

S 5 CompCet and interpretation of the coefficient souCcorrelations

EXAMPLE

AND) Calculation of Pearson product correlation coefficient (manually)

We are interested in whether it is statistically and factually significant for the group of boys dependence in the number of made mistakes and clicks. The performances are given in Table 5.

Tab. 5

<i>proband</i>	<i>shyby x_{and}</i>	<i>clicks y_{and}</i>	<i>x_{i2}</i>	<i>y_{i2}</i>	<i>xi yi</i>
1	1	2	1	4	2
2	3	3	9	9	9
3	2	3	4	9	6
4	0	0	0	0	0
5	5	8	25	64	40
6	6	5	36	25	30
7	1	1	1	1	1
8	4	6	16	36	24
9	3	7	9	49	21
10	5	5	25	25	25
11	6	8	36	64	48
12	2	2	4	4	4
13	1	5	1	25	5
14	1	3	1	9	3
15	8	12	64	144	96
Σ	48	70	232	468	314

$$= \frac{\sum \sum_{i=1}^{15} x_i y_i - (\sum_{i=1}^{15} x_i)(\sum_{i=1}^{15} y_i)}{\sqrt{[\sum_{i=1}^{15} x_i^2 - (\sum_{i=1}^{15} x_i)^2][\sum_{i=1}^{15} y_i^2 - (\sum_{i=1}^{15} y_i)^2]}}$$

$$= \frac{15 \times 314 - 48 \times 70}{\sqrt{[15 \times 232 - 48^2][15 \times 468 - 70^2]}} = 0.855$$

B) Calculation of Pearson product correlation coefficient (Jam) + statistical significance:

In the case of a random sample from the basic set, we can assess whether it is a statistically significant dependence, using the calculation p values:



After entering data, marking them as metric and assigning categories (folds, clicks) we continue through the election *Analyzes* → *Regression* → *Correlation Matrix*



The screenshot shows the Jamovi software interface. The top menu bar includes 'Data' and 'Analyses'. Under 'Analyses', there are icons for 'Exploration', 'T-Tests', 'ANOVA', 'Regression', and 'Frequencies'. The 'Regression' icon is highlighted, and a dropdown menu is open, showing options: 'Correlation Matrix', 'Linear Regression', 'Logistic Regression', '2 Outcomes Binomial', 'N Outcomes Multinomial', and 'Ordinal Outcomes'. Below the menu is a data table with two columns: 'Shyby' and 'Kliky'. The table contains 15 rows of data.

	Shyby	Kliky
1	1	2
2	3	3
3	2	3
4	0	0
5	5	8
6	6	5
7	1	1
8	4	6
9	3	7
10	5	5
11	6	8
12	2	2
13	1	5
14	1	3
15	8	12
16		

After assigning data to categories and selecting Person's test, the results are displayed in the right part.

The screenshot shows the Jamovi software interface. On the left, the 'Correlation Matrix' panel is active, displaying a search bar and a list of variables: 'Shyby' and 'Kliky'. Below this, there are sections for 'Correlation Coefficients' (Pearson, Spearman, Kendall's tau-b), 'Additional Options' (Report significance, Flag significant correlations, N, Confidence intervals), 'Hypothesis' (Correlated), and 'Plot' (Correlation matrix). The 'Correlation Coefficients' section has 'Pearson' selected. The 'Additional Options' section has 'Report significance' and 'Flag significant correlations' selected. The 'Hypothesis' section has 'Correlated' selected. The 'Plot' section has 'Correlation matrix' selected. The 'Confidence intervals' section has 'Interval' set to 95%. On the right, the 'Correlation Matrix' results are displayed in a table. The table shows the Pearson's r and p-value for the correlation between Shyby and Kliky. The Pearson's r is 0.855*** and the p-value is <.001. A note below the table states: 'Note. * p < .05, ** p < .01, *** p < .001'. Below the table, there is a 'References' section with two references: [1] The jamovi project (2020). *jamovi*. (Version 1.0.0). <https://www.jamovi.org>. [2] R Core Team (2019). *R: A Language and Environment for Statistical Computing*. [Computer software]. Retrieved from <https://www.R-project.org/>.

The value of the Pearson product correlation coefficient is 0.855. Value $p < 0.01$. The dependence of bugs and cranks is statistically significant.

C) Calculation procedure in E (practical) importance (effect size)

The square of the correlation coefficient is called coefficient of determination (r^2). Its value tells us how many percent the observed factor contributes to the resulting dependence (Kerlinger, 1972).

Coefficient of determination $r^2 = 0.855^2 = 0.731$

The dependence of the keys on the keys and vice versa is affected by 73%.

TASKS

1. In the Cartesian coordinate system, construct a so-called correlation diagram (correlogram) consisting of points about coordinates (x_{and} , y_{and}) for the dominant press (x_{and}) and non-dominant (y_{and}) arms. Correlogram (fence) construct using Jam software. You can find the data in the table you filled in at the link: <https://docs.google.com/spreadsheets/d/1K2nki8oDTRTQ7aC1MYqiiLLMA70pWhU3mlofiQiMxi0/edit?usp=sharing>
2. Visually assess the nature and nature of the scattering of plotted points, estimate the type and size of the observed statistical dependence.
3. Assume that it is a product correlation dependence and calculate the correlation coefficient ($r_{x,y}$).
4. Calculate materiality.