PSY 9555A (Nov 13): SEM Approach to Multilevel Modeling with Mplus

- MLM in Mplus – Data structure and syntax
- Intercept only model
- Level 1 predictors
- Intercepts and slopes as outcomes
- Measures within persons
- LGM and MLM
- Multilevel CFA

Additional resources

Mplus manual (especially Chapter 9)

Hox, J. J. (2010). *Multilevel analysis. Techniques and applications. 2nd ed*.

Example (from Joop Hox book on Multilevel Analysis, 2010)

Data

Level 1: pupils (2000 in total)
Level 2: Classes (100 classes of approx 20 pupils each)

Outcome variable:
pupil popularity (scale 0-10)
Predictor variables at pupil level (level 1)
pupil gender (1=girl 0=boy)
pupil extraversion (scale 1-10)
Predictor variable(s) at class level (level 2)
teacher experience (scale 2-25)

Data Structure

Mplus - [popular2modified]

File Edit View Mplus Plot Diagram Window Help

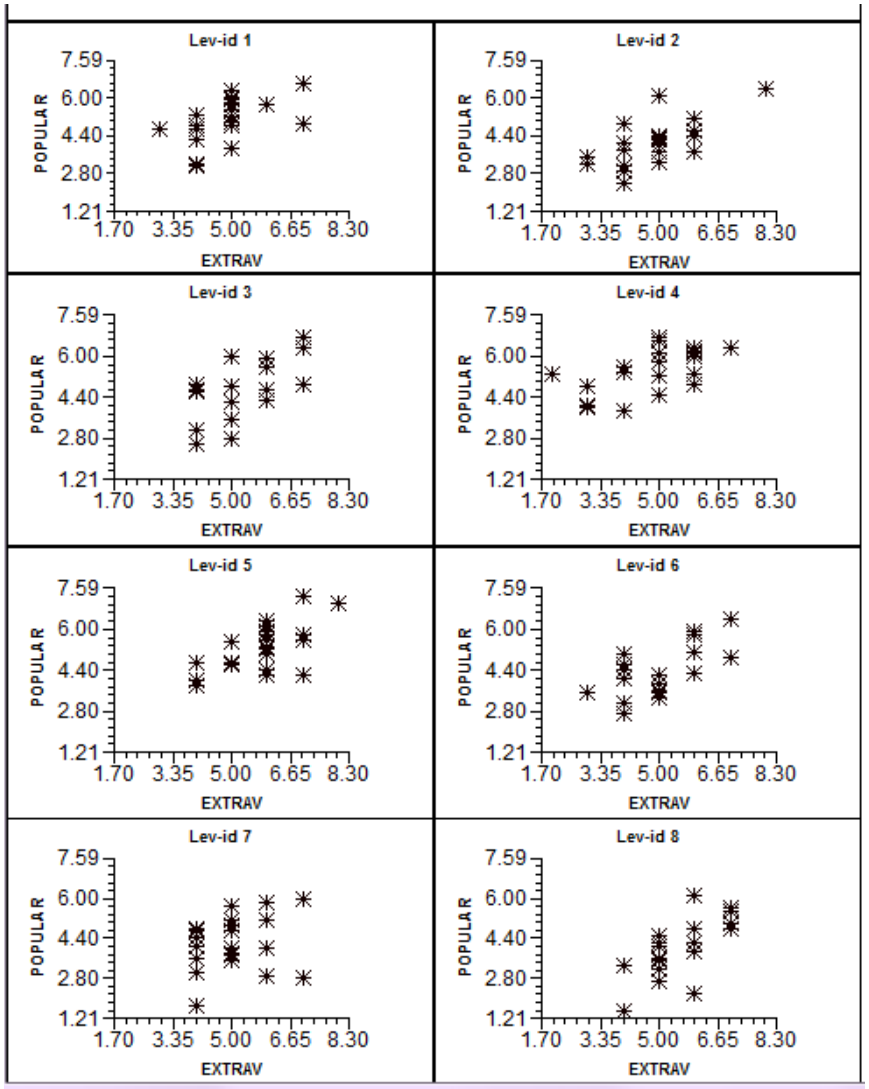
```
TITLE:  Random Effects ANOVA using Mplus;
DATA:
  FILE IS "popular2.dat";
VARIABLE:
NAMES ARE class pupil cons extrav sex texp popular
popteach zextrav zsex ztexp zpopular zpoptch;
usevariables are popular extrav;
CLUSTER IS class;
```

popular2 - Notepad

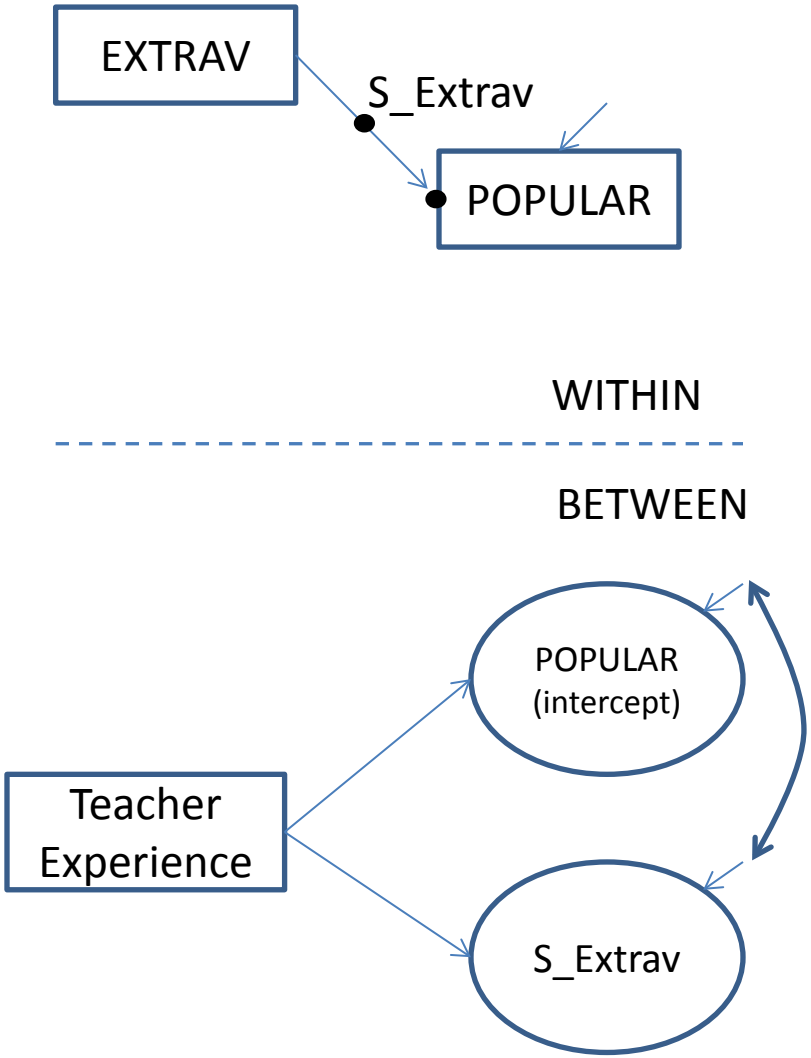
File Edit Format View Help

```
1 1 1 5 1 24 6.3 6 -.17031 .98881 1.48615 .88501 .66906
1 2 1 7 0 24 4.9 5 1.41401 -1.01081 1.48615 -.12763 -.04308
1 3 1 4 1 24 5.3 6 -.96248 .98881 1.48615 .1617 .66906
1 4 1 3 1 24 4.7 5 -1.75464 .98881 1.48615 -.27229 -.04308
1 5 1 5 1 24 6 6 -.17031 .98881 1.48615 .66802 .66906
1 6 1 4 0 24 4.7 5 -.96248 -1.01081 1.48615 -.27229 -.04308
1 7 1 5 0 24 5.9 5 -.17031 -1.01081 1.48615 .59569 -.04308
1 8 1 4 0 24 4.2 5 -.96248 -1.01081 1.48615 -.63395 -.04308
1 9 1 5 0 24 5.2 5 -.17031 -1.01081 1.48615 .08937 -.04308
1 10 1 5 0 24 3.9 3 -.17031 -1.01081 1.48615 -.85095 -1.46737
1 11 1 5 1 24 5.7 5 -.17031 .98881 1.48615 .45102 -.04308
1 12 1 5 1 24 4.8 5 -.17031 .98881 1.48615 -.19996 -.04308
1 13 1 5 0 24 5 5 -.17031 -1.01081 1.48615 -.0553 -.04308
1 14 1 5 1 24 5.5 6 -.17031 .98881 1.48615 .30636 .66906
1 15 1 5 1 24 6 5 -.17031 .98881 1.48615 .66802 -.04308
1 16 1 6 1 24 5.7 5 .62185 .98881 1.48615 .45102 -.04308
1 17 1 4 0 24 3.2 2 -.96248 -1.01081 1.48615 -1.35727 -2.17951
1 18 1 4 0 24 3.1 3 -.96248 -1.01081 1.48615 -1.4296 -1.46737
1 19 1 7 1 24 6.6 7 1.41401 .98881 1.48615 1.10201 1.3812
1 20 1 4 0 24 4.8 4 -.96248 -1.01081 1.48615 -.19996 -.75523
2 21 1 8 1 14 6.4 6 2.20617 .98881 -.04014 .95734 .66906
2 22 1 4 0 14 2.4 3 -.96248 -1.01081 -.04014 -1.93592 -1.46737
2 23 1 6 0 14 3.7 4 .62185 -1.01081 -.04014 -.99561 -.75523
2 24 1 5 1 14 4.4 4 -.17031 .98881 -.04014 -.48929 -.75523
2 25 1 5 1 14 4.3 4 -.17031 .98881 -.04014 -.56162 -.75523
2 26 1 5 0 14 4 4 -.17031 -1.01081 -.04014 -.77861 -.75523
2 27 1 4 1 14 3.8 5 -.96248 .98881 -.04014 -.92328 -.04308
2 28 1 5 0 14 4.2 5 -.17031 -1.01081 -.04014 -.63395 -.04308
```

Scatterplot of Extraversion by Popularity for Each Class



Intercepts and Slopes as Outcome Variables Model
Mplus Diagram



Example: Intercept Only Model

```
TITLE:  Random Effects ANOVA using Mplus;
DATA:
  FILE IS "popular2.dat";
VARIABLE:
NAMES ARE class pupil cons extrav sex texp popular
popteach zextrav zsex ztexp zpopular zpoptch;
usevariables are popular;
CLUSTER IS class;
ANALYSIS:
TYPE IS TWOLEVEL;
ESTIMATOR IS ML; !default is MLR
MODEL:
  %within%
  popular;
  %between%
  popular;
OUTPUT: SAMPSTAT;
```

Intercept Only Model

```
SUMMARY OF DATA

     Number of clusters                        100

     Average cluster size       20.000

     Estimated Intraclass Correlations for the Y Variables

                 Intraclass
     Variable    Correlation

     POPULAR       0.362
```

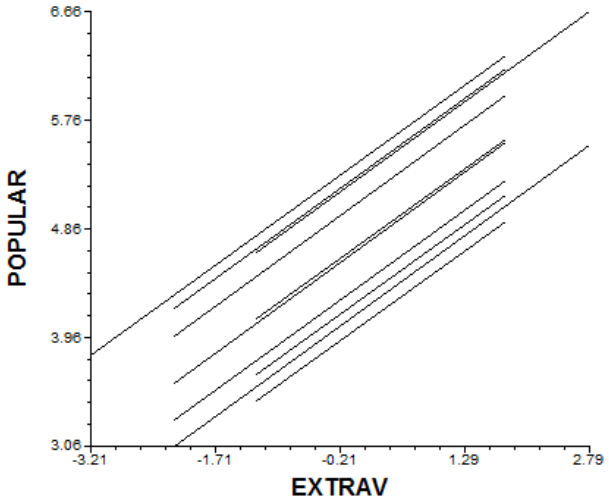
0.695/(0.695 + 1.222) = .362

```
MODEL RESULTS

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

Within Level

 Variances
    POPULAR          1.222       0.040     30.822       0.000

Between Level

 Means
    POPULAR          5.078       0.087     58.390       0.000

 Variances
    POPULAR          0.695       0.107      6.489       0.000
```

Level-1 Predictor Fixed

Note: in this model, we are estimating random variation in the intercepts but not in the slopes

```
TITLE:  Random Effects ANOVA using Mplus;
DATA:
  FILE IS "popular2.dat";
VARIABLE:
NAMES ARE class pupil cons extrav sex texp popular
popteach zextrav zsex ztexp zpopular zpoptch;
usevariables are popular extrav;
CLUSTER IS class;
within are extrav;
define:
center extrav (groupmean);
!centering = groupmean (extrav); use this statement instead of
!previous two lines in Mplus version 6 or earlier.
ANALYSIS:
TYPE IS TWOLEVEL;
ESTIMATOR IS ML; !default is MLR
MODEL:
  %within%
  popular on extrav;
  %between%
  popular;
OUTPUT: SAMPSTAT;
```

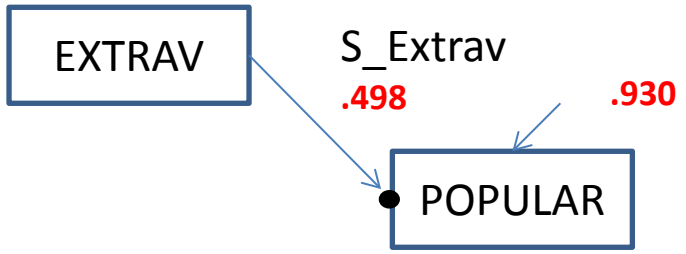


Level-1 Predictor Fixed

```
Number of Free Parameters                        4

Loglikelihood

          H0 Value                         -2904.238
          H1 Value                         -2904.238

Information Criteria

          Akaike (AIC)                      5816.476
          Bayesian (BIC)                    5838.880
          Sample-Size Adjusted BIC          5826.172
            (n* = (n + 2) / 24)
```

MODEL RESULTS

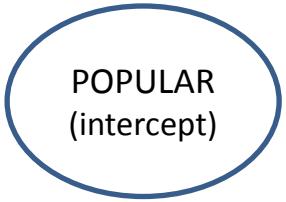
	Estimate	S.E.	Est./S.E.	Two-Tailed P-Value
Within Level				
POPULAR ON				
EXTRAV	0.498	0.020	24.430	0.000
Residual Variances				
POPULAR	0.930	0.030	30.822	0.000
Between Level				
Means				
POPULAR	5.078	0.087	58.378	0.000
Variances				
POPULAR	0.710	0.107	6.627	0.000



WITHIN

BETWEEN

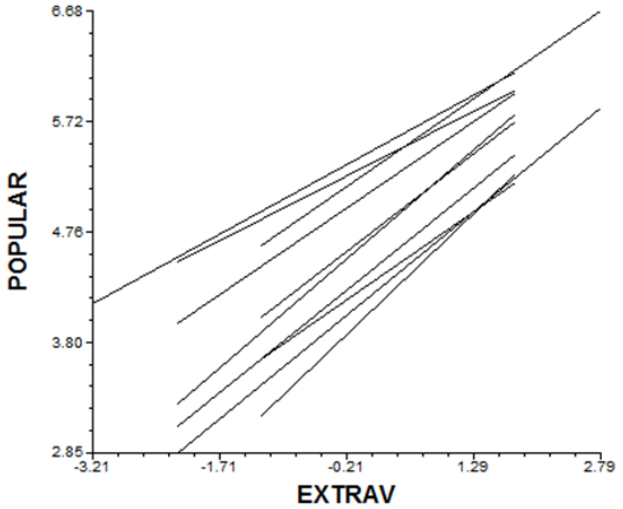
Mean = 5.078
Var = .710



Level-1 Predictor Random

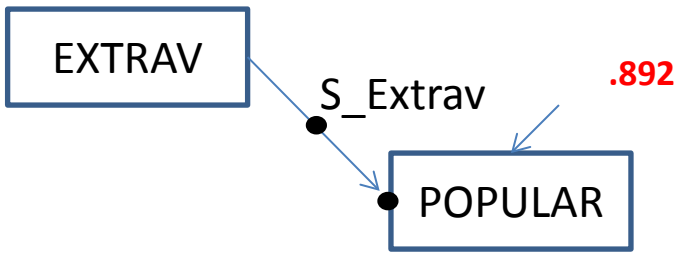
Note: in this model, we are estimating random variation in the intercepts and in the slopes (popularity regressed on extraversion)

```
TITLE:  Random Effects ANOVA using Mplus;
DATA:
  FILE IS "popular2.dat";
VARIABLE:
NAMES ARE class pupil cons extrav sex texp popular
popteach zextrav zsex ztexp zpopular zpoptch;
usevariables are popular extrav;
CLUSTER IS class;
within are extrav;
define:
center extrav (groupmean);
!centering = groupmean (extrav); use this statement instead of
!previous two lines in Mplus version 6 or earlier.
ANALYSIS:
TYPE IS TWOLEVEL RANDOM;
ESTIMATOR IS ML; !default is MLR
MODEL:
  %within%
  s_extrav|popular on extrav;
  %between%
  popular;
OUTPUT: SAMPSTAT;
```



Level-1 Predictor Random

```
Number of Free Parameters                       5

Loglikelihood

          H0 Value                       -2893.757

Information Criteria

          Akaike (AIC)                    5797.515
          Bayesian (BIC)                  5825.519
          Sample-Size Adjusted BIC        5809.634
            (n* = (n + 2) / 24)
```



WITHIN

BETWEEN

MODEL RESULTS

	Estimate	S.E.	Est./S.E.	Two-Tailed P-Value
Within Level				
Residual Variances				
POPULAR	0.892	0.030	30.018	0.000
Between Level				
Means				
POPULAR	5.078	0.087	58.389	0.000
S_EXTRAV	0.497	0.027	18.236	0.000
Variances				
POPULAR	0.711	0.107	6.648	0.000
S_EXTRAV	0.033	0.010	3.103	0.002

Mean =5.078
Var = 0.711

POPULAR (intercept)

Mean = 0.497
Var = .033

S_Extrav

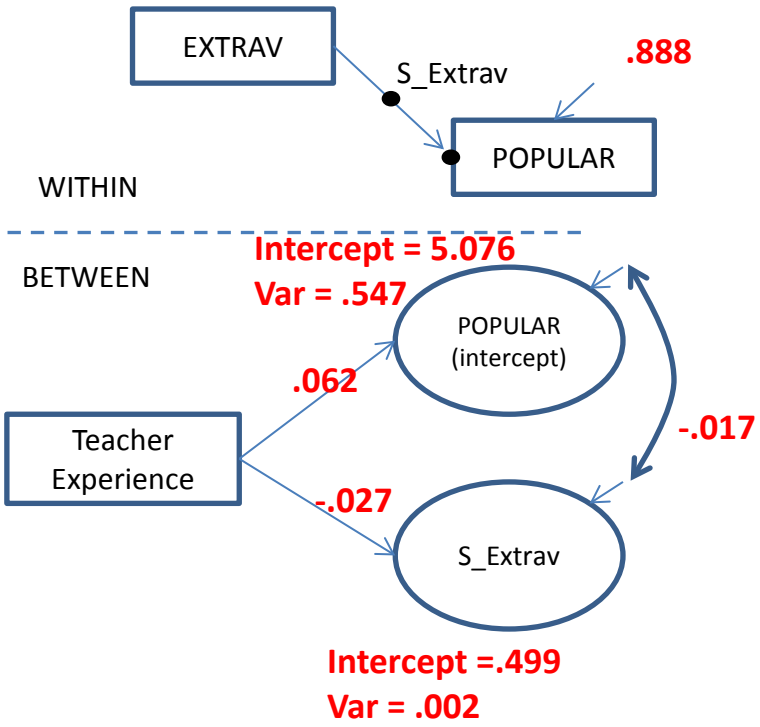
Adding a Level-2 Predictor

Note: in this model, we add a Level-2 predictor. We regress both the intercepts and the slopes on this predictor. (I also included a correlation between the intercept and slope residuals)

```
TITLE:  Random Effects ANOVA using Mplus;
DATA:
  FILE IS "popular2.dat";
VARIABLE:
NAMES ARE class pupil cons extrav sex texp popular
popteach zextrav zsex ztexp zpopular zpoptch;
usevariables are popular extrav texp;
CLUSTER IS class;
within are extrav;
between are texp;
define:
center extrav (groupmean);
!centering = groupmean (extrav); use this statement instead of
!previous two lines in Mplus version 6 or earlier.
center texp (grandmean);
ANALYSIS:
TYPE IS TWOLEVEL RANDOM;
ESTIMATOR IS ML; !default is MLR
MODEL:
  %within%
  s_extrav|popular on extrav;
  %between%
  popular on texp;
  s_extrav on texp;
  s_extrav with popular;
OUTPUT: SAMPSTAT;
```

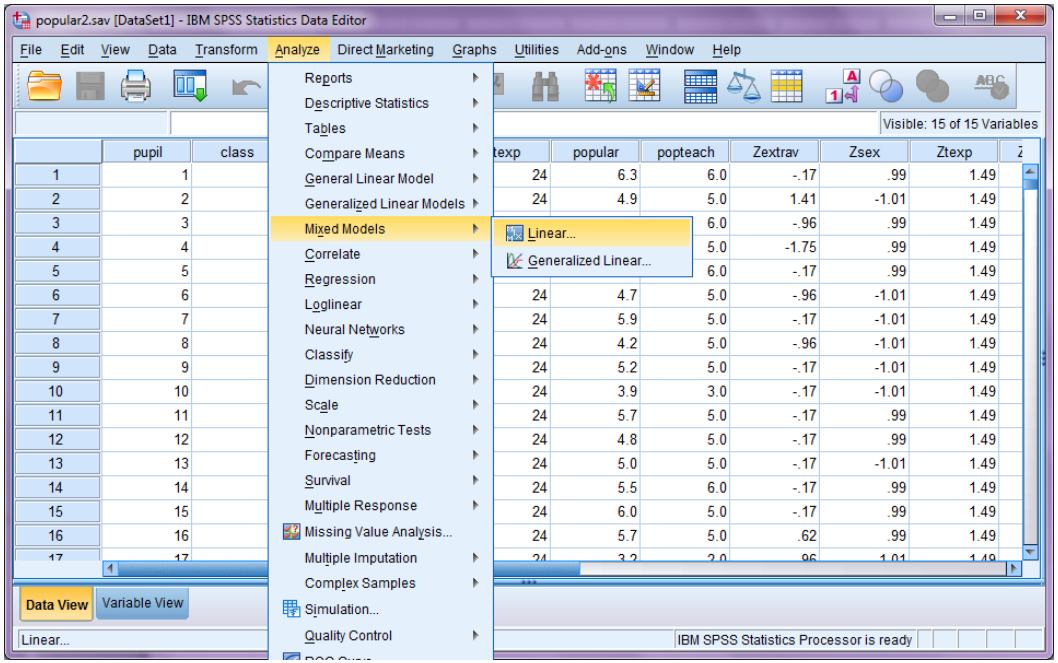
Adding a Level-2 Predictor

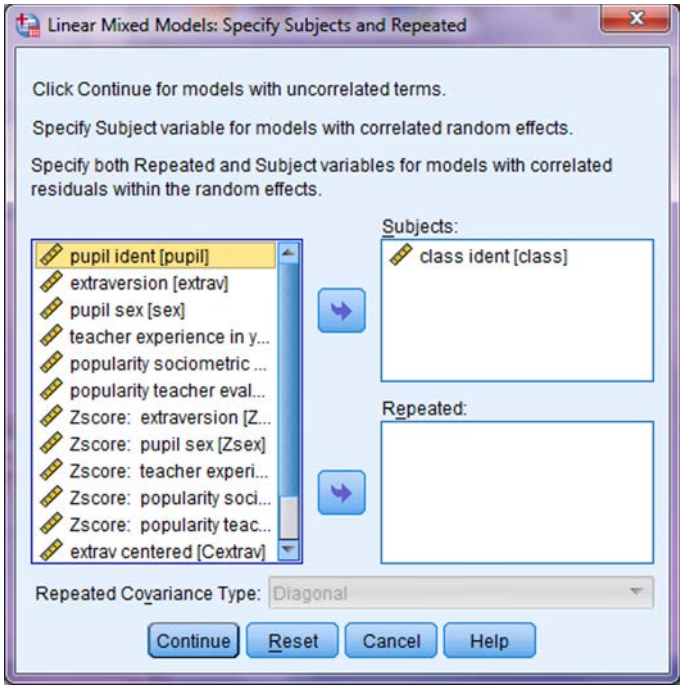
```
MODEL FIT INFORMATION

Number of Free Parameters                        8

Loglikelihood

          H0 Value                       -2849.735

Information Criteria

          Akaike (AIC)                    5715.471
          Bayesian (BIC)                  5760.278
          Sample-Size Adjusted BIC        5734.862
            (n* = (n + 2) / 24)
```

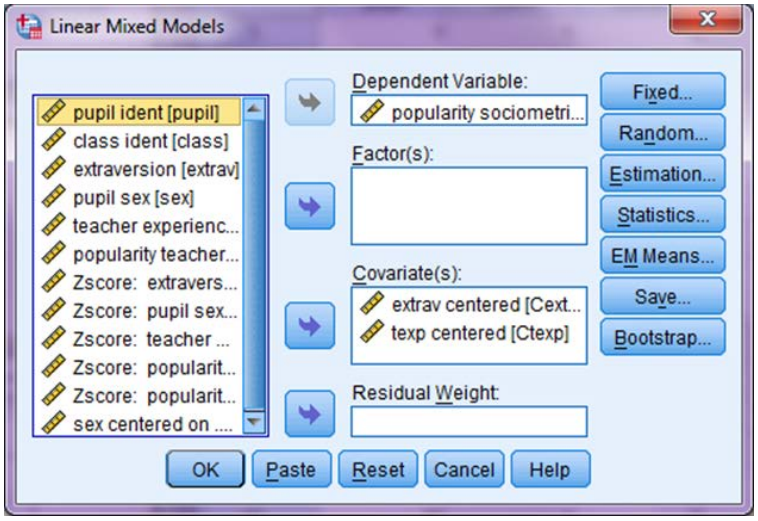



```
MODEL RESULTS

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

Within Level

 Residual Variances
    POPULAR          0.888      0.029     30.153      0.000

Between Level

 S_EXTRAV   ON
    TEXP            -0.027      0.003     -8.914      0.000

 POPULAR    ON
    TEXP             0.062      0.012      5.267      0.000

 S_EXTRAV WITH
    POPULAR         -0.017      0.017     -0.999      0.318

 Intercepts
    POPULAR          5.076      0.077     65.956      0.000
    S_EXTRAV         0.499      0.020     24.360      0.000

 Residual Variances
    POPULAR          0.547      0.084      6.535      0.000
    S_EXTRAV         0.002      0.007      0.289      0.773
```

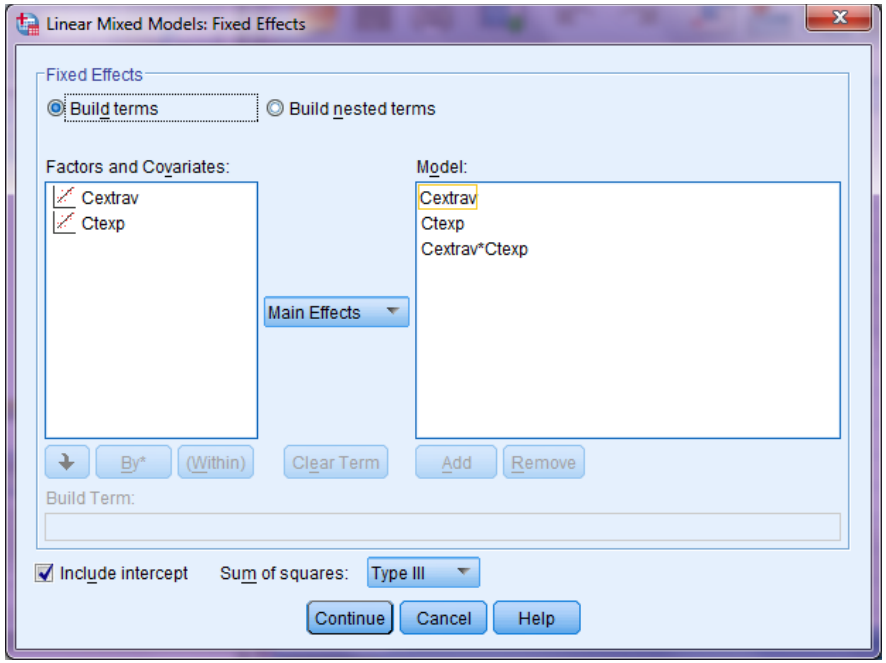
Replicating in SPSS Mixed Models

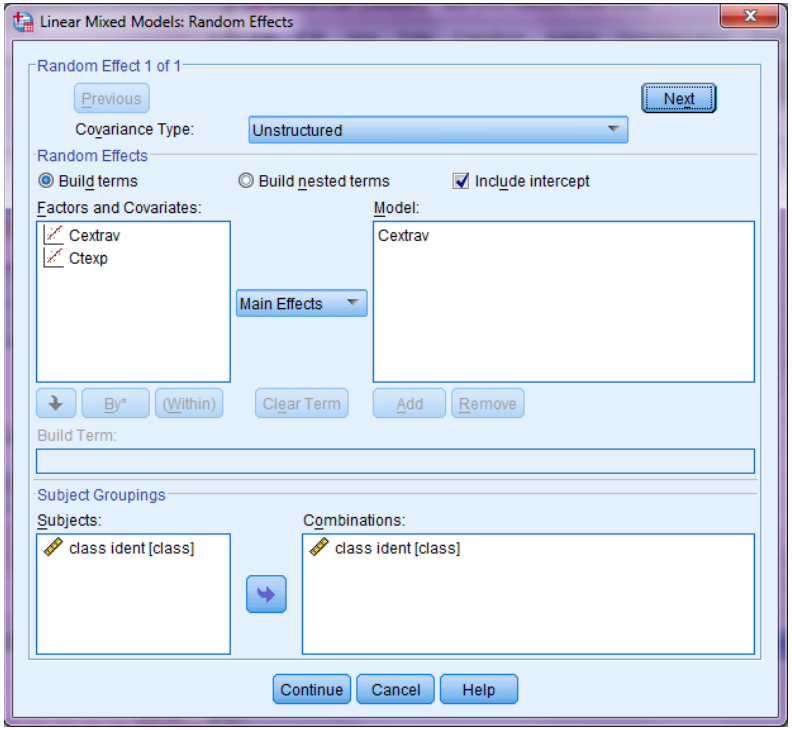






Previous Model in SPSS Mixed Models





Previous Model in SPSS Mixed Models

Note: model not exactly the same (level-1 predictor grand-mean centered instead of group-mean centered)

```
MIXED popular WITH Cextrav Ctexp
  /CRITERIA=CIN(95) MXITER(100) MXSTEP(10) SCORING(1) SINGULAR(0.000000000001) HCONVERGE(0, ABSOLUTE
LCONVERGE(0, ABSOLUTE) PCONVERGE(0.000001, ABSOLUTE)
  /FIXED=Cextrav Ctexp Cextrav*Ctexp | SSTYPE(3)
  /METHOD=ML
  /PRINT=SOLUTION TESTCOV
  /RANDOM=INTERCEPT Cextrav | SUBJECT(class) COVTYPE(UN).
```

Model Dimension[a]

		Number of Levels	Covariance Structure	Number of Parameters	Subject Variables
Fixed Effects	Intercept	1		1	
	Cextrav	1		1	
	Ctexp	1		1	
	Cextrav * Ctexp	1		1	
Random Effects	Intercept + Cextrav[b]	2	Unstructured	3	class
Residual				1	
Total		6		8	

a. Dependent Variable: popular popularity sociometric score.

b. As of version 11.5, the syntax rules for the RANDOM subcommand have changed. Your command syntax may yield results that differ from those produced by prior versions. If you are using version 11 syntax, please consult the current syntax reference guide for more information.

Information Criteria[a]

-2 Log Likelihood	5667.925
Akaike's Information Criterion (AIC)	5683.925
Hurvich and Tsai's Criterion (AICC)	5683.997
Bozdogan's Criterion (CAIC)	5736.732
Schwarz's Bayesian Criterion (BIC)	5728.732

The information criteria are displayed in smaller-is-better forms.

a. Dependent Variable: popular popularity sociometric score.

Previous Model in SPSS Mixed Models

Fixed Effects

Type III Tests of Fixed Effects[a]

Source	Numerator df	Denominator df	F	Sig.
Intercept	1	103.056	5611.552	.000
Cextrav	1	1981.068	637.815	.000
Ctexp	1	105.672	113.751	.000
Cextrav * Ctexp	1	1787.297	91.701	.000

a. Dependent Variable: popular popularity sociometric score.

Estimates of Fixed Effects[a]

Parameter	Estimate	Std. Error	df	t	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Intercept	4.986636	.066568	103.056	74.910	.000	4.854614	5.118657
Cextrav	.499467	.019777	1981.068	25.255	.000	.460681	.538253
Ctexp	.108705	.010192	105.672	10.665	.000	.088497	.128913
Cextrav * Ctexp	-.027452	.002867	1787.297	-9.576	.000	-.033074	-.021829

a. Dependent Variable: popular popularity sociometric score.

Covariance Parameters

Estimates of Covariance Parameters[a]

Parameter		Estimate	Std. Error	Wald Z	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Residual		.887014	.028723	30.882	.000	.832467	.945134
Intercept + Cextrav [subject = class]	UN (1,1)	.389512	.061633	6.320	.000	.285650	.531139
	UN (2,1)	-.012524	.013061	-.959	.338	-.038123	.013075
	UN (2,2)	.000403[b]	.000000	.	.	.	.

a. Dependent Variable: popular popularity sociometric score.

b. This covariance parameter is redundant. The test statistic and confidence interval cannot be computed.

Exact Same Model in Mplus (all predictors grand-mean centered)

MODEL FIT INFORMATION

Number of Free Parameters	8
Loglikelihood	
H0 Value	-2834.152
Information Criteria	
Akaike (AIC)	5684.304
Bayesian (BIC)	5729.112
Sample-Size Adjusted BIC (n* = (n + 2) / 24)	5703.695

MODEL RESULTS

	Estimate	S.E.	Est./S.E.	Two-Tailed P-Value
Within Level				
Residual Variances				
POPULAR	0.888	0.029	30.210	0.000
Between Level				
S_EXTRAV ON				
TEXP	-0.028	0.003	-9.348	0.000
POPULAR ON				
TEXP	0.109	0.010	10.662	0.000
POPULAR WITH				
S_EXTRAV	-0.011	0.014	-0.814	0.416
Intercepts				
POPULAR	4.986	0.067	74.919	0.000
S_EXTRAV	0.499	0.020	24.714	0.000
Residual Variances				
POPULAR	0.389	0.062	6.281	0.000
S_EXTRAV	0.002	0.007	0.262	0.793

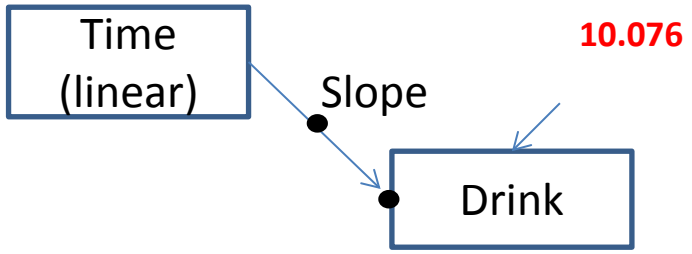
Measures within Persons

```
Title: PSY9555 Regression examples;
!note that two outliers of 0 were removed in average;
data: File is sem_mplus2.dat;
    Format is 1F4, 1F1, 1F2, 23F8.2, 1F11.3, 72F8.2;
data widetolong:
wide = drink1 drink2 drink3 drink4;
long = drink;
idvariable = person;
repetition = time;
variable: names are studid gender age
bppa bpv bpa bph bptot
sq1 sq2 sq3 sq4 sq5 sq6 sq7 sq8 sq9 sq10 sq11 sq12 sq13 sq14 sq15
es es_pt es_fin grade
drink1 drink2 drink3 drink4 epis1 epis2 epis3 epis4
stress1 stress2 stress3 stress4 pleased1 pleased2 pleased3 pleased4
enjoyc1 enjoyc2 enjoyc3 enjoyc4 enjoyu1 enjoyu2 enjoyu3 enjoyu4
effort1 effort2 effort3 effort4 harm1 harm2 harm3 harm4 dep1 dep2 dep3 dep4
drink1b drink2b drink3b drink4b epis1b epis2b epis3b epis4b
stress1b stress2b stress3b stress4b please1b please2b please3b please4b
enjoyc1b enjoyc2b enjoyc3b enjoyc4b enjoyu1b enjoyu2b enjoyu3b enjoyu4b
effort1b effort2b effort3b effort4b harm1b harm2b harm3b harm4b
dep1b dep2b dep3b dep4b;
missing = blank;
usevariables are drink person time;
cluster = person;
within = time;
analysis:
type = twolevel random;
model:
%within%
s | drink on time;
%between%
s with drink;
output: sampstat tech1;
```

When your data file is structured in the conventional one line per subject with repeated measures on the same line

Measures within Persons

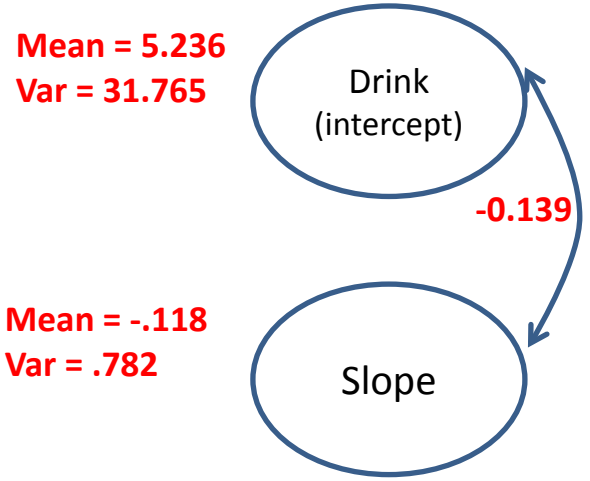
```
Loglikelihood

          H0 Value                          -4756.126
          H0 Scaling Correction Factor          3.5791
            for MLR

Information Criteria

          Akaike (AIC)                       9524.253
          Bayesian (BIC)                     9556.568
          Sample-Size Adjusted BIC           9537.507
            (n* = (n + 2) / 24)
```




```
MODEL RESULTS

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

Within Level

 Residual Variances
    DRINK            10.076      1.428      7.056      0.000

Between Level

 S        WITH
    DRINK            -0.139      1.168     -0.119      0.905

 Means
    DRINK             5.236      0.306     17.090      0.000
    S                -0.118      0.085     -1.396      0.163

 Variances
    DRINK            31.765      4.088      7.769      0.000
    S                 0.782      0.478      1.636      0.102
```

WITHIN

BETWEEN



Measures within Persons (Previous Model specified as LGM)

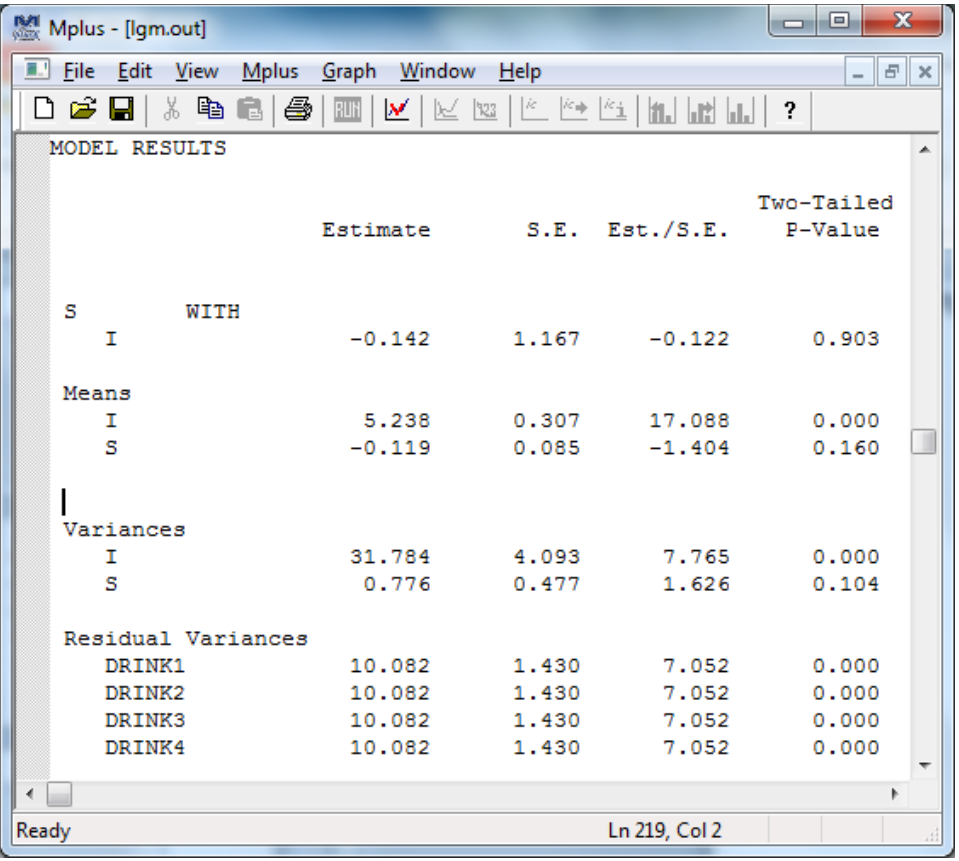
```
Title: PSY9555 Regression examples;
!note that two outliers of 0 were removed in average;
data: File is sem_mplus2.dat;
    Format is 1F4, 1F1, 1F2, 23F8.2, 1F11.3, 72F8.2;
!LISTWISE = ON;
variable: names are studid gender age
bppa bpv bpa bph bptot
sq1 sq2 sq3 sq4 sq5 sq6 sq7 sq8 sq9 sq10 sq11 sq12 sq13 sq14 sq15
es es_pt es_fin grade
drink1 drink2 drink3 drink4 epis1 epis2 epis3 epis4
stress1 stress2 stress3 stress4 pleased1 pleased2 pleased3 pleased4
enjoyc1 enjoyc2 enjoyc3 enjoyc4 enjoyu1 enjoyu2 enjoyu3 enjoyu4
effort1 effort2 effort3 effort4 harm1 harm2 harm3 harm4 dep1 dep2 dep3 dep4
drink1b drink2b drink3b drink4b epis1b epis2b epis3b epis4b
stress1b stress2b stress3b stress4b please1b please2b please3b please4b
enjoyc1b enjoyc2b enjoyc3b enjoyc4b enjoyu1b enjoyu2b enjoyu3b enjoyu4b
effort1b effort2b effort3b effort4b harm1b harm2b harm3b harm4b
dep1b dep2b dep3b dep4b;
missing = blank;
usevariables are drink1 drink2 drink3 drink4;
analysis:
type = general;
estimator = mlr;
model:
I S | drink1@0 drink2@1 drink3@2 drink4@3;
drink1-drink4 (1);
plot:
type is plot3;
series = drink1 (0) drink2 (1) drink3 (2) drink4 (3);
output: sampstat residual stdyx tech4 modindices;
```

Back to the conventional data structure specification

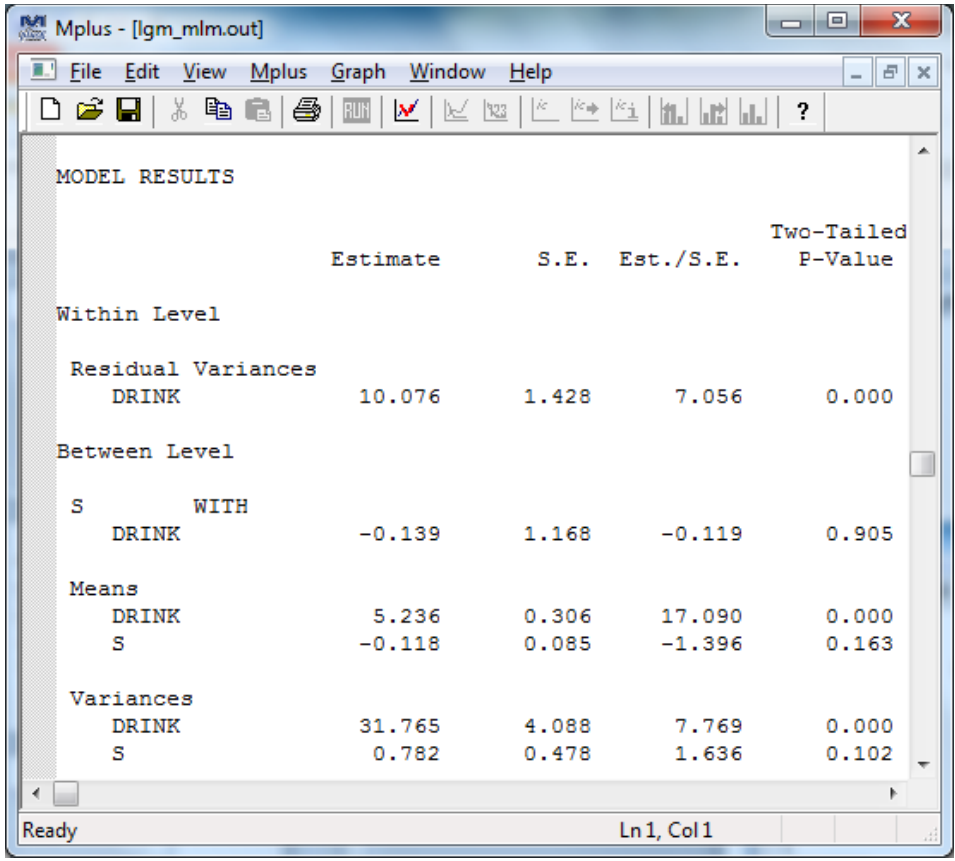
IN LGM these residuals are usually not constrained to equality but they are in MLM. I constrained them here.

Example: Measures within Persons (LGM and MLM)

LGM



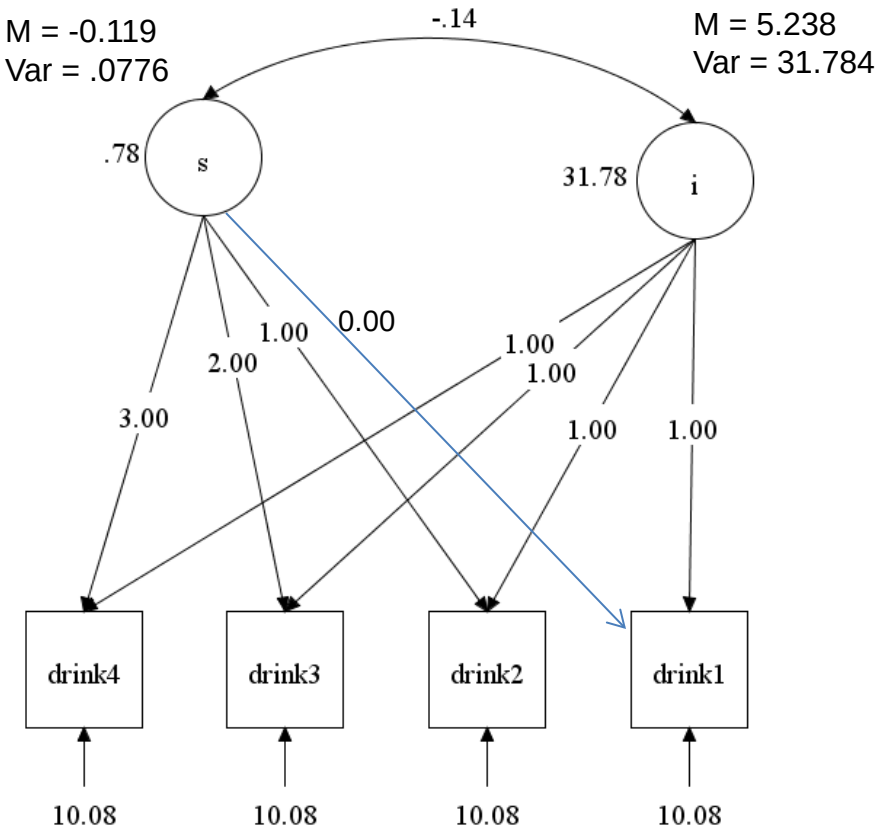
MLM



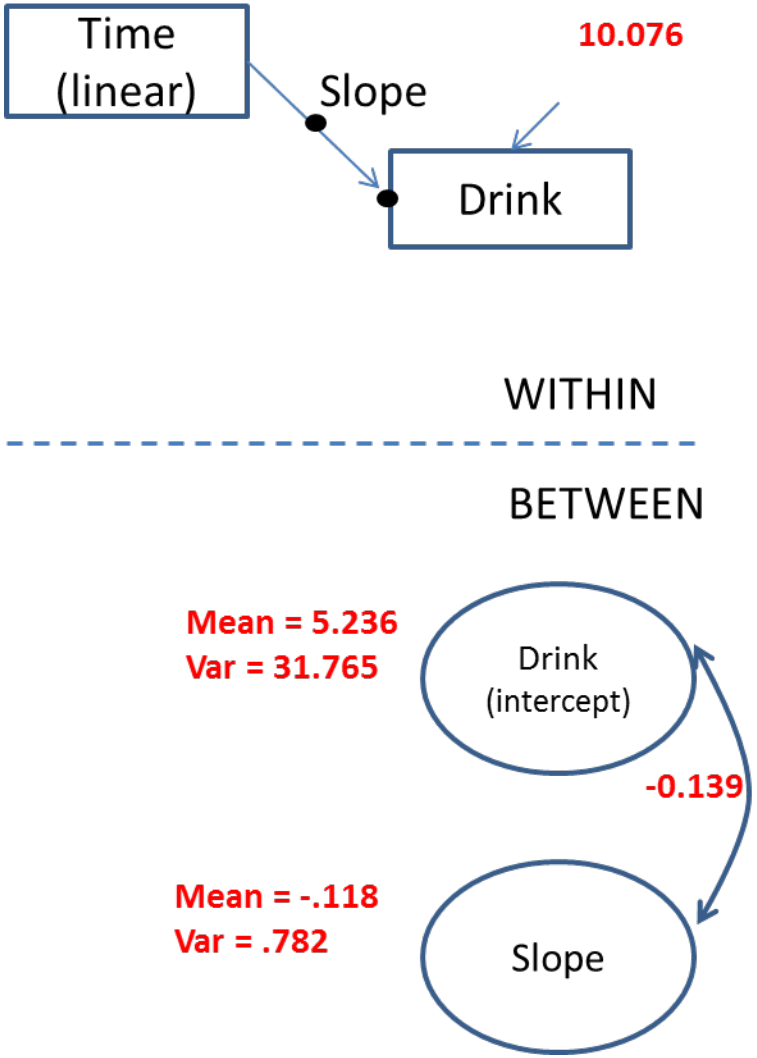
Same as in slide 13

Example: Measures within Persons (LGM and MLM)

LGM



MLM



Example: Measures within Persons (LGM and MLM)

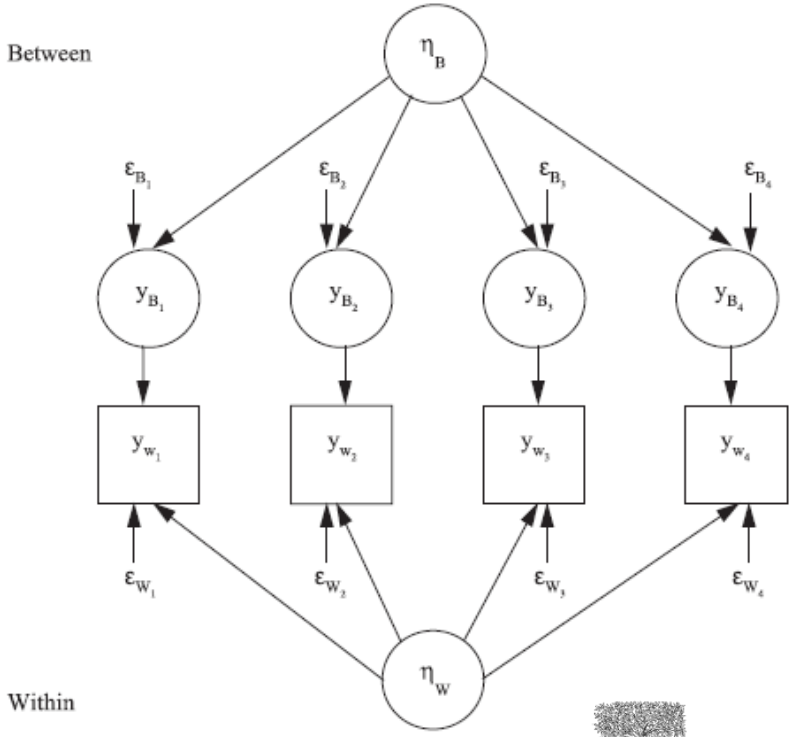
LGM

```
MODEL FIT INFORMATION

Number of Free Parameters                       6

Loglikelihood

          H0 Value                       -4756.126
          H0 Scaling Correction Factor       3.5794
            for MLR
          H1 Value                       -4731.180
          H1 Scaling Correction Factor       3.6974
            for MLR

Information Criteria

          Akaike (AIC)                    9524.252
          Bayesian (BIC)                  9548.407
          Sample-Size Adjusted BIC        9529.368
            (n* = (n + 2) / 24)

Chi-Square Test of Model Fit

          Value                             13.178*
          Degrees of Freedom                    8
          P-Value                           0.1059
          Scaling Correction Factor         3.7860
            for MLR
```

MLM

```
MODEL FIT INFORMATION

Number of Free Parameters                       6

Loglikelihood

          H0 Value                       -4756.126
          H0 Scaling Correction Factor       3.5791
            for MLR

Information Criteria

          Akaike (AIC)                    9524.253
          Bayesian (BIC)                  9556.568
          Sample-Size Adjusted BIC        9537.507
            (n* = (n + 2) / 24)
```

Multilevel CFA



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The Leadership Quarterly

Applying multilevel confirmatory factor analysis techniques to the study of leadership

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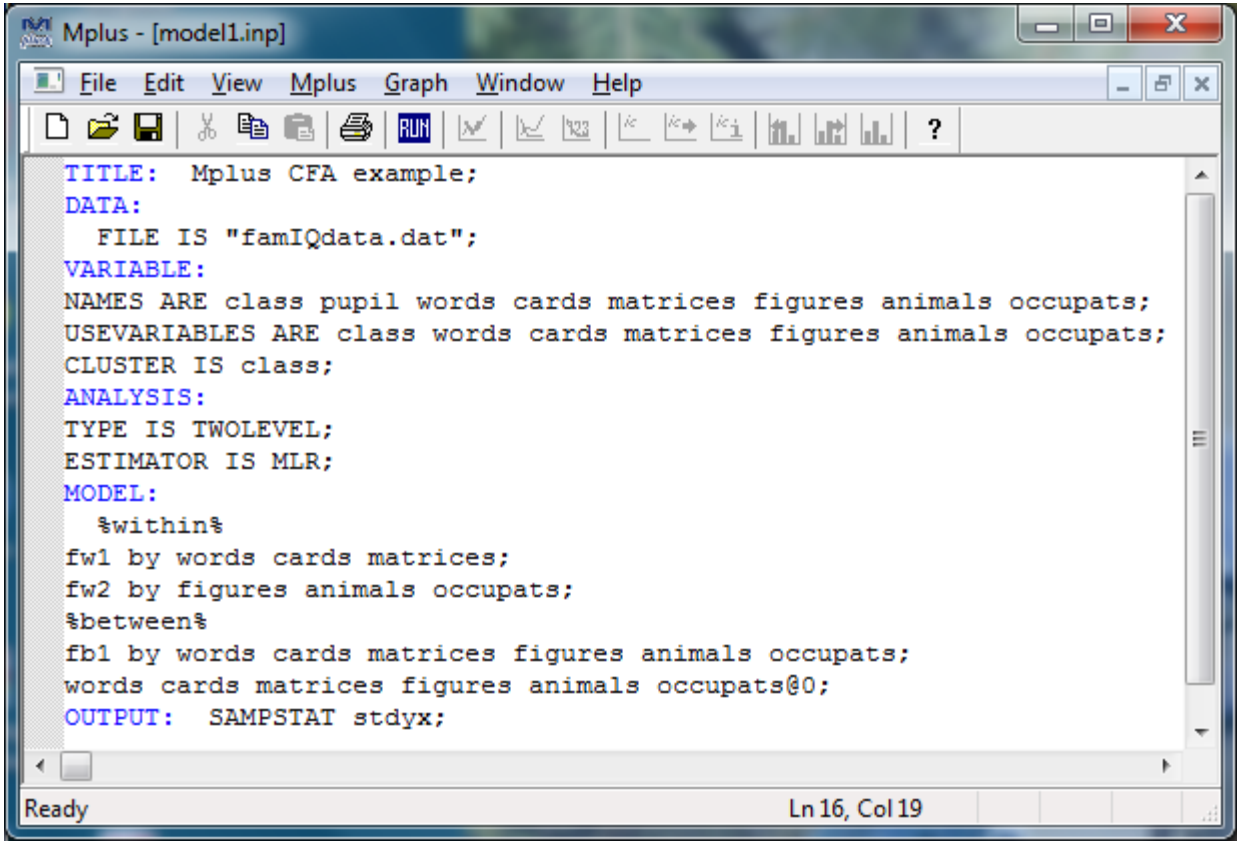
Multilevel CFA (data from Joop Hox, 2010)



Multilevel CFA (data from Joop Hox, 2010)

Mplus - [model1.out]

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```
SUMMARY OF ANALYSIS

Number of groups                                                 1
Number of observations                                         399

Number of dependent variables                                    6
Number of independent variables                                  0
Number of continuous latent variables                            3

   Number of clusters                         60

   Average cluster size        6.650

   Estimated Intraclass Correlations for the Y Variables

              Intraclass              Intraclass              Intraclass
   Variable  Correlation   Variable  Correlation   Variable  Correlation

   WORDS         0.399       CARDS         0.408       MATRICES      0.368
   FIGURES       0.379       ANIMALS       0.421       OCCUPATS      0.508
```

Ready Ln 43, Col 1

Mplus - [model1.out]

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```
   ESTIMATED SAMPLE STATISTICS FOR WITHIN

          Correlations
             WORDS         CARDS         MATRICES      FIGURES       ANIMALS
             _____         _____         _____         _____         _____
WORDS          1.000
CARDS          0.628         1.000
MATRICES       0.601         0.623         1.000
FIGURES        0.230         0.184         0.180         1.000
ANIMALS        0.299         0.295         0.242         0.627         1.000
OCCUPATS       0.242         0.243         0.194         0.596         0.626


   ESTIMATED SAMPLE STATISTICS FOR BETWEEN


          Correlations
             WORDS         CARDS         MATRICES      FIGURES       ANIMALS
             _____         _____         _____         _____         _____
WORDS          1.000
CARDS          0.873         1.000
MATRICES       0.862         0.815         1.000
FIGURES        0.810         0.832         0.820         1.000
ANIMALS        0.882         0.920         0.802         0.857         1.000
OCCUPATS       0.864         0.873         0.819         0.836         0.913
```

Ready Ln 72, Col 1

Multilevel CFA (data from Joop Hox, 2010)

Mplus - [model1.out]

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	Estimate	S.E.	Est./S.E.	Two-Tailed P-Value
Within Level				
FW1 BY				
WORDS	1.000	0.000	999.000	999.000
CARDS	0.991	0.075	13.236	0.000
MATRICES	0.959	0.081	11.773	0.000
FW2 BY				
FIGURES	1.000	0.000	999.000	999.000
ANIMALS	1.035	0.066	15.708	0.000
OCCUPATS	0.880	0.054	16.403	0.000
FW2 WITH				
FW1	3.806	0.877	4.338	0.000
Variances				
FW1	10.357	1.943	5.330	0.000
FW2	9.583	1.344	7.128	0.000
Residual Variances				
WORDS	6.181	0.782	7.909	0.000
CARDS	5.382	0.647	8.323	0.000
MATRICES	6.415	0.786	8.159	0.000
FIGURES	6.816	0.785	8.684	0.000
ANIMALS	4.704	0.631	7.450	0.000
OCCUPATS	5.908	0.759	7.788	0.000

Ready Ln 72, Col 1

Mplus - [model1.out]

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Between Level				
FB1 BY				
WORDS	1.000	0.000	999.000	999.000
CARDS	0.994	0.095	10.427	0.000
MATRICES	0.864	0.093	9.312	0.000
FIGURES	0.924	0.114	8.095	0.000
ANIMALS	1.049	0.112	9.336	0.000
OCCUPATS	1.211	0.140	8.661	0.000
Intercepts				
WORDS	29.874	0.472	63.227	0.000
CARDS	29.876	0.466	64.071	0.000
MATRICES	29.735	0.441	67.478	0.000
FIGURES	30.037	0.460	65.315	0.000
ANIMALS	30.138	0.472	63.879	0.000
OCCUPATS	29.980	0.508	58.968	0.000
Variances				
FB1	8.928	2.333	3.827	0.000
Residual Variances				
WORDS	1.334	0.514	2.597	0.009
CARDS	1.467	0.575	2.554	0.011
MATRICES	1.956	0.609	3.212	0.001
FIGURES	2.453	0.619	3.962	0.000
ANIMALS	1.273	0.636	2.000	0.045
OCCUPATS	0.000	0.000	999.000	999.000

Ready Ln 72, Col 1