

## STEPS FOR MAKING NORM WORK WITH SPSS & WITH 2-LEVEL HLM ANALYSIS

0. Impute  $m$  datasets with NORM
  - a. It is useful for the name of input dataset to be short (e.g., nash.dat)
  - b. Impute one additional dataset from EM parameters (e.g., nash\_0.imp)
  - c. DA-imputed files will have the names with numbers 1 to  $m$  (e.g., nash\_1.imp, nash\_2.imp, etc.)
  - d. Be sure that the original file (nash.dat), the corresponding variables names file (nash.nam), all the imputed datasets, and all of the utility files are in the same folder.

### STEPS FOR PERFORMING MULTIPLE REGRESSION ANALYSIS WITH SPSS (17-19) WITH THE $M$ IMPUTED DATA SETS (nash\_1.imp ... nash\_ $m$ .imp)

1. Open MIAutomate.exe
2. Click on the **Input Dataset Browse** button
  - a. Locate the original input data set: nash.dat, and "open" that file.
3. Check the box for **Variable Names File Available?**
  - a. It is a VERY good idea to have a variable names file (may even be required for this version of the automation utility)
4. Enter the **No. of imputations.**
  - a. Let's use 10 for this example (but a larger number – e.g., 40 – is usually best).
5. Click on the **Select First File** button.
  - a. locate and click on the first imputed file, in this case, nash\_1.imp.
  - b. click on **Open**
6. Click on the Syntax Choice window
  - a. Select SPSS 17/18 (also works with SPSS 19)
7. Click on RUN
  - a. Finished Processing! Would you like to launch SPSS? ... click on YES
  - b. SPSS should open automatically with the newly-created syntax file window already open. But it may take several seconds.
  - c. IF SPSS Opens properly ...
    - i. Click on RUN at the top of the syntax editor window
    - ii. Click on ALL
    - iii. SPSS will run the syntax, and you are ready to do analyses with your multiply-imputed data, using the SPSS 17-19 feature for combining results.

- d. IF SPSS fails to open .../
  - i. Open SPSS manually,
  - ii. Locate and open the newly-created syntax file: SPSS1.SPS
  - iii. Click on RUN and ALL and proceed with analyses.

**STEPS FOR PERFORMING 2-LEVEL HLM ANALYSIS  
WITH THE M IMPUTED DATA SETS (nash\_1.imp ... nash\_m.imp)**

Note that the ORDER shown below is very important with this version of MIAutomate.exe. Most importantly, Steps 2 and 3 MUST precede Step 5 (selecting HLM syntax).

1. Open MIAutomate.exe
2. Click on the **Input Dataset Browse** button
  - a. Locate the original input data set: nash.dat, and "open" that file.
3. Check the box for **Variable Names File Available?**
  - a. It is a VERY good idea to have a variable names file (may even be required for this version of the automation utility)
4. Enter the **No. of imputations.**
  - a. Let's use 10 for this example (HLM itself is VERY slow, so running it the recommended 40 times would take a while).
5. Click on the **Select First File** button.
  - a. locate and click on the first imputed file, in this case, nash\_1.imp.
  - b. click on **Open**
6. Click on the Syntax Choice window
  - a. Select HLM

The **Enter HLM Information** Window Will Open

7. Click on the **HLM Executable Browse** button
  - a. The HLM executable file is located in different places, and is actually called different things depending on the version of HLM you happen to have.
  - b. A common location for the Student Version of HLM6 or HLM7 is:
    - i. c:\Program Files\HLM6S\
    - ii. or
    - iii. c:\Program Files\HLM7Student\
    - iv. Locations for other versions of HLM6 (or HLM7) have similar folder names
  - c. The file name for the Student version of the 2-level program is:
    - i. HLM2S.exe
    - ii. File names for other versions of HLM6 are similar

- (1) e.g., HLM2R.exe (trial version)
    - (2) HLM2.exe (regular version)
  - iii. Locate the folder and executable for your version, click on it, and click on **Open**
  
8. Select the HLM model
  - a. Exactly ONE variable (**school** in this case) must be selected as the ID variable.
  - b. Exactly ONE variable (**alc9** in this case) must be selected as the DV.
  - c. Some number of variables may be selected as Level-1 predictors (covariates)
    - i. In this case, select four: **alc7**, **riskreb7**, **likepar7**, and **posatt7**
  - d. Some number of variables may be selected as Level-2 predictors (covariates)
    - i. In this case, select one: **program**
  
9. Close the Enter HLM Window (hit CLOSE button)
  
10. Click on **run** at the bottom of the main, **MI Automate** window.

The progress of the run will be shown in the lower right corner of the window. Because HLM must run two times for each imputed dataset, this process takes anywhere from 30 seconds to several minutes, depending on the number of imputed datasets specified.

The MI Inference output will be written to two files: minfer1.txt (regular standard errors) and minfer2.txt (robust standard errors).

These notepad windows open automatically at the end of the run.

The table shown may be reported in your article.

Parameter:	predictor variable (or intercept)
Est	Parameter estimate (regression coefficient, or b-weight)
SE	Standard Error for the estimate
t	t-value (Est / SE)
df	This is degrees of freedom from MI inference. A large value means that the solution has become stable. If the df value is small, it means that the solution has not stabilized, and that more imputations are needed. Note that for this version of MIAutomate (v. 9/03/10), the DF for level-2 predictors is correct. Although there is some controversy on this point, my current belief is that the maximum DF for level-2 predictors is limited by the number of clusters in the analysis. With one level-2 predictor, the correct DF should be $P$ (number of clusters) - 1 - 1 (= 10 in this case). With two level-2 predictors, it would be $P - 1 - 2$ .
% mis inf	Percent (or fraction) of missing information. This also an MI concept. It is similar to the % of missing values relating to the estimate of a particular parameter, but it can be lower than that number if good auxiliary variables have been included in the imputation model. If auxiliary variables that are highly correlated with DV (sometimes missing), then the % mis inf can be rather smaller than the % of missing values (see Graham & Collins, 2011).
p	p value associated with the t and df. For this version of MIAutomate.exe, this p-value for level-2 predictors is <b>incorrect</b> , and must be recalculated by hand for the smaller df.

There are several ways to get the correct p-value for the level-2 predictor(s). One way is to run the utility **probt.exe**. It should be located in the same folder in which you found MIAutomate.exe. Simply double-click on the program icon and enter the t and df values. The program gives the correct p-value.

In my running of this program (everyone gets slightly different numbers), I got:

t = -3.62, SE = .1307, df = 218, p = .0004 (robust SE)  
t = -3.37, SE = .1405, df = 292, p = .0009 (regular SE)

The correct numbers in this case should be:

t = -3.62, SE = .1307, df = 10, p = .0047 (robust SE)  
t = -3.37, SE = .1405, df = 10, p = .0071 (regular SE)