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Practice: Comparing Several Means

In this practice, you compare the means for the five trials using the data in the file **Michelson 1879.jmp**. The null hypothesis is that the means for the five trials are all equal.

1. Conduct a one-way ANOVA. What can you conclude about the means for the five trials (overall)?

   The *p*-value is < 0.05, so you can conclude that at least two of the means are different from one another.

2. Using the mean diamonds, compare the means for the five trials. What can you conclude?

   The mean for Trial 1 appears to be different from some, or all, of the other means.

3. Use Each Pair, Student's *t* to compare the different pairs of means. What can you conclude?

   Hint: From the red triangle, select **Compare Means**, then select **Each Pair, Student's t**.

   The mean for Trial 1 is different from the mean for all of the other trials, and none of the other means are different.

4. Use Tukey's HSD to compare the pairs of means. What can you conclude?

   Hint: From the red triangle, select **Compare Means**, and then select **All Pairs**, **Tukey's HSD**.

   The mean for Trial 1 is different from the means for Trials 4 and 5. There are no other differences.

5. Compare the results from Each Pair, Student's *t* to Tukey's HSD. Do the methods lead you to draw the same conclusions?

   Tukey's HSD found fewer differences. It is a less sensitive test than Each Pair, Student's *t* because it controls for the overall error rate of multiple tests, whereas the Each Pair test does not.

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