

ECLS Examples Code

output close \*.

get file='c:\jason\spsswin\mlrclass\ecls2011 missing.sav'.

descriptives vars=all.

MIXED reading with perskills

/METHOD = REML

/PRINT = SOLUTION TESTCOV

/FIXED = | SSTYPE(3)

/RANDOM = INTERCEPT | SUBJECT(schoolid) COVTYPE(UN).

**Descriptive Statistics**

	N	Minimum	Maximum	Mean	Std. Deviation
schoolid	2988	1006	1993	1513.14	281.061
reading X5 READING IRT SCALE SCORE-K2 DATA FILE	2945	49	116	89.70	13.055
lang X6 HOME LANGUAGE OF CHILD	2542	0	1	.27	.444
intprob X5 TEACHER REPORT INTERN PROB BEHAVIORS	2748	1	4	1.45	.473
perskills X5 TEACHER REPORT INTERPERSONAL	2646	1	4	3.16	.608
bmi X5 CHILD COMPOSITE BMI	2942	8	39	17.56	3.372
percmeal X6 PCT FREE RED MEAL ELIG STUDENTS (IMP)	2938	1	4	2.70	1.243
percmin X6 PERCENT NONWHITE STUDENTS IN SCHOOL	2937	1	4	2.72	1.227
schsize X6 TOTAL SCHOOL ENROLLMENT	2937	1	5	3.73	1.012
Valid N (listwise)	2177				

### Model Dimension<sup>a</sup>

		Number of Levels	Covariance Structure	Number of Parameters	Subject Variables
Fixed Effects	Intercept	1		1	
Random Effects	Intercept	1	Identity	1	schoolid
Residual				1	
Total		2		3	

a. Dependent Variable: reading X5 READING IRT SCALE SCORE-K2 DATA FILE.

### Information Criteria<sup>a</sup>

-2 Restricted Log Likelihood	20647.928146	68
Akaike's Information Criterion (AIC)	20651.928146	68
Hurvich and Tsai's Criterion (AICC)	20651.932723	34
Bozdogan's Criterion (CAIC)	20665.673819	03
Schwarz's Bayesian Criterion (BIC)	20663.673819	03

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

a. Dependent Variable: reading X5 READING IRT SCALE SCORE-K2 DATA FILE.

### Coefficients of Determination

Pseudo-R Square	Marginal	.000
Measures	Conditional	.193

### Intraclass Correlation Coefficients

Overall ICCs Adjusted	.193
Conditional	.193

### Type III Tests of Fixed Effects<sup>a</sup>

Source	Numerator df	Denominator df	F	Sig.
Intercept	1	227.462	40000.079	<.001

a. Dependent Variable: reading X5 READING IRT SCALE SCORE-K2 DATA FILE.

### Estimates of Fixed Effects<sup>a</sup>

Parameter	Estimate	Std. Error	df	t	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Intercept	89.845	.449	227.462	200.000	<.001	88.960	90.730

a. Dependent Variable: reading X5 READING IRT SCALE SCORE-K2 DATA FILE.

### Estimates of Covariance Parameters<sup>a</sup>

Parameter	Estimate	Std. Error	Wald Z	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Residual	136.253	3.934	34.639	<.001	128.757	144.185
Intercept [subject = schoolid]	Variance 32.608	4.301	7.582	<.001	25.180	42.227

a. Dependent Variable: reading X5 READING IRT SCALE SCORE-K2 DATA FILE.

### System Settings

Keyword	Description	Setting
LOCALE	country and character set	en_US.windows-1252 (en_US)

```

>
> library(lessR)
> mydata = Read("c:/jason/spsswin/mlrclass/ec1s2011.sav", quiet=TRUE)
[with read_spss() from the haven package]

```

Variable and Variable Label --> See vignette("Read"), SPSS section

```

-----
reading, X5 READING IRT SCALE SCORE-K2 DATA FILE
reading_f, X5 READING IRT SCALE SCORE-K2 DATA FILE
lang, X6 HOME LANGUAGE OF CHILD
lang_f, X6 HOME LANGUAGE OF CHILD
intprob, X5 TEACHER REPORT INTERN PROB BEHAVIORS
intprob_f, X5 TEACHER REPORT INTERN PROB BEHAVIORS
perskills, X5 TEACHER REPORT INTERPERSONAL
perskills_f, X5 TEACHER REPORT INTERPERSONAL
bmi, X5 CHILD COMPOSITE BMI
bmi_f, X5 CHILD COMPOSITE BMI
percmeal, X6 PCT FREE RED MEAL ELIG STUDENTS (IMP)
percmeal_f, X6 PCT FREE RED MEAL ELIG STUDENTS (IMP)
percmin, X6 PERCENT NONWHITE STUDENTS IN SCHOOL
percmin_f, X6 PERCENT NONWHITE STUDENTS IN SCHOOL
schsize, X6 TOTAL SCHOOL ENROLLMENT
schsize_f, X6 TOTAL SCHOOL ENROLLMENT

```

```

>
> library(psych)
> describe(mydata)

```

	vars	n	mean	sd	median	trimmed	mad	min	max	range	skew	kurt
CHILDIR*	1	2177	1089.00	628.59	1089.00	1089.00	806.53	1.00	2177.00	2176.00	0.00	0.00
schoolid	2	2177	1511.89	279.43	1512.00	1515.67	327.65	1006.00	1993.00	987.00	-0.06	0.00
reading	3	2177	90.58	13.04	92.32	91.42	12.23	49.98	116.38	66.40	-0.58	0.00
reading_f*	4	2177	1022.31	569.97	1041.00	1025.93	713.13	2.00	2007.00	2005.00	-0.05	0.00
lang	5	2177	0.25	0.43	0.00	0.19	0.00	0.00	1.00	1.00	1.13	0.00
lang_f*	6	2177	1.25	0.43	1.00	1.19	0.00	1.00	2.00	1.00	1.13	0.00
intprob	7	2177	1.45	0.47	1.25	1.38	0.37	1.00	4.00	3.00	1.46	0.00
intprob_f*	8	2177	4.56	2.86	3.00	4.16	1.48	2.00	19.00	17.00	1.38	0.00
perskills	9	2177	3.17	0.60	3.20	3.21	0.59	1.20	4.00	2.80	-0.46	0.00
perskills_f*	10	2177	17.43	4.87	17.00	17.76	5.93	2.00	24.00	22.00	-0.43	0.00
bmi	11	2177	17.56	3.39	16.60	17.09	2.33	7.81	38.54	30.73	1.53	0.00
bmi_f*	12	2177	388.37	226.57	339.00	371.63	220.91	2.00	932.00	930.00	0.59	0.00
percmeal	13	2177	2.59	1.25	3.00	2.62	1.48	1.00	4.00	3.00	-0.14	0.00
percmeal_f*	14	2177	6.59	1.25	7.00	6.62	1.48	5.00	8.00	3.00	-0.14	0.00
percmin	15	2177	2.60	1.23	3.00	2.62	1.48	1.00	4.00	3.00	-0.08	0.00
percmin_f*	16	2177	6.60	1.23	7.00	6.62	1.48	5.00	8.00	3.00	-0.08	0.00
schsize	17	2177	3.66	1.03	4.00	3.73	1.48	1.00	5.00	4.00	-0.45	0.00
schsize_f*	18	2177	5.66	1.03	6.00	5.73	1.48	3.00	7.00	4.00	-0.45	0.00

```

>
> #install nlme package upon first use on a computer
> #install.packages("nlme")
> library(nlme)
>
> #random effects ANOVA model
> model <- lme(reading ~ perskills, random = ~ 1|schoolid, data = mydata, method="REML")
> summary(model)

```

```

Linear mixed-effects model fit by REML
Data: mydata
      AIC      BIC    logLik
17027.93 17050.67 -8509.965

```

```

Random effects:
Formula: ~1 | schoolid

```

```

(Intercept) Residual
StdDev:      5.862184 11.32951

Fixed effects:  reading ~ perskills
              Value Std.Error   DF  t-value p-value
(Intercept)  74.61377  1.4586501 1942  51.15262    0
perskills    4.91590  0.4352676 1942  11.29397    0
Correlation:
(Intr)
perskills -0.946

Standardized within-Group Residuals:
      Min      Q1      Med      Q3      Max
-3.2991051 -0.6025662  0.1135635  0.7033500  2.7938211

```

```

Number of Observations: 2177
Number of Groups: 234

```

```

> #nlme provides standard deviations of the random effects by default, use VarCorr to obtain
> VarCorr(model)

```

```

schoolid = pdLogChol(1)
              Variance StdDev
(Intercept)  34.3652  5.862184
Residual    128.3579 11.329514

```

```

> #obtain confidence intervals for fixed and random effects (in SD units), similar to SPSS via
> intervals(model)

```

```

Approximate 95% confidence intervals

```

```

Fixed effects:
      lower      est.      upper
(Intercept) 71.753089 74.613774 77.474458
perskills    4.062261 4.915901  5.769542

```

```

Random Effects:
Level: schoolid
      lower      est.      upper
sd((Intercept)) 5.113883 5.862184 6.719982

```

```

within-group standard error:
      lower      est.      upper
10.97918 11.32951 11.69103

```

```

> #specify one-tailed as recommended by Snijders and Bosker, ignore values for fixed effects
> intervals(model,.90)

```

```

Approximate 90% confidence intervals

```

```

Fixed effects:
      lower      est.      upper
(Intercept) 72.213363 74.613774 77.014185
perskills    4.199608 4.915901  5.632195

```

```

Random Effects:
Level: schoolid
      lower      est.      upper
sd((Intercept)) 5.227404 5.862184 6.574048

```

```

within-group standard error:
      lower      est.      upper
11.03476 11.32951 11.63214

```

```

>

```

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**Module:** HLM2.EXE (8.0.2010.18)  
**Date:** 11 April 2024, Thursday  
**Time:** 12:10:42  
**License:** HLM Standard  
Master Key: 80256933-c63b-434d-b7f2-  
00b6b9394866  
Installation Key: 8edcceed-9ab5-4502-9b55-  
d2b3da2e547a  
Expiration: 4/4/2025 12:37:01 PM

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## Specifications for this HLM2 run

Problem Title: no title

The data source for this run = C:\Jason\HLM\mlrclass\ecls2011.mdm

The command file for this run = C:\Users\nwsomj\AppData\Local\Temp\whlmtmp.hlm

Output file name = C:\Jason\HLM\mlrclass\hlm2.html

The maximum number of level-1 units = 2177

The maximum number of level-2 units = 234

The maximum number of iterations = 100

Method of estimation: restricted maximum likelihood

The outcome variable is READING

## Summary of the model specified

### Step 2 model

#### Level-1 Model

$$READING_{ij} = \beta_{0j} + \beta_{1j} * (PERSKILL_{ij}) + r_{ij}$$

#### Level-2 Model

$$\beta_{0j} = \gamma_{00} + u_{0j}$$

$$\beta_{1j} = \gamma_{10}$$

#### Mixed Model

$$READING_{ij} = \gamma_{00} + \gamma_{10} * PERSKILL_{ij} + u_{0j} + r_{ij}$$

## Final Results - Iteration 6

Iterations stopped due to small change in likelihood function

$$\sigma^2 = 128.35796$$

$\tau$

INTRCPT1,  $\beta_0$  34.36479

Random level-1 coefficient	Reliability estimate
INTRCPT1, $\beta_0$	0.662

The value of the log-likelihood function at iteration 6 = -8.509047E+03

#### Final estimation of fixed effects:

Fixed Effect	Coefficient	Standard error	t-ratio	Approx. d.f.	p-value
For INTRCPT1, $\beta_0$					
INTRCPT2, $\gamma_{00}$	74.613777	1.458649	51.153	233	<0.001
For PERSKILL slope, $\beta_1$					
INTRCPT2, $\gamma_{10}$	4.915901	0.435268	11.294	1942	<0.001

**Final estimation of fixed effects  
(with robust standard errors)**

Fixed Effect	Coefficient	Standard error	<i>t</i> -ratio	Approx. <i>d.f.</i>	<i>p</i> -value
For INTRCPT1, $\beta_0$					
INTRCPT2, $\gamma_{00}$	74.613777	1.647430	45.291	233	<0.001
For PERSKILL slope, $\beta_1$					
INTRCPT2, $\gamma_{10}$	4.915901	0.476368	10.320	1942	<0.001

**Final estimation of variance components**

Random Effect	Standard Deviation	Variance Component	<i>d.f.</i>	$\chi^2$	<i>p</i> -value
INTRCPT1, $u_0$	5.86215	34.36479	233	798.07542	<0.001
level-1, $r$	11.32952	128.35796			

**Statistics for current covariance components model**

Deviance = 17018.093047  
 Number of estimated parameters = 2