Newsom
USP 655 SEM
Winter 2012

Two-Factor CFA Example in Mplus

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Mplus VERSION 6.12
MUTHEN & MUTHEN
02/02/2012  11:11 AM

INPUT INSTRUCTIONS


  title:  Self-esteem CFA Example--Two Factor Model;

  !  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\se1.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: selfneg by rnotworr ramfailr rnotprdr;
         selfpos by rnumqal ramable rfelpos;

  output:  stdyx ;


INPUT READING TERMINATED NORMALLY

Self-esteem CFA Example--Two Factor Model;

SUMMARY OF ANALYSIS

Number of groups                                                 1
Number of observations                                         118

Number of dependent variables                                    6
Number of independent variables                                  0
Number of continuous latent variables                            2

THE MODEL ESTIMATION TERMINATED NORMALLY

MODEL FIT INFORMATION

Number of Free Parameters                       13

Loglikelihood
          H0 Value                       -757.171
          H1 Value                       -747.474

Information Criteria
          Akaike (AIC)                  1540.341
          Bayesian (BIC)                1576.360
          Sample-Size Adjusted BIC      1535.264
            (n* = (n + 2) / 24)

Chi-Square Test of Model Fit
          Value                             19.393
          Degrees of Freedom                     8
          P-Value                           0.0129

RMSEA (Root Mean Square Error Of Approximation)
          Estimate                           0.110
          90 Percent C.I.                    0.048  0.173
          Probability RMSEA <= .05           0.056

CFI/TLI
          CFI                                0.902
          TLI                                0.816

Chi-Square Test of Model Fit for the Baseline Model
          Value                            131.265
          Degrees of Freedom                    15
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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
SELFNEG BY				
RNOTWORR	1.000	0.000	999.000	999.000
RAMFAILR	0.967	0.220	4.403	0.000
RNOTPRDR	1.266	0.282	4.495	0.000
SELFPOS BY				
RNUMQAL	1.000	0.000	999.000	999.000
RAMABLE	0.417	0.311	1.341	0.180
RFELPOS	0.740	0.260	2.849	0.004
SELFPOS WITH				
SELFNEG	0.146	0.042	3.450	0.001
Variances				
SELFNEG	0.230	0.094	2.457	0.014
SELFPOS	0.103	0.051	2.017	0.044
Residual Variances				
RNOTWORR	0.793	0.111	7.134	0.000
RNUMQAL	0.219	0.050	4.390	0.000
RAMFAILR	0.301	0.050	6.025	0.000
RAMABLE	0.859	0.113	7.626	0.000
RNOTPRDR	0.114	0.053	2.162	0.031
RFELPOS	0.484	0.067	7.207	0.000

STANDARDIZED MODEL RESULTS

STDYX Standardization

	Estimate	S.E.	Est./S.E.	Two-Tailed P-Value
SELFNEG BY				
RNOTWORR	0.474	0.083	5.717	0.000
RAMFAILR	0.646	0.071	9.094	0.000
RNOTPRDR	0.875	0.063	13.783	0.000
SELFPOS BY				
RNUMQAL	0.566	0.128	4.408	0.000
RAMABLE	0.143	0.105	1.365	0.172
RFELPOS	0.323	0.106	3.053	0.002
SELFPOS WITH				
SELFNEG	0.950	0.193	4.926	0.000
Variances				
SELFNEG	1.000	0.000	999.000	999.000
SELFPOS	1.000	0.000	999.000	999.000
Residual Variances				
RNOTWORR	0.775	0.079	9.839	0.000
RNUMQAL	0.679	0.145	4.672	0.000
RAMFAILR	0.583	0.092	6.359	0.000
RAMABLE	0.980	0.030	32.628	0.000
RNOTPRDR	0.235	0.111	2.118	0.034
RFELPOS	0.895	0.068	13.077	0.000

R-SQUARE

Observed Variable	Estimate	S.E.	Est./S.E.	Two-Tailed P-Value
RNOTWORR	0.225	0.079	2.858	0.004
RNUMQAL	0.321	0.145	2.204	0.028
RAMFAILR	0.417	0.092	4.547	0.000
RAMABLE	0.020	0.030	0.682	0.495
RNOTPRDR	0.765	0.111	6.891	0.000
RFELPOS	0.105	0.068	1.526	0.127

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Two-Factor CFA Example in Amos

C:\jason\amos\semclass\se2.amw

Analysis Summary

Date and Time

Date: Thursday, January 28, 2010
Time: 10:48:29 AM
Title

se2: Thursday, January 28, 2010 10:48 AM
Groups

Group number 1 (Group number 1)

Notes for Group (Group number 1)

The model is recursive.
Sample size = 118
Variable Summary (Group number 1)

Your model contains the following variables (Group number 1)

Observed, endogenous variables
RFELPOS
RNOTPRDR
RAMABLE
RAMFAILR
RNUMQAL
RNOTWORR
Unobserved, exogenous variables
e1
e2
e3
e4
e5
e6
selfpos
selfneg
Variable counts (Group number 1)

Number of variables in your model:	14
Number of observed variables:	6
Number of unobserved variables:	8
Number of exogenous variables:	8
Number of endogenous variables:	6

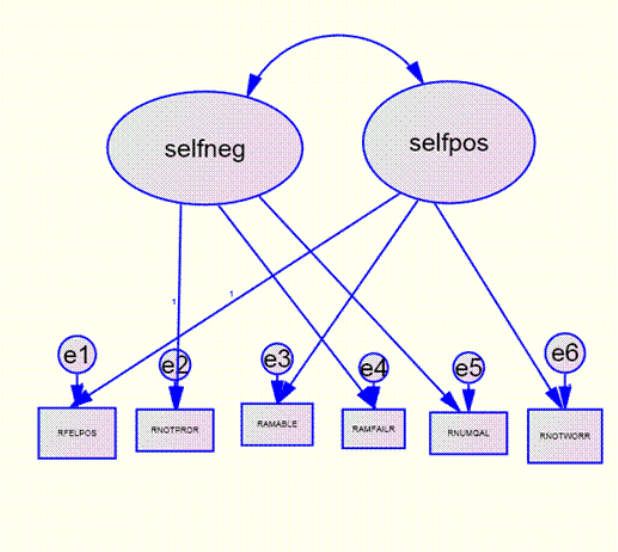
Models

Default model (Default model)
Notes for Model (Default model)
Computation of degrees of freedom (Default model)

Number of distinct sample moments:	21
Number of distinct parameters to be estimated:	13
Degrees of freedom (21 - 13):	8

Result (Default model)

Minimum was achieved
Chi-square = 19.105
Degrees of freedom = 8
Probability level = .014



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Group number 1 (Group number 1 - Default model)
Estimates (Group number 1 - Default model)
Scalar Estimates (Group number 1 - Default model)
Maximum Likelihood Estimates
Regression Weights: (Group number 1 - Default model)

			Estimate	S.E.	C.R.	P	Label
RNOTWORR	<---	selfpos	2.095	.768	2.726	.006	
RNOTPRDR	<---	selfneg	1.000				
RAMABLE	<---	selfpos	.588	.450	1.307	.191	
RFELPOS	<---	selfpos	1.000				
RAMFAILR	<---	selfneg	.792	.136	5.839	***	
RNUMQAL	<---	selfneg	.508	.101	5.008	***	

Covariances: (Group number 1 - Default model)

			Estimate	S.E.	C.R.	P	Label
selfpos	<-->	selfneg	.140	.048	2.934	.003	

Variances: (Group number 1 - Default model)

	Estimate	S.E.	C.R.	P	Label
selfpos	.043	.037	1.147	.251	
selfneg	.357	.077	4.619	***	
e1	.498	.070	7.138	***	
e2	.126	.050	2.503	.012	
e3	.862	.113	7.628	***	
e4	.293	.050	5.900	***	
e5	.230	.034	6.846	***	
e6	.836	.155	5.389	***	

Notes for Model (Group number 1 - Default model)

The following covariance matrix is not positive definite (Group number 1 - Default model)

	selfneg	selfpos
selfneg	.357	
selfpos	.140	.043

Notes for Group/Model (Group number 1 - Default model)

This solution is not admissible.
Minimization History (Default model)

Iteration		Negative eigenvalues	Condition #	Smallest eigenvalue	Diameter	F	NTries	Ratio
0	e	3		-.182	9999.000	161.881	0	9999.000
1	e	1		-.058	1.219	53.990	20	.780
2	e	1		-.061	.380	37.596	4	.721
3	e	0	65.112		.610	25.975	6	.748

Model Fit Summary

CMIN

Model	NPAR	CMIN	DF	P	CMIN/DF
Default model	13	19.105	8	.014	2.388
Saturated model	21	.000	0		
Independence model	6	130.153	15	.000	8.677

RMR, GFI

Model	RMR	GFI	AGFI	PGFI
Default model	.037	.947	.861	.361
Saturated model	.000	1.000		
Independence model	.138	.704	.586	.503

Baseline Comparisons

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Default model	.853	.725	.909	.819	.904
Saturated model	1.000		1.000		1.000
Independence model	.000	.000	.000	.000	.000

Parsimony-Adjusted Measures

Model	PRATIO	PNFI	PCFI
Default model	.533	.455	.482
Saturated model	.000	.000	.000
Independence model	1.000	.000	.000

NCP

Model	NCP	LO 90	HI 90
Default model	11.105	1.966	27.911
Saturated model	.000	.000	.000
Independence model	115.153	82.384	155.396

FMIN

Model	FMIN	F0	LO 90	HI 90
Default model	.163	.095	.017	.239
Saturated model	.000	.000	.000	.000
Independence model	1.112	.984	.704	1.328

RMSEA

Model	RMSEA	LO 90	HI 90	PCLOSE
Default model	.109	.046	.173	.059
Independence model	.256	.217	.298	.000

AIC

Model	AIC	BCC	BIC	CAIC
Default model	45.105	46.760	81.124	94.124
Saturated model	42.000	44.673	100.184	121.184
Independence model	142.153	142.917	158.777	164.777

ECVI

Model	ECVI	LO 90	HI 90	MECVI
Default model	.386	.307	.529	.400
Saturated model	.359	.359	.359	.382
Independence model	1.215	.935	1.559	1.222

HOELTER

Model	HOELTER .05	HOELTER .01
Default model	95	124
Independence model	23	28

Execution time summary

Minimization: .012
Miscellaneous: .124
Bootstrap: .000
Total: .136