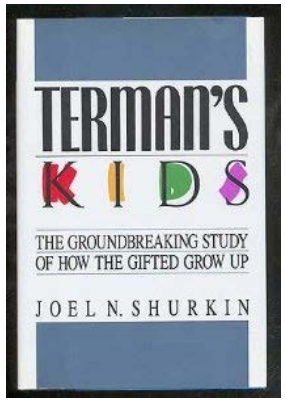
Mental Age and the Intelligence Quotient

Binet & Simon (1908); Stern (1912)

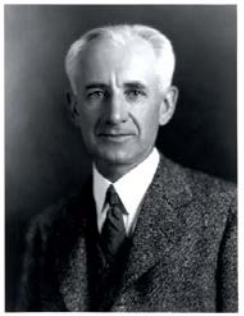
- Mental Age
  - Items Arranged in Increasing Order of Difficulty
  - Items Grouped into Clusters by Age Level
    - Ages 3-13
    - Passed by a Majority of Children at That Level
- IQ = (MA/CA) x 100
  - Mental Age
  - Chronological Age



The American Scene



- Louis Terman (1916)
  - Stanford-Binet Intelligence Scale
  - Study of “Gifted” Children
- Robert Yerkes (1921)
  - Army “Alpha” and “Beta” Tests
    - Armed Forces Qualification Test
- David Wechsler (1936)
  - Wechsler Adult Intelligence Scale
    - Wechsler Intelligence Scale for Children



The Wechsler Adult Intelligence Scale

Wechsler (1939)

Verbal Scales

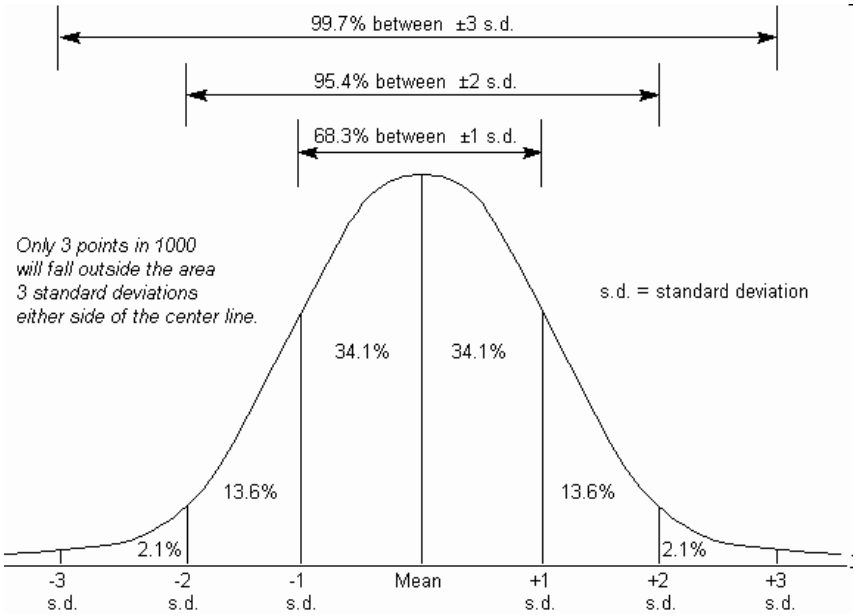
- Information
- Comprehension
- Memory span
  - 8 Digits Forward
  - 6 Digits Backward
- Arithmetical Reasoning
- Similarities
- Vocabulary

Performance Scales

- Picture Arrangement
- Picture Completion
- Block Design
- Object Assembly
- Digit Symbol

Calculating the Deviation IQ

- Norms for Age Groups
  - Age 16-75
- *Z*-Score: Standard Deviations from Mean
  - Produces “Normal” (Gaussian) Distribution

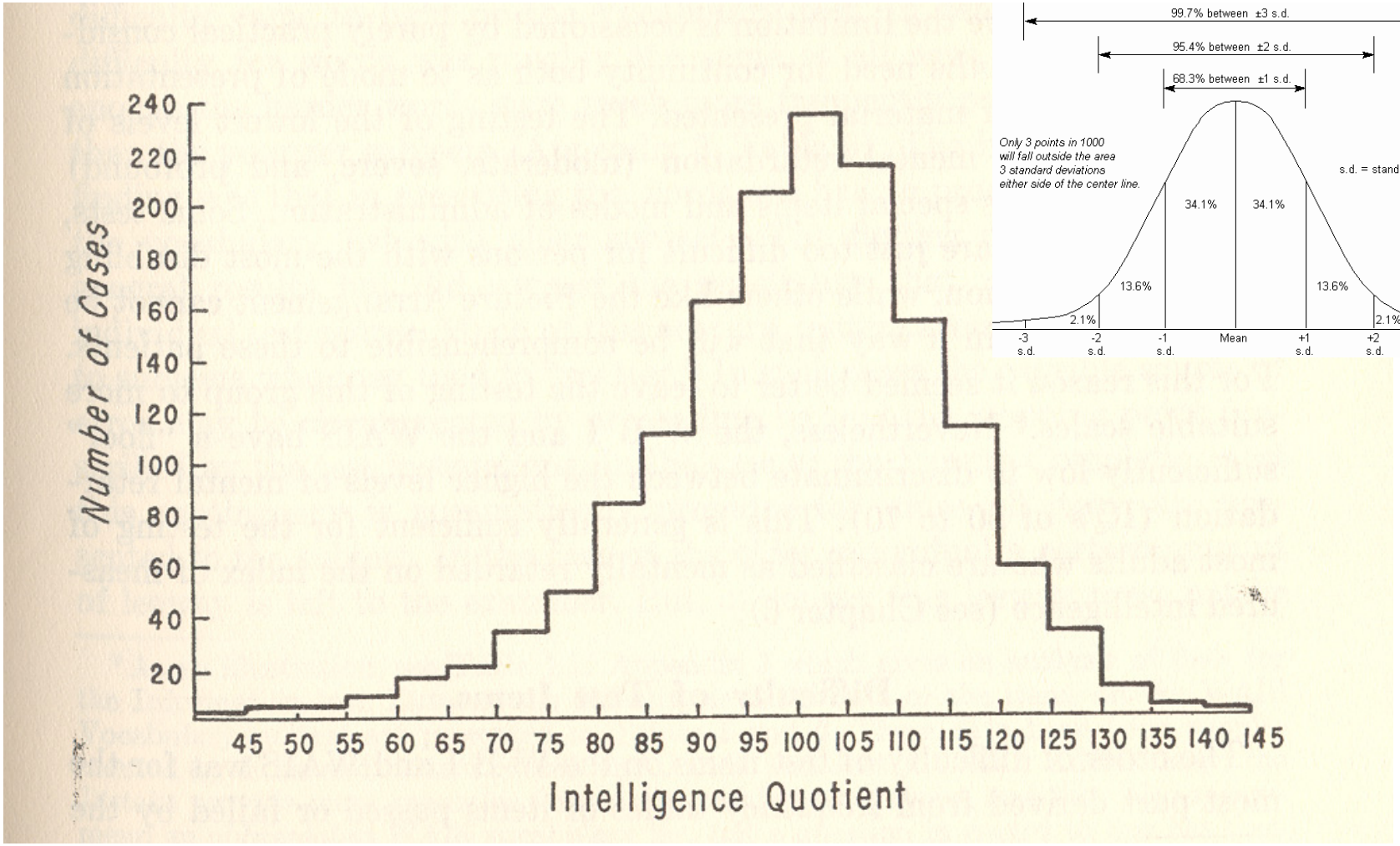


Assume $M = 40$, $SD = 12$
Transform to $M = 100$, $SD = 15$

Test Score	***Deviation IQ***
40	100
28	85
52	115
16	70
64	130

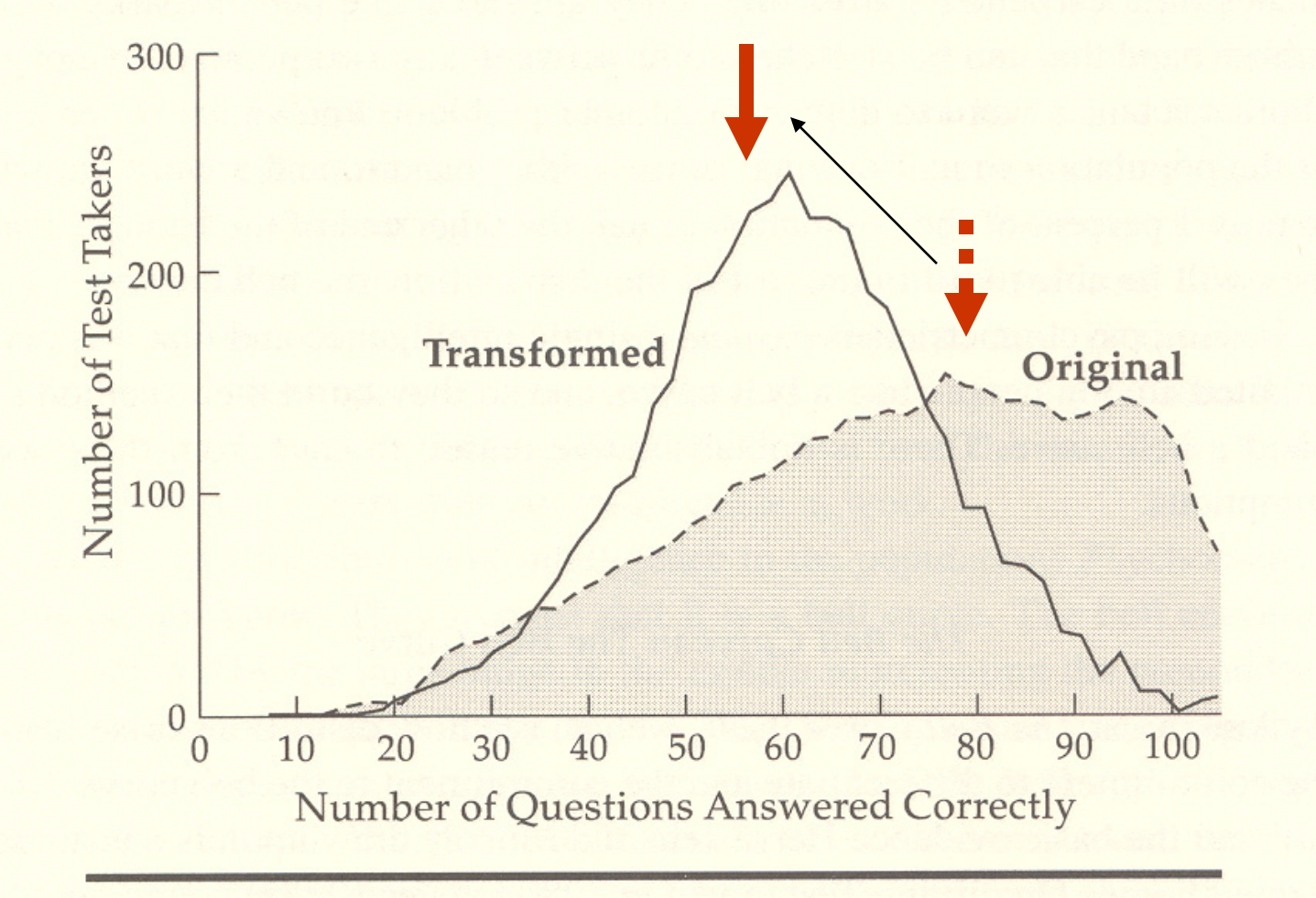
Frequency Distribution of IQ

after Wechsler (1939)



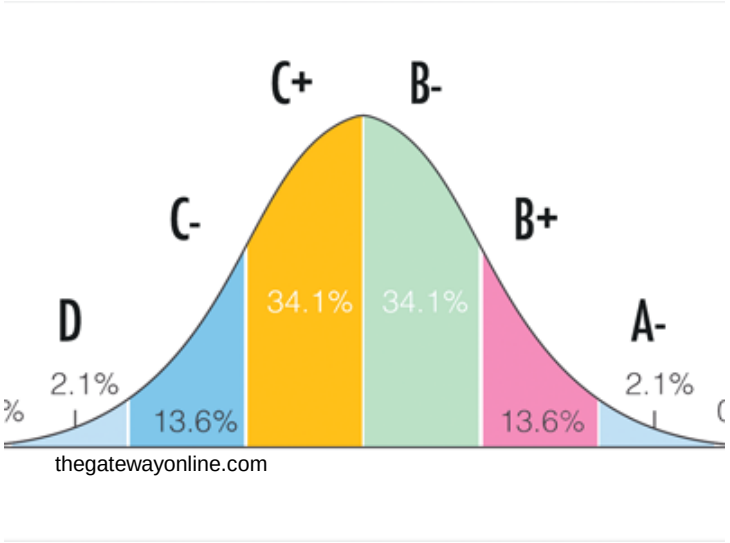
“The Bell Curve” of IQ

AFQT administered to National Longitudinal Study of Youth, 1980
Fischer et al. (1996), after Herrnstein & Murray (1994)



The “Forced Curve”

- “Grading on the Curve”
  - *M* = C; As and Bs = Ds and Fs
- WAIS, WISC, Stanford-Binet
  - *M* = 100, *SD* = 15
- SAT, GRE, GMAT
  - *M = 500, SD* = 100
- LSAT
  - *M* = 150, *SD* = 10



Properties of Psychometric Tests

- Standardization
- Norms
- Reliability
  - Inter-rater
  - Test-Retest
- Validity
  - External Criterion
- Utility
  - Cost-Benefit Ratio

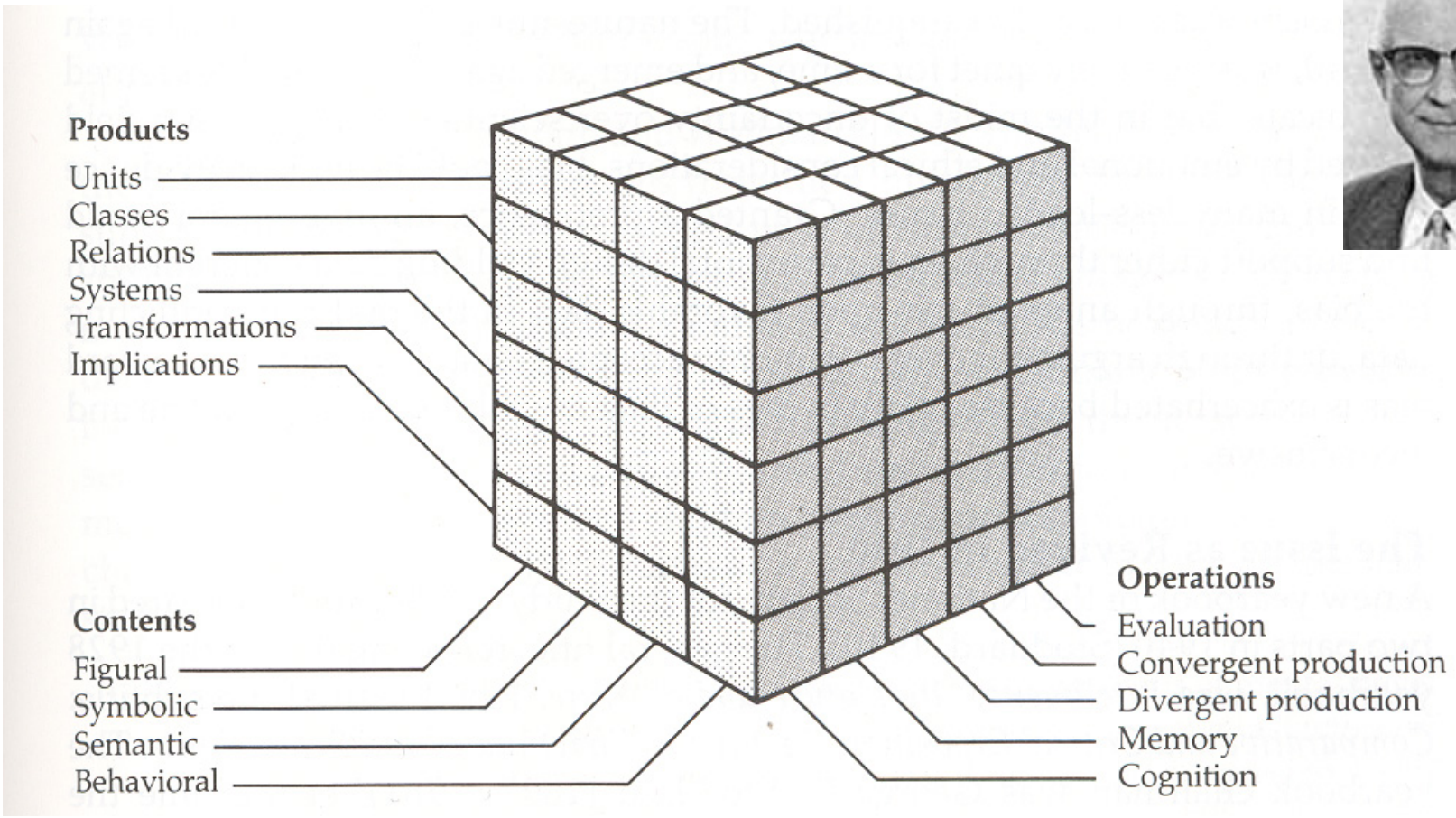
The Structure of Intelligence

- Spearman (1904): General Intelligence
  - Two-factor Theory
    - General Intelligence (*g*)
    - Specific Factors (s_n)

- Thurstone (1941): Primary Mental Abilities
  - Factor Analysis
    - Number
    - Word Fluency
    - Verbal Meaning
    - Memory
    - Reasoning
    - Space
    - Perceptual Speed

The Structure of Intellect

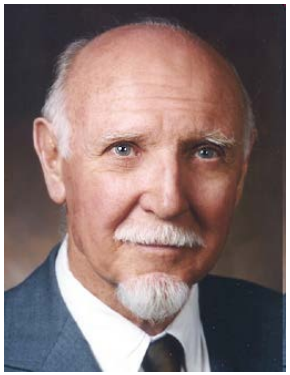
Guilford (1967),as revised



Crystallized and Fluid Intelligence

Cattell (1942)

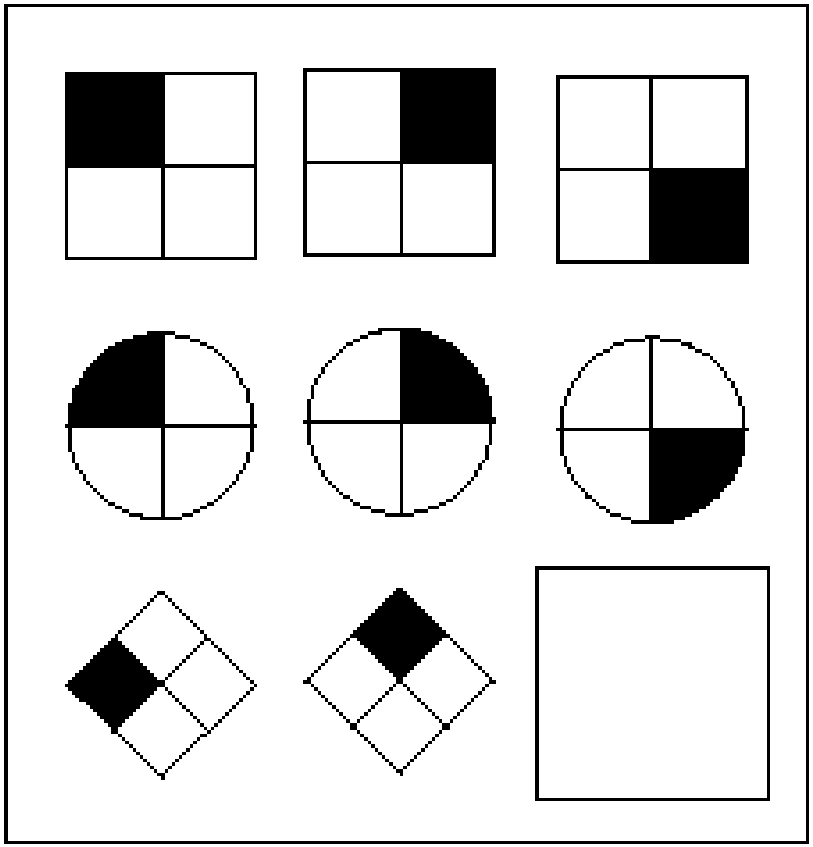
- Fluid Intelligence (*Gf*)
  - General Ability to Perceive Relationships
  - Neurological Connections
  - Assessed by “Culture Fair” Tests
- Crystallized Intelligence (Gc)
  - Product of Experience
    - Education, Environment
  - Assessed by Standard Intelligence Tests
- Components of Performance
  - Fluid Intelligence + Education + Motivation



Raven's Progressive Matrices

Raven (1938)

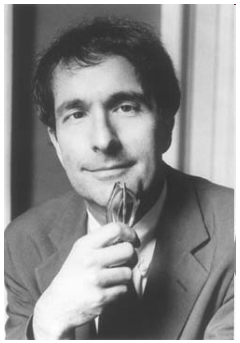
Sample Item



Wikipedia

The Theory of Multiple Intelligences

Gardner (1983, 1999)



Multiple Intelligences

- Linguistic
- Logical-Mathematical
- Spatial
- Musical
- Bodily-Kinesthetic
- Intrapersonal
- Interpersonal

Evidence

- Isolation by Brain Damage
- Exceptional Cases
- Identifiable Core Operations
- Psychometric Tests
- Experimental Tasks

Triarchic Theory of Intelligence

Sternberg (1985)

- Analytical Intelligence
  - Meta-Components
  - Performance Components
  - Knowledge Acquisition Components
- Creative Intelligence
  - Novelty Skills
  - Automatization Skills
- Practical Intelligence
  - Adaptation, Shaping, Selection

Intelligence Beyond Cognition

- Social Intelligence (Thorndike, 1920)

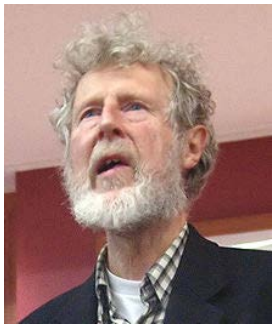
  "The ability to understand and manage men and women, boys and girls – to act wisely in human relations" (p. 228)

- Emotional Intelligence (Salovey & Mayer, 1990)

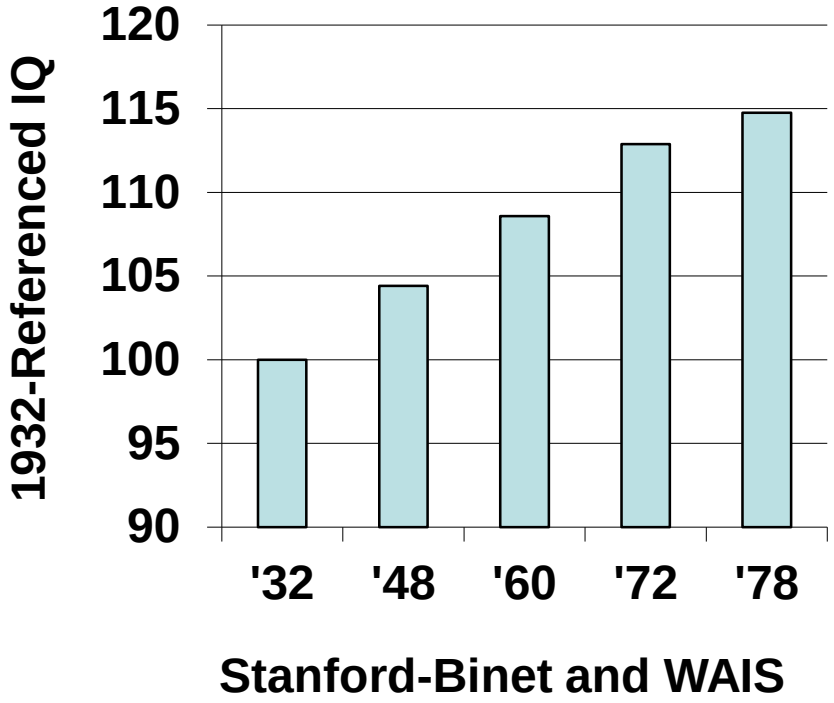
  "The ability to monitor one's own and others' feelings, to discriminate among them, and to use this information to guide one's thinking and action" (p. 189)

The “Flynn Effect”

Flynn (1984, 1987, 1999, 2007, 2012)



United States



Netherlands