# Procedure for Two-Way ANOVA.

In this activity we review the procedure for conducting two-way analysis of variance.

The sample data are categorized with two factors, a *row* variable and a *column* variable.

First, we test for an *interaction effect* between the row factor and column factor.

If there IS an interaction between the row and column factors, we stop and do not consider the effects of either factor without considering those of the other.

But if there is no interaction, we proceed to conduct a test for an effect from the row factor and then test for an effect from the column factor.

Because the calculations are so complex, use technology to obtain Two-Way ANOVA results from the sample data.

Your textbook includes instructions on how to obtain these results.

Technologies that can be used include StatCrunch, Statdisk, Excel, Minitab and TI-83 and 84 Plus Calculators.

To interpret the results from technology, begin by testing for an INTERACTION between the row factor and column factor.

The P-value is used to determine if there is an interaction effect and that P-value is based on the F Test Statistic.

If the P-value for the interaction is small, such as less than or equal to 0.05, *REJECT* the null hypothesis of NO *INTERACTION* effect.

There *DOES* appear to be an interaction effect.

If the interaction P-value is large, such as greater than 0.05, *FAIL TO REJECT* the null hypothesis of NO INTERACTION effect.

There DOES NOT appear to be an interaction effect.

If the P-value leads you to reject the null hypothesis of no interaction effect, then you should stop at this point.

When there does appear to be an interaction effect, we should not consider the effects of either factor without considering the effects of the other.

Now, it is time to test your knowledge.

However, if you fail to reject the null hypothesis of no interaction effect, you can proceed to test for an effect from the row factor using the P-value that is associated with the row factor.

If the corresponding P value for the row factor is small, conclude there is an effect from the row factor.

If the P value for the row factor is large, conclude there is not an effect from the row factor.

Next, you test for an effect from the column factor using the P-value that is associated with the column factor.

If the corresponding P value for the column factor is small, conclude that there is an effect from the column factor.

If the P value for the column factor is large, conclude that there is not an effect from the column factor.

Now, it is time to test your knowledge.

In summary, for two-way analysis of variance we first test for an interaction between the row factor and the column factor.

If no interaction effect is found, we then separately test for an effect from the row factor and for an effect from the column factor.

Congratulations, you have mastered an important concept of Statistics!

If you want more interaction, maybe join the debate team?