<table>
<tr><th>Bivariate Correlation</th><th>Scatterplot Graph</th></tr>
<tr><td>- Determine if two numerical continuous variables are linearly related to each other.

- Correlation coefficient is a number between -1 and 1 indicates the strength of the relationship of two variables.
• Sign: direction, positive or negative
○ Positive: higher score on one variable are associated with higher scores on the other variables
○ Negative: higher score on one variable are associated with lower scores on the other variable
• Magnitude: strength
○ A correlation coefficient of 1: near-perfect positive correlation.
○ A correlation coefficient of 0: uncorrelated.
○ A correlation coefficient of -1: near-perfect negative correlation.</td><td>- A simple two-dimensional plot in which the two coordinates of each dot represent the value of one variable measured on a single observation
• Independent variable on the horizontal axis.
• Dependent variables on the vertical axis.

- Underlying the phenomenon based on:
• Form: the overall shape made by the points.
○ Ex: linear, quadratic or nonlinear.
• Direction: positive or negative, whether the two variables tend to move in the same or opposite direction.
• Strength: governed by how much scatter is present, whether the points seem to be clustered to suggest a relationship.
• Outliers: any point that don't fit the overall pattern or lie far away.</td></tr>
<tr><td>Analyze – Correlate – Bivariate
➢ Select the two desired variables
➢ Option
○ Select Mean and Standard Deviation
○ Select either Pairwise or Listwise as desired
➢ Paste</td><td>Graph – Legacy Dialog – Scatter/Dot
➢ Select Simple Scatter – Define
➢ Select the desired independent variable for x-axis
➢ Select the desired dependent variable for y-axis
➢ Paste</td></tr>
<tr><td>correlations
/variables = Variable1 Variable2
/print = twotail-or-onetail nosig.
/statistics descriptives
/missing = pairwise-or-listwise</td><td>graph
/scatterplot = Variable1 with Variable2
/title = “Your-Graph-Name”</td></tr>
<tr><td>Two-tailed test:
H_0: There is no correlations, $\rho = 0$.
H_1: There is correlation, $\rho \neq 0$.

One-tailed test:
H_0: There is no correlation, $\rho = 0$.
H_1: There is a positive correlation, $\rho > 0$.
Or
H_1: There is a negative correlation, $\rho < 0$.</td><td> </td></tr>
<tr><td colspan="2">By default, SPSS has selected:
➢ Pearson and Two-tailed Test although users have the option to select Kendall’s tau-b/Spearman and One-tailed Test if desire.
➢ A pairwise deletion of missing values.
○ Pairwise: as long as both variables in the correlation have valid values for a case, it will be included in the correlation).
○ Listwise: if a case has missing value for any variable, it will be eliminated from all correlation even though there are valid values for the other variables in the current correlation</td></tr>
<tr><td colspan="2">Reporting Correlation in APA Format:
A Pearson Correlation test has <failed/succeeded> to reveal a statistical correlation between <Variable1> and <Variable2>, with <r = >, thus <accepting/rejecting> H_0.</td></tr>
</table>

height	weight
58	115
59	117
60	120
61	123
62	126
63	129
64	132
65	135
66	139
67	142
68	146
69	150
70	154
71	159
72	164

*** A full data set can be downloaded from:

https://www.picostat.com/dataset/r-dataset-package-datasets-women.

Example:

A selection of data from the Women dataset is chosen to illustrate the correlation between women's height and weight. The selection includes 15 observations and 2 variables: height (in inches) and weight (in pound)

Hypothesis:

Two-tailed test:
H_0: There is no correlation between women's height and weight, $\rho = 0$.
H_1: There is correlation between women's height and weight, $\rho \neq 0$.

SPSS Code:

```
CORRELATIONS
  /VARIABLES=height weight
  /PRINT=TWOTAIL NOSIG
  /STATISTICS DESCRIPTIVES
  /MISSING=PAIRWISE.
```

```
GRAPH
  /SCATTERPLOT(BIVAR)=weight WITH height
  /MISSING=LISTWISE
  /TITLE="Scatterplot of Women's Height Based on Women's Weight".
```

Output

Descriptive Statistics

	Mean	Std. Deviation	N
height	65.00	4.472	15
weight	136.73	15.499	15

Correlations

		height	weight
height	Pearson Correlation	1	.995**
	Sig. (2-tailed)		.000
	N	15	15
weight	Pearson Correlation	.995**	1
	Sig. (2-tailed)	.000	
	N	15	15

**. Correlation is significant at the 0.01 level (2-tailed).

Conclusion:

A Pearson Correlation test has succeeded to reveal a strong statistical positive correlation between women's height and weight ($r = 0.995$), thus rejecting H_0.