

Name: _____

Please complete the following problems using SPSS and Excel for graphs. Interpret all results at the .05 significance level and round to two decimal places (except for p-values). Record your responses in the spaces provided and make sure you do not miss any questions. Make sure to include statistical notation when appropriate and double-check your data entry! Upload this document and the Excel document by 12/20 at 11:59pm. Do not submit raw SPSS output.

1. In order to better prepare for her 8:00am classes, a statistics graduate student designs an experiment to see how various strategies improve test scores. Getting extra sleep and drinking coffee are often said to be good ways to improve focus in class. She assigns half of her participants to 4 hours of sleep the night before a test and the other half to 8 hours. Within these groups, half of the participants are given 50mg of caffeine the morning of the test and the other half are given 100mg of caffeine. She then measures exam performance on a test with scores ranging from 1-15. (50 points)

	4 hours of sleep	8 hours of sleep
50mg of caffeine	10 9 9 8 11 12 10	12 10 9 11 7 8 9
100mg of caffeine	11 10 9 10 12 9 11	15 12 11 12 13 12 14

A. What test should you perform? Be as specific as possible. (5 points)

B. Write a sentence describing the main effect of caffeine, include F, df, and p-value. Write a second sentence describing which group scored higher/lower (include means). (15 points)

C. Write a sentence describing the main effect of sleep, include F, df, and p-value. Write a second sentence describing which group scored higher/lower (include means). (15 points)

D. Write a sentence describing if there was a significant interaction effect or not (include F, df, p-value). (10 points)

E. Graph the interaction effect using Excel. Upload this Excel document to Blackboard as well. (5 points)

Bonus: What do the interaction results suggest? Is there an ideal sleep/caffeine combination that appears to be the most effective or particularly ineffective? (3 bonus points)

2. A researcher wants to evaluate the learning ability of college students with various background sounds during learning. She randomly divides 21 participants into three groups. All students study a passage of text for 30 minutes. Those in group 1 study with background sound at a constant volume in the background. Those in group 2 study with background sound that changes volume randomly. Those in group 3 study with no sound at all. After studying, all students take a 10-point multiple choice test about the material. Their scores follow:

Constant sound	Random sound	No sound
10	8	3
7	9	6
8	10	7
5	7	4
9	8	6
9	6	5
8	9	4

- A. What statistical test should you perform? Be as specific as possible. (7 points)
- B. Write a sentence describing the main effect of the statistical analysis (report the F, df, p-value). (8 points)
- C. Is the constant sound group significantly different from the random sound group? Write a sentence describing the relationship, include means and p-value. (8 points)
- D. Is the constant sound group significantly different from the no sound group? Write a sentence describing the relationship, include means and p-value. (8 points)
- E. Is the random sound group significantly different from the no sound group? Write a sentence describing the relationship, include means and p-value. (8 points)
- F. Write a “real-world” or “plain English” sentence about your findings. (6 points)
- G. Graph the means and SEM for the groups using Excel. Include axis titles and chart title. If you have the option on your Excel to add error bars, then add the SEM error bars. If you don’t have this option, no points will be deducted. Upload the Excel document to Blackboard as well. (5 points)