Contextual Effects Lab Exercise

Exercise 2 - Part 1: Contextual Effects

This exercise is to be completed in lab and uploaded to blackboard. Complete the exercise in groups of 3.

For this part on contextual analysis, you hand in (upload to BB) a word or pdf document (no excel file) containing your answers to the questions below. Please upload at the end of lab today.

We will reanalyze the exam dataset, analyzed in assignment 1, now from the perspective of contextual effects. As a reminder, the file exam.csv holds data from pupils in English Schools. The dependent variable is exam-scores, and the independent variables are reading ability (LRT, London Reading Test) and average reading ability in school (AvsLRT). In the analysis done in assignment 1, we included both reading ability and average reading ability in the school in our analysis. So, without knowing it, we already did a contextual analysis!

1. Start with model 3: the model that includes a random intercept, the predictors at level 1 (in this case, LRT - reading ability per student), and the predictors at level 2 (in this case, AvsLRT - the average reading ability in the school). Include the predictor LRT using **grand** mean centering.

   - a) What does the regression coefficient for LRT represent in terms of contextual effects?

   - b) What does the regression coefficient for AvsLRT represent in terms of contextual effects?

2. Suppose we want to calculate the predicted exam score for 2 children, child X and Y. We want to predict the exam score for these children under 2 scenarios: when the children would go to school A, and when the children would go to school B. We have the following information:

   - Child X has score -2, so he/she has a score below average
   - Child Y has score 2, so he/she has a score above average
   - School A has an average of -1, so the school is below average
   - School B has an average of 1, so the school is above average

What are the predicted exam scores for the two children under the two scenarios?

3. Again, fit model 3 (the model that includes a random intercept, and the predictors at level 1 and 2), but this time include the predictor LRT using **cluster** mean centering (i.e., within cluster centering).

   - a) What does the regression coefficient for LRT represent in terms of contextual effects? Interpret this coefficient.

   - b) What does the regression coefficient for AvsLRT represent in terms of contextual effects? Interpret this coefficient.

4. Does the within effect differ significantly from the between effect? Interpret.