Problem Set 3
Psy 7821, SEM
Due Thursday Sept 20

A) Use your favorite SEM software to duplicate the results presented in the course notes in Sec 5, p. 6 for the model regarding exercise and weight loss. Match up all 8 parameter estimates. Nothing to hand in.

B) Again with your favorite software duplicate the results for Felson & Bornstadt's model about Achievement and Attractiveness on p. 29. Nothing to hand in.

1. A famous path analysis attempts to explain how the relative advantages of social class lead to differences in performance in school. The variables are SES (higher scores mean more advantages due to a person's social class), IQ (the standardized intelligence test), nAch (need for achievement, a measure of motivation and ambition), GPA (grade point average in school). The relationships for the three endogenous variables of the model are below. Assume residuals for the three equations are uncorrelated. Try to fit everything on a single page.

$$\text{SES} \rightarrow \text{IQ}$$
$$\text{SES IQ} \rightarrow \text{nAch}$$
$$\text{SES IQ nAch} \rightarrow \text{GPA}$$

(a) Draw a complete path diagram. It should have graph icons for each parameter and also Greek letters for each parameter.

(b) Write the free and fixed elements of the four path analysis parameter matrices ($\boldsymbol{\Gamma}$, $\mathbf{B}$, $\boldsymbol{\Phi}$, $\boldsymbol{\Psi}$).

(c) Fit the model. Report parameter estimates with standard errors plus the squared multiple correlation for each outcome variable.

2. The model below was proposed to explain the relationships between real and perceived social status. The idea is that Actual Income and Actual Occupational Prestige are predicted by Subjective Income and Subjective Occupational Prestige (which influence each other) and produce Subjective Social Status. Variables are: Y_1, subjective income; Y_2, subjective occupational prestige; Y_3, subjective social status; X_1, actual income; X_2, actual occupational prestige. Report parameter estimates, standard errors, squared multiple correlations.