

Lecture #2 Annotated MPlus Handout

Data Preparation:

Prepare the initial dataset in SPSS, including creation of grand mean centered variables and cluster mean centered variables. Export the SPSS dataset into a tab delimited .dat file. This is what is read into MPlus.

Model #1 Empty Model:

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Input:  
 Title: HLM Example  
 DATA: File is SchoolT.dat;  
 Variable: NAMES ARE school studs achieve gmean cmean studsmc studgmc clusgmc;  
 usevariables are achieve;  
 ANALYSIS: TYPE = general;  
 MODEL: [achieve];

---

Output:

Loglikelihood

H0 Value

-1245.741

Deviance =

-2 Loglikelihood=

-1245.741 \* -2 = 2491.5

MODEL RESULTS

Two-Tailed

Estimate S.E. Est./S.E. P-Value

Means

ACHIEVE 101.381 0.454 223.081 0.000

$\beta_0 = 101.381$

Variances

ACHIEVE 72.287 5.464 13.229 0.000

$\sigma^2 = 72.287$

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Model #2:

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Input:

```
Title: HLM Example
DATA: File is SchoolT.dat;
Variable: NAMES ARE school studs achieve gmean cmean studsmc studgmc
clusgmc;
      usevariables are achieve;
      cluster =school;
ANALYSIS: TYPE = TWOLEVEL;
MODEL: %between%
      [achieve];
```

Output:

Loglikelihood

H0 Value

-1101.266

Deviance = -1101.266  
\* -2= 2205.5

MODEL RESULTS

Two-Tailed

Estimate S.E. Est./S.E. P-Value

Within Level

Variances

ACHIEVE 29.039 2.108 13.773 0.000

$\sigma^2 = 29.039$

Between Level

Means

ACHIEVE 101.381 2.502 40.515 0.000

$\beta_0 = 101.381$

Variances

ACHIEVE 43.245 14.742 2.933 0.003

$\tau_0^2 = 43.245$

Model Building Using GMC:  
Level 1 Only:

Input:

```
Title: HLM Example
DATA: File is SchoolT.dat;
Variable: NAMES ARE school studs achieve gmean cmean studsmc studgmc
clusgmc;
      usevariables are studgmc achieve;
      cluster =school;
      within = studgmc;
ANALYSIS: TYPE = TWOLEVEL;
      estimator=ml;
MODEL: %within%
      achieve ON studgmc;
```

Output:

MODEL RESULTS

Two-Tailed

Estimate S.E. Est./S.E. P-Value

Within Level

ACHIEVE ON

STUDGMC -0.944 0.141 -6.688 0.000

Residual Variances

ACHIEVE 25.363 1.937 13.092 0.000

$$\sigma^2 = 25.365$$

Between Level

Means

ACHIEVE 101.381 3.560 28.476 0.000

Variances

ACHIEVE 88.222 48.130 1.833 0.067

$$\tau_0^2 = 88.222$$

Level 2 Only:

Input:

Title: HLM Example

DATA: File is SchoolT.dat;

Variable: NAMES ARE school studs achieve gmean cmean studsmc studgmc  
clusgmc;

usevariables are clusgmc achieve;

cluster =school;

within = clusgmc;

ANALYSIS: TYPE = TWOLEVEL;

estimator=ml;

MODEL: %within%

achieve ON clusgmc;

Output:

MODEL RESULTS

Two-Tailed

Estimate S.E. Est./S.E. P-Value

Within Level

ACHIEVE ON

CLUSGMC 1.626 0.418 3.891 0.000

Residual Variances

ACHIEVE 29.038 2.217 13.096 0.000

$$\sigma^2 = 29.038$$

Between Level

Means

ACHIEVE 101.381 1.407 72.048 0.000

Variances

ACHIEVE 13.279 7.411 1.792 0.073

$$\tau_0^2 = 13.279$$

Levels 1 and 2:

Input:

Title: HLM Example

DATA: File is SchoolT.dat;

Variable: NAMES ARE school studs achieve gmean cmean studsmc studgmc clusgmc;

usevariables are studgmc clusgmc achieve;

cluster =school;

between = clusgmc;

within = studgmc;

ANALYSIS: TYPE = TWOLEVEL;

estimator=ml;

MODEL: %within%

achieve ON studgmc;

%between%

achieve ON clusgmc;

Output:

MODEL RESULTS

Two-Tailed

	Estimate	S.E.	Est./S.E.	P-Value
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Within Level

ACHIEVE ON

STUDGMC	-0.989	0.140	-7.054	0.000
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Residual Variances

ACHIEVE	25.355	1.936	13.096	0.000
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$\sigma^2 = 25.355$
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Between Level

ACHIEVE ON

CLUSGMC	2.615	0.441	5.933	0.000
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Intercepts

ACHIEVE	101.381	1.407	72.058	0.000
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### Residual Variances

ACHIEVE	13.349	7.407	1.802	0.071
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$$\tau_0^2 = 13.349$$

### Model Building Using CMC: Level 1 Only:

#### Input:

Title: HLM Example

DATA: File is SchoolT.dat;

Variable: NAMES ARE school studs achieve gmean cmean studsmc studgmc clusgmc;

usevariables are studsmc achieve;

cluster =school;

within = studsmc;

ANALYSIS: TYPE = TWOLEVEL;

estimator=ml;

MODEL: %within%

achieve ON studsmc;

#### Output:

#### MODEL RESULTS

#### Two-Tailed

	Estimate	S.E.	Est./S.E.	P-Value
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#### Within Level

ACHIEVE ON

STUDSMC	-0.990	0.140	-7.059	0.000
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#### Residual Variances

ACHIEVE	25.355	1.936	13.096	0.000
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$$\sigma^2 = 25.355$$

#### Between Level

#### Means

ACHIEVE	101.381	2.502	40.516	0.000
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#### Variances

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ACHIEVE    43.323    23.428    1.849    0.064

$$\tau_0^2 = 43.323$$

*Note that Level 2 GMC is identical to Level 2 CMC. Analyses are not repeated.*

### Levels 1 and 2:

Input:

Title: HLM Example

DATA: File is SchoolT.dat;

Variable: NAMES ARE school studs achieve gmean cmean studsmc studgmc clusgmc;

usevariables are studsmc clusgmc achieve;

cluster =school;

between = clusgmc;

within = studsmc;

ANALYSIS: TYPE = TWOLEVEL;

estimator=ml;

MODEL: %within%

achieve ON studsmc;

%between%

achieve ON clusgmc;

Output:

MODEL RESULTS

Two-Tailed

Estimate    S.E. Est./S.E.    P-Value

Within Level

ACHIEVE    ON

STUDSMC    -0.990    0.140    -7.059    0.000

Residual Variances

ACHIEVE    25.355    1.936    13.096    0.000

$$\sigma^2 = 25.355$$

Between Level

ACHIEVE    ON

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CLUSGMC	1.626	0.418	3.891	0.000
Intercepts				
ACHIEVE	101.381	1.407	72.059	0.000
Residual Variances				
ACHIEVE	13.349	7.406	1.802	0.071

$$\tau_0^2 = 13.349$$