One-Way ANOVA

Test for differences between three or more population means using the Fit Y by X platform. Note: If testing two means (two levels of the categorical X variable), refer to the page **Two Sample t-Test and CIs**.

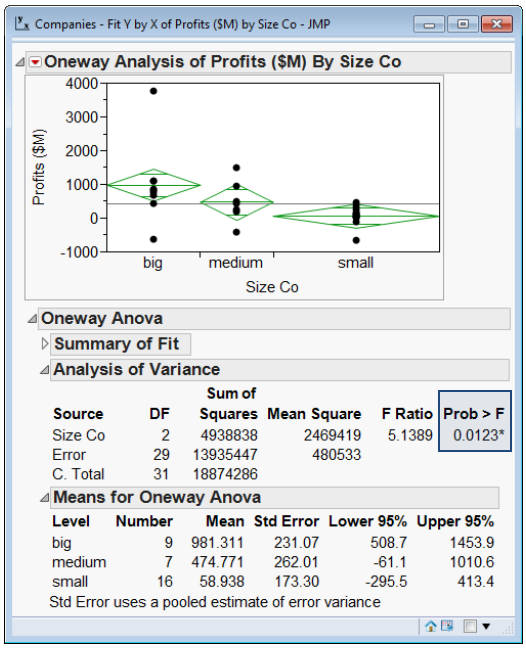
One-Way Analysis of Variance

1. Select **Analyze > Fit Y by X**.
2. Click on a continuous variable from **Select Columns**, and Click **Y, Response** (continuous variables have blue triangles).
3. Click on a categorical variable and click **X, Factor** (categorical variables have red or green bars).
4. Click **OK**. The Oneway Analysis output window will display.
5. Click on the **red triangle**, and select **Means/Anova**.

JMP® will plot means diamonds (95% confidence intervals for each mean), and will generate:

- The Summary of Fit.
- The Analysis of Variance (Anova) table.
- Means for Oneway Anova, containing summary statistics and confidence intervals for each mean (based on the pooled estimate of the standard error).

Example: Companies.jmp (Help > Sample Data)

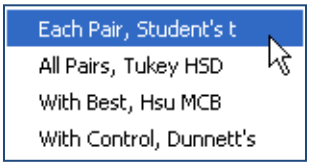


Interpretation of the results in the Anova table (using a significance level of 0.05 – click **the red triangle, Set α Level** to change significance level):

- The null hypothesis is that there are no differences between the population means (i.e., all means are equal).
- **Prob > F** is the p-value for the whole model test. Since the **Prob > F is less than than 0.05, reject the null hypothesis**. Conclude that there are differences between at least two of the means.
- To determine which means are different, a post hoc multiple comparison technique can be used.

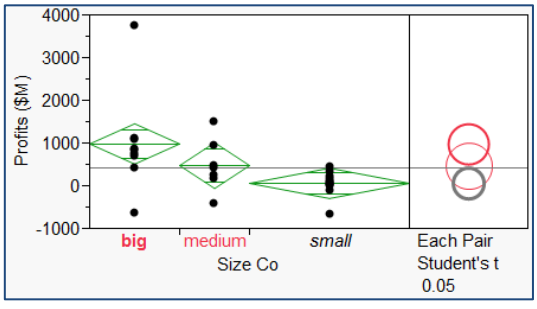
Multiple Comparison Procedures

From the Oneway Analysis output window (shown above), click on the **red triangle**, select **Compare Means**, and select one of the four methods (described in JMP Help).



Each Pair, Student's t has been selected. This produces comparison circles (shown), along with statistical output (not shown).

Click on a circle for a mean to test for paired differences.

- The **selected mean** will have a **bold, red circle and variable label**.
- Means that **are not significantly different** from the selected mean will have **unbolded, red circles and variable labels**.
- Means that **are significantly different** from the selected mean will have **gray circles** and **gray italicized variable labels**.

In this example, the mean for **big** is significantly different from the mean for **small**, but is not significantly different from the mean for **medium**.