What is the difference between a Left Tailed Test and a Right Tailed Test?

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A left-tailed test, also known as a one-tailed test, is a statistical hypothesis test that is used to determine whether the mean of a population is significantly less than a specific value. This type of test is typically used when there is a specific direction or prediction regarding the difference between the population mean and the specified value.

On the other hand, a right-tailed test, also known as a one-tailed test, is a statistical hypothesis test that is used to determine whether the mean of a population is significantly greater than a specific value. This type of test is also used when there is a specific direction or prediction regarding the difference between the population mean and the specified value.

In summary, the main difference between a left-tailed test and a right-tailed test is the direction of the hypothesis being tested. A left-tailed test is used to determine if the mean is significantly less than a specific value, while a right-tailed test is used to determine if the mean is significantly greater than a specific value.

Identify a Left Tailed Test vs. a Right Tailed Test

In statistics, we use to determine whether some claim about a is true or not.

Whenever we perform a hypothesis test, we always write a null hypothesis and an alternative hypothesis, which take the following forms:

H0 (Null Hypothesis): Population parameter = ≤, ≥ some value

HA (Alternative Hypothesis): Population parameter <, >, ? some value

There are three different types of hypothesis tests:

Two-tailed test: The alternative hypothesis contains the "? " signLeft-tailed test: The alternative hypothesis contains the "<" signRight-tailed test: The alternative hypothesis contains the ">" sign

Notice that we only have to look at the sign in the alternative hypothesis to determine the type of hypothesis test.

Left-tailed test: The alternative hypothesis contains the "<" sign

Right-tailed test: The alternative hypothesis contains the ">" sign

The following examples show how to identify left-tailed and right-tailed tests in practice.

Example: Left-Tailed Test

Suppose it's assumed that the average weight of a certain widget produced at a factory is 20 grams. However, one inspector believes the true average weight is less than 20 grams.

To test this, he weighs a of 20 widgets and obtains the

following information:

n = 20 widgetsx = 19.8 gramss = 3.1 grams

He then performs a hypothesis test using the following null and alternative hypotheses:

H0 (Null Hypothesis): μ ≥ 20 grams

HA (Alternative Hypothesis): μ < 20 grams

The test statistic is calculated as:

t = (x - μ) / (s/√n)t = (19.8-20) / (3.1/√20)t = -.2885

According to the , the t critical value at α = .05 and n-1 = 19 degrees of freedom is -1.729.

Since the test statistic is not less than this value, the inspector fails to reject the null hypothesis. He does not have sufficient evidence to say that the true mean weight of widgets produced at this factory is less than 20 grams.

Example: Right-Tailed Test

Suppose it's assumed that the average height of a

certain species of plant is 10 inches tall. However, one botanist claims the true average height is greater than 10 inches.

To test this claim, she goes out and measures the height of a of 15 plants and obtains the following information:

n = 15 plantsx = 11.4 inchess = 2.5 inches

She then performs a hypothesis test using the following null and alternative hypotheses:

H0 (Null Hypothesis): $\mu \leq$ 10 inches

HA (Alternative Hypothesis): μ > 10 inches

The test statistic is calculated as:

t = (x - μ) / (s/√n)t = (11.4-10) / (2.5/√15)t = 2.1689

According to the , the t critical value at α = .05 and n-1 = 14 degrees of freedom is 1.761.

Since the test statistic is greater than this value, the botanist can reject the null hypothesis. She has

sufficient evidence to say that the true mean height for this species of plant is greater than 10 inches.