Some general guidelines for assignments:

Please type your answers so that your answers will be clear and unambiguous. It is always important to link results back to the original data. What do the results mean in the context of the research? If you are asked to analyze data, remember that part of any analysis is the critical interpretation of results, even if I do not explicitly ask for it.

Notes: This homework is due on **Friday, Feb. 24**. Point values are in brackets [60].

Use Snijders and Bosker's educational data (sb.sav) for these exercises. Document each step with SPSS output (*not* the entire file—just the important parts). I previously posted the data and some "starter code" on the website to get you started. As always, discuss and interpret the results, considering the pros and cons of each approach.

1.   Use the "build-up" stepwise strategy of model building to construct a model for the educational data, using language test scores (**LANGPOST**) as the dependent variable and (potentially, depending on how it goes) percentage minority (**PERCMINO**) and SES (**SES**) as predictors. To anchor your analysis, use the null model (random effects ANOVA) as your simplest model. [15]

2.   Now use the "tear down" stepwise strategy. To anchor your analysis, use as the most complex model one with random intercepts, in which **SES** serves as a level-1 predictor with random slopes and **PERCMINO** as a level-2 predictor of both intercepts and slopes. Do you settle on the same model as in #1? (I'm not leading you; I really don't know!) [15]

3.   Now fit the model with a random intercept and a random slope. Use the website to plot and interpret the significant cross-level interaction effect. Leave the "df" boxes blank, and remember that the web page does not understand scientific notation (i.e., if you see 0.193383E-02, enter 0.00193383 instead). If Rweb is not working, you can simply copy and paste the generated code directly into R. Include and interpret: [20]

        a.   Text output (interpret only the "simple intercepts and simple slopes" and "regions of significance" sections).
        b.   A plot of the simple regression of **LANGPOST** on **SES** at three conditional values of **PERCMINO**: the minimum observed (0%), middle (45%), and maximum observed (90%).
        c.   A plot of the confidence bands around the simple slope of **LANGPOST** regressed on **SES**. The *x*-axis of this plot should extend from the minimum to maximum observed values of **PERCMINO**.

4.   Einstein allegedly claimed that you never really know a subject until you can explain it to your grandmother. Please pretend I am your grandmother, and that I just asked you what *group mean centering* and *grand mean centering* are. Explain these concepts to the best of your ability. Assume that your "grandmother" has no quantitative training, speaks fluent English, and is genuinely curious. [10]