

Modification Index Examples

Mplus

(output excerpts)

Mplus VERSION 6.12
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INPUT INSTRUCTIONS

```
title: Self-esteem CFA Example--One Factor;

! below I use a fixed format for the data file.
! I recommend using free format with tab-delimited data, however;
data: file=c:\jason\spsswin\arc\sel.dat; format=6f2.0;
      listwise=on;

variable: names = rnotworr rnumqal ramfailr ramable rnotprdr rfelpos;

! For now, use the following analysis commands to estimate using ML, non-robust,
! with no missing data estimation and no meanstructure (the default in most packages);

analysis: type=general; estimator=ml;
          model=nomeanstructure; information=expected;

model: se by rnotworr-rfelpos;

output: stdx modindices(all 3.84);
! The keyword all means modification indices for associations
! with covariates are included and the 3.84 requests any modification
! indices over the chi-square critical value for 1 df.
```

THE MODEL ESTIMATION TERMINATED NORMALLY

Number of observations 118

MODEL FIT INFORMATION

Number of Free Parameters 12

Loglikelihood
H0 Value -757.201
H1 Value -747.474

Information Criteria
Akaike (AIC) 1538.402
Bayesian (BIC) 1571.650
Sample-Size Adjusted BIC 1533.715
(n* = (n + 2) / 24)

Chi-Square Test of Model Fit
Value 19.454
Degrees of Freedom 9
P-Value 0.0216

RMSEA (Root Mean Square Error Of Approximation)
Estimate 0.099
90 Percent C.I. 0.036 0.160
Probability RMSEA <= .05 0.086

CFI/TLI
CFI 0.910
TLI 0.850

Chi-Square Test of Model Fit for the Baseline Model
Value 131.265
Degrees of Freedom 15
P-Value 0.0000

SRMR (Standardized Root Mean Square Residual)
Value 0.061

MODEL RESULTS

	Estimate	S.E.	Est./S.E.	Two-Tailed P-Value
SE BY				
RNOTWORR	1.000	0.000	999.000	999.000
RNUMQAL	0.637	0.159	4.012	0.000
RAMFAILR	0.969	0.220	4.405	0.000
RAMABLE	0.265	0.202	1.309	0.190
RNOTPRDR	1.262	0.279	4.522	0.000
RFELPOS	0.478	0.174	2.751	0.006
Variances				
SE	0.231	0.094	2.460	0.014
Residual Variances				
RNOTWORR	0.793	0.111	7.134	0.000
RNUMQAL	0.228	0.033	6.866	0.000
RAMFAILR	0.300	0.050	6.029	0.000
RAMABLE	0.860	0.112	7.650	0.000
RNOTPRDR	0.116	0.051	2.268	0.023
RFELPOS	0.488	0.065	7.496	0.000

STANDARDIZED MODEL RESULTS

STDYX Standardization

	Estimate	S.E.	Est./S.E.	Two-Tailed P-Value
SE BY				
RNOTWORR	0.475	0.083	5.725	0.000
RNUMQAL	0.539	0.078	6.899	0.000
RAMFAILR	0.647	0.071	9.173	0.000
RAMABLE	0.136	0.100	1.361	0.173
RNOTPRDR	0.872	0.062	14.069	0.000
RFELPOS	0.312	0.093	3.349	0.001
Variances				
SE	1.000	0.000	999.000	999.000
Residual Variances				
RNOTWORR	0.775	0.079	9.833	0.000
RNUMQAL	0.709	0.084	8.415	0.000
RAMFAILR	0.581	0.091	6.354	0.000
RAMABLE	0.982	0.027	36.219	0.000
RNOTPRDR	0.240	0.108	2.218	0.027
RFELPOS	0.903	0.058	15.525	0.000

R-SQUARE

Observed Variable	Estimate	S.E.	Est./S.E.	Two-Tailed P-Value
RNOTWORR	0.225	0.079	2.862	0.004
RNUMQAL	0.291	0.084	3.449	0.001
RAMFAILR	0.419	0.091	4.586	0.000
RAMABLE	0.018	0.027	0.681	0.496
RNOTPRDR	0.760	0.108	7.035	0.000
RFELPOS	0.097	0.058	1.675	0.094

MODEL MODIFICATION INDICES

Minimum M.I. value for printing the modification index 3.840

	M.I.	E.P.C.	Std E.P.C.	StdYX E.P.C.
ON Statements				
RNOTWORR ON RNUMQAL	9.520	-0.603	-0.603	-0.338
RNOTWORR ON RAMFAILR	11.224	0.637	0.637	0.453
RNUMQAL ON RNOTWORR	9.518	-0.174	-0.174	-0.310
RNUMQAL ON RNOTPRDR	12.918	1.327	1.327	1.625
RAMFAILR ON RNOTWORR	11.227	0.241	0.241	0.340
RAMFAILR ON RNOTPRDR	6.640	-1.562	-1.562	-1.510
RNOTPRDR ON RNUMQAL	12.914	0.673	0.673	0.549
RNOTPRDR ON RAMFAILR	6.643	-0.603	-0.603	-0.623

WITH Statements

RNUMQAL WITH RNOTWORR	9.519	-0.138	-0.138	-0.324
RAMFAILR WITH RNOTWORR	11.226	0.191	0.191	0.392
RNOTPRDR WITH RNUMQAL	12.914	0.154	0.154	0.945
RNOTPRDR WITH RAMFAILR	6.643	-0.181	-0.181	-0.970

Amos

Choose View→Analysis Properties, choose Output tab, and check "Modification Indices"

(output excerpts)

Modification Indices (Group number 1 - Default model)

Covariances: (Group number 1 - Default model)

	M.I.	Par Change
e5 <--> e6	8.221	-.120
e4 <--> e6	8.239	.142

Variances: (Group number 1 - Default model)

M.I.	Par Change

Regression Weights: (Group number 1 - Default model)

	M.I.	Par Change
RNOTWORR <--- RNUMQAL	5.436	-.347
RNOTWORR <--- RAMFAILR	4.213	.241
RNUMQAL <--- RNOTWORR	6.069	-.112
RAMFAILR <--- RNOTWORR	6.104	.132

(These parameter changes estimates appear to be unstandardized whether standardized estimates are requested in the output or not)

