**Assignment #3  
Due: March 21, 2023  
  
This is due prior to the beginning of live session on the due date. Use this document to answer questions. Include the questions with answers and highlight answers. Copy and paste relevant software output into this document in your answer. Software is only required to be used where indicated. Please submit as a word document or pdf.**

**Please identify any students you worked with on this assignment.**

1. [Week 7: (a)-(f), Week 8: (g)-(j)] In Assignment 1, we considered two variables from the undergrad student survey: high school GPA (HSGPA) and college GPA (CollegeGPA). We examined the sample means to determine differences between high school GPA and college GPA in the sample. Let's now extend this to the population to determine if there is a difference (or not) in the population means using a related samples t-test.
   1. Write the null hypothesis in symbols and words
   2. Write the alternative hypothesis in symbols and words
   3. By hand, calculate the degrees of freedom (Note N = 499 because of a missing value). Show calculation.
   4. Use software to obtain the test statistic and p-value. Note: to run the analyses in Excel, row 228 must be deleted because there is a missing value for CollegeGPA.
   5. Make a decision about the null using the p-value approach
   6. Write the conclusion in APA style
   7. Compute and report the 95% CI.
   8. Interpret the 95% CI.
   9. Using the CI, make a decision about the null hypothesis. Be sure to explain your reasoning.
   10. Does this agree with your decision from part (e)?
2. [Week 7: (a)-(f), Week 8: (g)-(j)] Researchers were interested in the effect of sleep on memory consolidation. Twenty-four participants were randomly assigned to either a “Sleep” or “No-Sleep” group, such that there were 12 participants in each group. On the first day, all participants were flashed pictures of 15 different objects on a computer screen and asked to remember as many objects as possible. That night, the “Sleep” group got an ordinary night’s sleep. The “No-Sleep” group was kept awake until the second night. All participants got an ordinary night’s sleep on the second and third nights. On the fourth day, all participants were tested to see how many of the original 15 objects they remembered. The data are in Sleep.xlsx. Conduct an independent samples t-test, two-tailed, alpha = .05.
   1. Write the null hypothesis in symbols and words
   2. Write the alternative hypothesis in symbols and words
   3. By hand, calculate the degrees of freedom. Show calculation
   4. Use software to obtain the test statistic and p-value
   5. Make a decision about the null using the p-value approach
   6. Write the conclusion in APA style
   7. Compute and report the 95% CI.
   8. Interpret the 95% CI.
   9. Using the CI, make a decision about the null hypothesis. Be sure to explain your reasoning.
   10. Does this agree with your decision from part (e)?
3. [Week 9] To test whether arousal or stress levels increase as the difficulty of a task increases, eight participants were asked to complete an easy, typical or difficult task. Their galvanic skin response (GSR) was recorded. A GSR measures the electrical signals of the skin in units called microSiemens, with higher signals indicating greater arousal or stress. The data for each task is given in the dataset Difficulty.xlsx.
   1. Write the null hypothesis in symbols and words
   2. Write the alternative hypothesis in symbols and words
   3. By hand, calculate each degrees of freedom. Show calculations.
   4. Use software to obtain the test statistic and p-value. Report the ANOVA table.
   5. Make a decision about the null using the p-value approach.
   6. If appropriate, calculate and interpret the effect size. If not, state why.
   7. Write the conclusion in APA style.