

Homework 2

Due Feb. 18, 2010, 1pm

For all the following problems, please type your answers and provide the relevant printouts. Each answer should be no longer than 1-2 paragraphs in length.

Data for the following problems are derived from the 1994 Canadian National Population Health Survey. The survey included from a measure of psychological distress developed by Kessler and colleagues (Kessler et al., 2003). Respondents were asked to rate how often they felt that “nothing could cheer you up,” “nervous,” “restless,” “hopeless,” “worthless,” and “everything is an effort.” Each item was rated on a 5-point scale: 1=none of the time, 2=a little, 3=some of the time, 4=most of the time, and 5=all of the time. Two other variables, gender (SEX; 1=men, 2=women) and perceived criticisms from others (CRITICAL) are included in the data set, but not used for the first several questions. Perceived criticisms from others is measured by a question that asks agreement on “people are too critical” (0=no, 1=yes).¹

The ASCII data file and Mplus input statements can be downloaded from <http://www.up.pdx.edu/IOA/newsom/data.htm> (you will need to add the appropriate model statements).

1. Use Mplus to conduct a confirmatory factor analysis testing whether a single factor model fits the data. Report the standardized loadings, their significance, the chi-square for the model, the CFI, and the SRMR. Does this model fit the data well? Why or why not? Do the factor loadings suggest there are any poor items? Why or why not? (save your input program for later use in Problem 6).
2. Test to see if the items really belong to two related latent variables (i.e., a two-factor model) in which CHEER HOPELESS WORTHLESS load on one factor related to sadness (negative affect) and NERVOUS RESTLESS EFFORT load on another factor related to physical symptoms (somatic). Report the standardized loadings, their significance, the chi-square for the model, the CFI, and the SRMR. Does this model fit the data well? Why or why not?
3. Compare the fit of the one- and two-factor model using a chi-square difference test to see if there is a significant difference in fit. Report and interpret your findings.
4. For the two-factor model tested in Problem 2, calculate by hand how the degrees of freedom are derived (show your work).
5. a. Test the two-factor model again (same item assignments as in Problem 2), but this time set the variance of the latent variables to 1 instead of using a reference variable for each factor. Request modification indices (for later use only). How is the output similar or different from that obtained in Problem 2?
 - b. Use the information contained in the printout from Problem 5a to compute Bollen’s IFI by hand. Interpret the result and compare to the value of the CFI obtained from Mplus.

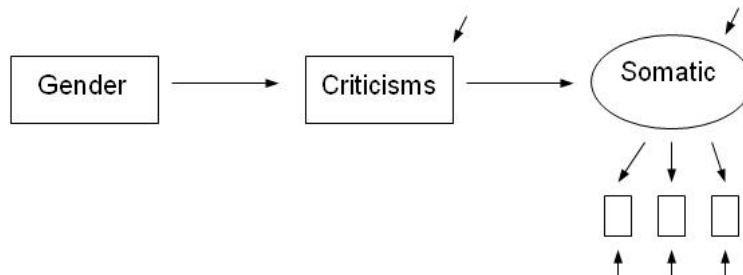
¹ Note that it is problematic to use a binary variable as a dependent variable with maximum likelihood estimation. Moreover, if you were to look closely, the other variables used in this set of analyses have some distributional problems as well. We will return to these issues later and perhaps examine how these variables might impact the results in this problem.

6. a. Rerun the single-factor model from Problem 1, but request the modification indices. Report and interpret the two highest modification indices (including the M.I. and the StdYX E.P.C.).

b. Add the appropriate changes to the model according to the two highest modification indices and retest the model. Request the modification indices again and report your findings. Examine the biggest modification index and speculate about what you might find if you made that change in the model.

7. There has been some debate about whether depressive symptoms are a cause or a consequence of negative interactions with others. Gender is often associated with depressive symptoms and one reason might have to do with gender differences in social relationships. The following two models examine gender in relation to perceived criticisms from others and depressive symptoms. For these models, you will need to modify the USEVARIABLES= line so that it includes only the variables used in the model. Omit any correlated errors or other changes you may have made to the somatic factor (it should be specified as in Problem 2).

a. Using only the somatic symptoms factor, test the following structural equation model in which criticisms from others (CRITICAL) is a mediator in the relation between gender (SEX) and somatic symptoms. Report and interpret your findings, including standardized and unstandardized coefficients, indirect effects, and model fit (at least chi-square, CFI, and SRMR).



b. Using the same variables as in 7a., examine the following structural model in which somatic symptoms mediate the relationship between gender (SEX) and criticisms from others (CRITICAL). Report and interpret your findings, including standardized and unstandardized coefficients, indirect effects, and model fit (at least chi-square, CFI, and SRMR). What can you say about the results from this model in comparison to the results from 7a?

