**Assignment 5: Factorial Analysis of Variance (ANOVA)**

For this assignment, use the online dataset “Erotic Pictures and Love” found on the JASP Data Library webpage (https://johnnydoorn.github.io/DataLibraryBookdown/myChapters/chapter\_3.html). Details about this dataset are below. Complete all questions in all sections. Whenever you use code or report an answer obtained from code, report both code and output.

**Description:**

This data set, "Erotic Pictures and Love", provides men and women's feelings towards their partners after watching either erotic or artistic pictures. Use this data to examine whether men and women across conditions (nude vs abstract art) differ or not in their reported Love for Partner.

**Variables:**

* **Gender -** Participant's gender.
* **Age -** Participant's age.
* **RelLen -** Number of years in a current relationship.
* **Condition -** Experimental condition (Nudes = nude pictures, Abstract Art = abstract art pictures)
* **PartnerAttractiveness -** A sum of 6 Likert scales about the partner's attractiveness (1 = not at all, 9 = very much).
* **LoveForPartner -** A sum of 13 Likert scales from a Love Scale.
* **AveragePleasantness -** A mean of 3 items about pleasantness of the pictures.

**Reference:** Balzarini, R. N., Bobson, K., Chin, K., and Campbell, L. (2017). Does exposure to erotica reduce attraction and love for romantic partners in men? Independent replications of Kenrick, Gutierres, and Goldberg (1989), Journal of Experimental Social Psychology, 70: 191-197.

**Section 1. Examine the data (4 pts).**

1. What are the independent variables in this example?
   1. How many levels (J) does each independent variable have?
2. What is the dependent variable in this example?
3. Examine and briefly report relevant descriptive statistics, including measures of central tendency, variability, normality, and/or counts for each independent and dependent variable. Include your code and results.

**Section 2. Hypotheses (4 pts).**

1. Write the null hypotheses as they relate to the population means.
2. Write the alternative hypotheses as they relate to the population means.
3. Using typical language, write the null hypothesis.
4. Using typical language, write the alternative hypothesis.

**Section 4. Fit a factorial ANOVA & Compare Models (3 pts)**

1. Fit both a restricted and full one-way ANOVA using lm() or aov(). Report your code and output.
2. Using model outputs, compare the fit between the restricted and full models. Report your code and output.
3. Based on your comparison, which model should you choose to interpret?

**Section 3. Assumption Check (5 pts).**

1. List the 4 assumptions of factorial ANOVA, and the code/results and/or logic you used to examine each assumption, as appropriate.
2. Were all assumptions met. If not, describe.

**Section 5. Interpretation & Write-up (7 pts)**

1. Calculate the coefficient of determination (eta-squared or omega-squared).
2. Report the ANOVA results in table format.
3. Using APA formatting, write a concise 1 paragraph report describing the models you tested, model fit, model fit comparisons, model assumptions, model results, effect sizes, and reference figures/tables relevant for interpreting model results.

Section 6. Theory & Concept (7 pts)

1. A 2x2 factorial design was used to examine the impact of diet type (plant-based vs high-protein) and primary exercise type (cardio vs weight training) on 1-month muscle mass gains (measured in kg). Use the table below to calculate a factorial ANOVA **completely by hand. You must show your work and answers for full credit.** Use the mean of means approach, where applicable.

|  |  |  |  |
| --- | --- | --- | --- |
|  | | Factor *B*: Diet Type | |
| Plant-Based | High-Protein |
| Factor *A*:  Exercise Type | Cardio | 0.2 | 0.5 |
| 0.3 | 1.3 |
| -0.5 | -0.1 |
| 0.3 | 1.1 |
| -0.3 | 0.7 |
| Weight Training | 0.3 | 0.8 |
| 0.5 | 1.2 |
| 0.7 | 1.5 |
| 0.4 | 1.1 |
| 0.6 | 1.0 |