Welcome back! Please show all of your work. This is due on Monday, January 23 at the beginning of class. Ask for help if you need it (before frustration sets in).

1) Consider the following set of scores from an independent-samples experiment (I used 0 and 1 as values for the samples for a reason, which may become clear in part g; you should use 0 and 1 when generating the scatterplot):

```
Sample 0          Sample 1
1, 2, 6          1, 5, 9
```

a. Generate a scatterplot (by hand or software) of the data with the group numbers on the x-axis and the scores on the y-axis. (That is, for X, use 0 for the scores in Sample 0, and use 1 for the scores in Sample 1.)

b. On the graph, draw a horizontal line that represents the grand mean, $\bar{Y}$. (This is a visual representation of the null model.) Add lines that represent deviations for each of the six scores, that is, vertical lines from each score to the grand mean. (I believe you'll have to do this by hand, but if you can get some software to do it for you, go for it.)

c. Compute $SS_{total}$ by hand/calculator.

d. Regenerate the plot from part a, but instead of adding a horizontal line at $\bar{Y}$, add one for $\bar{Y}_0$ and another for $\bar{Y}_1$. (This is a visual representation of the "fuller model", which is the structural model for the one-factor ANOVA.) Add lines that represent deviations for each score within its group.

e. Compute $SS_{within}$ by hand/calculator.

f. Find $SS_{between}$ by finding the difference between $SS_{total}$ and $SS_{within}$, and compute the proportion of variance explained (i.e., $\eta^2$) by the fuller model.

Now for something that'll stretch your mind a bit.

g. Generate one last time the plot from part a. This time, instead of drawing separate horizontal lines at $\bar{Y}_0$ and $\bar{Y}_1$, draw one line that goes through both $\bar{Y}_0$ and $\bar{Y}_1$.

h. Find the slope and y-intercept for the line you drew in part g. (slope = rise/run; y-intercept = where the line crosses the y-axis, i.e., the mean of Sample 0)

i. Turn the slope and y-intercept from part h into a linear equation of the form $\bar{Y} = b_1X + b_0$, where $b_1$ is the slope and $b_0$ is the intercept.

You just found the equation of a regression line, or line of best fit. Notice that the regression line goes through each group's scores in the exact same place as the ANOVA structural model: at the mean.

j. Compute (use software) the correlation between X and Y. For X, use 0 for the scores in Sample 0, and use 1 for the scores in Sample 1.

k. Square the correlation from part j. Compare this value to what you found in part f. Are they similar?

---

¹ For guidance: [http://comp.uark.edu/~whlevine/psyc2013/correlation.html](http://comp.uark.edu/~whlevine/psyc2013/correlation.html)