

CORRELATION ANALYSIS:

A CASE STUDY: EXAM SCORE DATA

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Correlation refers to a statistical measure that describes the extent to which two variables are related or move together. In other words, it quantifies the strength and direction of the relationship between two sets of data.

Key points about correlation include:

1. **Strength:** Correlation coefficients range from -1 to +1, where -1 indicates a perfect negative correlation (as one variable increases, the other decreases), +1 indicates a perfect positive correlation (both variables increase together), and 0 indicates no correlation (variables are unrelated).
2. **Direction:** The sign of the correlation coefficient (+ or -) indicates the direction of the relationship:
 - Positive correlation: Both variables increase together.
 - Negative correlation: One variable increase as the other decreases.
3. **Linear Relationship:** Correlation measures the linear relationship between variables. It assumes that as one variable changes, the other changes proportionally.
4. **Not Causation:** Correlation does not imply causation. Even if two variables are strongly correlated, it does not necessarily mean that one causes the other to change.
5. **Correlation Coefficient:** It is symbolized by “ r ”, and its calculation involves standardizing variables by their standard deviations to ensure comparability.

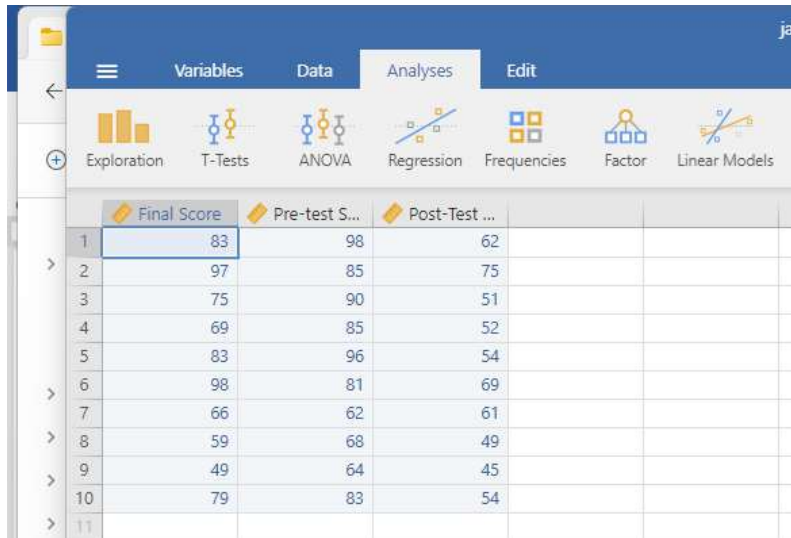
Correlation is widely used in various fields, including statistics, economics, social sciences, and natural sciences, to understand relationships between variables and to make predictions based on observed data patterns.

The Problem

The purpose of the study is to ascertain how the relationship between pre-test, post-test and final score.

Data

Download **Adjusted R square** file form the given link <https://dsdhakre.in/Datafiles.html>



	Final Score	Pre-test S...	Post-Test ...
1	83	98	62
2	97	85	75
3	75	90	51
4	69	85	52
5	83	96	54
6	98	81	69
7	66	62	61
8	59	68	49
9	49	64	45
10	79	83	54
11			

Hypothesis

H_{01} : There is no significant relationship between pre-test and final score

H_{02} : There is no significant relationship between post-test and final score

H_{03} : There is no significant relationship between pre-test and post-test

Steps

The screenshot shows the Jamovi software interface. The 'Analyses' menu is open, displaying a list of statistical tests. The data table on the left contains the following information:

		Pre-test S...	Pot-Test S...
scary	3	98	62
	7	85	75
	5	90	51
	9	85	52
	3	96	54
survey/mv	8	81	69
	6	62	61
	9	68	49
vij Multiple Response	9	64	45
	9	83	54

The right panel displays the Jamovi logo and the version number 2.4.14.

The screenshot shows the Jamovi software interface with the 'Scatterplot' analysis configured. The X-Axis is set to 'Pre-test Score' and the Y-Axis is set to 'Final Score'. The 'Regression Line' is set to 'Linear' and 'Standard error' is checked. The 'Marginals' are set to 'None'. The resulting scatterplot shows a positive linear relationship between Pre-test Score and Final Score.

Scatterplot

X-Axis: Pre-test Score
Y-Axis: Final Score
Group: (empty)

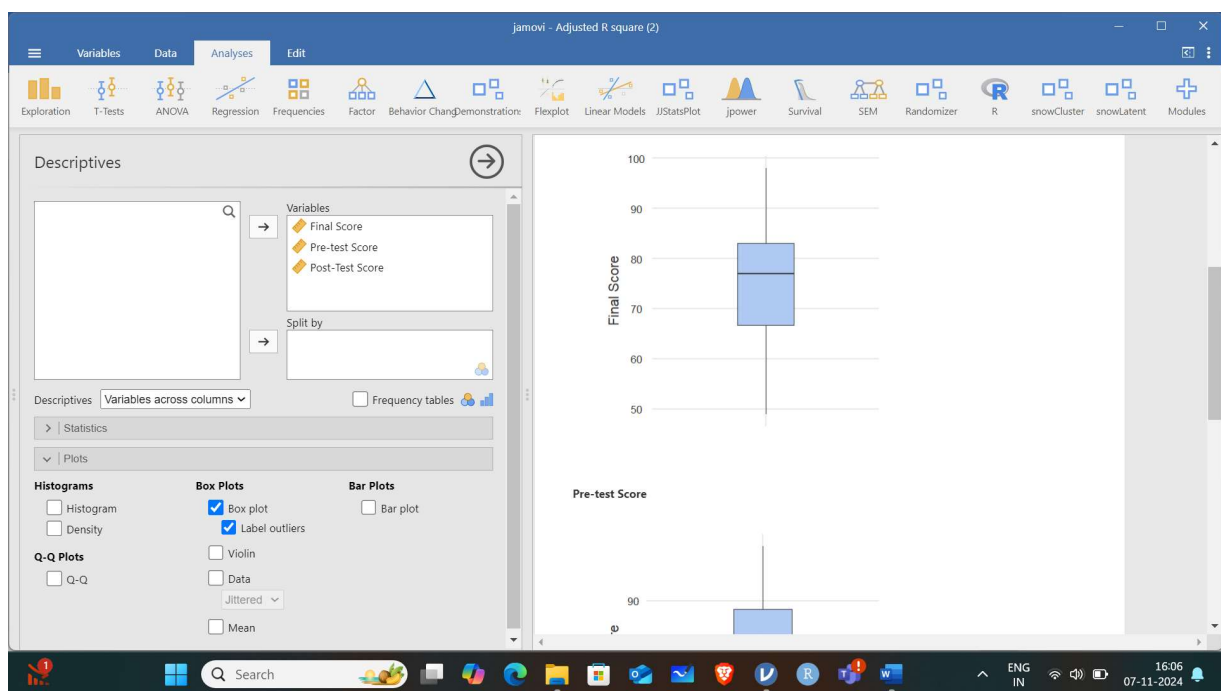
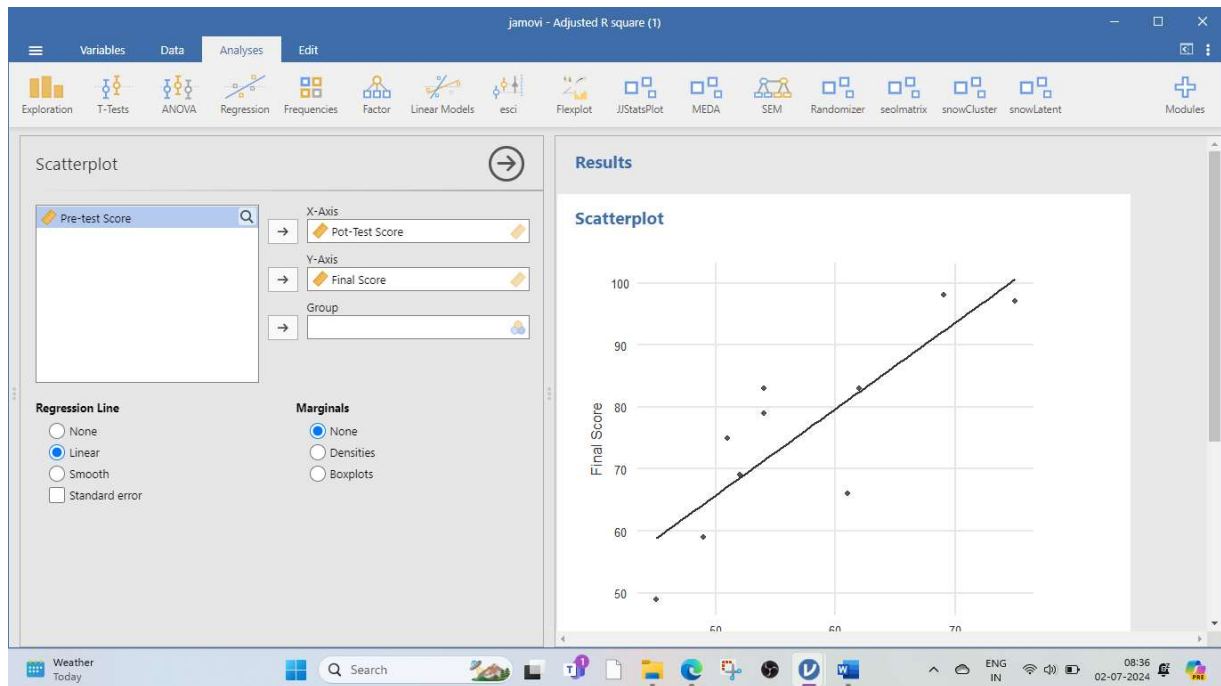
Regression Line

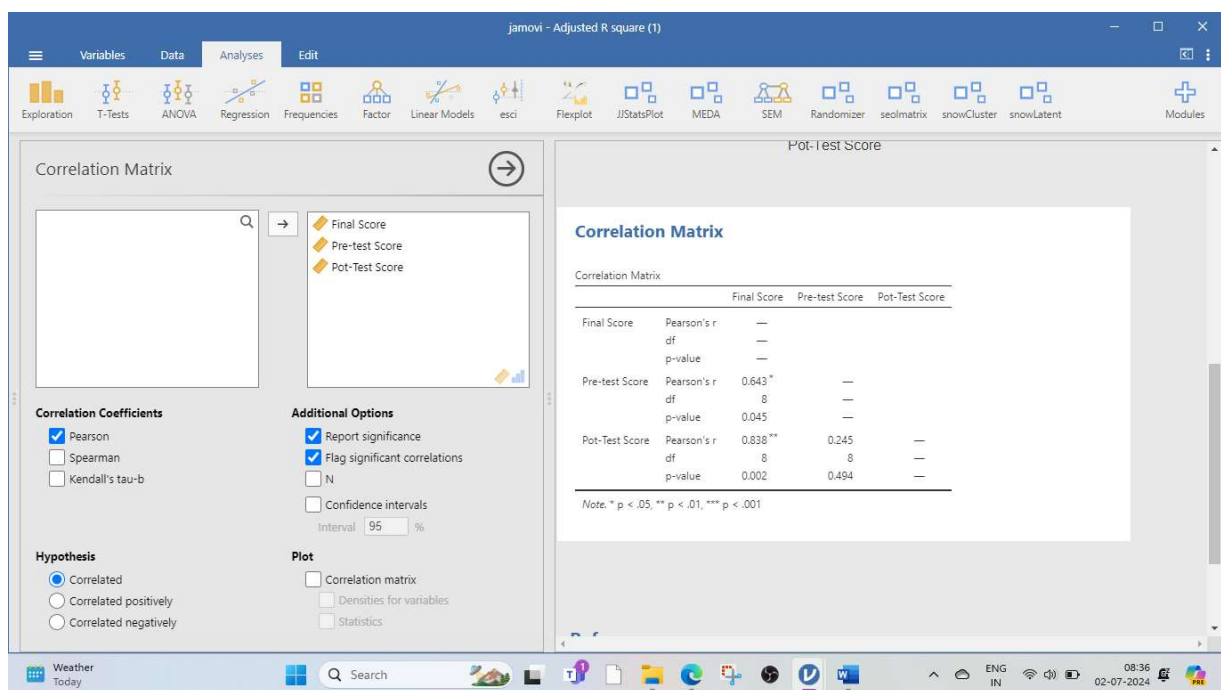
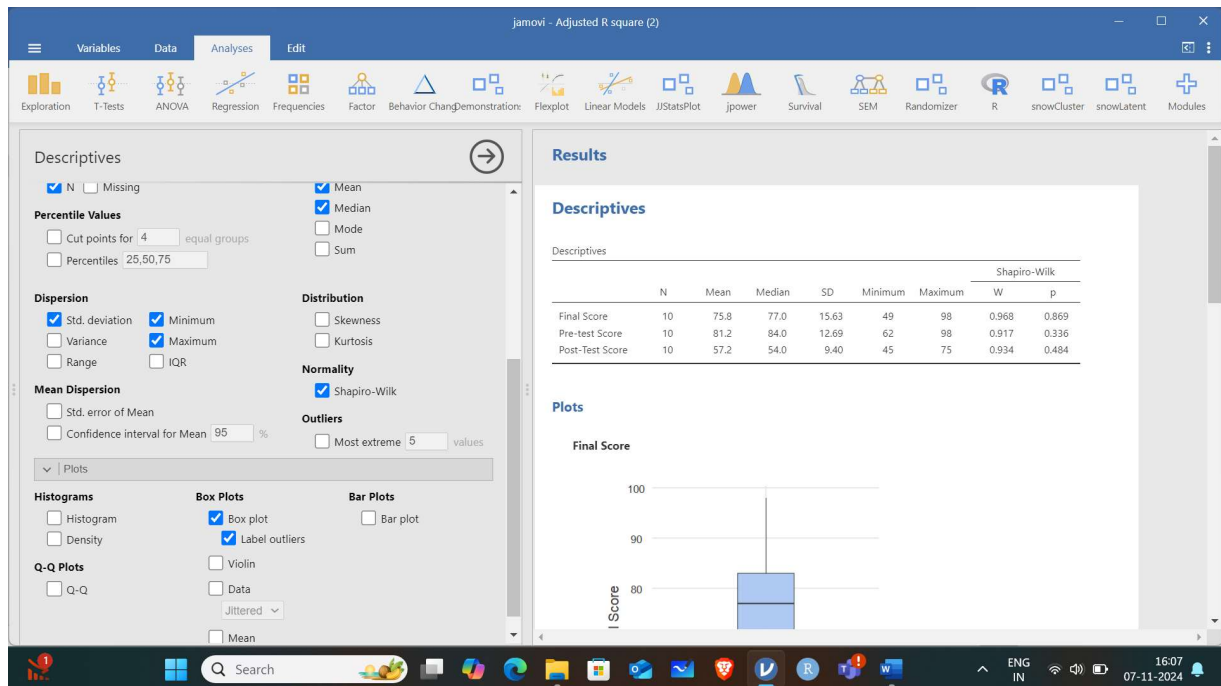
- ☐ None
- ☒ Linear
- ☐ Smooth
- ☐ Standard error

Marginals

- ☒ None
- ☐ Densities
- ☐ Boxplots

The scatterplot displays data points and a linear regression line. The X-axis is labeled 'Pre-test Score' and the Y-axis is labeled 'Final Score'.





Reporting

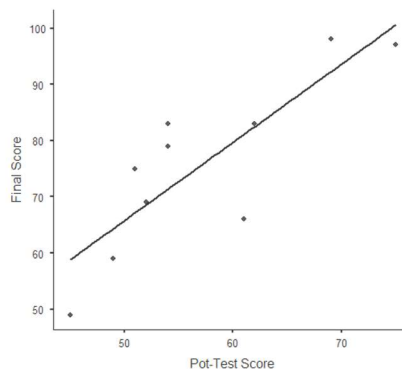
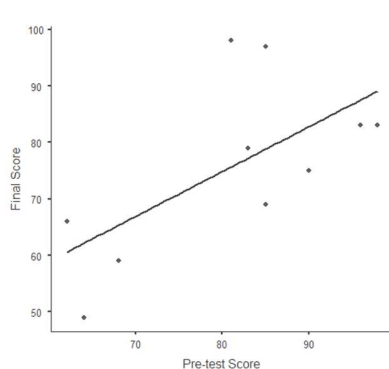
Karl Pearson correlation between pre-test and final score was found to be moderate positive and significant ($r=0.643$, $p<0.001$). Hence, H_{01} was supported. This shows that the marks increase in pre-test would lead to a final score. Correlation between post-test and final score was also found to be high positive and significant ($r=0.838$, $p<0.001$). Hence, H_{02} was also supported. This shows that the marks increase in post-test would also lead to a final score. But pre-test and post-test is not significantly correlated.

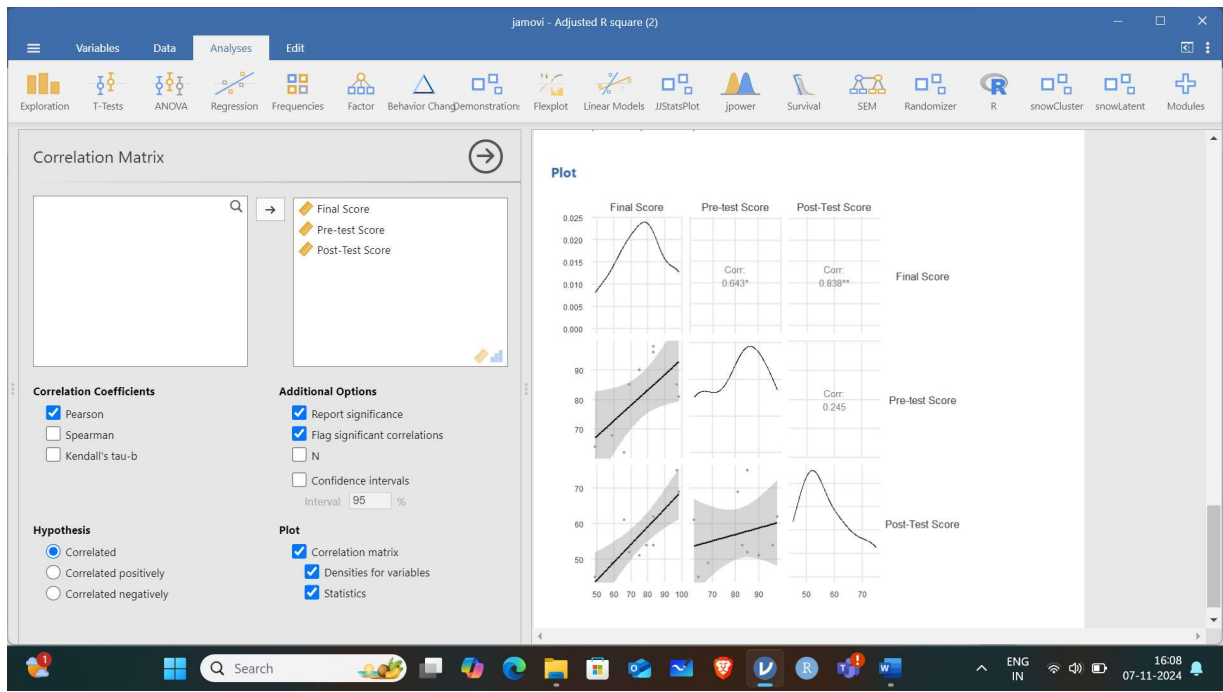
Table shows the summary of the findings.

Correlation Matrix

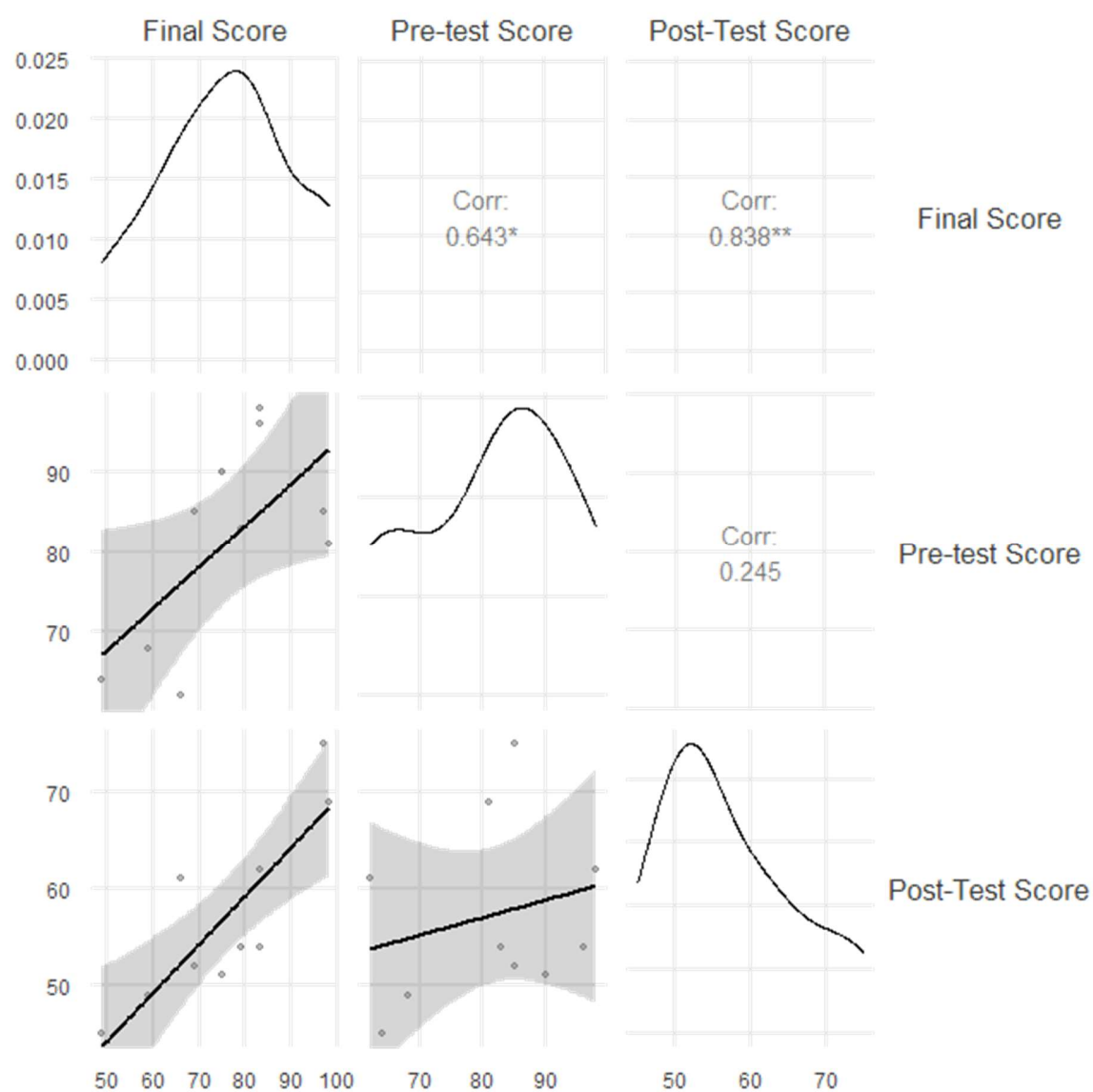
		Final Score	Pre-test Score	Pot-Test Score
Final Score	Pearson's r	—		
	df	—		
	p-value	—		
Pre-test Score	Pearson's r	0.643 *	—	
	df	8	—	
	p-value	0.045	—	
Pot-Test Score	Pearson's r	0.838 **	0.245	—
	df	8	8	—
	p-value	0.002	0.494	—

Note. * $p < .05$, ** $p < .01$, *** $p < .001$



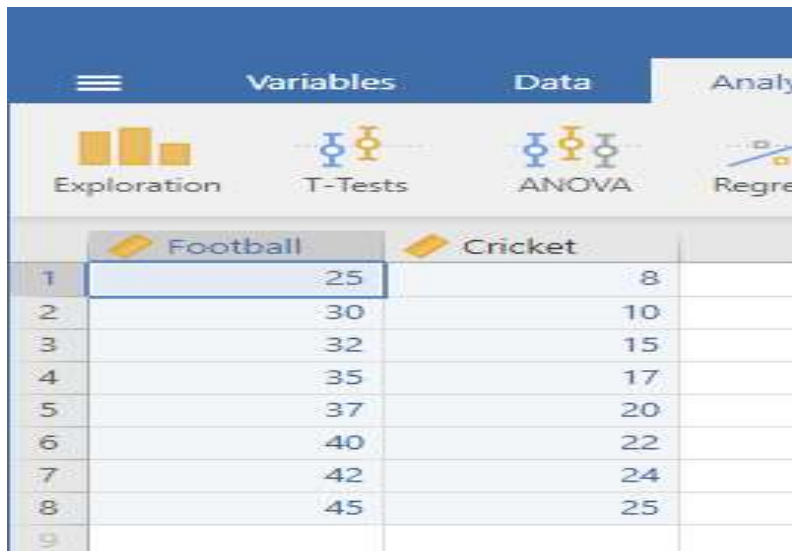


Plot



Do your self

Download **Correlation** file form the given link <https://dsdhakre.in/Datafiles.html>



	Football	Cricket
1	25	8
2	30	10
3	32	15
4	35	17
5	37	20
6	40	22
7	42	24
8	45	25
9		
