

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

### **Homework #6 (Total 10 Points)**

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

#### **Homework Problems:**

The homework problems are based on the analysis of data from the Body Image Rating Scale (BIRS), a survey created to measure individual differences in body image. Data used come from a study (with 2,297 undergraduate students of a Midwestern university) of Body Dysmorphic Disorder (BDD), a somatoform disorder defined in the Diagnostic and Statistical Manual of Mental Disorders (4<sup>th</sup> Edition, Text Revision; or DSM-IV-TR). When otherwise not accounted for by another mental disorder, BDD is defined by when an individual meets two criteria:

- A. Preoccupation with an imagined defect in appearance. If a slight physical anomaly is present, the person's concern is markedly excessive.
- B. The preoccupation causes clinically significant distress or impairment in social, occupational, or other important areas of functioning.

The Body Image Rating Scale (BIRS) is a diagnostic assessment used for diagnosing BDD consisting of 14 nine-point Likert-type items that focus on cognitive, affective, and behavioral characteristics of BDD. The items of the BIRS can be found at the end of this document. Using the data set found in our dropbox folder and the items found in this document, answer the following questions (use MLR for all analyses):

#### Determining the Appropriate Statistical Model

1. Estimate a parallel items one-factor CFA model with items 1, 3, 7, 8, 10, and 11 (the 6 items you found to fit a one-factor model from last week). Be sure your log-likelihood is -27,925.789. Report the RMSEA, CFI, and TLI. Does the parallel items model fit the data? (.5 points)
2. Estimate a tau equivalent items one-factor CFA model with items 1, 3, 7, 8, 10, and 11 (the 6 items you found to fit a one-factor model from last week). Be sure your log-likelihood is -27,833.020. Report the RMSEA, CFI, and TLI. Does the tau equivalent model fit the data? (.5 points)
3. As the parallel items and the tau equivalent models are nested, use a likelihood-ratio test to determine which model is preferred between the two. Report the null hypothesis (which parameters are being tested), the alternative hypothesis, and MLR scaled likelihood ratio test statistic between the two models, and the degrees of freedom for this test. Which model is preferred? (.5 points)
4. Run a one-factor CFA model with only items 1, 3, 7, 8, 10, and 11 (log-likelihood should be -27,679.104). Report the RMSEA, CFI, and TLI. Does the one-factor model fit the data? (.5 points)
5. As the tau equivalent and unrestricted CFA models are nested, use a likelihood-ratio test to determine which model is preferred between the two. Report the null hypothesis (which parameters are being tested), the alternative hypothesis, and MLR scaled likelihood ratio test statistic between the two models, and the degrees of freedom for this test. Which model is preferred? (.5 points)

### Summarizing the Reliability for a Given Type of Score

6. Which reliability coefficient is most appropriate for the sum score of the items under the best fitting CFA model? Report the estimated reliability. (.5 points)
7. Save the factor scores from this analysis. What is the estimated reliability for the factor score? (.5 points)

### Comparison of Results for Secondary Analyses

8. Using the sum score of all six items (HINT: use the DEFINE command in Mplus), predict the score of item #14, one of the items omitted from the scale. Report the standardized regression coefficient, the standard error, the Wald test statistic for the comparison of this value against zero, and the Wald test p-value. (1 point)
9. Using the factor score, predict the gender of the participant, predict the score of item #14, one of the items omitted from the scale. Report the standardized regression coefficient, the standard error, the Wald test statistic for the comparison of this value against zero, and the Wald test p-value. (1 point)
10. Using a single-indicator model with the sum score (where variance is partitioned by the reliability found in question 6), predict the score of item #14, one of the items omitted from the scale. Report the standardized regression coefficient, the standard error, the Wald test statistic for the comparison of this value against zero, and the Wald test p-value. (1 point)
11. Using a single-indicator model with the factor score (where variance is partitioned by the reliability found in question 7), predict the score of item #14, one of the items omitted from the scale. Report the standardized regression coefficient, the standard error, the Wald test statistic for the comparison of this value against zero, and the Wald test p-value. (1 point)
12. Using a structural equation model, predict the score of item #14 by the body image factor. Report the standardized regression coefficient, the standard error, the Wald test statistic for the comparison of this value against zero, and the Wald test p-value. (1 point)

### Determining the Appropriate Statistical Model – With Your Data

13. Using your data set and the single factor you found in last week's homework, repeat the analyses for questions #1-7. (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.

### Body Image Rating Scale Items

- 1) I \_\_\_\_\_ that other people may be noticing my physical appearance.  
1.....2.....3.....4.....5.....6.....7.....8.....9  
don't worry                      sometimes worry                      worry
- 2) It \_\_\_\_\_ when I think that I am in a situation where others are evaluating my physical appearance.  
1.....2.....3.....4.....5.....6.....7.....8.....9  
does not bother me                  makes me feel a little                  frightens me  

uneasy
- 3) During the day, I \_\_\_\_\_ as the result of a specific aspect of my physical appearance.  
1.....2.....3.....4.....5.....6.....7.....8.....9  
rarely or never seek out    sometimes seek out or                  seek out or avoid  
or avoid mirrors                  avoid mirrors                  mirrors
- 4) I \_\_\_\_\_ find myself touching/physically inspecting a certain part of my physical appearance.  
1.....2.....3.....4.....5.....6.....7.....8.....9  
rarely if ever                      sometimes                      very often
- 5) I \_\_\_\_\_ articles of clothing and/or makeup to mask part of my physical appearance.  
1.....2.....3.....4.....5.....6.....7.....8.....9  
never find myself using    sometimes find myself                  often find myself using  

using
- 6) I spend \_\_\_\_\_ deciding how I can best conceal a certain aspect of my physical appearance.  
1.....2.....3.....4.....5.....6.....7.....8.....9  
a minimal amount of time    a lot of time
- 7) If I could change a certain aspect of my physical appearance, my overall quality of life would \_\_\_\_\_.  
1.....2.....3.....4.....5.....6.....7.....8.....9  
remain the same                  improve somewhat                  greatly improve
- 8) Most people \_\_\_\_\_ about my physical appearance.  
1.....2.....3.....4.....5.....6.....7.....8.....9  
have felt the same as I    don't know what it is like  
feel    to feel as bad as I feel
- 9) Discussing my physical appearance with others \_\_\_\_\_.  
1.....2.....3.....4.....5.....6.....7.....8.....9  
does not bother me                  makes me feel slightly                  makes me feel very  

self conscious                      uncomfortable
- 10) If I never thought about my physical appearance, things in life would be \_\_\_\_\_.  
1.....2.....3.....4.....5.....6.....7.....8.....9  
no different                      about the same                      much improved
- 11) I \_\_\_\_\_ because of a specific aspect of my physical appearance.  
1.....2.....3.....4.....5.....6.....7.....8.....9  
never avoid things                  rarely avoid things                  often avoid things  
that I love doing                  I love doing                  that I love doing

12) When I am engaged in a conversation with someone, I \_\_\_\_\_.

1.....2.....3.....4.....5.....6.....7.....8.....9	
don't hide any part of	shield part of my
physical appearance	physical appearance
from them	from their view

13) When I think of my physical appearance the word(s) that best corresponds to my thoughts is/are \_\_\_\_\_.

1.....2.....3.....4.....5.....6.....7.....8.....9		
beautiful/handsome	not bad	ugly

14) If I ran naked through the street, people would \_\_\_\_\_.

1.....2.....3.....4.....5.....6.....7.....8.....9		
act disgusted, but	be shocked, but	notice a defect in
secretly admire	wouldn't necessarily	my physical appearance
God's masterpiece	study my entire	
	physical appearance	