

THIRD-VARIABLES WEEK 2 STAT 209

Partial, part correlations

(spurious associations)

Consider X_1, X_2, X_3 (maybe measured w/ error)

$$r_{13 \cdot 2} = \frac{r_{13} - r_{12} r_{23}}{\sqrt{(1 - r_{12}^2)(1 - r_{23}^2)}}$$

adjusted vari's

$$r_{13 \cdot 2} =$$

$$\frac{r_{(1 \cdot 2)3}}{\sqrt{(1 \cdot 2)(3 \cdot 2)}}$$

also $r_{12 \cdot 345} = \sqrt{(1 \cdot 345)(2 \cdot 345)}$ etc

part correlations $\sqrt{(1 \cdot 2)3}$

$$r_{1(3 \cdot 2)}$$

$$R_{Y \cdot X_1 X_2}^2 = r_{Y X_1}^2 + r_{Y(X_2 \cdot X_1)}^2$$

From Stat 60

$H_0: \rho = 0$

t-statistic $\frac{r\sqrt{n-2}}{\sqrt{1-r^2}}$

t_{n-2} critical value

for $H_0: \rho_{12 \cdot 3} = 0$

test statistic $\frac{r_{12 \cdot 3} \sqrt{n-3}}{\sqrt{1-r_{12 \cdot 3}^2}}$

Dichotomous Data: Spurious Correlation, Confounding

Partial, Part Correl.

< NWS ^{9.4} ~~p. 206-7~~ > p. 276

partial correlation

X_1 X_2 X_3

[Radin X_1 nurturance (home nu)
 X_2 ach motivation
 X_3 achievement (S-Binet)]

Correlation (X_2 moderator var?)

$$r_{13.2} = \frac{r_{13} - r_{12}r_{23}}{\sqrt{(1-r_{12}^2)(1-r_{23}^2)}}$$

< 9.417
< ~~8.387~~

relation to
standardized
regression
coefficient

$$= r_{(1.2)(3.2)}$$

adjusted variables (marks. log)

Part (semi-partial)

$$r_{(1.2)3}$$

$$r_{1(3.2)}$$

Relations to R^2

relation to
extra SS
NWK see 7.3

Y, X_1, X_2

$$(1 - R_{Y \cdot X_1, X_2}^2) = (1 - r_{YX_1}^2)(1 - r_{YX_2 \cdot X_1}^2)$$

$$R_{Y \cdot X_1, X_2}^2 = r_{YX_1}^2 + r_{Y(X_2 \cdot X_1)}^2$$

$$= r_{YX_2}^2 + r_{Y(X_1 \cdot X_2)}^2$$

Inferences for partial, part

Fishers χ^2 transf. (4-4)

Package ‘ppcor’

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Type Package

Title Partial and Semi-Partial (Part) Correlation

Version 1.1

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Depends R (>= 2.6.0), MASS

Description Calculates partial and semi-partial (part) correlations along with p-value.

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NeedsCompilation no

Repository CRAN

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ppcor-package *Partial and Semi-partial (Part) Correlation*

Description

Calculates parital and semi-partial (part) correlations along with p value.

Details