**Psych 610/710**

**HW 3, Due 27 September, 2017**

Answer reading questions in your Word doc, data analysis and corresponding short answers in your R script (unless otherwise noted). Send to both TAs by Wednesday at 5:00pm of the form “Lastname\_HW3.”

**Reading questions**

1. Let’s say you fit a model that predicts a person's anxiety level (on a 10-point scale) from their daily coffee consumption (in ounces). Let’s further suppose that coffee consumption has been mean-centered, and that after fitting the model, b0 = 4 and b1 = 0.1.  Interpret these coefficients in terms of the units of measurement provided.
2. Define partial eta squared, and the logic of how it is calculated, in your own words. What term is analogous to “partial eta squared”?

**Data analysis**

Salary.dat contains salary information (SALARY) for 62 faculty at some university. One might wonder whether number of publications is meaningfully related to faculty salaries in academia. (This is an old dataset; don’t panic if the salaries seem low.) The dataset contains the number of publications (PUBS) for each individual to allow you to test this question.

1. Read in and inspect the data.
2. Is the mean faculty salary significantly greater (or smaller) than $50,000/year? Report the corresponding *F-*statistic, *df* and *p*-value.
3. Fit a linear model predicting salary from number of publications. Test if the number of publications significantly predicts salary (report *F*-statistic, *df*, and *p*-value) and provide a 95% confidence interval for the parameter. Describe the effect of publications on salary in a sentence in your script (if effect is significant, describe using a dollar amount).
4. Report a variance-based indicator of effect size, along with its interpretation.
5. To better understand this effect, you’ll now calculate some predicted salaries based on number of publications. This does not typically get included in a final manuscript, so you don’t need to include it in your write-up. Just save your answers in your script:
   1. Based on our model, what is the predicted salary of someone with 5 publications?
   2. Based on our model, what is the predicted salary of someone with 15 publications?
6. Create a scatterplot (using ggplot) that displays salary as a function of publications. Include the regression line of the model as well as bands representing the standard error of the point estimate. Paste this plot into your Word document. (For the purposes of gaining fluency with ggplot, try doing this by adding one layer at a time on your own, like we did in lab, rather than copy-pasting the big block of code and changing names.)
7. Look back at the script from class, where we listed a few things that can take a ggplot ~to the next level~, in terms of getting it ready to be published. Using the power of the internet, make 2 of these changes to your graph.
8. In your Word document, write a concise results section (a few sentences). Explain the hypothesis you tested, the statistical results of your test, and the practical interpretation of the result. Write for an audience who doesn’t know anything about these data.
9. At the bottom of your script write the number of hours you spent working on this homework assignment.