

Homework 3

(hard copy due 3/19/09 by 4pm in my mailbox in 470 Urban Center)

Please type your responses and include the relevant printouts with each answer. Answers should be about one paragraph for each question, and they should be written as if they were part of a research report or journal article. Include the relevant statistical values in the text.

Your answers should be in your own words.

For all of the problems below, allow as many iterations as necessary for convergence. For any of your results: if the robust estimates differ substantially in significance, report the robust findings.

The data for this homework come from a 2-year national study of older adults' (over 65 years old) social relationships.¹ There were 5 waves of data collected, each separated by 6 months. The dependent variable we will focus on in this homework is social support, an index of frequency of supportive exchanges with family and friends over the previous month and measured with 12 questions about emotional support, instrumental support, helpful advice, and companionship (SUPPORT). There are two uncentered time variables: TIME (coded 0, 1, 2, 3, 4) and the square of the time variable (TIMESQ). CTIME and CTIMESQ are centered versions of the time variables. A time-varying measure is self-rated health (HEALTH), measured at each time point, with lowest scores indicating poor health and highest scores indicating excellent health. In the SPSS data file, HEALTH has been grand-mean centered, but it is uncentered in the HLM data file. Education (EDUC) is a person-level variable with original values ranging from 1 (less than 8th grade) to 9 (completed graduate school or professional training). This variable has been grand-mean centered in the SPSS data file but not in the HLM data file.

1. Use SPSS to run a basic growth model with SUPPORT as the outcome and TIME (uncentered) as the predictor. Using SPSS, generate a graph with a random sample of 20 growth curves using the *igraph* command. Report and interpret your results in terms of the research problem.
2. Use SPSS to see whether education level has any effect on initial levels of social support or changes in social support by adding education (EDUC, grand-mean centered) as a level-2 predictor of the intercepts and slopes. Report and interpret your results in terms of the research problem.
3. In HLM, run a model with SUPPORT as the outcome and HEALTH as a grand-mean centered variable at Level 1. Allow both TIME and HEALTH to have random varying slopes (you may need to request additional iterations). Report and interpret your results in terms of the research problem.
4. In SPSS, run two new models to test whether the change in social support over time is linear or quadratic (do not include covariates, just the two time variables). a) Use the uncentered variables, TIME and TIMESQ. Interpret the fixed and random effects in terms of the research problem. b) Replace the uncentered variables with their centered counterparts, CTIME and CTIMESQ and retest the model. Interpret the fixed and random effects in terms of the research problem. Be sure to describe and explain any differences you find in the two models.

(additional questions on the back)

¹ A random sample of participants was drawn and the data have been altered to protect anonymity.

Data for the following problems is taken from the 2005 British Election Survey, a study of voting preferences in England, Scotland, and Wales.² Download the data from the website at <http://www.upa.pdx.edu/IOA/newsom>. In this version of the data set, there are 2,278 respondents in 255 voting wards. The grouping variable is WARD. Level-1 variables include whether the respondent voted in the last general election (VOTED, 0=did not vote, 1=did vote), the age of the respondent (AGE, from 18 to 90), whether he or she had a college degree (COLLEGE, 0=no college degree, 1=college degree or higher), and whether the respondent trusts politicians in general (TRUSTPOL, 0 = no trust to 10 = trust a great deal). The proportion of conservatives in the ward (MEANCON, ranging from 0.0 representing no conservatives to 1.0 representing 100% conservatives) is a level-2 variable.

For these models, allow additional iterations if necessary.

5. Using HLM, estimate a multilevel logistic model with VOTED as the outcome (specify Bernoulli as the estimation setting) and COLLEGE as the predictor. Interpret the fixed effects, including the odds ratio, and the random effects.

6. Using HLM, test a second multilevel logistic model with VOTED as the outcome (specify Bernoulli as the estimation setting) and the following grand-mean centered predictors: AGE, COLLEGE, TRUSTPOL, MEANCON. Allow all random effects, but do not test any cross-level interactions.

² More on the BES can be found at <http://bes.utdallas.edu/2005/Survey%20with%20Mailback.htm>