PSYC 610 Analysis of Behavioral Data
Cumulative topics and thought questions – Final Exam

**Cumulative topics**
1. Sampling distribution of the mean and the standard error of the mean.
2. Sampling distribution of the difference between means and the standard error of the difference between mean.
3. Type I and Type II error. Corrections for family-wise risk of Type I error.
4. Sampling distribution of the F ratio. Conceptual definition of the F-ratio (i.e., error+treatment divided by error. etc). Sources of error in both the numerator and denominator of the F-ratio.
5. The logic of hypothesis testing (i.e., null and alternative hypotheses, alpha level, sampling distributions, significance levels).
6. Drawing inferences about cause and effect from experiments and correlations.
7. Interpretation of a correlation coefficient.
9. All SPSS material. Writing a conclusions sentence or paragraph for every statistical test we’ve done using SPSS (one-sample t-test, independent samples t-test, correlation coefficient, simple and multiple regression, One-way ANOVA, Two-way ANOVA, etc).

**Thought questions**
1. What is the nature of the error (denominator) in a within-subjects design?
2. How does the source of error in a within-subjects factor differ from the source of error in a between-subjects factor?
3. Why is "subjects" treated as an independent variable in a within-subjects design?
4. Why is a different error term needed for every test involving a within-subjects factor.
5. What do a set of simple effects in a two-way ANOVA account for and why?
6. Just from looking at a graph of the treatment means, how can you tell whether an interaction is present or not? How do you know when main effects are present?
7. Why would you say that the presence of an interaction means that you have to "qualify your answer" when talking about the effects of one independent variable? (i.e., saying “there’s an effect of factor A, however…”)
8. When there are two independent variables, what is the between groups sum of squares composed of?
9. How is **statistical significance** different from **clinical significance**? Which of the two does an F-test provide information about? Which of the two does eta-squared provide information about?
10. Why should researcher be concerned about issues **statistical power and effect size**?
11. Why would one look at the simple effects of B at each level of A rather than the simple effects of A at each level of B?
12. How do the forward, backward, and stepwise methods for selecting predictor variables differ from each other?
13. What do the SS\text{Between-groups} and the SS\text{Regression} have in common? What do the SS\text{Within-groups} and the SS\text{Residual} have in common?
14. How do the Forward, Backward, and Stepwise methods for selecting predictor variables work?
15. How can you use multiple regression to determine whether one predictor variable accounts for a significant amount of variability, above and beyond what a second predictor variable can account for? In other words, how do you test the unique contribution of a particular predictor variable?
16. What information does a squared multiple correlation provide?