

## **PSYC 948: Latent Trait Measurement and Structural Equation Modeling**

### **Homework #3 (Total 10 Points)**

**Due: Wednesday, February 13, 2013 at 11:59pm.**

#### **Homework Problems:**

The homework questions and analyses are based on the following paper available in dropbox under Readings for Week 3:

Tian, Q. (2011). Social anxiety, motivation, self-disclosure, and computer-mediated friendship: a path analysis of the social interaction in the blogosphere. *Communication Research*, DOI: 10.177/0093650211420137. \

In the paper, two path models were run to analyze the relationship between the variables of the study with new and existing friendships formed online. Be sure to read the paper before continuing (available in Dropbox or online if you are on the UGA campus network).

Data were simulated from a multivariate normal using the statistics found in Table 1 (p. 12). Then, data were made missing using a completely random mechanism so as to try to match the proportion of missing cases reported in the paper (3.7%, p. 10). Note: any differences in your results and the paper are likely due to the data generating mechanism of simulation and do not reflect upon choices made by the author. Simulated data can be found on the course website. Also note: data are in Microsoft Excel format and must be converted to text format (use a comma-space file) before being imported into Mplus.

Using the paper only, answer the following questions:

1. How many endogenous variables were in model #1 and model #2? (.25 points)
2. How many exogenous variables were in model #1 and model #2? (.25 points)
3. How many total parameters could be estimated in either model #1 or model #2?  
Hint: they both have the same number. (.25 points)
4. Were the models just-identified, over-identified, or under-identified? (.25 points)

Using the data and the MLR estimator, replicate the analysis for Model #1 and answer the following questions:

5. Report the fit statistics of the analysis – did the model appear to fit well? (.25 points)
6. Report the variable name and value for the largest standardized coefficient for the prediction of the number of new friends. Interpret this value. (.25 points)
7. Report the standardized total effect of social anxiety on number of new friends, along with the p-value. Interpret this value. (.25 points)

Using the data and the MLR estimator, replicate the analysis for Model #2 and answer the following questions:

8. Report the fit statistics of the analysis – did the model appear to fit well? (.25 points)
9. Report the variable name and value for the largest standardized coefficient for the prediction of the number of existing friends. Interpret this value. (.25 points)
10. Report the standardized total effect of social anxiety on number of existing friends, along with the p-value. Interpret this value. (.25 points)

Create a new analysis, model #3, that estimates both model #1 and model #2 simultaneously using MLR. Be sure to use all variables in the analysis and make sure all paths are specified correctly. Answer the following questions:

11. How many total parameters could be estimated in model #3? (.5 points)
12. Was the model just-identified, over-identified, or under-identified? (.5 points)
13. Report the fit statistics of the analysis – did the model appear to fit well? (.5 points)
14. Report the value of and variables for the largest normalized residual covariance.  
Interpret this value. (.5 points)
15. Report the value of the largest modification index and expected parameter change for the residual covariances. Interpret these values. (.5 points)

Create a new analysis, model #4, that adds the two residual covariances with the largest modification indices found in question #15 to model #3 using MLR. Answer the following questions:

16. Was the model just-identified, over-identified, or under-identified? (.5 points)
17. Report the fit statistics of the analysis – did the model appear to fit well? (.5 points)
18. Compare the estimates and standard errors of the standardized coefficients for predicting Quality of New Friends across models #1, #3, and #4. Are there any differences? (.5 points)
19. Compare the estimates and standard errors of the standardized coefficients for predicting Quality of Existing Friends across models #2, #3, and #4. Are there any differences? (.5 points)
20. Report the standardized direct effects that are non-significant at ( $\alpha < 0.05$ ). Would you advise removing these effects from the model? (.5 points)
21. Report the standardized total effect of social anxiety on number of existing friends, along with the p-value. Interpret this value. (.5 points)
22. Using the principles of parsimony and of using the smallest number of statistical models possible for an analysis, which would you choose to publish: (a) models #1 AND #2, (b) model #3 only, or (c) model #4 only? (.5 points)

Using your data:

23. Choose three continuous variables from your data set and estimate a path model where:
  - a. One variable is exogenous, predicting both other predictors
  - b. One variable is the mediator, predicting the other outcome
  - c. And...one variable is the outcome predicted by both the exogenous variable and the mediator
  - d. And...you use the MLR estimator.

Using this traditional mediational analysis, report your results in an APA-style results section. Be sure to discuss model fit, direct effects, and indirect effects. (1.5 points)

### **Submission Instructions:**

All homework and final answers must be your own and not be copied or paraphrased from anyone else's answers. Homework must be submitted via email ([jtemplin@unl.edu](mailto:jtemplin@unl.edu)) in the form of Microsoft Word document with the name: 948\_FirstLast\_HW#.docx. Late homework will have a penalty of 10% per calendar day.