36-463/663: Multilevel & Hierarchical Models
Fall 2014
HW05 – Due Thu, 06 Oct 2016

Announcements

- Please turn in your assignment as a single pdf on blackboard.
- Reading in Gelman & Hill (G&H):
  - This homework covers G&H Chapters 9 and 10.
  - This is really the end of the "preliminaries" part of the class. Next week we will turn to chapters 11 and 12 but we will also start going more slowly, at least in terms of the number of pages of the textbook per week. We will also start skipping around the G&H text and adding material from outside the text, a bit more.

Exercises

Note that many of these exercises require simulation in R.

1. Please read and try the ideas in G&H, Ch 9 & 10. Then do
   (a) G&H, Chapter 9, #3
   (b) G&H, Chapter 9, #8.
2. In class we considered the `sesame` data (available in the `week05` area of the class website). This is an example of an "encouragement design": subjects were randomly assigned to be encouraged (or not) to watch the Sesame Street TV show, and then they were tested to see if their letter skills had improved.
   (a) Why do you suppose kids were randomly assigned to "encouraged" or "not encouraged", rather than "watch Sesame Street" or "don't watch Sesame street"?
   (b) In class we obtained Wald and two-stage least-squares (TSLS) IV estimates of the effect of watching Sesame street. Install package `sem` on your computer and use the `tsls()` function to estimate the same effect.
   (c) Use the `sim()` function from `library(arm)` to generate 1000 simulated values of the Wald estimate, from fake data sets similar to the `sesame` data *(HINT: to get 1000 Wald estimates, you will have to run* `sim()` *2000 times.)* Use these to generate a standard error (SE) for the Wald estimate, and compare this to the SE generated by the `tsls` function.
3. G&H, Chapter 10, #2. The folder `bypass` is available in the `hw05` area of the class website.