

## One Sample T-Test

One sample  $t$ -test is a statistical procedure used to examine the mean difference between the sample and the known value of the population mean. In one sample  $t$ -test, we know the population mean. We draw a random sample from the population and then compare the sample mean with the population mean and make a statistical decision as to whether or not the sample mean is different from the population mean. We can use this analysis, for example, when we take a sample from the city and we know the mean of the country (population mean). If we want to know whether the city mean differs from the country mean, we will use the one sample  $t$ -test.

### Procedure:

Set up the hypothesis:

- A. Null hypothesis: assumes that there are no significance differences between the population mean and the sample mean.
- B. Alternative hypothesis: assumes that there is a significant difference between the population mean and the sample mean.

1. Calculate the standard deviation for the sample by using this formula:

$$S = \sqrt{\frac{\sum (X - \bar{X})^2}{n - 1}}$$

Where,

S = Standard deviation

$\bar{X}$

= Sample mean

n = number of observations in sample

2. Calculate the value of the one sample  $t$ -test, by using this formula:

$$t = \frac{\bar{X} - \mu}{S} \sqrt{n}$$

Where,

t = one sample t-test value

$\mu$

= population mean

3. Calculate the degree of freedom by using this formula:

$$V = n - 1$$

Where,

V= degree of freedom

4. Hypothesis testing: In [hypothesis testing](#), statistical decisions are made to decide whether or not the population mean and the sample mean are different. In hypothesis testing, we will compare the calculated value with the table value. If the calculated value is greater than the table value, then we will reject the null hypothesis, and accept the alternative hypothesis.

**Assumptions:**

1. Dependent variables should be normally distributed.
2. Samples drawn from the population should be random.
3. Cases of the samples should be independent.
4. We should know the population mean.

*\*[Click here](#) for assistance with conducting a one sample t-test or other quantitative analyses.*

**Related Pages:**

[One-Sample T-Test Video Tutorial](#)

[Conduct and Interpret a One-Sample T-Test](#)

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