Assignment Two

Due Feb. 13

A pharmaceutical company conducted an experiment to evaluate a pain relief drug for migraine headache sufferers. In the experiment, 27 volunteers were selected and 9 were randomly assigned to one of the three drug conditions – Control, Drug-400 mg dose, Drug-800 mg dose. In the two drug groups, the participants took the drug during the first migraine headache episode they experienced after the start of the study. In the control group, participants took a placebo. All participants reported their pain relief on a scale of 1 = no pain relief to 10 = maximum pain relief 30 minutes after taking the drug or placebo.

For this assignment, students will use SAS to conduct an ANOVA on these data. If you are using the SAS University Edition, you need to upload the file “analgesics.csv” to your SAS University Edition directory. This file has been uploaded to Canvas. If you are using SAS On Demand, the “analgesics.csv” file is located in the directory */courses/d41266e5ba27fe300*. More detailed instructions on how to carry out ANOVA for this assignment using SAS will be given in class.

Students shall address all of the following:

1. What type of ANOVA did you carry out? This is a one-way analysis of an anova. The experiment contains an category explanatory variable with three different conditions (Control, Drug-400 mg dose, Drug-800mg dose). We are comparing whether the group mean of the pain relief for each condition are significantly different.
2. State the null and alternative hypotheses for the study.

H0: There is no difference between the group mean of pain relief between the three drug conditions.

HA: There is a difference between the group mean of pain relief between the three drug conditions.

1. Assume that alpha is set to 0.05. What do the ANOVA results say about whether the null hypothesis should be rejected or not? State your conclusions based upon the ANOVA results and report the relevant test of significance.
2. Inspect the group means and describe whether the means suggest that the drug is effective at increasing pain relief. Explain what can be inferred about the effectiveness of the drug and increasing the dose from the overall test of significance in the ANOVA.
3. Was the equal variance assumptions of the ANOVA satisfied? Report and interpret the relevant test of significance.

Students shall turn in their SAS code, the pdf file containing the SAS results, and their written responses to the above items in class on the due date. The written responses must be in the form of grammatical and complete sentences. The results of statistical tests must be reported using APA format. For guidance on using APA format, students can check out <https://depts.washington.edu/psych/files/writing_center/stats.pdf> or other similar pages,

1. I carried out a one-way ANOVA for the experiment. The experiment contains a category explanatory variable with three different conditions (Control, Drug-400 mg dose, Drug-800mg dose). We are comparing whether the group mean of the pain relief for each condition are significantly different than the other.
2. H0: There is no difference between the group mean of pain relief between the three drug conditions.

HA: There is a difference between the group mean of pain relief between the three drug conditions.

1. My results say that the null hypothesis should be rejected since the p-value (0.0003) was less than alpha value of 0.05. From my analysis I am 95 percent confident that there is enough evidence to suggest that there is a difference between the group mean of the three drug conditions with *F*(2,24) = 11.91, *p*= 0.0003.
2. From looking at the graph of the mean pain relief of the three conditions I noticed that the people who took the drug tended to have a higher pain relief then people not taking the drug. When dosage of the drug increases from the control to the 400 mg of the drug, the mean of the pain relief was increased. Once you increase the drug from 400 mg to 800 mg the pain relief stays relatively constant and there was not a significant difference between the two dosages.
3. Yes, the equal variance assumption was satisfied based on the Levene’s test *F*(2,24) = 2.93, *p*=.0729. With the p-value greater than alpha value of 0.05, we fail to reject the null hypothesis and we conclude that we are 95% confident that there was an equal variance among the three different conditions.

The Code

proc import datafile="/folders/myfolders/sasuser.v94/Analgesics.csv"

out=WORK.IMPORT dbms=csv;

getnames=yes;

run;

proc glm plots=all;

class group;

model pain= group;

means group / hovtest= levene;

run;