

Homework 3

Due Friday, March 21, 1 pm

1. The following questions use the same school survey study example that was used in HW 2. There is a new data set, however, which includes gender. The sample size is now 2,431 because of missing data on the gender variable. The data page has a new ASCII data file, new Mplus input files, and an SPSS version of the file (<http://www.ioa.pdx.edu/newsom/data.htm>). Be sure to use the appropriate data and analysis statements for each problem (i.e., download and modify the Mplus input files found on the data webpage).

a. Obtain descriptive information from SPSS about the skew and kurtosis of all six variables. Report your findings and evaluate the degree to which the data are likely to violate distributional assumptions based on criteria provided by West, Finch, & Curran (1995) for these univariate statistics.

b. Using standard maximum likelihood run a three-factor model with CRIME and FIGHTS on one factor, ABANDON and GRAFITTI on the second factor, and GETOUT and INANDOUT on the third factor (same model as in #3 for HW 2, except a different sample size). Report the model fit statistics and standardized loadings for the model.

c. Using maximum likelihood robust statistics (MLM in Mplus), test the same three factor model as in 1b above. Compare your output to that obtained with the standard ML solution. Be sure to describe any differences in the fit statistics, the loadings, and the standard errors. What is the scaling correction factor and what does it tell you about nonnormality and the chi-square test?

2. For this problem, use the same data set and standard ML estimation (to simplify chi-square difference testing for now)¹.

a. Run two multigroup structural equation models to compare the 3-factor CFA for males and females to see if there is at least partial measurement invariance across groups (to simply things, we are not comparing means or intercepts across groups in this exercise). In the first model, allow all parameters to differ across groups (same form model). In a second model, constrain only the loadings to be equal across gender groups, leaving factor variances, measurement variances, and correlations between the factors to be freely estimated in each group (partial or weak invariance). Use a chi-square difference test to see if there is at least partial measurement invariance across gender groups.

b. Test the same predictive model from HW 3 Problem 8, but this time compare the predictive paths across the two groups. In this model, buildings and violence predict desire to leave the neighborhood. Keep the loading constraints used in Problem 2a above and allow the predictive paths to be freely estimated in the two groups. Report and interpret your findings. There is one path that seems to be different across groups, test whether this path is significantly different across groups and report your findings.

3. The data for the following problems come from a national study of social relationships among 916 older adults that was recently collected by colleagues, Karen Rook and David Morgan, and myself. I've included three waves of responses (one year apart) to a question about how often the study participant engaged in vigorous physical activity, such as walking, jogging, or swimming (W1VIGACT, W2VIGACT, and W3VIGACT; 0=never to 6=daily) and three waves of responses to a question about overall perceived health ("In general, would you say your health is excellent, very good, good, fair, or poor?"; W1HEALTH, W3HEALTH, and W5HEALTH; 0=poor to 4=excellent). Use standard ML estimation for these models.

¹ Analyses using the Satorra-Bentler correction for nonnormality did not lead to any differences in the substantive conclusions.

