Conference 3: ANOVA

**Question 1:**

Dopamine transmission in the dorsal hippocampus (dHPC) is thought to play an important role in spatial memory, but the mechanisms remain unclear. To test if signaling through the dopamine type 1 receptor (D1R) may play a role, researchers delivered a D1R antagonist (SKF3839) or vehicle directly into the dHPC of rats using microinjection. Spatial memory was tested through the Morris Water Maze. The outcome measure is time spent to find the platform in the Morris Water Maze.

0 nM SKF38393 (Vehicle)

1nM SKF38393

10nM SKF38393

20nM SKF38393

**2. Perform the appropriate ANOVA (show assumptions), and Bonferroni post hoc to determine the effect of the D1R antagonist SKF38393 on spatial memory. Are there significant differences between groups?**

**Question 2:**

A new drug is being tested for efficacy with hopes of improving attention in patients with attention deficit hyperactive disorder (ADHD). Male and female subjects that have been diagnosed and have no history of prior medical treatment were given either given placebo (1) or the drug (2). The outcome measure is a score on test of attention.

Score 0-30 - not impulsive

Score 31-60 – mild impulsivity

Score 61-80 – moderate impulsivity

Score 81-100 – high impulsivity

1. Perform the appropriate ANOVA with Estimated Marginal Means and a plot of the interaction of effects. (For the plot - add one factor as “Horizontal Axis” and another as “Separate Lines” to have the plot show up correctly. The result is that one of your factors will not have the group listed on the x-axis, but the means will still show up. Then refer to Estimated Marginal Means to make more sense of the plot given your missing group indicators.)

**2. Are the main effects significant? Is the interaction significant? How can you tell?**

**3. Is the drug effective? Should any critical conditions be considered when subscribing the drug in the future?**

**Question 3:**

A new drug is being tested for extending axon growth following spinal cord injury. Axons are tested in culture across multiple timepoints so that recordings from the same axon are seen across the following timepoints:

Control

First Timepoint

Second Timepoint

Third Timepoint.

1. Perform the appropriate test to determine if there is a significant difference in axon length between timepoints.

**Question 4:**

After determining the impact of different timepoints on axons, you decide to test if a higher dosage of drug causes a significant difference in axon length. The dosages are as follows:

0 nM SKF38393 (Control)

1nM SKF38393

10nM SKF38393

20nM SKF38393

1. 1. Perform the appropriate test to determine if there is a significant difference in axon length between timepoints.