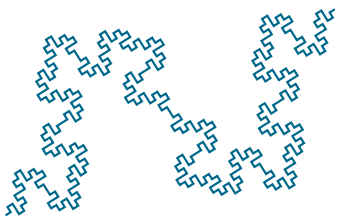
Personality and Intelligence

S. Mason Garrison
Vanderbilt University, Peabody College



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Introduction

Definitions of Intelligence I

- Consensus Definition (Gottfredson, 1997)

  "Intelligence is a very general mental capability that, among other things, involves the ability to reason, plan, solve problems, think abstractly, comprehend complex ideas, learn quickly and learn from experience. **It is not merely book learning, a narrow academic skill, or test-taking smarts. Rather it reflects a broader and deeper capability for comprehending our surroundings** – 'catching on,' 'making sense' of things, or 'figuring out' what to do."

Definitions of Intelligence II

- Boring's Definition (Boring, 1923)

  "[I]ntelligence as a measurable capacity must at the start be defined as the capacity to do well in an intelligence test. Intelligence is what the tests test."

- Boring's Definition Misquoted (e.g., Legg & Hutter, 2007)

  "Intelligence is what is measured by intelligence tests."

Structure I

- Fluid – Crystallized Distinction (Cattell, 1941; Horn, 1965)
  - Fluid Intelligence
    is the ability to think systematically and solve problems in novel situations.
  - Crystallized Intelligence
    is the capacity to use reason, information, and experience. I like to think of it as "knowledge," and that is the product of our accumulated experiences interacting with fluid intelligence.

Structure II

- Carroll Three-Stratum Theory (1993)
  - Hierarchical Structure
    1. narrow (70),
    2. broad (10), and
    3. general cognitive ability (1)

Structure III

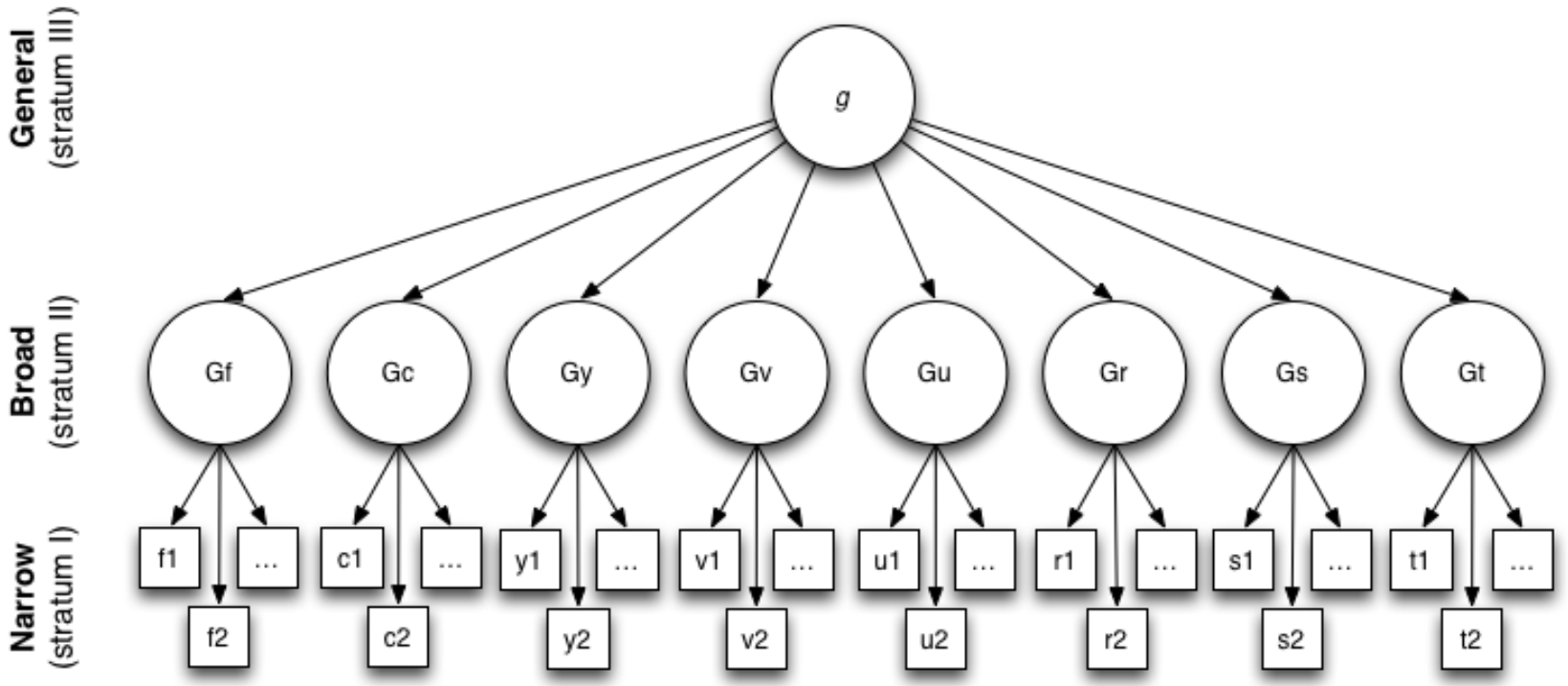


Image Source: Wikipedia.org

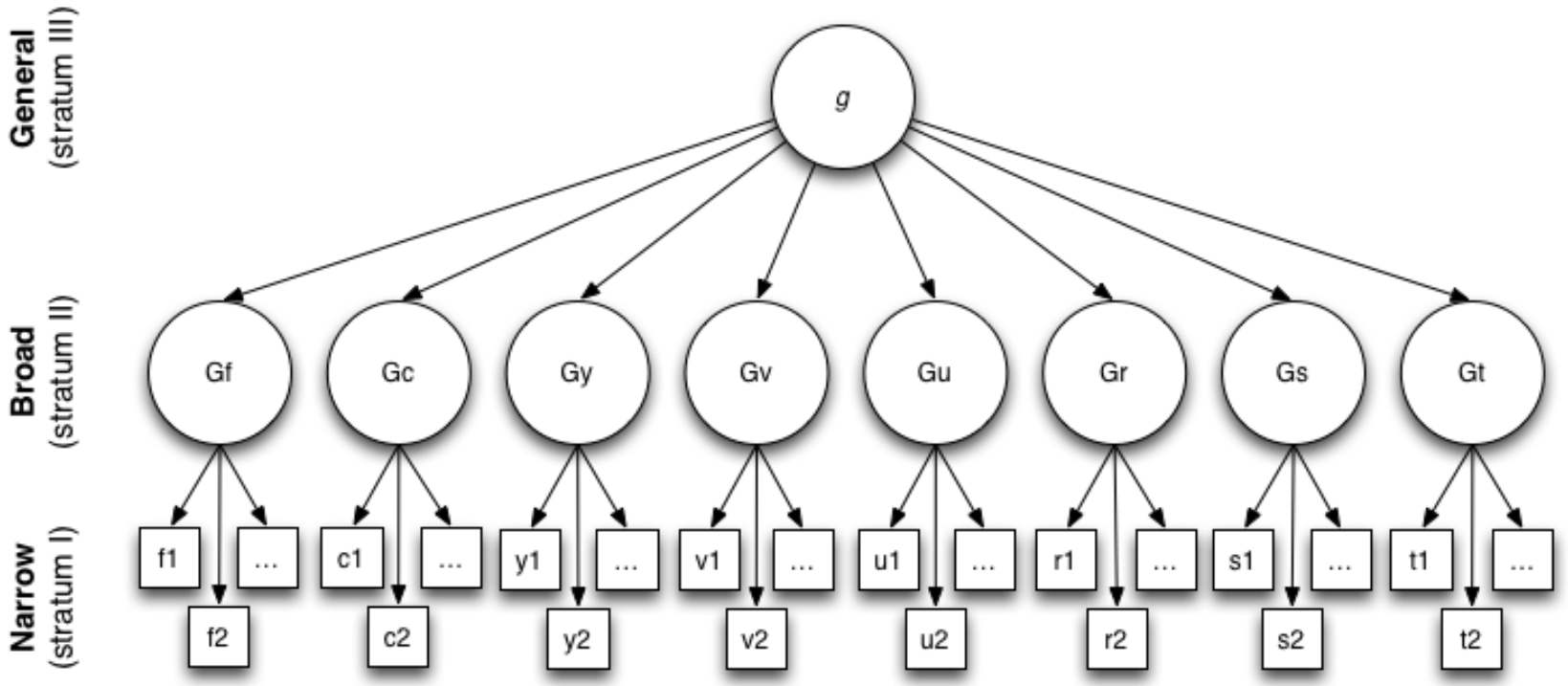
Structure IV

- Cattell-Horn-Carroll Theory
  is the integration of Cattell and Horn's theory within Carroll's structural model. The broad abilities are:
  1. Crystallized Intelligence (Gc)
  2. Fluid Intelligence (Gf)
  3. Quantitative Reasoning (Gq)
  4. Reading Writing Ability (Grw)
  5. Short-Term Memory (Gsm)
  6. Long-Term Storage and Retrieval (Glr)
  7. Visual Processing (Gv)

Structure V

8. Auditory Processing (Ga)
9. Processing Speed (Gs)
10. Decision/Reaction Time/Speed (Gt)

Structure VI



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Why the distinction?: Intelligence vs. Personality I

Three dichotomies seem to create the view that intelligence and personality are considered categorically distinct (DeYoung, 2011).

1. Cognitive and noncognitive traits
   - Intelligence considered to be cognitive, and
   - personality considered to be noncognitive.
   - However, this is a very arbitrary distinction.
   - Cognition is an essential part of personality.
   - At present, all this distinction states is that Noncognitive traits are not intelligence. (DeYoung, 2011).
2. Methods of measurement:
   - Intelligence is usually assessed using performance based "ability" tests, whereas
   - personality is usually assessed by self report (or other report) "questionnaires".

Why the distinction?: Intelligence vs. Personality II

3. Conceptual distinction in measurement
   - Intelligence is often considered to reflect "maximal performance" (i.e., performance when individuals are trying their hardest), whereas
   - personality is considered to reflect "typical behavior"(Cronbach, 1949).

- These final two distinctions are a function of the method of assessment.
  - Noncognitive traits impact cognitive performance all the time.
    - Test Anxiety, Motivation, etc.
  - Duckworth and colleagues (2011) illustrated that incentivizing performance on IQ tests lead to a .66 SD score increase, or approximately 10 IQ points.

Intelligence within Personality Theory I

- Eyesynck: PEN I
  - Intelligence and Personality are unrelated (Eysenck, 1994)
  - Orthogonal to Personality
- Big Five and the Lexical Hypothesis (Goldberg, 1990)
  - Is a fundamental piece of multiple factors
  - Primarily, Openness to Experience & Intellect (Saucier, 1992; Trapnell, 1994; McCrae, 1994)
    intellectual, intelligent, philosophical, erudite, clever
  - But, pieces of conscientiousness are in there also (Mischel et al., 1989; Duckworth et al., 2011)
  - Some see it as a fundamental facet of intellect (DeYoung et al., 2007)

Intelligence and Conscientiousness I

It's wonderfully weird!

- Orthogonal (Ackerman & Heggestad, 1997)
- Positively Correlated (Kuntsi et al., 2004; Lynam et al., 1993)
- Negatively Correlated (Moutafi et al., 2004; Duckworth et al., 2011; Chamorro-Premuzic & Furnham, 2005)

Intelligence and Conscientiousness I

Stakes of Assessment explains the distinction.

- Orthogonal in meta-analyses (they aggregate)
- Positively Correlated under low stakes testing (Goff & Ackerman, 1992)
- Negatively Correlated under high stakes testing (Moutafi et al., 2004; Duckworth et al., 2011)

Applications to Health Research

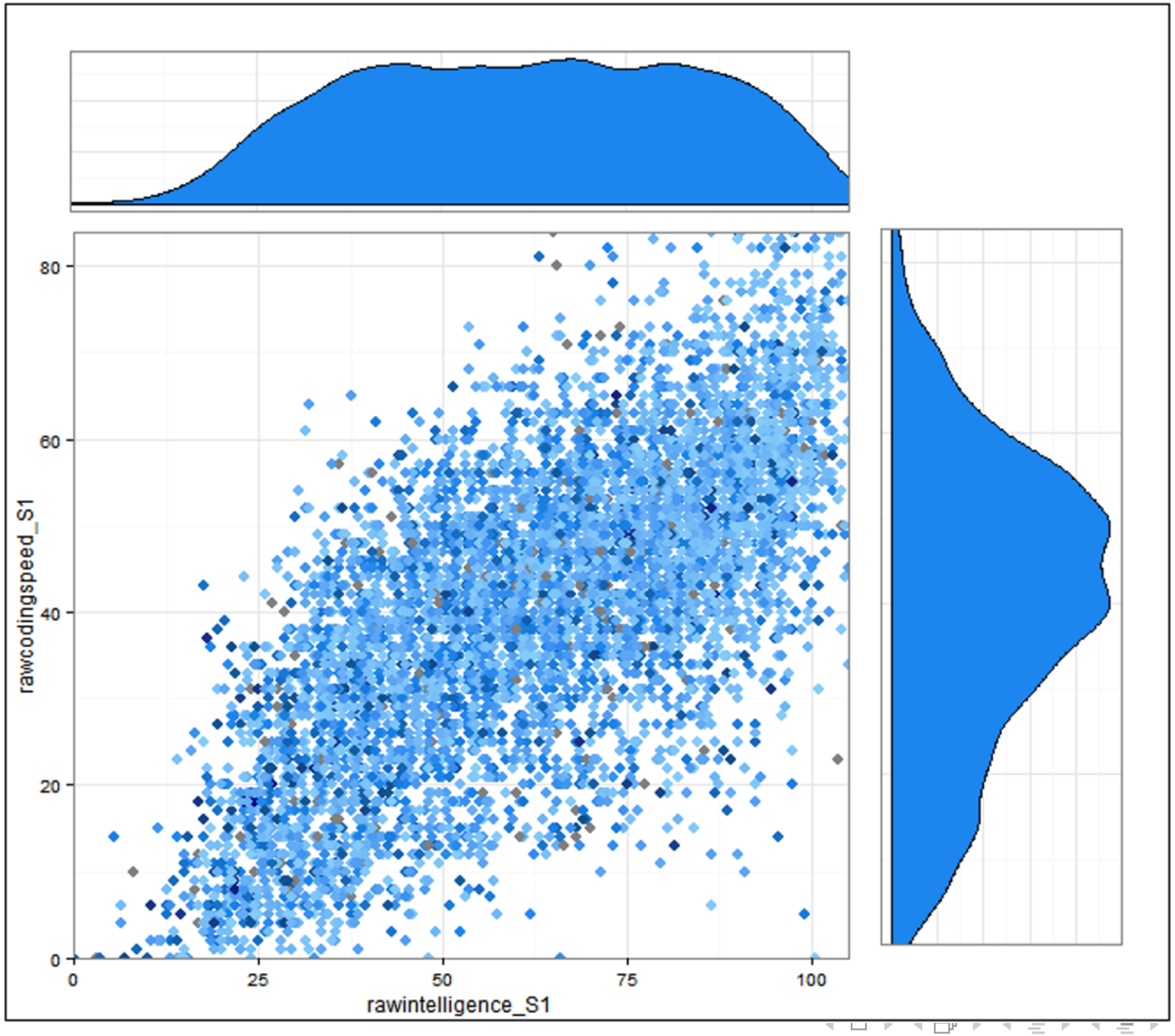
- Conscientiousness and intelligence consistently predict later health outcomes (Jokela et al., 2013; Gottfredson & Deary, 2004), across the life course (Roberts et al., 2007).

- However, conscientiousness and intelligence are seldom tested simultaneously (Deary et al., 2010), making it difficult to determine whether both traits determine health or one measure is a proxy for the other.
- Intelligence and the conscientiousness facet of persistence are confounded under many assessment conditions (Duckworth et al., 2011; Segal, 2012).

- Moreover, persistence is associated with later health (Torres & Solberg, 2001), making the persistence-intelligence confound even more difficult to untangle.

Data

- National Longitudinal Survey of Youth 1979
- In 1980, 12,686 adolescents between the ages of 14 and 22 were surveyed on a battery of measures, including the Armed Forces Vocational Aptitude Battery (ASVAB).
  - Subscales of the ASVAB measure intelligence (AFQT) and
  - persistence (Coding Speed).
- Outcome Measures
  - Health: **40**+ Health Module
  - Focus on two items in particular
  - Self-assessed health: "In general, would you say your health is...
  - Excellent / Very Good / Good / Fair / Poor?"


rawcodingspeed_S1
0
20
40
60
80
0
25
50
75
100
rawintelligence_S1

METHODS I

To control for gene and environmental confounds, we (2014) have adapted Kenny's (2006) reciprocal standard dyad model. The adaptation controls for gene and shared environmental influences within a simple regression framework, by taking the difference between the two siblings:

$$Y_{diff} = \beta_0 + \beta_1 \bar{Y} + \beta_2 \bar{X} + \beta_3 X_{diff}$$

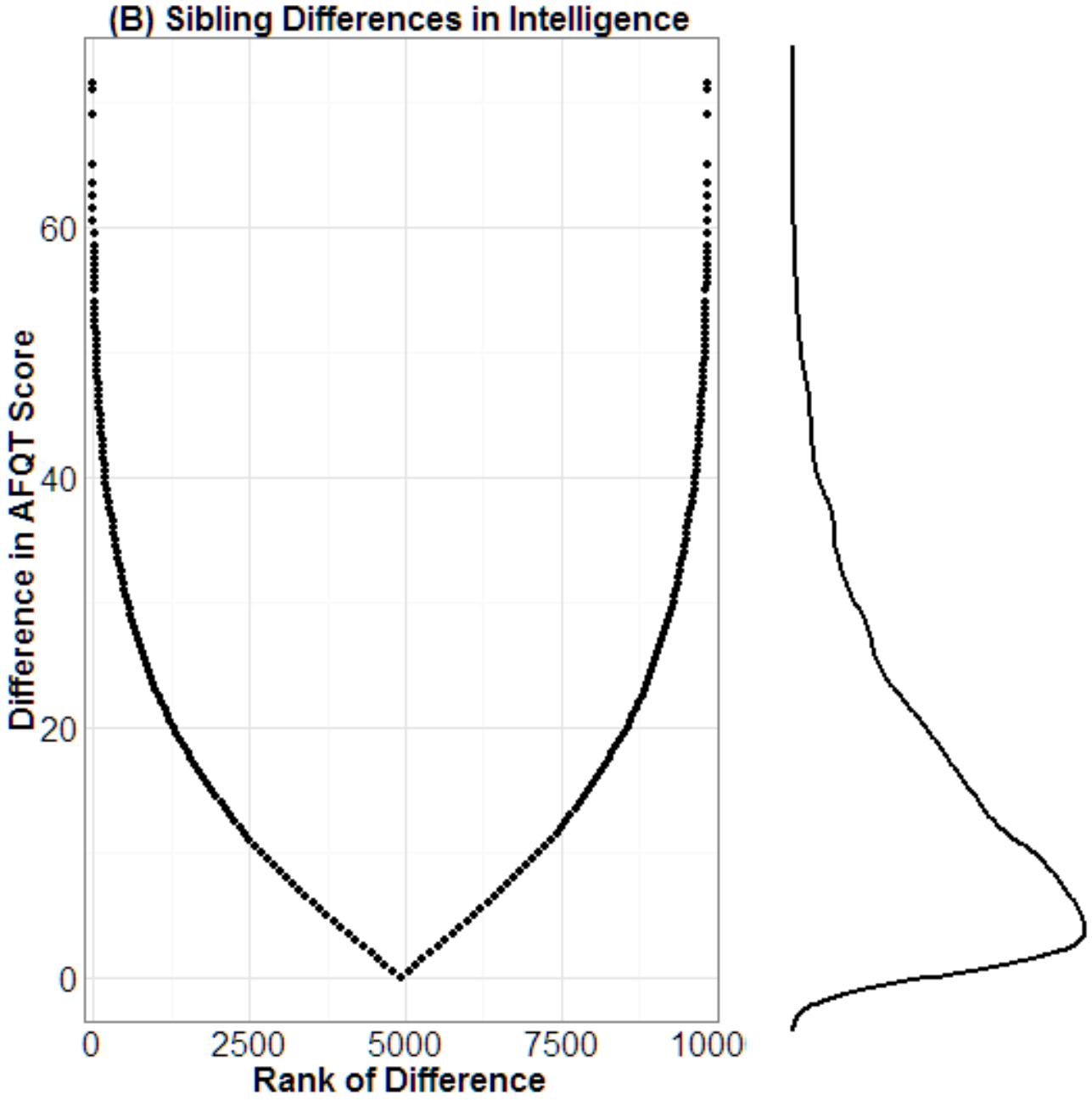
where,

$$Y_{diff} = Y_{1i} - Y_{2i}; \bar{Y} = \frac{Y_{1i} + Y_{2i}}{2}$$

$$X_{diff} = X_{1i} - X_{2i}; \bar{X} = \frac{X_{1i} + X_{2i}}{2}$$

Methods II

- The relative difference in outcomes (Y_{diff}) is predicted from
  - the mean level of the outcome ($\bar{Y}$),
  - the mean level of the predictor ($\bar{X}$), and the
  - between-sibling predictor difference (X_{diff}).
- The mean levels support causal inference through at least a partial control for genes and shared environment.
- Therefore, we simultaneously evaluate the individual difference (X_{diff}) and the joint contribution of genes and shared environment ($\bar{Y}$ & $\bar{X}$).


(B) Sibling Differences in Intelligence
Difference in AFQT Score
0
20
40
60
0
2500
5000
7500
1000
Rank of Difference

Differences in Health

	(1)	(2)	
Individual			
Persistence	-0.099* (**0.024**)	-0.059* (**0.014**)	-0.(
Intelligence	-0.095* (**0.024**)	-0.037* (**0.014**)	-0.03
Family			
Persistence	-0.053* (**0.017**)	-0.043* (**0.013**)	-0.05
Intelligence	-0.027(0.017)	0.014(0.013)	0.(
Health	0.155* (**0.014**)	0.155* (**0.014**)	0.15
Observations	4,268	4,268	
Adjusted R^2	0.042	0.042	
F Statistic	38.665* (df = 5; 4262)	38.665* (df = 5; 4262)	38.665*

Discussion Points

- Why do you think intelligence and personality are treated as distinct categories?
- How could we assess personality traits as abilities?
- What about intelligence as we do personality?
- Why don't we include more intelligence measures in personality research?

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