

Tutorial 8

Research Methods for Political Science - PO3110

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<https://andrsalvi.github.io/research-methods/>

Table of contents

1. Correlation by hand
2. Correlation in SPSS
3. Project Work

Correlation by hand

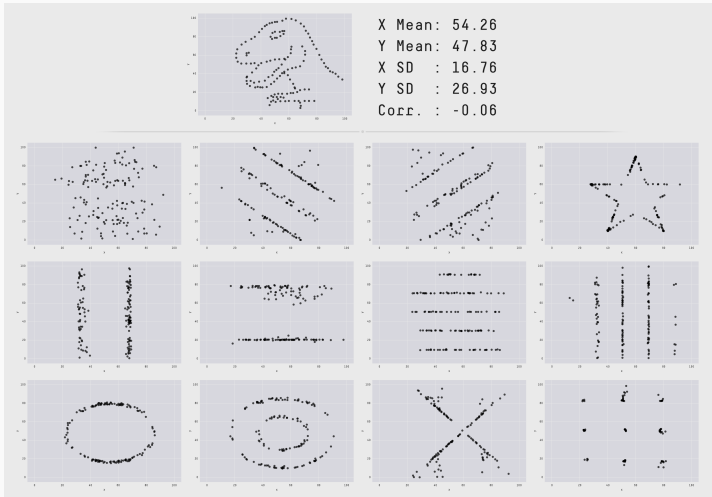
Preliminary Steps

1. Correlation and co-variation measure the association between two interval-ratio variables

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1. Correlation and co-variation measure the association between two interval-ratio variables
2. Before you start, always create a scatter-plot!

Behold! The datasaur!



¹<https://www.autodeskresearch.com/publications/samestats>

From variance to co-variance

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Problem of co-variation? It depends on the scales of the variables of interest!

- $\sigma_x \sigma_y \leq \sigma_{xy} \leq \sigma_x \sigma_y$
- Solution?

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- correlation = $\frac{\text{covariance}}{\text{sd } x \times \text{sd } y}$
- $r = \frac{\sigma_{xy}}{\sigma_x \times \sigma_y}$
- $-1 \leq r \leq 1$

x	y
1	1
2	3
4	5
5	7

Steps:

1. Calculate mean of each variable:

Hands-on

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1. Calculate mean of each variable:
2. Calculate standard deviations of x and y : $\sigma = \sqrt{\frac{\sum (x - \bar{x})^2}{n-1}}$
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Correlation, $r = 0.99$

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1. Insert dataset into SPSS

Correlation in SPSS

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2. Create scatter-plot of x and y

Correlation in SPSS

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1. Insert dataset into SPSS
2. Create scatter-plot of x and y
3. Estimate correlation

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- It distributes t when N is small!
- $DF = N - 2$
- $t = r \sqrt{\frac{n-2}{1-r^2}}$
- $H_0 : r = 0$

Project Work

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- When in doubt, have a look at this link: <https://stats.idre.ucla.edu/other/mult-pkg/whatstat/>
- Further resources have been included the tutorial website!

Furthering your project

Team up and discuss (some of) the following aspects:

1. Research question + relevance
2. Theoretical argument + hypothesis
3. Type of data + operationalisation of variables
4. Ways of analysing your data

I am available for further questions/feedback!