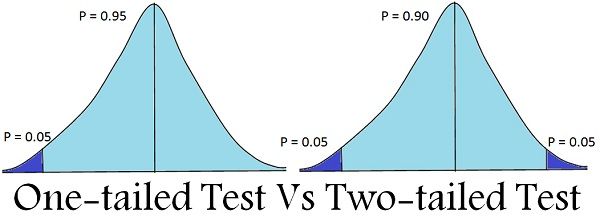
Difference Between One-tailed and Two-tailed Test

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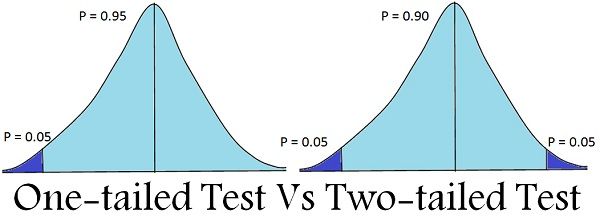
[](https://keydifferences.com/wp-content/uploads/2017/01/one-tailed-vs-two-tailed-test.jpg)

The two ways of carrying out statistical significance test of a characteristic, drawn from the population, with respect to the test statistic, are a one-tailed test and two-tailed test. The **one-tailed test** refers to a test of null hypothesis, in which the alternative hypothesis is articulated directionally. Here, the critical region lies only on one tail. However, if the alternative hypothesis is not exhibited directionally, then it is known as the **two-tailed test** of the null hypothesis., wherein the critical region is one both the tails.

To test the hypothesis, test statistics is required, which follows a known distribution. In a test, there are two divisions of probability density curve, i.e. region of acceptance and region of rejection. the region of rejection is called as a **critical region**.

In the field of research and experiments, it pays to know the difference between one-tailed and two-tailed test, as they are quite commonly used in the process.

# Difference Between One-tailed and Two-tailed Test

[](https://keydifferences.com/wp-content/uploads/2017/01/one-tailed-vs-two-tailed-test.jpg)The two ways of carrying out statistical significance test of a characteristic, drawn from the population, with respect to the test statistic, are a one-tailed test and two-tailed test. The **one-tailed test** refers to a test of null hypothesis, in which the alternative hypothesis is articulated directionally. Here, the critical region lies only on one tail. However, if the alternative hypothesis is not exhibited directionally, then it is known as the **two-tailed test** of the null hypothesis., wherein the critical region is one both the tails.

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## Content: One-tailed Test Vs Two-tailed Test

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### Comparison Chart

| **BASIS OF COMPARISON** | **ONE-TAILED TEST** | **TWO-TAILED TEST** |
| --- | --- | --- |
| Meaning | A statistical hypothesis test in which alternative hypothesis has only one end, is known as one tailed test. | A significance test in which alternative hypothesis has two ends, is called two-tailed test. |
| Hypothesis | Directional | Non-directional |
| Region of rejection | Either left or right | Both left and right |
| Determines | If there is a relationship between variables in single direction. | If there is a relationship between variables in either direction. |
| Result | Greater or less than certain value. | Greater or less than certain range of values. |
| Sign in alternative hypothesis | > or < | ≠ |

### **Definition of One-tailed Test**

One-tailed test alludes to the significance test in which the region of rejection appears on one end of the sampling distribution. It represents that the estimated test parameter is greater or less than the critical value. When the sample tested falls in the region of rejection, i.e. either left or right side, as the case may be, it leads to the acceptance of alternative hypothesis rather than the null hypothesis. It is primarily applied in chi-square distribution; that ascertains the goodness of fit.

In this statistical hypothesis test, all the critical region, related to α, is placed in any one of the two tails. One-tailed test can be:

* **Left-tailed test**: When the population parameter is believed to be lower than the assumed one, the hypothesis test carried out is the left-tailed test.
* **Right-tailed test**: When the population parameter is supposed to be greater than the assumed one, the statistical test conducted is a right-tailed test.

### **Definition of Two-tailed Test**

The two-tailed test is described as a hypothesis test, in which the region of rejection or say the critical area is on both the ends of the normal distribution. It determines whether the sample tested falls within or outside a certain range of values. Therefore, an alternative hypothesis is accepted in place of the null hypothesis, if the calculated value falls in either of the two tails of the probability distribution.

In this test, α is bifurcated into two equal parts, placing half on each side, i.e. it considers the possibility of both positive and negative effects. It is performed to see, whether the estimated parameter is either above or below the assumed parameter, so the extreme values, work as evidence against the null hypothesis.

## Key Differences Between One-tailed and Two-tailed Test

The fundamental differences between one-tailed and two-tailed test, is explained below in points:

1. One-tailed test, as the name suggest is the statistical hypothesis test, in which the alternative hypothesis has a single end. On the other hand, two-tailed test implies the hypothesis test; wherein the alternative hypothesis has dual ends.
2. In the one-tailed test, the alternative hypothesis is represented directionally. Conversely, the two-tailed test is a non-directional hypothesis test.
3. In a one-tailed test, the region of rejection is either on the left or right of the sampling distribution. On the contrary, the region of rejection is on both the sides of the sampling distribution.
4. A one-tailed test is used to ascertain if there is any relationship between variables in a single direction, i.e. left or right. As against this, the two-tailed test is used to identify whether or not there is any relationship between variables in either direction.
5. In a one-tailed test, the test parameter calculated is more or less than the critical value. Unlike, two-tailed test, the result obtained is within or outside critical value.
6. When an alternative hypothesis has ‘≠’ sign, then a two-tailed test is performed. In contrast, when an alternative hypothesis has ‘> or <‘ sign, then one-tailed test is carried out.

### **Conclusion**

To sum up, we can say that the basic difference between one-tailed and two-tailed test lies in the direction, i.e. in case the research hypothesis entails the direction of interrelation or difference, then one-tailed test is applied, but if the research hypothesis does not signify the direction of interaction or difference, we use two-tailed test.