

Synthesis / Review

1668

Psychology 402 - Fall 2023 - Dr. Michael Diehr

Copyright © 2023 Michael Diehr
All Rights Reserved

For use only by students enrolled
in my sections of Psyc 402
through the end of the semester.
May not be posted, shared or uploaded
online without permission.

1669

Psychology 402 - Fall 2023 - Dr. Michael Diehr

Synthesis / Review

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

1672

Psychology 402 - Fall 2023 - Dr. Michael Diehr

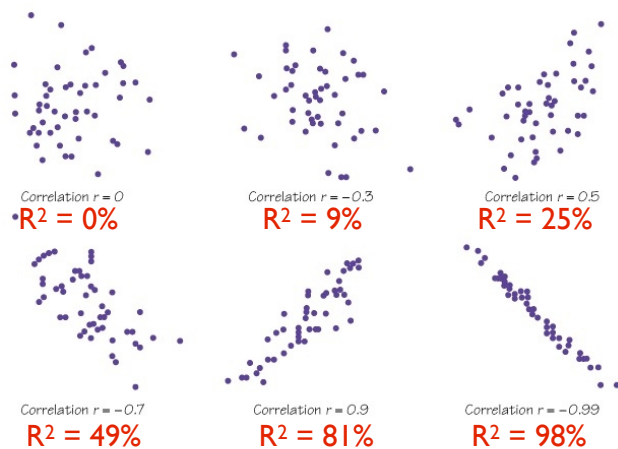
Review : correlation / variance

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

1673

Psychology 402 - Fall 2023 - Dr. Michael Diehr

Correlations



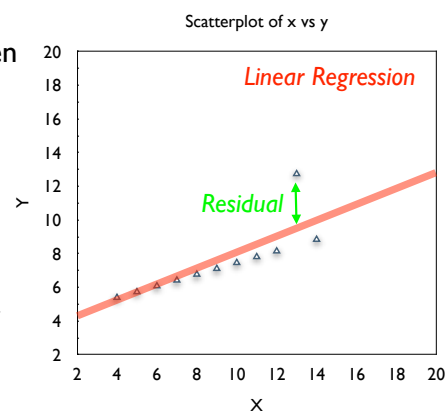
1675

Psychology 402 - Fall 2023 - Dr. Michael Diehr

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



1676

Psychology 402 - Fall 2023 - Dr. Michael Diehr

Variance Pie Chart

- Explained
- Unexplained

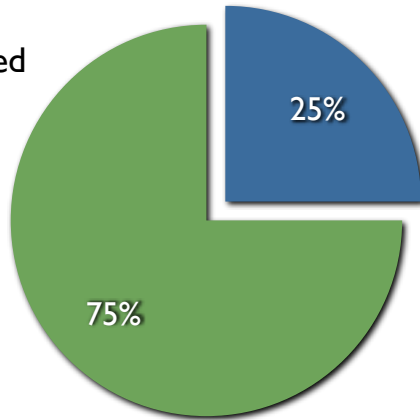
Example:

$$r = 0.50$$

$$r^2 = 0.25$$

a *Large* effect size.

25% explained
75% *unexplained*



1677

Psychology 402 - Fall 2023 - Dr. Michael Dohr

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)?

1678

Psychology 402 - Fall 2023 - Dr. Michael Dohr

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

1679

Psychology 402 - Fall 2023 - Dr. Michael Dohr

IQ testing

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

1680

Psychology 402 - Fall 2023 - Dr. Michael Dohr

Stanford-Binet Test

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

1681

Psychology 402 - Fall 2023 - Dr. Michael Dohr

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

1682

Psychology 402 - Fall 2023 - Dr. Michael Dohr

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

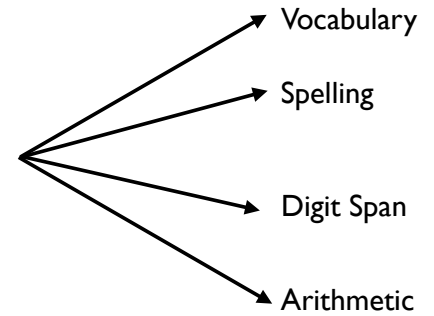
1683

Psychology 402 - Fall 2023 - Dr. Michael Dohr

Factor Analysis

Four Tests,
showing high
correlations

What are the
Factors?

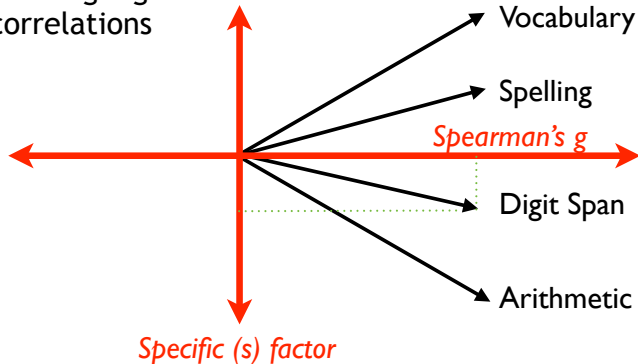


1684

Psychology 402 - Fall 2023 - Dr. Michael Dohr

Factor Analysis

Four Tests,
showing high
correlations

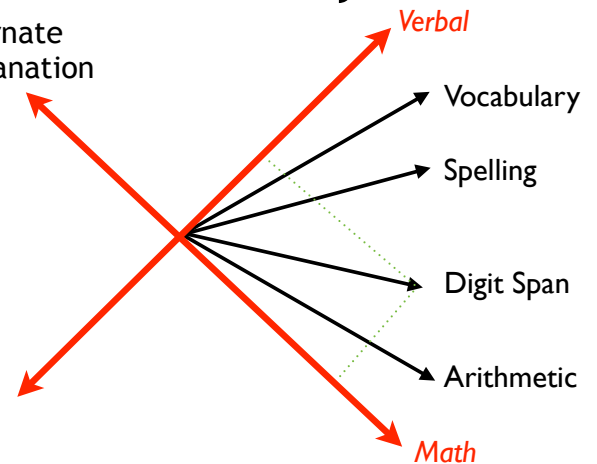


1685

Psychology 402 - Fall 2023 - Dr. Michael Dohr

Factor Analysis

Alternate
explanation



1686

Psychology 402 - Fall 2023 - Dr. Michael Dohr

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

1687

Psychology 402 - Fall 2023 - Dr. Michael Dohr

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

1688

Psychology 402 - Fall 2023 - Dr. Michael Dohr

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

1689

Psychology 402 - Fall 2023 - Dr. Michael Doherty

Real-world Issues

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

1690

Psychology 402 - Fall 2023 - Dr. Michael Doherty