

Multilevel Mediation with SEM Exercises

Day 4

June 17, 2015

Files for this exercise:

Data file: OPEQ_example.csv

Mplus input file: OPEQ_example.inp

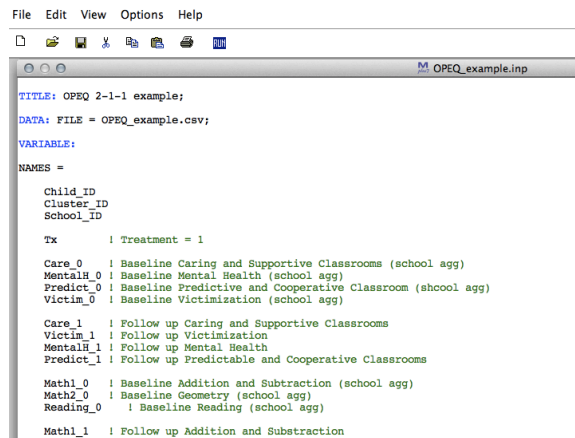
Make sure these are saved together in the same folder.

Step 1:

Open the input file with Mplus. Note, you (usually) need to open Mplus, then navigate to the input file using the Mplus. If you double click on the file, Mplus will (usually) not open it.

Important: DO NOT open the data file (especially not with Excel)!! Excel and other programs (especially Microsoft) reformat basic text files when saving them, and this will cause Mplus to not read the data.

Your Mplus screen should look something like this (this screen shot is from a Mac, but it should be similar on Windows):



```
File Edit View Options Help
M OPEQ_example.inp
TITLE: OPEQ 2-1-1 example;
DATA: FILE = OPEQ_example.csv;
VARIABLE:
NAMES =
  Child_ID
  Cluster_ID
  School_ID
  Tx      ! Treatment = 1
  Care_0  ! Baseline Caring and Supportive Classrooms (school agg)
  MentalH_0 ! Baseline Mental Health (school agg)
  Predict_0 ! Baseline Predictive and Cooperative Classroom (school agg)
  Victim_0 ! Baseline Victimization (school agg)
  Care_1  ! Follow up Caring and Supportive Classrooms
  Victim_1 ! Follow up Victimization
  MentalH_1 ! Follow up Mental Health
  Predict_1 ! Follow up Predictable and Cooperative Classrooms
  Math1_0 ! Baseline Addition and Subtraction (school agg)
  Math2_0 ! Baseline Geometry (school agg)
  Reading_0 ! Baseline Reading (school agg)
  Math1_1 ! Follow up Addition and Subtraction
```

Step 2: Run the example

We will go through the contents of the Mplus input file together as a class. Below is a rundown of the basic **commands** and statements. All **commands** are in blue and followed by a colon. All statements are in black and end with a semi-colon. Note that **Comments** are not read by Mplus, they are just there to help us understand the commands and statements.

Title is the title

DATA tells Mplus about your data file

FILE is the name of the data file

VARIABLE tells Mplus stuff about your variables

NAMES tells Mplus the names of the variables in the data file. NEVER edit this unless you have changed your data set. Please read the comments to understand the variable names.

USEVARIABLES tell Mplus which variables you want to use for the analysis. ALWAYS edit this whenever you change the variables you want to use in a model.

CLUSTER is the cluster ID variable(s).

BETWEEN is the variables that only vary at level 2: these would be in the level 2 data file for HLM, but are all in the same file for Mplus.

WITHIN is the variables that only vary at level 1 (have ICC < .05)

NOTE that the default is to treat variables as having variance at both levels; these variables do not get a special statement.

MISSING is the missing data code(s).

ANALYSIS tells Mplus details about estimation

TYPE is the model category, here TWOLEVEL.

MODEL is where you write the model you want to run using Mplus model syntax

%WITHIN% is used to specify the level 1 model

%BETWEEN% is used to specify the level 2 model

ON means regression.

MODEL INDIRECT tells Mplus to test direct, indirect, and total effects

IND means indirect effects. The variable on the left is the outcome, the variable on the right is treatment. For example

Y IND X;

Tell Mplus to test the total, direct, indirect effects between X and Y.

If you have read all this and are still waiting, press the "RUN" button and look at the .output file.

Step 3: Read the output

There is a lot of stuff in an Mplus output file. Here is a basic sketch of the contents.

INPUT INSTRUCTIONS repeats the input. At the end of this section Mplus reports any errors or warnings with your Mplus input file.

SUMMARY OF ANALYSIS technical details of the analysis, including ICCs for all variables that appear at both levels (when TYPE = TWOLEVEL)

THE MODEL ESTIMATION section reports any problems with computations

MODEL FIT INFORMATION provides goodness of fit indices. These are useful in SEM, but not really important for simple mediation. Skip it!

MODEL RESULTS provide the parameter estimates, at the within level and at the between level. These should be pretty straightforward (variances, regression coefficients, and intercepts)

QUALITY OF NUMERICAL RESULTS gives the condition number of the Hessian. Skip it.

TOTAL, TOTAL INDIRECT, SPECIFIC INDIRECT, AND DIRECT EFFECTS gives the output of the MODEL INDIRECT command, which is what we want to focus on today. This section should look as follows. See if you can make sense of it and be prepared to discuss your interpretation with the class.

```
TOTAL, TOTAL INDIRECT, SPECIFIC INDIRECT, AND DIRECT EFFECTS
```

	Estimate	S.E.	Est./S.E.	Two-Tailed P-Value
WITHIN				
BETWEEN				
Effects from TX to MATH2_1				
Total	0.166	0.083	2.000	0.046
Total indirect	-0.025	0.028	-0.915	0.360
Specific indirect				
MATH2_1				
CARE_1				
TX	-0.025	0.028	-0.915	0.360
Direct				
MATH2_1				
TX	0.191	0.084	2.276	0.023

Step 4: Interpret the findings

We will do this together as a class. Note that this mediation is “surprising” since the indirect and direct effects have a different sign!

Step 5: Further analysis (optional)

Here are some additional analyses you can try.

Analysis 1: Add the other mediator (Predictable and Cooperative Classrooms).

- Add Predict_1 to the USEVARIABLES statement
- Add Predict_1 to the regression statements in the MODEL command

```
Math2_1 ON Tx Care_1 Predict_1;  
Care_1 Predict_1 ON Tx;
```

- Press RUN and interpret the direct and indirect effects

Analysis 2: Try another outcome.

- Same as above, but change the outcome variable.

Analysis 3: Control for baseline.

- Control for baseline in the outcome by adding it to the regression model for the outcome.
- Control for baseline in the mediator by adding it to the regression for the mediator. Note that the baseline variables are school aggregates so these need to be added to the BETWEEN statement
- Don't forget to edit the USEVARIABLE statement!
- Here is an example of the new model statement:

```
%BETWEEN% !Level 2  
  
Reading_1 ON Tx Care_1 Predict_1 Reading_0;  
Care_1 ON Tx Care_0;  
Predict_1 ON Tx Predict_0;  
  
MODEL INDIRECT:  
  
Reading_1 IND Tx;
```