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Practice: Performing a Two-Way ANOVA Using the NWAY ANOVA Task

Data were collected to determine whether different dosage levels of a drug have an effect on blood pressure for people with one of three types of heart disease. The data are in the **drug** data set.

1. Examine the data with a vertical line plot. Put **BloodP** on the Y axis, and **DrugDose** on the X axis, and then stratify by **Disease**.

    1. In the Navigation pane, select **Tasks and Utilities**.
    2. Expand **Tasks**.
    3. Expand **Graph** and select the **Line Chart** task.
    4. Select the **stat1.drug** table.
    5. Assign **DrugDose** to category, and **Disease** to sub-category.
    6. Click the **Measure** drop-down list, and select **Variable**. Select **BloodP** as the Measure variable.
    7. Submit the code

    Here are the results.

2. What information can you obtain by looking at the data?

    It seems that the drug dose affects a change in blood pressure. However, that effect is not consistent across diseases. Higher doses result in increased blood pressure for patients with disease B, decreased blood pressure for patients with disease A, and little change in blood pressure for patients with disease C.

3. Test the hypothesis that the means are equal. Be sure to include an interaction term if the graphical analysis that you performed indicates that would be advisable.

    1. Expand **Statistics** and select the **N-Way ANOVA** task.
    2. Select the **stat1.drug** table.
    3. Assign **BloodP** as the dependent variable and **DrugDose** and **Disease** as the factors.
    4. On the MODEL tab, click the **Edit** button to open the Model Effects Builder.
    5. Select **DrugDose** and **Disease**, in that order, and click **Add** to add them to Model effects. You can use the arrows to change the order of the effects.
    6. Select both variables in the **Variables** field and click **Cross** to add the interaction term to Model effects.
    7. Click **OK**.
    8. On the OPTIONS tab, in the drop-down list of **Select statistics to display**, select the option to display **Default and additional statistics**, and clear the **Perform multiple comparisons** option.
    9. Submit the code.

    Here are the results.

4. What conclusions can you reach at this point?

    The global *F* test indicates a significant difference among the different groups. Because the interaction is in the model, this is a test of all combinations of **DrugDose*Disease** against all other combinations. The R-square value implies that approximately 35% of the variation in **BloodP** can be explained by variations in the explanatory variables. The interaction term is statistically significant,

as predicted by the plot of the means.

5. To investigate the interaction effect between the two factors, manually edit the code to include an LSMEANS statement to slice the interaction by **Disease**.

```
ods noproctitle;
ods graphics / imagemap=on;

proc glm data=STAT1.DRUG;
        class DrugDose Disease;
        model BloodP=DrugDose Disease DrugDose*Disease / ss1 ss3;
        lsmeans DrugDose*Disease /slice=disease;
quit;
```

Here are the results.

6. Is the effect of **DrugDose** significant?

The slice table shows the effect of **DrugDose** at each level of the disease. The effect is significant for all, except Disease C.

Hide Solution