Byrne – Chapter 5 Second Order Models

* Second order identification:
  + Make sure the upper part of the model is identified – same way as before (K + K\*1) / 2
  + May need to set one of the regression weights to one to make sure it’s not over identified
* Critical ratio of the differences – shows the differences if you were to restrain parameters to equal over letting them freely vary (view > analysis properties > output > critical ratios for the differences)
* You can set the error variances for the latent variables to be equal (by relabeling them under object properties) for critical ratio differences that are very small (since they are z-scores < 1.96 which is the critical cut off for z-tests p<.05).
* Continuous versus categorical variables
  + Likert variables using max likelihood? Is that appropriate given that likert variables are not continuous?
    - SEM based on variance/covariance – correlations are higher with really continuous variables
    - Less than 5 categories, variables tend to be skewed – which causes problems in SEM (lots of problems)
  + Are likert variables really dichotomizations of a real continuous scale?
    - ALSO: these separations are not necessarily equal
  + Assumptions:
    - Underlying latent that is continuous
    - Lots of people
    - Number of observed variables is small
* AMOS categorical variables
  + Bayesian estimation (which in theory is better than the ADF estimation)
    - Prior distribution – distribution of parameters before they are actually observed
    - Posterior distribution – distribution of parameters after they are estimated combined with the prior distribution
  + How to:
    - First you have to turn on estimation of means and intercepts
    - Analyze > Bayesian estimation
      * Will start estimating using Monte Carlos and will continue until you stop it.
      * You need to wait until the happy face is there ☺
      * Look at all the pretty graphs!

CFA Second Order and Different Estimation Example

1. The overall quality of this course was among the top 20% of those I have taken.

2. The instructor presented the course in a clear and organized manner.

3. The examinations were representative of the material covered in the assigned readings and class lectures.

4. The instructor used fair and appropriate methods in the determination of grades.

5. The instructor made a strong effort to be available to students.

6. The textbook was a useful and integral part of the course.

7. The instructor was knowledgeable about the subject matter.

8. The instructor appreciated student comments, questions, and viewpoints.

9. The assignments and required activities in the class were appropriate.

10. This class offered me an intellectual challenge.

11. The instructor made good use of assigned class time.

12. This was a course I wanted to take.

13. The classroom and/or laboratory facilities need improvement.

14. The prerequisites for this course are appropriate.

15. What grade do you expect to receive in this course?

Factors:

* General factor
* Instructor: 2, 4, 5, 7, 8, 11
* Grades: 3, 9, 15
* Other stuff: 1, 6, 10, 12, 13, 14

Test the model as designed.

Change questions, factors, etc. as modification indices indicate.

Test as a second order model.

Test with Bayesian estimation and see how estimates change.