E-411 PRMA

WEEK 6 - INTELLIGENCE AND FACTOR ANALYSIS

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THIS WEEK

Intelligence

Factor Analysis

INTELLIGENCE

What is intelligence?

What makes someone intelligent?

INTELLIGENCE IS ...

- There is no consensus on what intelligence is
- There is no single instrument to measure intelligence
- To Sternberg's public, intelligence means
  - "Reasons logically and well"
  - "Reads widely"
  - "Displays common sense"
  - "Keeps an open mind"
  - "Reads with high comprehensions"

INTELLIGENCE COULD INVOLVE ...

- Problem-solving ability
- Verbal ability
- Social competence

INTERACTIONIST VIEWS OF INTELLIGENCE

Galton - possessing great sensory (hearing, visual) abilities

Binet - intelligence involves reasoning, judgment, memory, and abstraction and these cannot be seperated

Wechsler - intelligence is an aggregate capacity made of measurable, qualitatively different abilities that interact in a complex, non-additive fashion

Wechsler - measurement of intelligence affected by nonintellective factors

Piaget - evolving biological adaption to the world

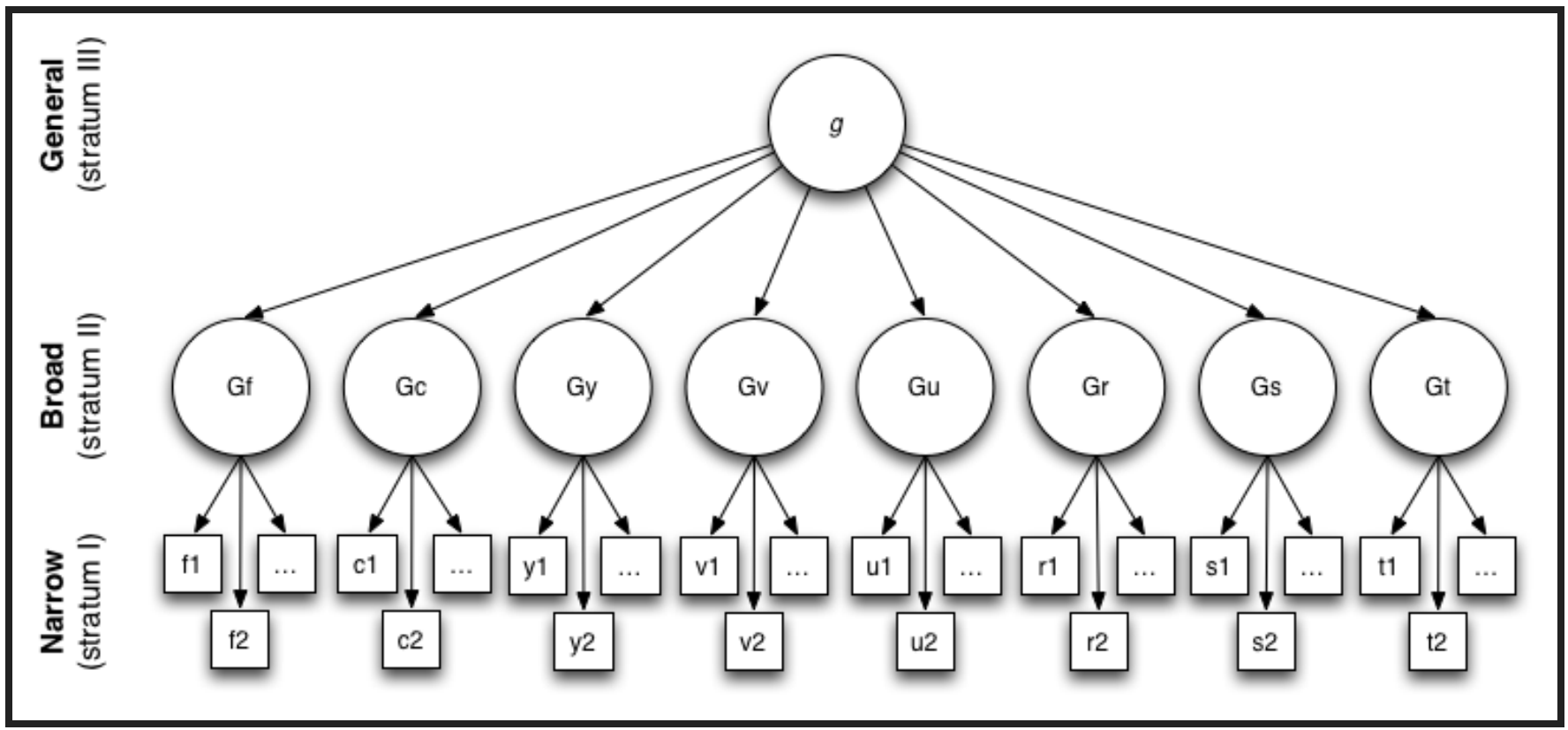
FACTOR ANALYSIS AND INTELLIGENCE

- Spearman (1927), existence of a general ability factor, *g* and specific factors, *s*
- Intelligence tests with high correlations possess high *g*
- Group factors common to a group of activities but not *g*
- Thurstone purposed a 7 factor structure of intelligence but could not escape *g*
- Gardner adds interpersonal (working with others) and intrapersonal (working with yourself)

MOTIVATION FOR THE CHC MODEL

- Cattell proposed a theory of intelligence that consists of crystallized and fluid intelligence
- crystallized intelligence, *Gc*, ability to use skills, experience, & knowledge (e.g. retrieving and applying information)
- fluid intelligence, *Gf*, capacity for solving novel problems
- Horn added additional factors *Gs*
- Carroll proposed a 3 layered hierarchical view with *g* on the top, then factors similar to Cattell's and Horn's, and specific factors depending on the second-level factors

CARROLL'S MODEL



CHC MODEL

McGrew and colleagues tried to reconcile these approaches

Proposed a modified Carroll model without a *g*

Omission of *g* based on the lack of utility for their needs

McGrew calls for adoption of the CHC model and made data available here

INFORMATION-PROCESSING FRAMEWORK

- Rather than using factor analysis to derive "what" intelligence is, examine how information is processed
- simultaneous processing, integration at once
- successive processing, sequential integration
- Extant tests do not take into account problem solving strategy
- Sternberg proposed successful intelligence, how well we adapt, share, shape, select environments that confirm to personal and societal success

HOW TO MEASURE INTELLIGENCE?

- Myriad of tasks developed depending on age of testtaker
- Infants focused on sensorimotor skills; shift towards verbal and performance abilities as children age
- Mental age has fallen out of favor
- For children, tests often used for school placement
- Adults, test more diverse and typically used clinically

PROBLEMS IN INTELLIGENCE

- Nature vs. nurture
  - Preformationism & predeterminism - slave to your genes
  - Twin studies
  - Interactionist view - unlimited potential
- Stability
  - Young adult intelligence most important predictor of intelligence of older adults
  - Aging, physical/mental health, medications - confounders
  - "Early ripe, early rot"

- Early ripe, early rot

MORE PROBLEMS

Flynn effect - rise in intelligence test scores expected to occur on a normed intelligence test from the date the test was first normed.

TED Talk by Flynn

Personality ≡ Intelligence

Gender differences?

Family effects starting in the womb?

Cultural considerations? Culture-loading and creation of culture-fair tests