

Step by step procedure for independent sample 't' test in SPSS

Introduction

The independent-samples t-test (or independent t-test, for short) compares the means between two unrelated groups on the same continuous, dependent variable. For example, you could use an independent t-test to understand whether first year graduate salaries differed based on gender (i.e., your dependent variable would be "first year graduate salaries" and your independent variable would be "gender", which has two groups: "male" and "female"). Alternately, you could use an independent t-test to understand whether there is a difference in test anxiety based on educational level (i.e., your dependent variable would be "test anxiety" and your independent variable would be "educational level", which has two groups: "undergraduates" and "postgraduates").

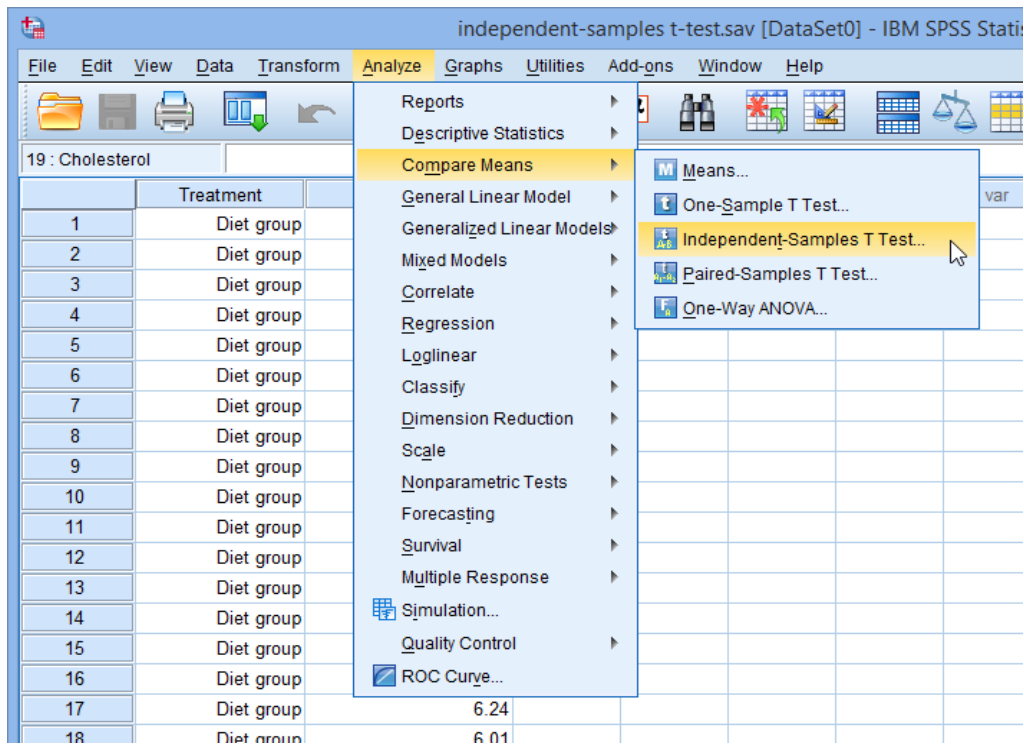
Setup in SPSS Statistics

In SPSS Statistics, we separated the groups for analysis by creating a grouping variable called **Treatment** (i.e., the independent variable), and gave the "diet group" a value of "1" and the "exercise group" a value of "2" (i.e., the two groups of the independent variable). Cholesterol concentrations were entered under the variable name **Cholesterol** (i.e., the dependent variable).

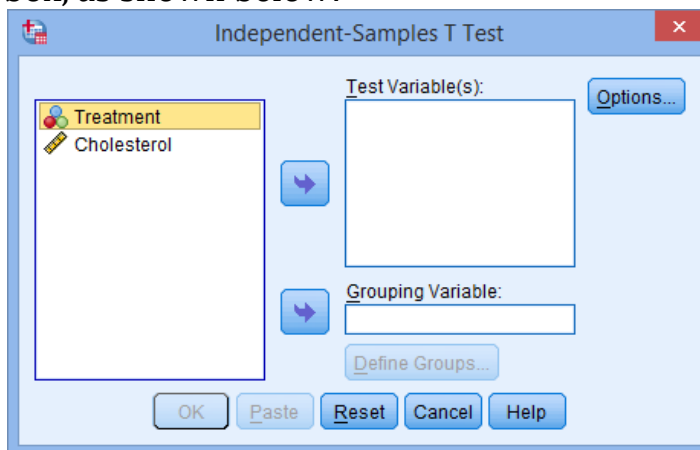
Test Procedure in SPSS Statistics


The eight steps below show you how to analyse your data using an independent t-test in SPSS Statistics

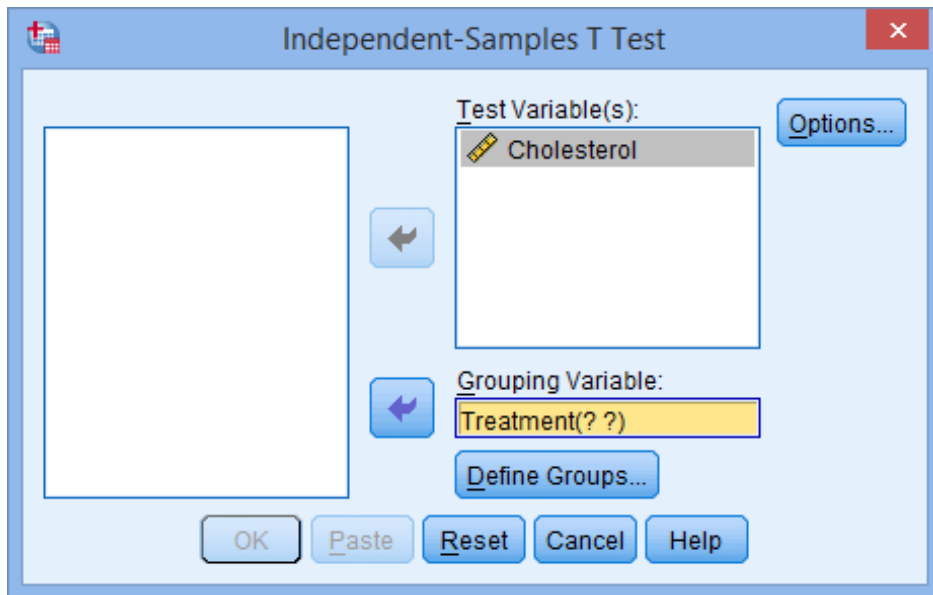
Click **Analyze > Compare Means > Independent-Samples T Test...** on the top menu, as shown below:



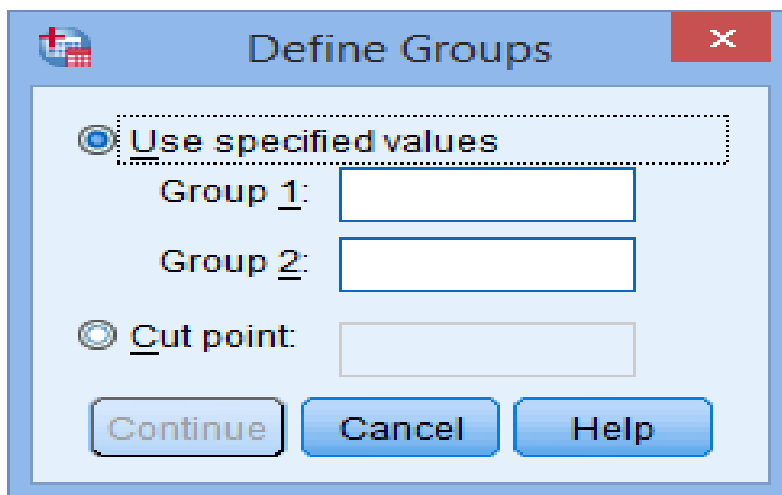
You will be presented with the **Independent-Samples T Test** dialogue box, as shown below:



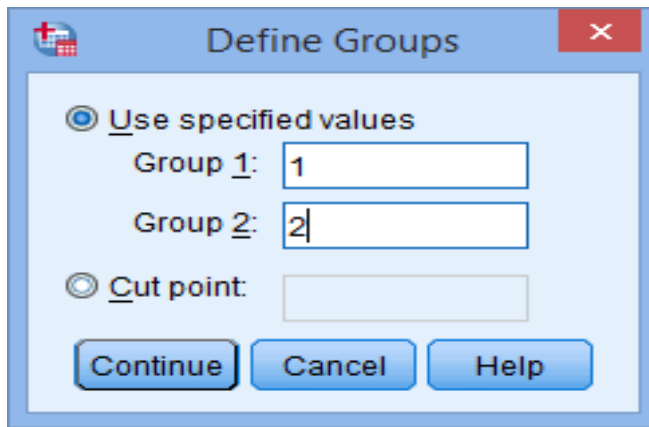
1. Transfer the dependent variable, **Cholesterol**, into the **Test Variable(s):** box, and transfer the independent variable, **Treatment**, into the **Grouping Variable:** box, by highlighting the relevant variables and pressing the  buttons. You will end up with the following screen:



2. You then need to define the groups (treatments). Click on the **Define Groups...** button. You will be presented with the **Define Groups** dialogue box, as shown below:

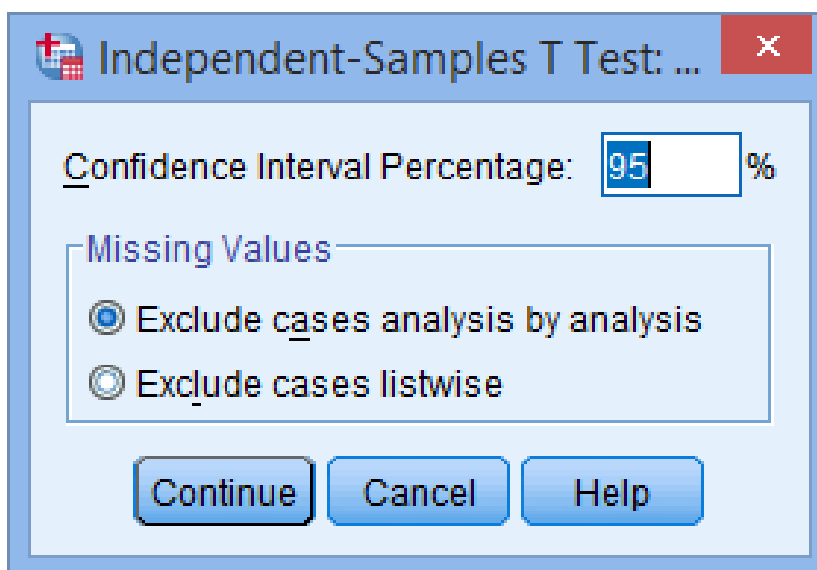


3. Enter "1" into the **Group 1:** box and enter "2" into the **Group 2:** box. Remember that we labelled the **Diet Treatment** group as 1 and the **Exercise Treatment** group as 2.



Note: If you have more than 2 treatment groups in your study (e.g., 3 groups: **diet**, **exercise** and **drug** treatment groups), but only wanted to compared two (e.g., the **diet** and **drug** treatment groups), you could type in **1** to Group 1: box and **3** to Group 2: box (i.e., if you wished to compare the diet with drug treatment).

4. Click the **Continue** button.
5. If you need to change the confidence level limits or change how to exclude cases, click the **Options...** button. You will be presented with the following:



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6. Click the **Continue** button. You will be returned to the **Independent-Samples T Test** dialogue box.
7. Click the **OK** button.

Output of the independent t-test in SPSS Statistics

SPSS Statistics generates two main tables of output for the independent t-test.

Group Statistics Table

This table provides useful descriptive statistics for the two groups that you compared, including the mean and standard deviation.

Group		N	Mean	Std. Deviation	Std. Error Mean
Cholesterol Concentration	Diet	20	6.1450	.51959	.11618
	Exercise	20	5.7950	.38179	.08537

Unless you have other reasons to do so, it would be considered normal to present information on the mean and standard deviation for this data. You might also state the number of participants that you had in each of the two groups. This can be useful when you have missing values and the number of recruited participants is larger than the number of participants that could be analysed.

A diagram can also be used to visually present your results. For example, you could use a bar chart with error bars (e.g., where the error bars could use the standard deviation, standard error or 95% confidence intervals). This can make it easier for others to understand your results. Again, we show you how to do this in our enhanced independent t-test guide.

Independent Samples Test Table

This table provides the actual results from the independent t-test.

		Cholesterol Concentration	
		Equal variances assumed	Equal variances not assumed
Levene's Test for Equality of Variances	F	.314	
	Sig.	.579	
t-test for Equality of Means	t	2.428	2.428
	df	38	34.886
	Sig. (2-tailed)	.020	.021
	Mean Difference	.35000	.35000
	Std. Error Difference	.14418	.14418
	95% Confidence Interval of the Difference	Lower Upper	.05813 .64187

You can see that the group means are statistically significantly different because the value in the "**Sig. (2-tailed)**" row is less than 0.05. Looking at the **Group Statistics** table, we can see that those people who undertook the exercise trial had lower cholesterol levels at the end of the programme than those who underwent a calorie-controlled diet.