Correlations

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A correlation measures the strength and direction of a relationship between two numerical variables. While a correlation indicates that variables are related, it does *not* imply that one variable causes a change in the other.

Examples

- Study time and exam score
- Height and weight
- Temperature and ice cream sales

Correlation coefficient (r)

The correlation coefficient ranges from −1 to +1.

Value of r	Relationship	Direction
+1	Perfect positive	As one variable increases, the other increases.
+0.7 to +0.9	Strong positive	
+0.3 to +0.7	Moderate positive	
0	No linear relationship	The variables do not show a clear pattern or relationship.
-0.3 to -0.7	Moderate negative	As one variable increases, the other decreases.
-0.7 to -0.9	Strong negative	
-1	Perfect negative	

Pearson correlation coefficient (r)

The Pearson correlation coefficient (*r*) measures the strength and direction of a linear relationship between two numerical variables.

Use Pearson when:

- Variables are numerical
- Relationship appears linear
- Data does not contain extreme outliers

	MotivationLevel	StudyHours
MotivationLevel	—	
StudyHours	0.977	—

Note. H_a is positive correlation

Spearman correlation (p or rs)

The Spearman correlation coefficient (*ρ* or *rs*) measures the strength and direction of a monotonic relationship using ranks.

Use Spearman when:

- Data is ordinal
- Data is not normally distributed
- Outliers are present
- Relationship may not be perfectly linear

	Motivation Level	Hours of Study
Motivation Level	—	
Hours of Study	0.981	—

Note. H_a is positive correlation

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Correlation matrix

A correlation matrix displays correlations between multiple variables in a single table.

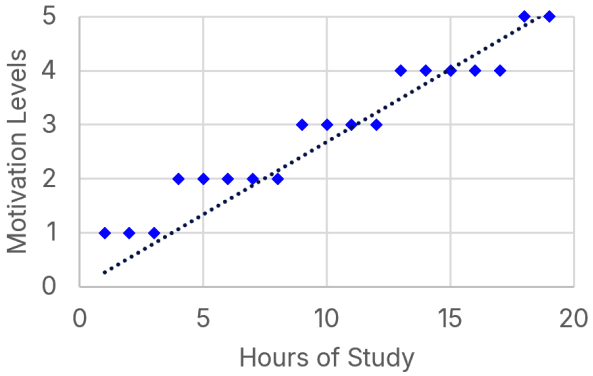
	Exam Score	Hours of Study	Motivation Level
Exam Score	—		
Hours of Study	0.721	—	
Motivation Level	0.699	0.977	—

Reporting correlations

After creating a correlation matrix in *jamovi*, the next step is to interpret and report the relationships between variables.

When interpreting a correlation, consider:

- Direction – Positive or negative
- Strength – Weak, moderate, or strong
- Variables – Variables being compared
- Interpretation – What the relationship suggests



Example interpretation

Variables	Correlation (r)	Interpretation
Exam Score and Hours of Study	0.721	Strong positive
Exam Score and Motivation	0.699	Moderate-to-strong positive
Hours of Study and Motivation	0.977	Very strong positive

Reporting template

There was a **[strength] [positive/negative]** relationship between **[Variable 1]** and **[Variable 2]** (*r* = **value**), indicating that **[interpretation].**

Example

There was a strong positive relationship between hours of study and exam score (*r*= .721), indicating that students who studied more tended to achieve higher exam scores.

Related helpsheets

- Correlation vs Cause-effect

References

The jamovi project. (2025). *jamovi* (Version 2.7) [Computer software]. https://www.jamovi.org

R Core Team. (2025). *R: A language and environment for statistical computing* (Version 4.5) [Computer software]. Retrieved from https://cran.r-project.org. (R packages retrieved from CRAN snapshot 2025-05-25).