Measure of Association

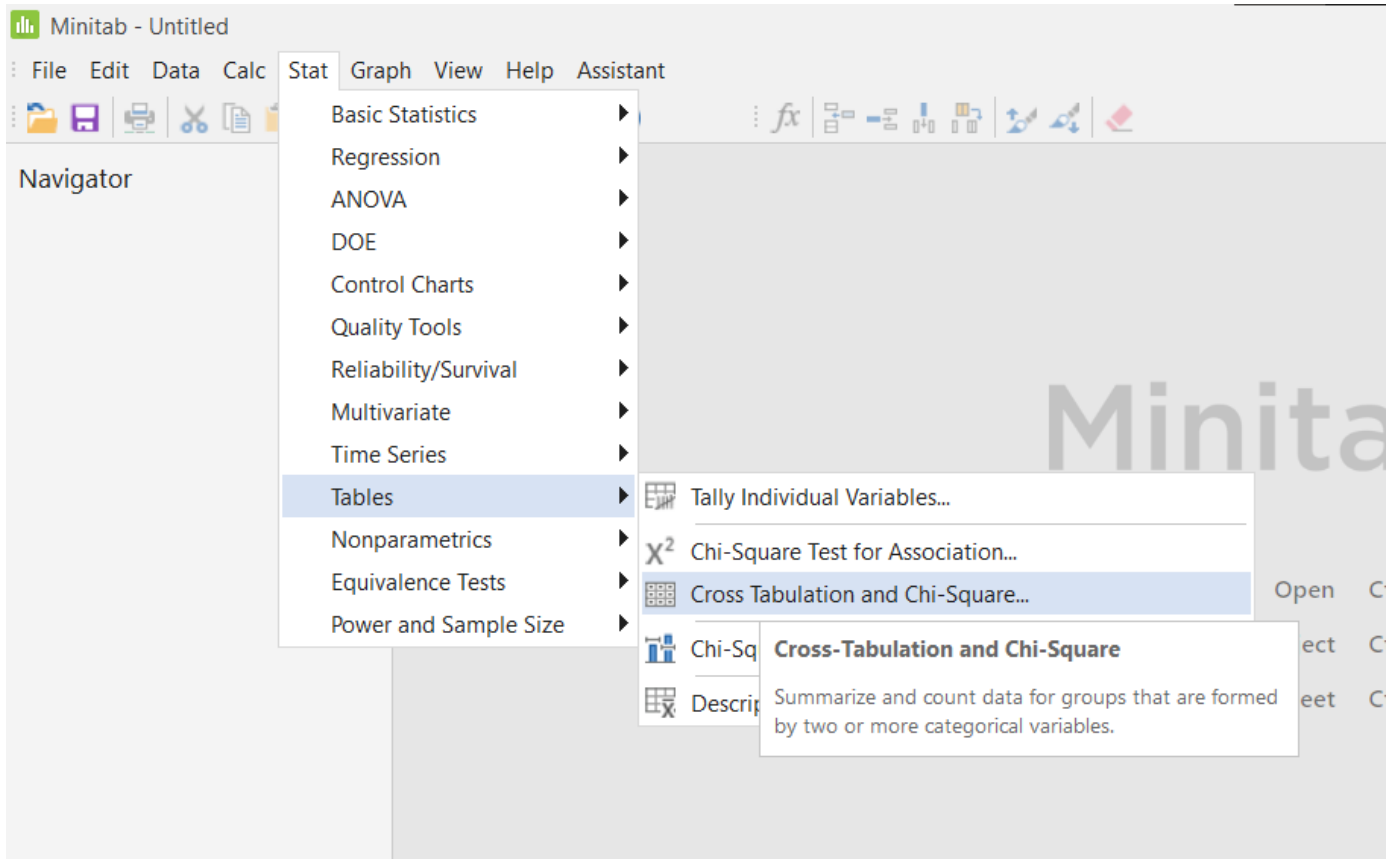
NOTES:

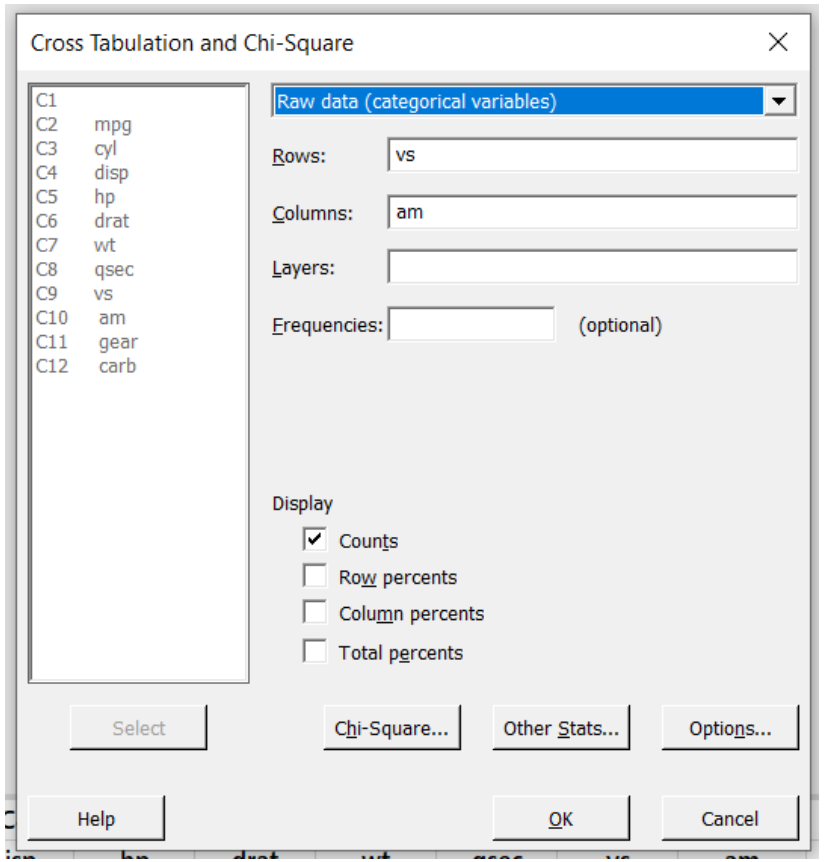
We’ll be using **mtcars2** data. So before continue, please import the data first into your Minitab worksheet.

Sabeb mau Minitab 19 atau 16..

Association of 2 Nominal Variables (1)

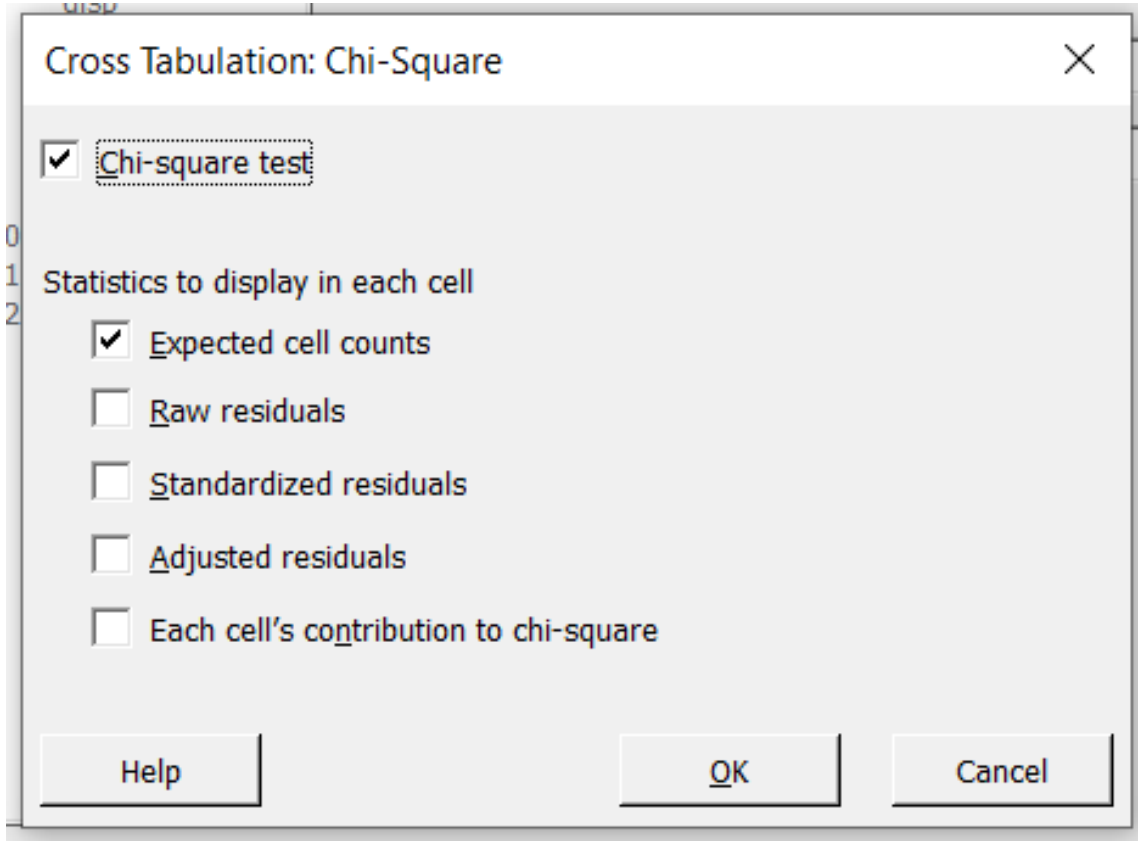
Contingency Tables



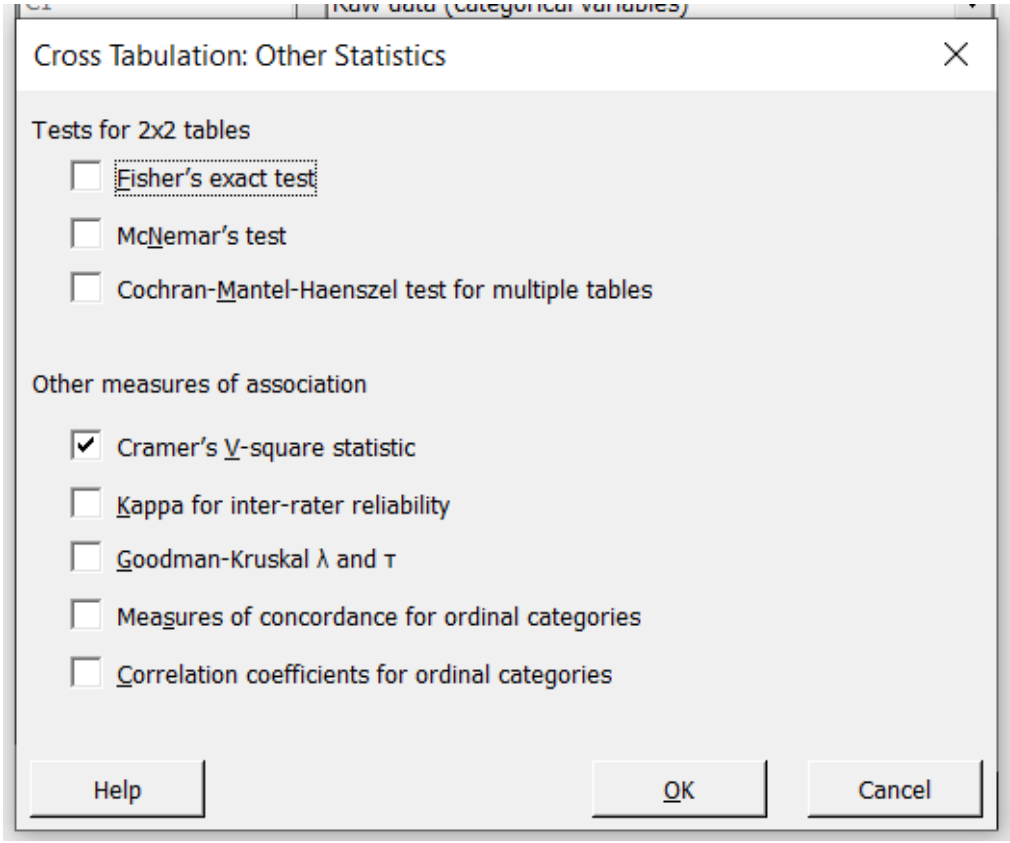


Association of 2 Nominal Variables (2)

Add Chi-square test and expected cell counts into contingency table.



Add Cramer's V-square statistic into the output



Association of 2 Nominal Variables (3)

Result

MTCARS2.CSV

Tabulated Statistics: vs; am

Rows: vs Columns: am

	automatic	manual	All
S	7	7	14
	8.313	5.688	
V	12	6	18
	10.688	7.313	
All	19	13	32

Cell Contents
Count
Expected count

Chi-Square Test

	Chi-Square	DF	P-Value
Pearson	0.907	1	0.341
Likelihood Ratio	0.907	1	0.341

Cramer's Measure of Association

Cramer's V-square	0.0283401

Pearson chi-square test
The Pearson chi-square statistic (χ^2) involves the squared difference between the observed and the expected frequencies.

Use the chi-square statistics to test whether the variables are associated. Use the p-values to evaluate the significance of the chi-square statistics.

- **P-value ≤ α: The variables have a statistically significant association (Reject H_0).** If the p-value is less than or equal to the significance level, you reject the null hypothesis and conclude that there is a statistically significant association between the variables.
- **P-value > α: Cannot conclude that the variables are associated (Fail to reject H_0).** If the p-value is larger than the significance level, you fail to reject the null hypothesis because there is not enough evidence to conclude that the variables are associated.

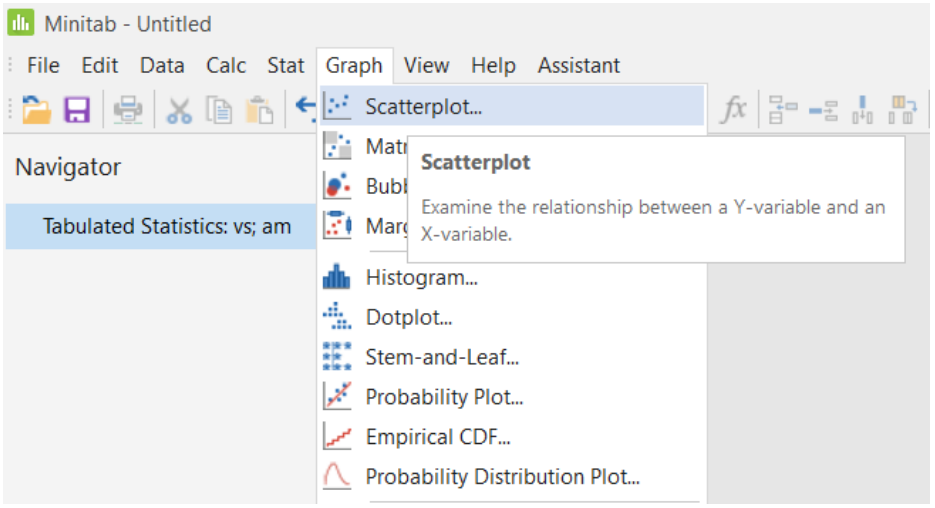
Read chi-square test here.

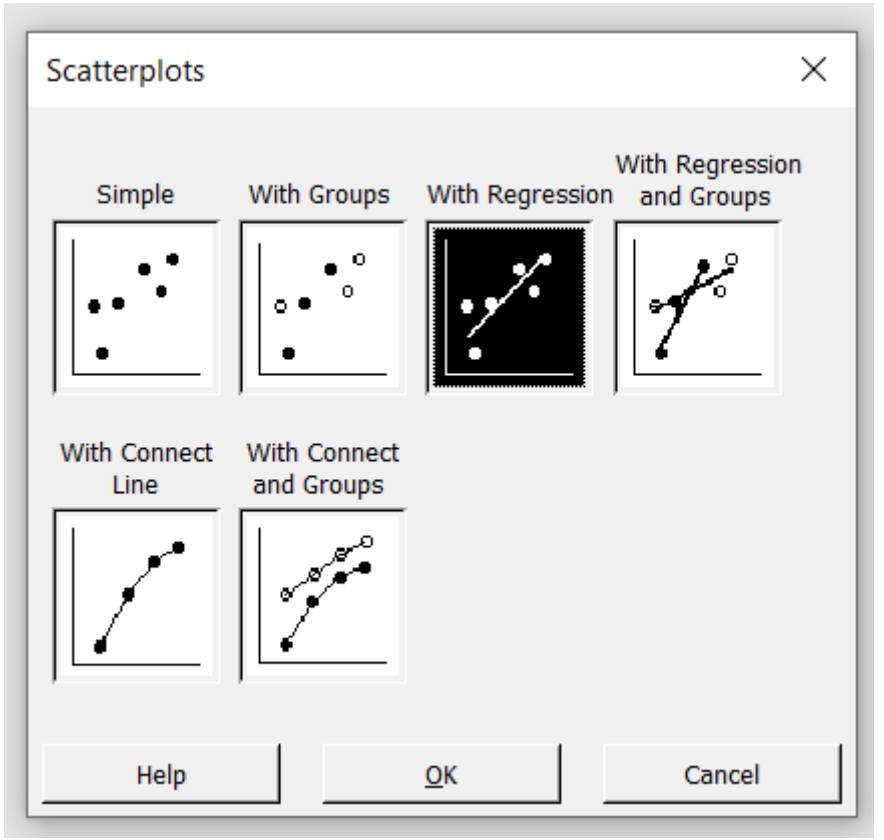
Cramer's V-square
Cramer's V^2 measures association between two variables (the row variable and the column variable). Cramer's V^2 values range from 0 to 1. Larger values for Cramer's V^2 indicate a stronger relationship between the variables, and smaller value for V^2 indicate a weaker relationship. A value of 0 indicates that there is no association. A value of 1 indicates that there is a very strong association between the variables.

Read others measures of association here.

Association of 2 Continuous Variables (1)

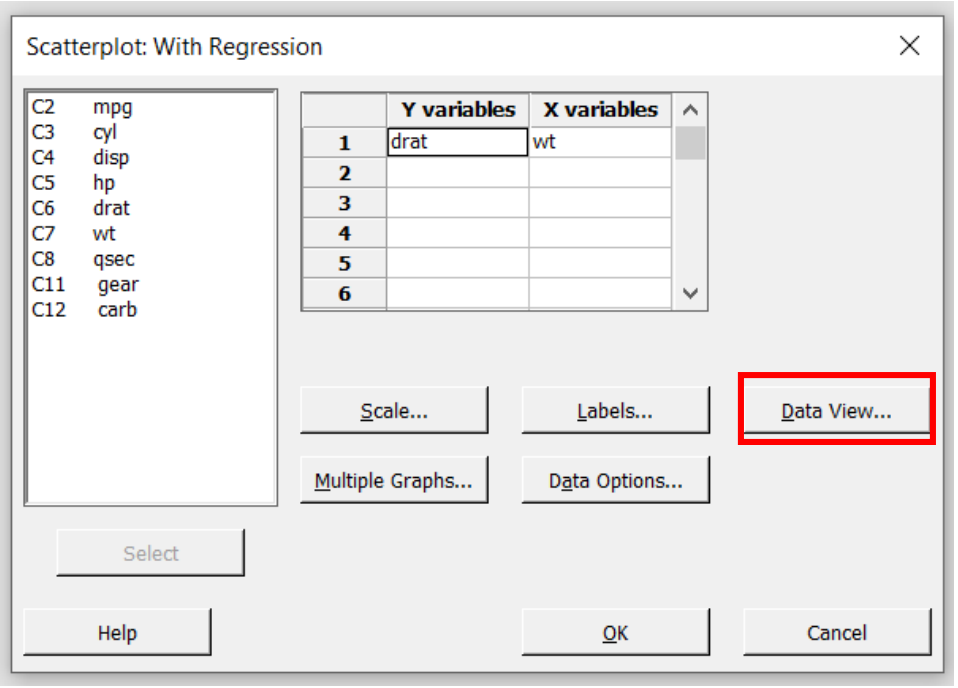
Scatter Plot



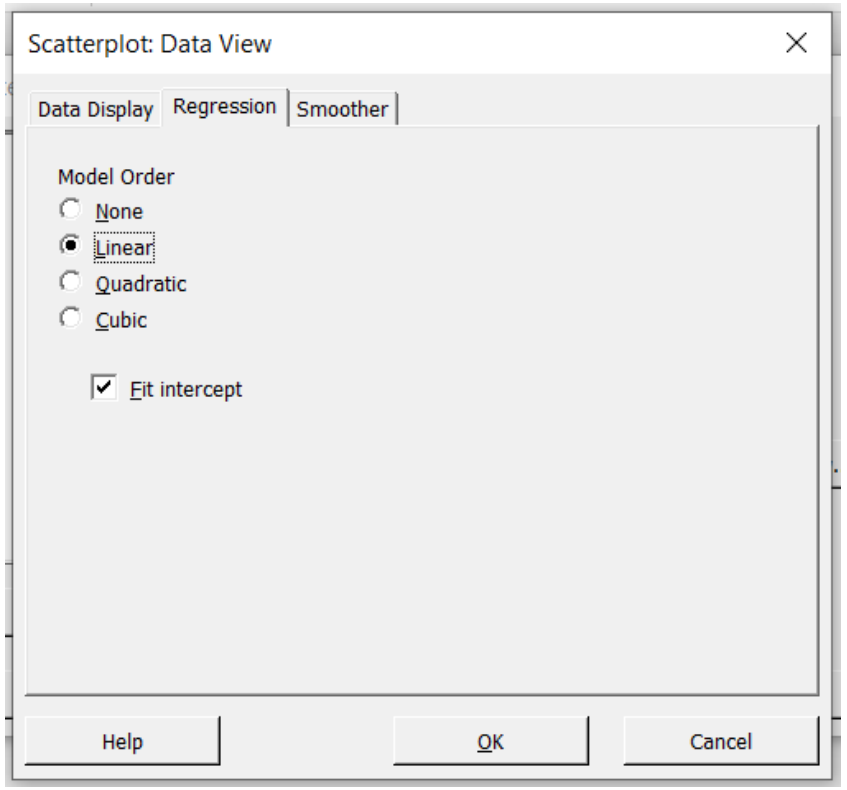


Association of 2 Continuous Variables (2)

Input 2 variables



Choosing form of relationship

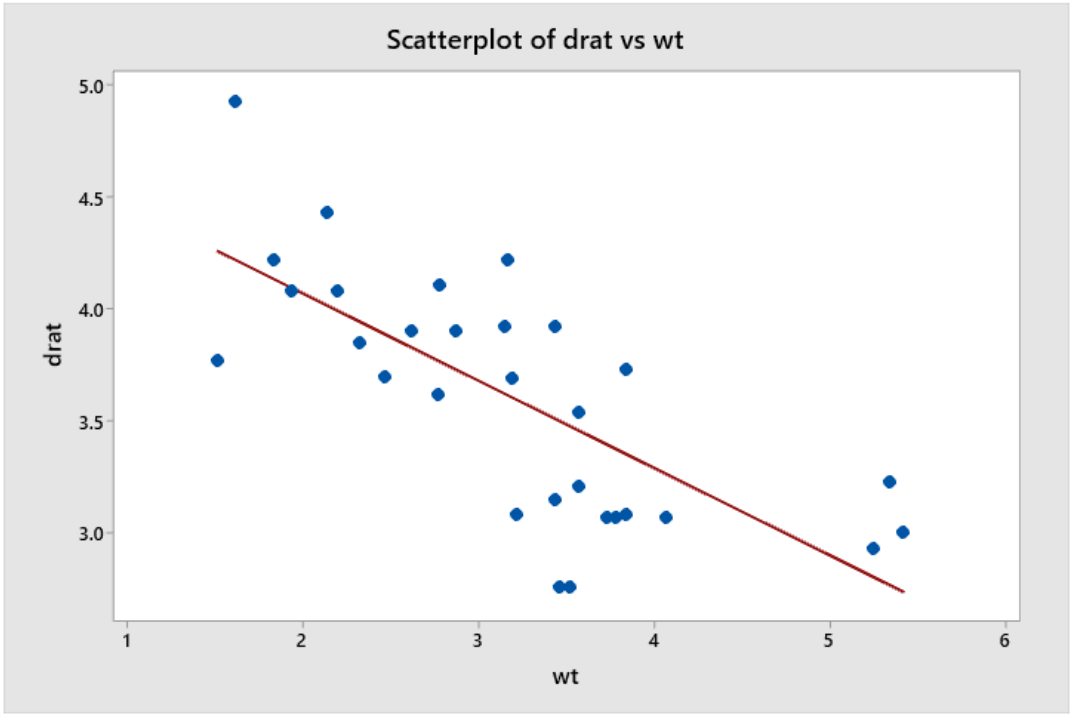


Association of 2 Continuous Variables (3)

Result

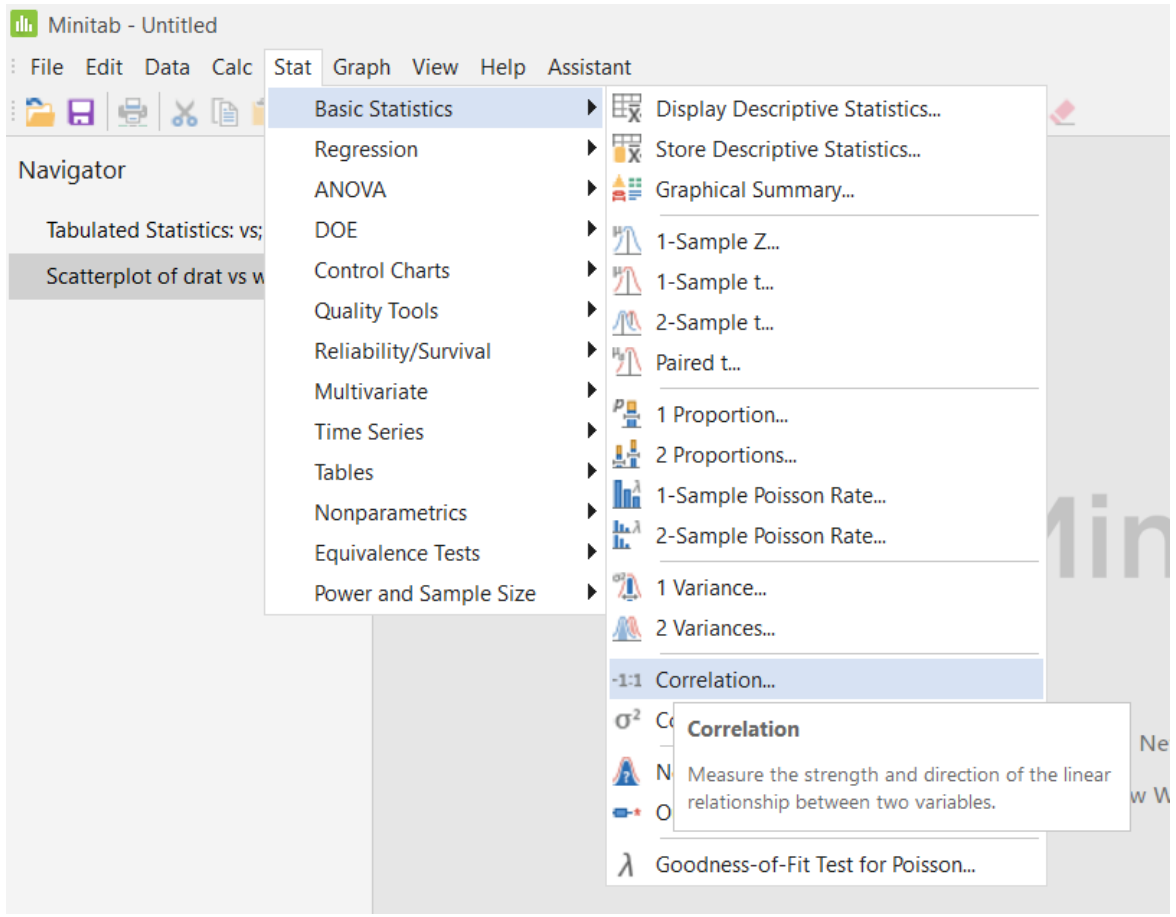
MTCARS2.CSV

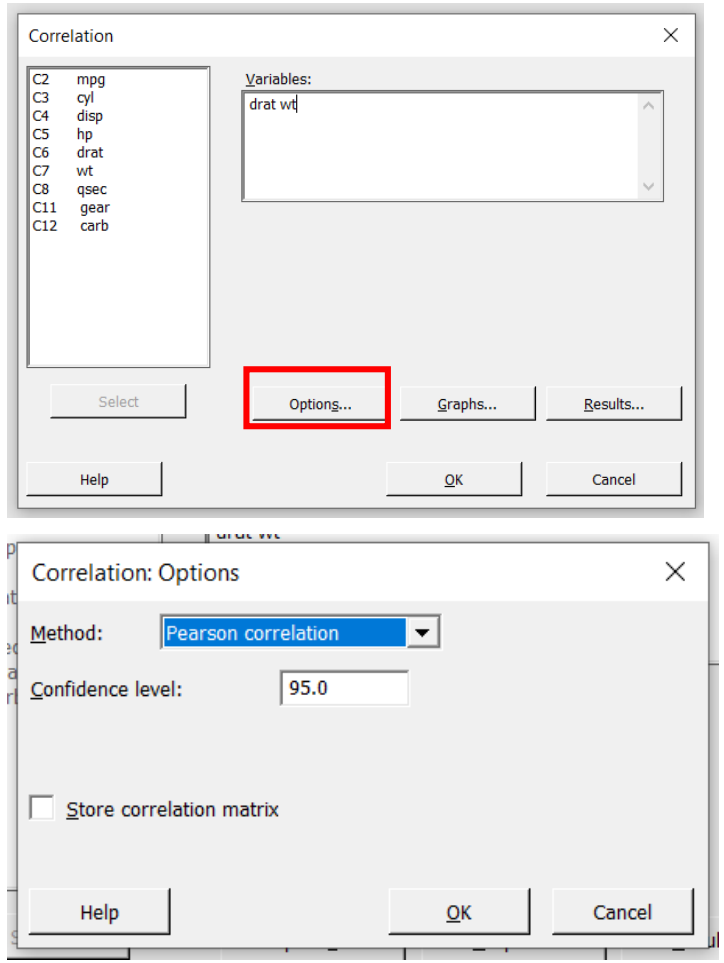
Scatterplot of drat vs wt



Association of 2 Continuous Variables (4)

Pearson Correlation



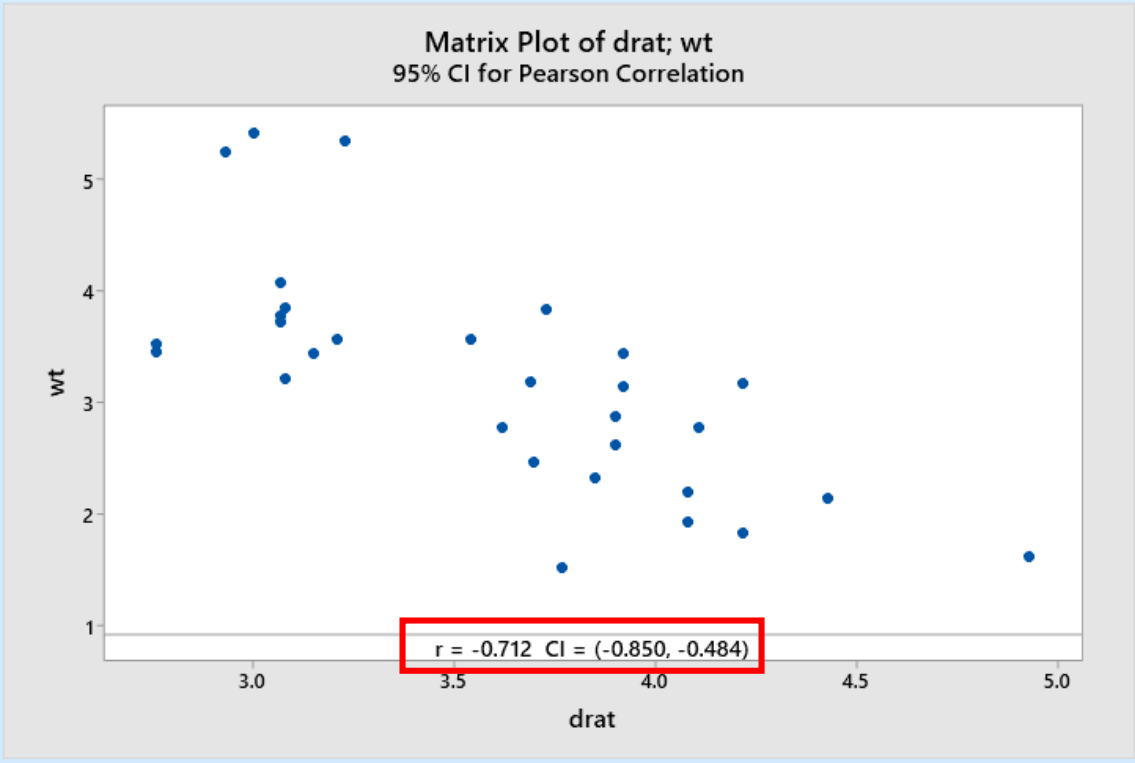


Association of 2 Continuous Variables (5)

Result

MTCARS2.CSV

Correlation: drat; wt



Use the Pearson correlation coefficient to examine the strength and direction of the linear relationship between two continuous variables.

Strength

The correlation coefficient can range in value from −1 to +1. The larger the absolute value of the coefficient, the stronger the relationship between the variables.

For the Pearson correlation, an absolute value of 1 indicates a perfect linear relationship. A correlation close to 0 indicates no linear relationship between the variables.

Direction

The sign of the coefficient indicates the direction of the relationship. If both variables tend to increase or decrease together, the coefficient is positive, and the line that represents the correlation slopes upward. If one variable tends to increase as the other decreases, the coefficient is negative, and the line that represents the correlation slopes downward.

Read Pearson correlation interpretation here.