Structural Equation Modeling

P.08 - MIMIC Models

November 15, 2022 (15:45:12)

Lab Description

For this practical you will need the following packages: `lavaan` and `semPlot`. You can install and load these packages using the following code:

```
# Install packages.
install.packages(c("lavaan", "semPlot", "mvtnorm", "GGally"))

# Load the packages.
library(lavaan)
library(semPlot)
```

Exercise 1

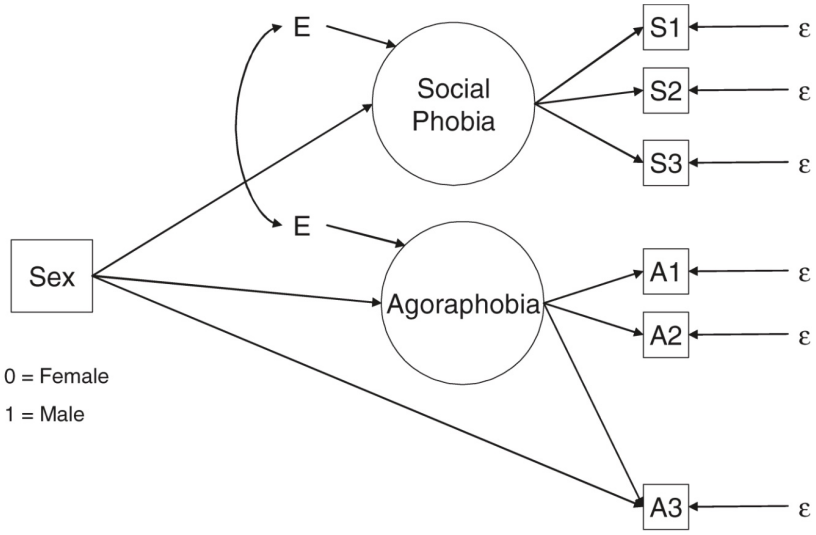
Estimate the model in *Figure 1* in `lavaan` and examine if there is evidence of Differential Item Functioning (DIF) in the measurement instruments. To help you get started, you are provided with the code that contains the correlations and standard deviations corresponding to the model depicted in *Figure 1*.

Standard deviations and correlations.

```
# Standard deviations.
sd <- "2.26 2.73 2.11 2.32 2.61 2.44 0.50"

# Correlations.
cor <- "
    1.000
    0.705   1.000
    0.724   0.646   1.000
    0.213   0.195   0.190   1.000
    0.149   0.142   0.128   0.521   1.000
    0.155   0.162   0.135   0.557   0.479   1.000
    -0.019  -0.024  -0.029  -0.110  -0.074  -0.291   1.000
"

# Get covariances.
cov <- getCov(cor, sds = sd, names = c("S1", "S2", "S3", "A1", "A2", "A3", "sex"))
```



Sample Correlations and Standard Deviations (*SD*s); *N* = 730 (365 males, 365 females)

	S1	S2	S3	A1	A2	A3	Sex
S1	1.000						
S2	0.705	1.000					
S3	0.724	0.646	1.000				
A1	0.213	0.195	0.190	1.000			
A2	0.149	0.142	0.128	0.521	1.000		
A3	0.155	0.162	0.135	0.557	0.479	1.000	
Sex	-0.019	-0.024	-0.029	-0.110	-0.074	-0.291	1.000
SD:	2.260	2.730	2.110	2.320	2.610	2.440	0.500

FIGURE 7.5. MIMIC model of Social Phobia and Agoraphobia. S1, giving a speech; S2, meeting strangers; S3, talking to people; A1, going long distances from home; A2, entering a crowded mall; A3, walking alone in isolated areas. (All questionnaire items rated on 0–8 scales, where 0 = no fear and 8 = extreme fear.)

Figure 1: Reproduction of Figure 7.5 from Brown (2014, p. 275)

References

Brown, T. A. (2014). *Confirmatory factor analysis for applied research.* Guilford Publications.