

Correlation (Statistical overview)

Nathaniel Yomogida, SPT Chloë Kerstein, SPT

Table of contents

1	Definition	1
1.1	Correlation	1
1.2	Variance	1
1.3	Covariance	2
1.4	Intra-class Coefficient (ICC)	2
1.5	Correlation coefficient	2
1.6	Coefficient of Determination (R^2)	2
1.7	Linear correlation	2

1 Definition

1.1 Correlation

Monotonic association between 2 variables(Schober et al., 2018)

- 1. one variable increases \rightarrow other increases
- 2. One variable increases \rightarrow Other Decreases

1.2 Variance

Measure of the variability of a single variable¹

Covariance vs Variance

Covariance is similar to variance, but whereas variance describes the variability of a single variable¹

1.3 Covariance

Defined as the Degree to which the change in 1 continuous variable is associated with the change in another continuous variable¹

Covariance is a measure of how 2 variables vary together¹

Covariance vs Variance

Covariance is similar to variance, but whereas variance describes the variability of a single variable¹

1.4 Intra-class Coefficient (ICC)

- 0-1 (higher is better)
- Correlations between repeated measurements within a class of data²

1.5 Correlation coefficient

Describes Strength & Direction of association between variables

1.6 Coefficient of Determination (R^2)

Proportion of variance in 1 variable that is accounted for by the other¹.

1.7 Linear correlation

[See more about linear correlation](#)

1. Schober P, Boer C, Schwarte LA. Correlation Coefficients: Appropriate Use and Interpretation. *Anesthesia and Analgesia*. 2018;126(5):1763-1768. doi:[10.1213/ANE.0000000000002864](https://doi.org/10.1213/ANE.0000000000002864)
2. Liljequist D, Elfving B, Skavberg Roaldsen K. Intraclass correlation - A discussion and demonstration of basic features. *PloS One*. 2019;14(7):e0219854. doi:[10.1371/journal.pone.0219854](https://doi.org/10.1371/journal.pone.0219854)