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Demo: Conducting a One-Sample t Test

In this video, you learn how to conduct a one-sample t test using the file Diameter Test.jmp. This data set contains diameter measurements for 50 randomly selected parts.

First, we run a distribution analysis for Diameter. To do this, we use the Distribution platform from the Analyze menu. We select Diameter as the Y, Column and click OK.

To conduct a One Sample t test, we select Test Mean from the red triangle for the analysis.

For this example, suppose that we're testing the null hypothesis that the mean diameter is 16.15 mm against the alternative that the mean is not 16.15.

We enter 16.15 as the hypothesized value.

There are two other options available. If you know the true standard deviation, you can enter it in the field provided. If you do this, JMP conducts a z test rather than a t test. For this example, we don't know the true population standard deviation, so we leave this field blank.

You can also request a nonparametric test, called the Wilcoxon Signed Rank test. For more information about when to use this, and other nonparametric tests, see the JMP Help files.

We'll click OK to run the t test.

The test statistic, the t ratio, is -1.3973. The sample mean, 16.1406, is approximately 1.4 standard errors below the hypothesized mean.

The p-value for the two-tailed test is

0.1686. This p-value and the observed sample mean are displayed in the graph at the bottom of the analysis. The JMP philosophy is "a graph for every analysis." So, when you conduct statistical tests in JMP, you'll usually see graphs such as this curve to help you interpret the test results.

Based on the graph and the statistical results, if we use a significance level of 0.05, we do not reject the null hypothesis that the true mean is 16.15. The sample mean is consistent with the hypothesized value.

What if we have a different null hypothesis? For example, what if the null hypothesized value is 16.12 instead of

16.15? The t ratio for this test is 3.06. The sample mean is more than three standard errors above the hypothesized value. Given our sample size, it is unlikely we'd observe a sample mean of 16.14 if the true mean is

16.12. The p-value for the two-tailed test is 0.0036. At a significance level of 0.05, we reject the null hypothesis and conclude that the true mean is not 16.12.

What if, instead of performing a two-tailed test, you wanted to perform a one-tailed test?

The p-values for the two-tailed test and both one-tailed tests are reported automatically.

For the alternative hypothesis that the mean is greater than 16.12, the p-value is 0.0018, and the p-value for the alternative hypothesis that the mean is less than 16.12 is 0.9982.

The p-value you use depends on the alternative hypothesis you are testing.

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