

Synthesis / Review

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Synthesis / Review

- Correlation & Variance
- Race, Ethnicity, DNA & Variance
- IQ tests
- Claims and analysis of “The Bell Curve”
- Societal / Social issues

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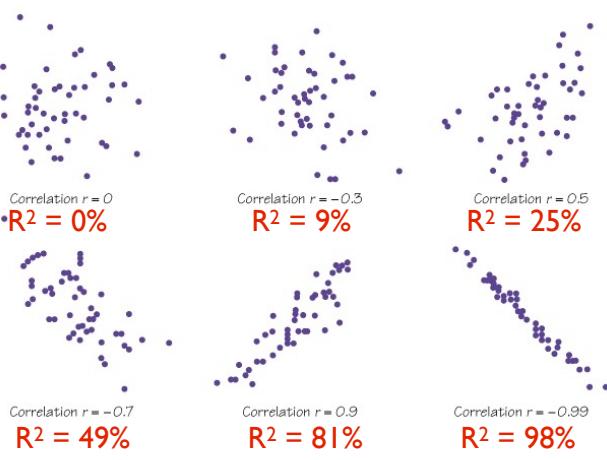
Review : correlation / variance

- Correlation expresses the strength of relationship between two variables
- but correlation is not causation

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Correlations



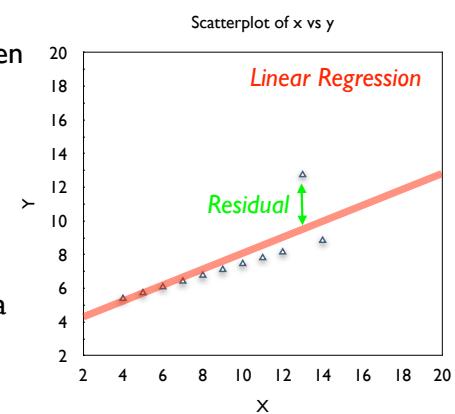
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Residuals in Linear Regression

Residual is difference between actual Y and predicted Y' ($Y - Y'$)

Graphically it is equal to how far away (vertically) a point is from the linear regression line



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Variance Pie Chart

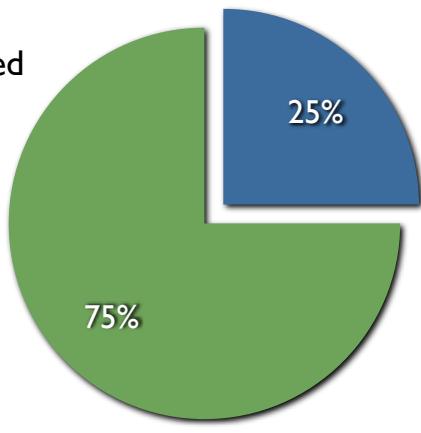
- Explained
- Unexplained

Example:

$$r = 0.50$$

$$r^2 = 0.25$$

a Large effect size.



25% explained
75% unexplained

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IQ testing

- IQ tests
- Reliable? Yes. ($R > 0.90$)
- Valid? Answer depends on context
- To determine validity
 - What is the Construct?
 - What are the Criterion(s)?

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Race vs. DNA

- Ethnicity is a sociocultural construct
- Race is hard to define biologically
- DNA variation among humans exists, but
 - is about 0.1% (humans are 99.9% similar genetically)
 - 85% of variance is *within* population groups
 - 15% of variance is *between* population groups
- :: the genetic variation *within* groups is much larger than the difference *between* them

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IQ testing

- Binet -- developed IQ test to identify low-functioning children to help.
- Assumptions:
 - Ranking or Normal / High functioning pupils?
 - Hereditary (Genetic?)
 - Mutable?

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Stanford-Binet Test

- Louis Terman (American) developed Binet's test at Stanford.
- Applied a *hereditarian* framework
 - assumes IQ is
 - genetic
 - immutable
 - good for ranking individuals and groups

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The Bell Curve (1994)

- Herrnstein & Murray -- as criticized by Gould
- Intelligence can be quantified as a single number
- IQ can rank people (or groups) in linear order and is the *cause* of social problems (crime, disease, poverty...)
- Intelligence is genetic
- Intelligence is immutable

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Intelligence : IQ as Single Number?

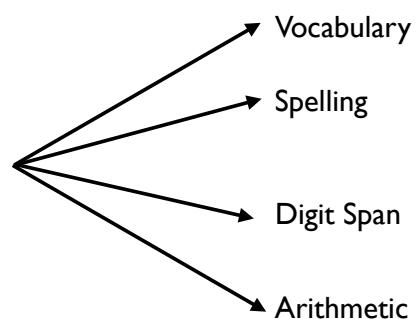
- Pro:
 - common “g” factor ($R^2 > .80$)
 - IQ tests give single result
 - high correlations between IQ and “success”
 - Factor analysis : “objective”
- Con:
 - “g” has been over-estimated ($R^2 < .40$)
 - IQ tests have multiple subtests
 - IQ measures only 3 of 8 Multiple Intelligences
 - Factor analysis : subjective

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Factor Analysis

Four Tests,
showing high
correlations



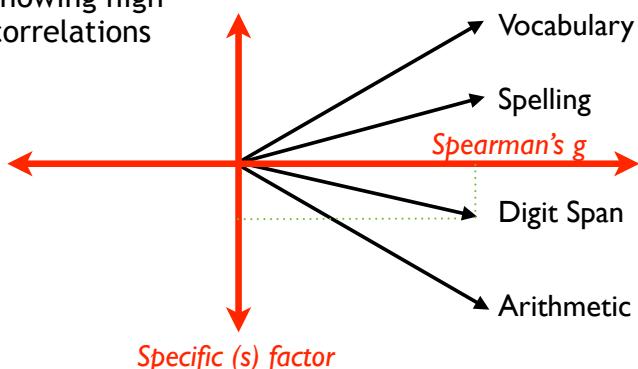
What are the
Factors?

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Factor Analysis

Four Tests,
showing high
correlations

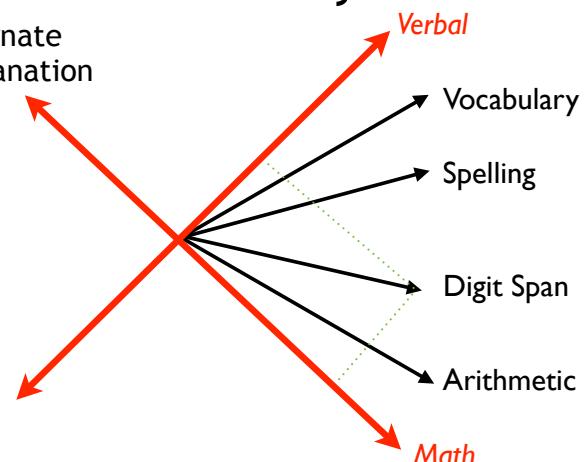


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Factor Analysis

Alternate
explanation



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Factor Analysis

- Patterns within correlation matrix
- Compute *Factors* which account for maximum variance
- Factors: How many? Naming them?

Correlation Matrix

Measure	Factor 1	Factor 2
Vocabulary	0.75	0.17
Spelling	0.87	0.05
Digit Span	-0.02	0.65
Arithmetic	0.10	0.91

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Intelligence : Rank Groups

- Pro:
 - genetic factor within groups is high
 - cross-group factor “must be” genetic
- Con:
 - logical fallacy
 - height of villagers vs. city dwellers
 - even if group differences are genetic, R^2 (% of variance explained) is low
 - can’t predict individual behavior

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IQ is Genetic / Immutable

- Pro:
 - biological: cross-species genetic differences
 - genetic disorders (e.g. Down's syndrome)
 - test score differences between "Whites" & "Blacks"
- Con:
 - Flynn Effect : 30+ points in last 100 years, 15+ in last 50
 - Kendler (2015) - IQ of adopted siblings changed up to 12 points based on education of adopting parents

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Real-world Issues

- IQ & Death Penalty
- Cuts to Childcare Spending
- College Enrollment & SAT scores
- Gender, IQ, and perceived IQ

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Killer with Low IQ Executed (2009)

By JAMES C. McKINLEY Jr. Published: December 3, 2009

HOUSTON — Bobby Wayne Woods was executed Thursday evening in Texas after his lawyers lost a battle to persuade the courts that he was too mentally impaired to qualify for capital punishment.

Mr. Woods, 44, was convicted of raping and killing an 11-year-old girl in 1997. He received a lethal injection and was pronounced dead at 6:48 p.m. in the death chamber at a state prison in Huntsville, Tex., after the [United States Supreme Court](#) denied a request from his lawyers to stay his execution. His last words, at 6:40, were: "Bye. I am ready." Tests administered to Mr. Woods over the years placed his I.Q. between 68 and 86, prompting a bitter debate between his lawyers and the state over whether he was too impaired to face execution. The state and federal courts repeatedly sided with prosecutors.

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Cuts to Childcare (2010)

California child care cuts postponed until Jan. 1

OAKLAND -- Subsidized child care services chopped from the state budget will continue through Dec. 31, according to a legal settlement and court order signed Wednesday in Alameda Superior Court.

About 55,000 children in California, thousands of whom are in the East Bay, originally were slated to lose their child care slots Nov. 1 after Gov. Arnold Schwarzenegger vetoed \$256 million from the state's welfare-to-work program. That date has been postponed three times as the result of a lawsuit filed in October on behalf of Parent Voices Oakland. The advocacy group argued that the California Department of Education failed to give families accurate and timely information about possible alternatives.

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The "Asian Invasion" (2014)

- In 1922, capped Jewish enrollment at 15% due to "Jewish Invasion"
- In 2014, 50% of applicants with highest SAT scores were Asian, but make up only 20% of admissions
- New lawsuit claims discrimination

The Opinion Pages | OP-ED CONTRIBUTOR

Is Harvard Unfair to Asian-Americans?

By YASCHA MOUNK NOV. 24, 2014



CAMBRIDGE, Mass. — NEARLY a century ago, Harvard had a big problem: Too many Jews. By 1922, Jews accounted for 21.5 percent of freshmen, up from 7 percent in 1900 and vastly more than at Yale or Princeton. In the Ivy League, only Columbia and the University of Pennsylvania had a greater proportion of Jews.

Harvard's president, A. Lawrence Lowell, warned that the "Jewish invasion" would "ruin the college." He wanted a cap: 15 percent. When faculty members balked, he stacked the admissions

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Selection Philosophy

- Unqualified Individualism
 - high scores overall are selected
- Quota System
 - high scores within each group are selected
- Qualified Individualism
 - high scores overall are combined with other information to improve differential prediction

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Harvard / Asian admissions Lawsuit (2019)

Harvard Does Not Discriminate Against Asian-Americans in Admissions, Judge Rules

By Anemona Hartocollis • Updated Nov. 5, 2019

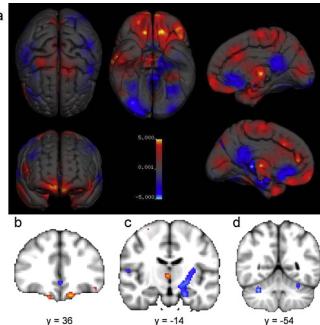
- Claims were that Harvard
 - intentionally discriminated against Asian-Americans
 - used race as a predominant factor in admissions decisions
 - racially balanced its classes
 - considered race without first exhausting race-neutral alternatives to create diversity.
- Judge Burroughs cleared the university of all four claims.
- Ruling allows race to be used in admissions
- Strict quotas are still prohibited

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A meta-analysis of sex differences in human brain structure

They started with a set of MRIs that measured the volume of gray matter in the brains of 112 men and 169 women ages 18 to 79. On these scans, they examined 116 separate regions and zeroed in on the 10 that showed the greatest difference between men and women.



Using results from 570 participants in the Maryland Adolescent Development in Context Study, they found that only 1.8% of them scored consistently male or consistently female, compared with 59% who showed "substantial variability."

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He's Not as Smart...

A British researcher reports that the male ego is often larger than his actual IQ. But you might be surprised by what women think of men's intellect.

By [Joan Raymond](#) | Newsweek Web Exclusive
Jan 23, 2008 | Updated: 5:25 p.m. ET Jan 23, 2008

Are men smarter than women? No. But they sure think they are. An analysis of some 30 studies by British researcher Adrian Furnham, a professor of psychology at University College London, shows that men and women are fairly equal overall in terms of IQ. But women, it seems, underestimate their own candlepower (and that of women in general), while men overestimate theirs.

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Harvard University Admissions: Meritocracy?

- Harvard rejects ~97% of applicants
- However, 43% of white students received special treatment:
 - Athletes, legacies, dean's list (family donation\$) or children of employees
 - 75% of these would not have been admitted otherwise
 - "One might call it affirmative action for the rich and privileged"

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No Dimorphism?

- Recent research (2021) says effect of sex/gender on brain organization is less than 1%
- Only real difference is overall size (~11%)

Neuroscience and Biobehavioral Reviews 125 (2021) 667-697



Dump the "dimorphism": Comprehensive synthesis of human brain studies reveals few male-female differences beyond size

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Summary

- For 1000s of years, it was widely accepted that men were smarter than women.
 - denied opportunities -> lack of success
 - yet intelligence testing suggests this simply isn't true
- For 1000s of years, it was widely accepted that race _____ was superior to race _____
 - denied opportunities -> lack of success

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