# Hypothesis Test for Linear Correlation.

In this activity, we review the procedure for testing for a linear correlation.

Two methods are presented. Method 1 reinforces concepts you have likely already covered in your statistics course.

Method 2 involves fewer calculations.

These two methods yield the same results and you are encouraged to try both of them to determine which you prefer.

First, you establish as the null hypothesis that there is no linear correlation, rho equals zero.

The alternative hypothesis is that rho is not equal to zero, which is equivalent to saying that there is a linear correlation.

Next, you select a significance level, alpha.

Based on the sample data, you calculate the value of the linear correlation coefficient, *r* for the sample.

You can then use one of two methods to determine the test statistic.

In method 1, the test statistic is equal to *r* divided by the square root of the quotient of the quantity one minus r-squared over the quantity n-2.

The critical values of *t* are from Table A-3 with n minus 2 degrees of freedom.

The advantage of using method 1 is that it closely follows the same hypothesis testing procedures introduced in your textbook and statistics course, and uses the already familiar Student t-distribution.

In method 2, the test statistic is simply *r*.

The critical values of *r* are found in Table A-6.

Method 2 uses fewer calculations, and is therefore easier to apply.

Whichever method you choose, you next compare the absolute value of the test statistic to the critical values.

If the absolute value of the test statistic exceeds the critical values, reject the null hypothesis of rho equals zero.

If the absolute value of the test statistic does not exceed the critical values, then fail to reject the null hypothesis.

If the null hypothesis, rho equals zero, is rejected, then conclude that there is a linear correlation.

If the null hypothesis is not rejected, then state that there is not sufficient evidence to conclude that there is a linear correlation.

Now, it is time to test your knowledge.

Let’s try another one.

In this activity we reviewed the procedure for conducting a hypothesis test for a linear correlation.

Two methods were presented and either method can be used based on your preference.

Congratulations, you have mastered an important concept of Statistics!

Correlation does not imply causality, but then again, it doesn’t rule it out.