PSYC*6380: Minor Assignment 3 (Analysis of Variance)

Due: Monday, February 7th, 2022 @ 11:59pm

Part 1:

Background:

After hearing one of our examples during class today, a social psychologist became interested in studying what *specifically* makes 'third wheeling' on dates so darn awkward. To do this, the psychologist collected data from 500 different couples. Each couple told a story about a time when they were dealing with a 'third wheel' on one of their dates. Each couple specifically identified whether: 1) They had been dating a long time already; and, 2) how eccentric the third-wheeling individual had been (which the psychologist argued may dilute the awkward effects of their presence by also being entertaining). Each couple also indicated how awkward they found the situation to be on a scale of 1-12 (1 = not so bad; 12 = much cringe).

Your task is to load and prepare the data, and then look at the relation between couple type and third wheel type in predicting awkwardness. The psychologist is specifically interested in assessing the potential interaction between couple type and third wheel type on awkwardness (using the type of third-wheeling individual as the moderator).

Filename: "*anovaAssignmentData.csv*"

Structure: Comma-separated values

Variables:

Participant ID Number (*ID*): 1-500

Eccentricity of Third Wheel (*WheelType*): 1= Not Eccentric; 2 = Eccentric

Length of Time Spent Dating (*CoupleType*): 1 = New Couple; 2 = Established Couple

Self-Reported Assessment of Situational Awkwardness (*Awkward*): 1-12 scale

Missing Data Code(s): N/A (no values are missing in this file)

Your Task:

Use the techniques we covered in today's class (and draw on material from our first class on using *R* to load and clean data) to run a multivariate analysis of variance. Where necessary, run follow-up analyses to deconstruct any observed interactions and assess simple effects.

Once you've done this, please answer the following questions about the results. Unless otherwise indicated, you do not need to provide full-sentence answers; just the numbers the questions request are fine:

1. Prepare the data file to run a multivariate ANOVA that uses both the type of couple and the type of third wheel to predict awkwardness. Test the homogeneity of variance assumption for this model. Please report: 1) the *F*-value for the Levene's test; 2) its degrees of freedom; and, 3) its associated *p*-value. **(0.5 marks).** What do the results of the Levene's test suggest about your data? Please be as exacting as possible in your interpretation. **(0.5 marks).**

   populati on-level variance

2. Run a multivariate ANOVA that uses both the type of couple and the type of third wheel to predict awkwardness. What is the main effect of type of couple on awkwardness? Please report: 1) The associated partial eta squared statistic (i.e., *partial* η^2); and, 2) the 95% confidence intervals around that *partial* η^2 **(0.5 marks).** Based on your interpretation of the *partial* η^2 confidence intervals, how would you best characterize the predictive relation that's being demonstrated? Please be as exacting as possible when discussing both the *partial* η^2 value and its *CIs*. **(0.5 marks).**

   remember idea of partial effects

3. Please report the two marginal means that were compared in the main effect analysis for q2 **(0.5 marks).** Re-express the mean difference in awkwardness for new vs. established couples using a regression equation (assume new couples is the baseline level). **(0.5 marks).**

   Hint. For simplicity's sake, please report this equation using the original raw units the data are presented in; and assume there are no other predictors of awkwardness in the model.

4. In the multivariate ANOVA you ran for q2, what is the "*CoupleType*"*"*WheelType*" interaction on awkwardness? Please report: 1) The associated partial eta squared value (i.e., *partial* η^2); and, 2) the 95% confidence intervals around that *partial* η^2 **(0.5 marks**). Do your results support the idea of an interaction? **(0.5 marks).**

   say yes or no

5. Run a simple effects analysis to help you interpret the interaction term in q4. Did the type of couple in question predict awkwardness specifically when the third wheel was eccentric? Please report: 1) The standardized mean difference for this comparison (i.e., Cohen's *d*); and, 2) the 95% confidence intervals around that *d* value. **(0.5 mark**s). Based on your interpretation of the Cohen's *d* confidence intervals, how would you best characterize this relation? Please be as exacting as possible when discussing both the *d* value and its *CIs*. **(0.5 marks**).

   remember what a cohen's d is versus partial eta

   cohen's d is similar to Beta

Part 2:

Background:

To help the psychologist better understand how analyses of variance work (and better interpret the results of your analysis), please answer the following conceptual questions in a short answer (i.e., 1-2 sentences) format:

1. In the slides for this week, Scott suggested that you couldn't accurately test for an interaction without also testing the main effects of each predictor variable. Why is that? **(1 mark).**

   Hint. It may be helpful to refer back to your notes on multivariate regression.

2. Imagine that you ran an ANOVA that used a categorical predictor with three groups (i.e., "*X*", "*W*", and "*Z*") to predict a continuous outcome (i.e., "*Y*"). You calculated the following raw score regression equation, which you understand is currently expressed using treatment contrasts:

   $$Y' = 20 + 15(W) + 22(Z)$$

   What are the mean scores on "*Y*" for group "*X*", group "*W*", and group "*Z*"? **(1 mark).**

3. How would you explain the concept of homogenous variances and why they're important to someone who has no background in statistics? **(1 mark).**

Please provide your full *R* script with your submission and leave comments in your script (i.e., using "#") explaining what each command you wrote does. **(1 mark for including a full script; 1 mark for including appropriate commenting).**

Good Luck!