

# 1 One-sample t-test

## 1.1 Overview

The one sample t-test is used to test a hypothesis about the mean of a variable on a population.

Here is an example of when the test is used: A student claims that the average weight of students on Loughborough University campus is 70kg. Another student does not believe this to be true, so he measures the weight of 20 participants. The student would then test the hypothesis that the mean weight is 70kg.

The assumptions of the one-sample t-test are:

- Random sampling from a defined population.
- Quantitative response variable.
- Variable normally distributed with unknown variance on the population. However, there is a rule of thumb that for sample sizes larger than 30, the t-test can be used even if the distribution is not normal. (This is due to the central limit theorem).

If you do not have quantitative data, then you are in the wrong part of the flowchart and it is advised that you start again and look at the definitions of nominal, ordinal and quantitative variables.

If your sample size is smaller than 30 and your measurements are far from normal then it would be better to use a one-sample median test.

## 1.2 Analysis plan

The descriptive statistics you should have calculated are: sample size, sample mean, sample variance and standard error of sample. It may also be useful to calculate skewness and kurtosis to assess whether your data is normally distributed. You could use a stem-and-leaf plot, histogram or box plot to visualise the data.

A good follow up test is to calculate a 95% confidence interval for the mean of the variable on the population.

Here are some examples of a one sample t-test being carried out:

<a href="http://www.youtube.com/watch?v=492o03VFm5U">http://www.youtube.com/watch?v=492o03VFm5U</a>	(by hand)
<a href="http://www.youtube.com/watch?v=jTJdj7ZYmmU">http://www.youtube.com/watch?v=jTJdj7ZYmmU</a>	(in SPSS)
<a href="http://www.instantr.com/2012/12/29/performing-a-one-sample-t-test-in-r/">http://www.instantr.com/2012/12/29/performing-a-one-sample-t-test-in-r/</a>	(in R)