# Accessibility Guidance for the Map of Statistical tests in SPSS.

## Getting Started.

* [Introduction to Map](https://skillshub.northampton.ac.uk/statistics/map-of-statistical-tests-in-spss/introduction-to-map/): this button link takes you to further resources including a video and fact sheet.
* [Using an online survey](https://video.northampton.ac.uk/media/Free%2BOnline%2BSurveys/1_1z1x9h9t): this button link opens a video on the University’s Media Space site.
* [Importing Excel to SPSS](https://skillshub.northampton.ac.uk/statistics/map-of-statistical-tests-in-spss/importing-excel-to-spss/): this button link takes you to further resources including a video and fact sheet.

## Introduction to statistics and SPSS.

* [Entering Data into SPSS](https://video.northampton.ac.uk/media/Data%2BEntry%2Bin%2BSPSS/1_w044sp70): this button link opens a video on the University’s Media Space site.
* [Descriptive Statistics](https://skillshub.northampton.ac.uk/statistics/map-of-statistical-tests-in-spss/descriptive-statistics/): this button link takes you to further resources including fact sheets and a video.
* [Descriptive Statistics in SPSS](https://video.northampton.ac.uk/media/Descriptive%2BStatistics%2Bin%2BSPSS/1_zhxejqwk): this button link opens a video on the University’s Media Space site.
* [Hypothesis Testing](https://skillshub.northampton.ac.uk/statistics/map-of-statistical-tests-in-spss/hypothesis-testing/): this button link takes you to further resources including a video and fact sheet.

## Which Test.

### ****Chi-squared Test:****

[Chi-squared Test](https://skillshub.northampton.ac.uk/statistics/map-of-statistical-tests-in-spss/chi-square-test/)**:** this button link takes you to further resources including fact sheets and a video.

The chi-squared ($χ^{2}$) is used to test whether there is an association between two categorical measures. For example, is there an association between your favourite colour and gender. The categorical measures can be ordinal or nominal.

### Independent T-tests:

[Independent T-tests](https://skillshub.northampton.ac.uk/statistics/map-of-statistical-tests-in-spss/independent-t-test/): this button link takes you to further resources including fact sheets and a video.

Independent T-test is appropriate when you want to test whether there is a difference in a continuous measure between two independent groups. For example, is there a difference in examination results between male and female students. To do this test, there are some assumptions that must be met. For both the independent groups the data must be parametric – this mean that the data is normally distributed and has no outliers. If this assumption cannot be met, you should use the Mann-Whitney U test.

### Mann Whitney:

[Mann Whitney](https://skillshub.northampton.ac.uk/statistics/map-of-statistical-tests-in-spss/mann-whitney-test/):this button link takes you to further resources including fact sheets and a video.

Mann-Whitney U test is conducted when you want to test whether there is a difference in a continuous or ordinal measure between two independent groups. For example, is there a difference in how satisfied students are on their course and whether they are male or female. This test is used when the assumptions of normality and outliers on the independent t-test are not met (If they are and your data is continuous you should use the independent t-test because it is a more robust test).

### Paired T-tests:

[Paired T-Tests](https://skillshub.northampton.ac.uk/statistics/map-of-statistical-tests-in-spss/paired-t-test/): this button link takes you to further resources including a video and fact sheet.

Paired T-test is used when you test the difference of a continuous measure for two related samples or periods. An example of this could be that has the weight of a group of patients changed after undertaking a diet. The patients’ weights are measured before and after the intervention. Because we are comparing the same patients before and after the treatment they are related. To do this test, the assumption that needs to be met is the difference between the two periods of your continuous measure is normally distributed and has no outliers. If this assumption cannot be met, you should use the Wilcoxon signed ranked test.

### Wilcoxon:

[Wilcoxon](https://skillshub.northampton.ac.uk/statistics/map-of-statistical-tests-in-spss/wilcoxon/): this button link takes you to further resources including fact sheets and a video.

Wilcoxon signed ranked test is used when you test the difference of a continuous or ordinal measure for two related samples. An example of this could be that has the anxiety of a group of patients changed after a consultation with a doctor. The patients’ anxiety scores are taken before and after the consultation. Because we are comparing the same patients before and after the treatment they are related. This test is used when the assumptions of normality and outliers on the paired t-test are not met (If they are you and your data is continuous you should use the paired t-test because it is a more robust test).

### One-way ANOVA:

[One-way ANOVA](https://skillshub.northampton.ac.uk/statistics/map-of-statistical-tests-in-spss/one-way-anova/): this button link takes you to further resources including fact sheets and a video.

One-way ANOVA is used when we want to compare the means of two or more independent groups. It is normally used when you compare three or more groups as an independent t-test can be used for two groups. An example of this is when you want to compare the impact of a fertilizer on three types of carrot to see which carrots grew the most. To do this test there are some assumptions that need to be met. Firstly, that the dependent measure (your measurement) is continuous and that there are at least two independent groups that you are comparing your measure on. Secondly, that for each group the dependent measure is normally distributed with no outlier. The final assumption is that there needs to be homogeneity of variance. This means simply that the spread of the dependent measure in each of the groups is similar. This is tested using a Levene’s test within the ANOVA analysis.

### Kruskall Wallis:

[Kruskall Wallis](https://video.northampton.ac.uk/media/Kruskal%2BWallis/1_zid5bss9): this button link opens a video on the University’s Media Space site.

Kruskall Wallis is used when the assumptions on a one-way ANOVA test are not met but you still want to compare two or more groups on a continuous or ordinal measure. If the data is normally distributed in each of the independent groups, there are no outliers and the dependent measure is continuous, a one-way ANOVA is the most appropriate test as it is more robust. An example when you might use a Kruskall Wallis test is if you needed to know whether there was a difference in satisfaction of patients care across three different hospital wards.

### One Way ANOVA:

[One Way ANOVA](https://skillshub.northampton.ac.uk/statistics/map-of-statistical-tests-in-spss/one-way-anova/): this button link takes you to further resources including fact sheets and a video.

One Way Repeated ANOVA is test when you want to compare a continuous measure across two or more related samples or periods. It is normally used when you compare three or more groups as a paired t-test can be used for two groups. An example of this could be when a Vo2 measure was compared at three periods during a 6-month exercise programme. Measures for participants were taken at the beginning, middle and end of the programme to compare vo2 measures. Because we are comparing the same people at the periods they are related. The assumptions that need to be met are the distribution in each of the periods/samples of your continuous measure is normally distributed and has no outliers and there is an assumption of sphericity, (this only applies to three or more periods/samples and is simply that the differences between each pair of periods/samples have the same variance). This test is conducted within the repeated measures analysis and depending on whether you have sphericity or not you will choose the appropriate analysis for your study.

### Friedman Test:

[Friedman Test](https://video.northampton.ac.uk/media/Friedman%2Btest/1_ku7gvxxd): this button link opens a video on the University’s Media Space site.

Friedman Test is a non-parametric version of a one-way repeated ANOVA. It is used to compare a continuous or ordinal measure across three or more related samples or periods. The Friedman test is used rather than the one-way repeated ANOVA when the assumption of normality or no outliers cannot be met, or the dependent measure is ordinal. For example, satisfaction with a sports programme was compared at three periods during a 6-month exercise programme. Satisfaction was measured on a 4-point ordinal scale.

### Two-way ANOVA:

[Two-way ANOVA](https://skillshub.northampton.ac.uk/statistics/map-of-statistical-tests-in-spss/two-way-anova/): this button link takes you to further resources including fact sheets and a video.

Two-way ANOVA compares the mean differences of a measure between groups that have been split on two independent variables (called factors). One of the key elements of the analysis is that it enables the analysis of the interaction between the two independent variables on the dependent measure. For example, a researcher is interested in understanding the difference in student exam scores based on age and gender. The dependent variable is the exam scores and the independent factors are age and gender. In order to conduct this test several assumptions need to met. Firstly, the dependent variable is continuous and there are two or more independent factors. Secondly, the dependent variable is normally distributed and has no outliers for each level within the independent factors. Thirdly there is independence of observations - this means that there is no relationship between the respondents’ results. And, finally, there is homogeneity of variance in each combination of independent factor groups. This is tested with a Levene’s test within the analysis.

[Correlation analysis](https://mypad.northampton.ac.uk/skillshub/statistics/map-of-statistical-tests-in-spss/correlation/): this button link takes you to further resources including fact sheets and a video.

Correlation analysis tests whether there is a linear (straight line) relationship between two ordinal or continuous measures. In simple terms if you produce a scatter diagram of two measures and draw a line of best fit through the data, the correlation analysis will tell you how good the line is at explaining the relationship. There are two correlation tests that are commonly used – Pearson’s product moment correlation and Spearman’s rank correlation. If each of the measures being tested are continuous and normally distributed without outliers the Pearson’s product moment correlation is the most appropriate test to use and if not, the Spearman’s rank correlation should be used.

[Simple Linear Regression](https://mypad.northampton.ac.uk/skillshub/statistics/map-of-statistical-tests-in-spss/simple-linear-regression/): this button link takes you to further resources including fact sheets and a video.

Simple linear regression is used when you are using one (independent) measure to explain another (dependent measure) with a straight-line relationship. It is a follow on from correlation analysis and tells you how much of one measure is explained by the other and gives us an equation which can be used to predict the dependent measure. An example could be the value of a companies return on equity (ROE) by the board size. There are many assumptions that need to be adhered to conduct a simple regression. Firstly, the two measures should be continuous and that there should be a linear relationship between them. Secondly, there should be no outliers from the regression analysis. Next, there should be no independence of observations - this means that there is no relationship between the respondents’ results. In addition, there should be homoscedasticity, which means that the linear relationship stays constant as you move along the line (as one of the measure increases) and finally, that the residuals (errors) from the model are normally distributed.

[Multiple Regression](https://mypad.northampton.ac.uk/skillshub/statistics/map-of-statistical-tests-in-spss/multiple-linear-regression/): this button link takes you to further resources including fact sheets and a video.

Multiple Regression is used when we want to predict the value of a variable (dependent variable) based on the value of two or more other variables (independent variables). An example could be predicting sales of a product based on the price of it to buy and advertising spend. There are many assumptions that need to be adhered to conduct a multiple regression. Firstly, all measures should be continuous and that there should be a linear relationship between each independent variable with the dependent variable. Secondly, there should be no outliers from the regression analysis. Next, there should be independence of observations - this means that there is no relationship between the respondents’ results. In addition, there should be homoscedasticity, which means that the linear relationship stays constant as you move along the line (as one of the measure increases), the residuals (errors) from the model are normally distributed, and finally there should be no multicollinearity (a strong relationship between the independent variables).