PSY6063 Spring 2021

Homework Assignment 2

Due on March 23

The data set used in this homework, [*School Alcohol and Drug Survey*](http://www.upa.pdx.edu/IOA/newsom/mlrclass/school.sav),is from a real survey about drug use and violence collected from 11th grade students in Oregon by NPC Research, Inc. Twenty-eight schools are selected for these analyses, with 2,283 individuals total.

Students responded to a wide variety of questions about the student’s drug use, alcohol use, violence, community, and family. A few of these variables are included in the data set, including alcohol use in the past year (ALCUSE), an index of neighborhood support (NHSUP), an index of neighborhood erosion (EROSION).

In this homework, you need to focus on the possible school-level and individual-level predictors of alcohol use. Both SPSS and SAS formats of the data files are available in the website.

Alcohol use over the last year (“alcuse”):

0 “none”

1 “1-2 times”

2 “3-5 times”

3 “6-9 times”

4 “10-19 times”

5 “20-39 times”

6 “40+ times”

Neighborhood support (“nhsup”):

QC7 My neighbors notice when I am doing a good job and let me know.

QC9 there are people in my neighborhood who encourage me to do my best.

QC10 There are people in my neighborhood who are proud of me when I do something well.

QC12 There are lots of adults in my neighborhood I could talk to about something important.

Neighborhood erosion (“erosion”):

QC1A How much does "crime and/or drug selling" describe your neighborhood?

QC1B How much does "fights" describe your neighborhood?

QC1C How much does "lots of empty or abandoned buildings" describe your neighborhood?

QC1D How much does "lots of graffiti" describe your neighborhood?

1. Run standard OLS regression (with “alcuse” as the dependent variable) for each individual school, 

(1) Plot the regression lines in the same figure for the first ten schools

(2) Get descriptive statistics for intercepts and slopes obtained from all schools

(3) What do you observe from (1) and (2) in terms of the uses of standard OLS regression?

2. Run a random effect ANOVA with “alcuse” as the dependent variable

(1) Write down the model that you fit

(2) Report and interpret the estimates for both fixed and random effects

(3) Justify the use of HLM with these data by computing the intraclass correlation and design effect

3. Center “nhsup” around its group mean, and then run an unconditional random coefficients HLM to answer the following questions:

(1) Write down the model that you fit

(2) How much do the school means of alcohol use (i.e., intercepts) vary?

(3) How much does the relationship between neighborhood support and alcohol use (i.e., slopes) vary across schools?

(4) How much do the intercepts and slopes covary? Interpret this in context of the research.

(5) Compute the proportion of variance explained at level-1 and interpret it

4. Add the school-level variable “dropout” to the level-2 equations in Question 3 with “dropout” grand-mean centered (taking off the grand mean from each observation)

(1) Write down the model that you fit

(2) Report and interpret the estimates for both fixed and random effects and their significance

5. Now run a HLM with the level-1 model as, and consider all level-1 coefficients are randomly varying across schools without predictors. Report and interpret the estimates of both fixed and random effects.