**Research Question:**

Dogs were trained to perform basic tricks. Is one training method better than the other when examining an overall performance (correctness/length of learning time)? Is there an interaction between number of training sessions and method?

* IVs
  + Training: clicker versus traditional training
  + Number of sessions: 5, 10, 15 sessions
* DVs
  + Correct: number of correct actions
  + Delay: how long it took before they learned the trick

Include the following SPSS boxes:

1. Data screening:
   1. Accuracy/Missing data (you can assume the scores are accurate) – show if there are any missing data.
      1. Fix/list what you did with the missing data.
   2. Outliers
      1. What are the top 5 Mahalanobis scores?
      2. What is the cut off for Mahalanobis (df and X2)?
      3. Delete any multivariate outliers.
   3. Multicollinearity – are the DVs too correlated?
      1. Include a correlation table.
   4. Normality
      1. Show skew and kurtosis for the DVs.
      2. Include the **multivariate** normality chart for the combined DVs.
      3. Is the data normal?
   5. Linearity
      1. Include the PP Plot for the combined DVs.
      2. Is the data linear?
   6. Homogeneity.
      1. Include the residuals graph for the combined DVs.
      2. Is the data homogeneic?
2. MANOVA
   1. Include the descriptives box.
   2. Include Box’s Test.
   3. Include the MANOVA box.
   4. Include Levene’s Test.
   5. Include the Between Subjects ANOVA.
   6. Fill out the following chart – remember if your values stop being significant, you would stop filling in values for that column. (you will be replacing my notes with APA statistics or interpretations – like clicker > training).

|  |  |  |  |
| --- | --- | --- | --- |
|  | MANOVA Results | | |
| APA statistic | Training:  FILL IN HERE | Sessions:  FILL IN HERE | Interaction:  FILL IN HERE |
|  | ANOVA Results | | |
| APA statistic  DV: Correct | Training:  FILL IN HERE | Sessions:  FILL IN HERE | Interaction:  FILL IN HERE |
| APA statistic  DV: Delay | Training:  FILL IN HERE | Sessions:  FILL IN HERE | Interaction:  FILL IN HERE |
|  | Post Hoc Results | | |
| APA statistic  DV: Correct | Only two levels, talk about means | Tukeys! | Independent *t* |
| APA statistic  DV: Delay | Only two levels, talk about means | Tukeys! | Independent *t* |

* 1. Include Tukey or independent t boxes here if necessary.
     1. If the interaction is significant, only do those post hocs.
     2. If the interaction is not significant, only do the main effect post hocs.
     3. Remember Cohen’s *d* is independent t either way.
     4. Remember when you write up, you have just *p, d* for Tukey and *t(df), p, d* for independent t.

1. Using Pillia’s V from the output for the multivariate test, what number of subjects did we need to get sufficient power for the interaction? (fill in your numbers below in the ? spots, so we can tell how you got the number you did).
   1. F-test family, MANOVA: ?
   2. Hit determine, enter Pillia’s V: ?
      1. Calculate f2 from this value: ?
      2. Use number of predictors + response variables listed below.
   3. Alpha: ?
   4. Power: ?
   5. Number of groups (conditions): ?
   6. Number of predictors (IVs): ?
   7. Number of response variables (DVs): ?
   8. GO!
   9. Total sample size: ?
2. Charts:
   1. Create interaction graphs (clustered bar charts) for each DV.
   2. Be sure to format:
      1. X axis label
      2. X group labels (including legend)
      3. Y axis label
      4. (didn’t give you range for Y axis, so don’t worry about that).
3. Write up
   1. Short description of the variables (both DVs and IVs).
   2. Be sure to include data screening information.
   3. MANOVA information:
      1. Type of MANOVA using the number system (i.e. 4X3 between subjects).
      2. F-values for all three effects (two main effects and interaction) even if they are non-significant.
   4. ANOVA information:
      1. F values for all DVs for significant MANOVAs.
      2. List those F values even if they are non-significant (not the non-significant MANOVA ones, but if one DV is p = .01 and one is p = .10 list both).
      3. Post Hocs for significant ANOVA effects with effect sizes for Tukey comparisons or independent t values.
   5. Graph for means for DVs (there should be several graphs).