# Rank Correlation Procedure.

In this activity we review the procedure for the rank correlation test (or Spearman’s rank correlation test). This is a non parametric test that uses ranks of sample data consisting of matched pairs. It is used to test for an association between two variables.

A major advantage of using rank correlation instead of linear correlation is that there is no requirement of a normal distribution, and the original data can be in the form of ranks.

Also, the rank correlation test can be used to detect some relationships that are not linear.

First we need to check to see if the pairs of data consist of ranks.

If the sample data are not already ranks, convert the data of the first sample to ranks from 1 to *n* and then do the same for the second sample.

With the data pairs now in the form of ranks, we determine whether there are any TIES among the ranks of *either* variable.

If there are no ties in either variable, a simpler formula can be used to calculate the value of the rank correlation coefficient.

First calculate the difference d for each pair ranks by subtracting the lower rank from the higher rank.

Square each difference d and then find the sum of those squares.

Complete the computation of the rank correlation coefficient *r sub* s by evaluating 1 minus the quantity (6 times the sum of the *d*-squares) divided by the quantity (*n* times the quantity *n*-squared minus 1) where *n* is the number of PAIRS of sample data.

Now, it is time to test your knowledge.

However, if either variable has ties among its ranks, then you calculate the rank correlation coefficient *r sub* s using the equation shown.

Note that this formula is the same as the formula for the linear correlation coefficient given in Chapter 10 of the Triola textbook.

Next consider the sample size.

If the number of pairs of data, is less than or equal to 30, find the critical values of the rank correlation coefficient from table A-9.

If the sample size is GREATER THAN 30, calculate the critical values of the rank correlation coefficient by evaluating plus and minus *z* divided by the square root of the quantity n minus 1, where *z* corresponds to the significance level.

For example, if the significance level is 0.05, then use *z* = 1.96 and *z* = negative 1.96.

If the rank correlation coefficient is between the negative and positive critical values, *fail to reject* the null hypothesis of no correlation.

If the rank correlation coefficient *is not* between the negative and positive critical values, *reject* the null hypothesis and conclude that there is sufficient evidence to support the claim of a correlation.

Now, it is time to test your knowledge.

In this activity we reviewed the procedure for the rank correlation test.

This procedure uses ranks of sample data consisting of matched pairs to test for an association between two variables.

An advantage of the rank correlation test is that it can be used to detect some, but not all, relationships that are not linear.

Congratulations, you have mastered an important concept of Statistics!

When it comes to rank, don’t go blank.