

TABLE 1: Variable types

VARIABLE TYPE	DESCRIPTION	EXAMPLE
Nominal (categorical) variables	They take values that represent qualities that cannot be rank ordered. Arithmetic operations cannot be performed on these values.	<p><i>What is your eye colour?</i></p> <ul style="list-style-type: none"> ○ <i>Blue</i> ○ <i>Green</i> ○ <i>Brown</i> ○ <i>Black</i> ○ <i>Other</i>
Dichotomous variables	Nominal variables that take only two values.	<p><i>Do you smoke?</i></p> <ul style="list-style-type: none"> ○ <i>Yes</i> ○ <i>No</i>
Ordinal variables	They take values that can be rank ordered, but the exact distance (difference) between any two values is unknown. Arithmetic operations (addition, subtraction, division, etc.) cannot be performed on these values.	<p><i>What is your age group?</i></p> <ul style="list-style-type: none"> ○ <i>18-30</i> ○ <i>31-40</i> ○ <i>41-50</i> ○ <i>> 50</i>
Interval variables	They take values measured along a numerical scale that has equal distances between adjacent points. These distances are called “intervals.” There is no true zero point on an interval scale , which is what distinguishes it from a ratio scale. Arithmetic operations are meaningful and can be performed on these values.	Temperature measured in Celsius degrees Credit score
Ratio variables	They take values measured along a numerical scale that has equal distances between adjacent points, plus there is a true zero point representing the absence of the property being measured (e.g. no money, no distance, etc.) that allows value comparisons based on relative amounts/ratios (double, triple, half, etc.). Arithmetic operations can be performed on these values.	<p><i>What is your net monthly income?</i></p> <p><i>How many hours per week do you watch TV?</i></p>

NOTE: SPSS does not distinguish ratio variables from interval variables. Both variable types are entered into SPSS as “scale variables”.

TABLE 2

Descriptive statistics and graphs by variable type

VARIABLE TYPE	DESCRIPTIVE STATISTICS	GRAPHS
Nominal	Frequency distributions in one-way or two-way tables, mode.	Pie charts, bar charts.
Ordinal	Frequency distributions in one-way or two-way tables, mode, maximum, minimum.	Pie charts, bar charts.
Interval or ratio (scale)	Mean, median, mode, standard deviation, range, interquartile range, maximum, minimum, skewness and kurtosis measures (shape of the distribution).	Bar charts, histograms, boxplots, line graphs, dispersion graphs.

TABLE 3: Inferential statistics by variable type
(tests of dependence/correlation between two variables)

VARIABLE TYPE	WHAT IS TESTED	STATISTIC
Two nominal variables	Differences between observed and expected frequencies.	Chi-square statistic for independent samples ¹ .
One nominal and one ordinal variable	Differences between observed and expected frequencies.	Chi-square statistic for independent samples.
Two ordinal variables	Correlation between variables (strength and direction).	Spearman Rho correlation coefficient for dependent samples. ²
One ordinal and one dichotomous variable	Difference in mean ranks or (conventionally) difference in means.	Non parametric Mann-Whitney (U) test for two independent samples' it examines whether there is a difference in the mean ranks or (conventionally) the means of an ordinal variable for the two groups of a dichotomous variable.
Two scale (interval or ratio) variables	Correlation between variables (strength and direction).	Pearson r correlation coefficient for dependent samples.
One scale variable (normal distribution) and one dichotomous variable	Difference in means.	Parametric t-test for comparing the means of two independent samples (it examines whether there is a difference in the means of a scale variable for the two groups of a dichotomous variable).
One scale variable (not normally distributed) and one dichotomous variable	Difference in mean ranks or (conventionally) difference in means.	Non parametric Mann-Whitney (U) test for two independent samples' it examines whether there is a difference in the mean ranks or (conventionally) the means of a scale variable <u>which is not normally distributed</u> for the two groups of a dichotomous variable.

¹**Independent samples:** when each participant belongs to only one of the two groups (or conditions) being compared.

²**Dependent samples:** when each participant belongs to both groups (or conditions) being compared.

TABLE 4: HOW TO INTERPRET INFERENCE STATISTICS (TESTS)
(level of statistical significance $\alpha=0.05$)

PROBABILITY VALUE	INTERPRETATION
$p(\text{sig}) > 0.05$	Results are not statistically significant. Therefore, I cannot generalise to the wider population (I do not reject the null hypothesis H_0).
$p(\text{sig.}) \leq 0.05$	Results are statistically significant. Therefore, I can generalise to the wider population (I reject the null hypothesis H_0).

TABLE 5

Basic steps followed (selection of items on the menu bar) in order to conduct statistical operations in SPSS

OPERATION	BASIC STEPS (SELECTION OF MENU ITEMS)
Opening an Excel file	Open → Data → Files of type 'Excel (*.xls *.xlsx, *.xlsm)' → File name → 'Read variable names' if the first row of the spreadsheet contains variable names → Open
Defining a variable type	Variable View → Measure (select scale, ordinal or nominal)
Coding a variable	Variable View → Values
Defining missing values	Variable View → Missing Values
Detecting errors	Data → Sort Cases → Sort by (select Ascending or Descending)
Recoding a variable	Transform → Recode into different variables → Old and New Values
Creating a new variable using existing ones	Transform → Compute Variable
Creating an ID variable	Transform → Compute Variable → Functions Group (select All) → Functions and Special Variables (select \$Casenum)
Selecting cases	Data → Select Cases → If condition is satisfied → If
Adding a new case (row)	Data View → click any individual cell below where you want your new case (row) to be inserted → Edit → Insert Cases
Adding a new variable (column)	Data View → click any individual cell to the right of where you want your new variable (column) to be inserted → Edit → Insert Variable
Deleting a case or a variable	Data View → select the row or column you want to delete → right click → Clear
Creating a simple (one-way) frequency table	Analyze → Descriptive Statistics → Frequencies → Display frequency tables
Creating a cross-tabulation (two-way table)	Analyze → Descriptive Statistics → Crosstabs → dependent variable in Row(s) → independent variable in Column(s) → Cells → Percentages → Column
Estimating measures of central tendency and/or dispersion	Analyze → Descriptive Statistics → Frequencies → deactivate Display frequency tables → Statistics → select Mean, Median, Mode, Quartiles, Range, Minimum, Maximum, Std. Deviation

Creating a pie chart	Analyze → Descriptive Statistics → Frequencies → Charts → Pie charts
Creating a bar chart	Analyze → Descriptive Statistics → Frequencies → Charts → Bar charts
Creating a clustered bar chart	Graphs → Chart Builder → Gallery → Bar → icon Clustered Bar → Chart Preview → independent variable in X-Axis? → dependent variable in Cluster on X: set color → Element Properties → Count → Percentage → Set Parameters → Total for Each X-Axis Category
Creating a histogram with normal distribution curve	Analyze → Descriptive Statistics → Frequencies → Charts → Histograms → Show normal curve on histogram
Creating a box plot	Graphs → Chart Builder → Gallery → Boxplot → icon Simple Boxplot → chart preview → dependent variable in Y-Axis → independent variable in X-Axis
Estimating measures of central tendency and/or dispersion of a scale variable for each category of a nominal or ordinal variable	Analyze → Compare Means and Proportions → Means → dependent variable in Dependent List → independent variable in Layer 1 of 1 → Options → move Mean, Median, Standard Deviation, Range, Maximum, Minimum, Number of Cases to the box "Cell statistics"
Estimating measures of central tendency and/or dispersion of a scale variable for each category of a nominal or ordinal variable	Analyze → Descriptive Statistics → Explore → dependent variable in Dependent List → independent variable in Factor List → in Display, select Statistics
Conducting a chi-square test	Analyze → Descriptive Statistics → Crosstabs → dependent variable in Row(s) → independent variable in Column(s) → Statistics → Chi-square (top left)
Pearson r correlation coefficient	Analyze → Correlate → Bivariate → move the two variables in the Variables box → select Pearson (under Correlation Coefficients)
Spearman Rho correlation coefficient	Analyze → Correlate → Bivariate → move the two variables in the Variables box → select Spearman (under Correlation Coefficients)
Parametric t-test	Analyze → Compare Means → Independent Samples t-test
Mann-Whitney U test	Analyze → Nonparametric Tests → Legacy Dialogs → 2 Independent Samples