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TIME: 14:41

L I S R E L 8.72

BY

Karl G. J”reskog & Dag S”rbom

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The following lines were read from file C:\hbat_cfa.LS8:

```
TI CFA HBAT EXAMPLE
!
! COMMENTS CAN BE ADDED AS NEEDED AS ILLUSTRATED HERE
!
! THE DA LINE DESCRIBES DATA PARAMETERS
! THE CM LINE INDICATES A COVARIANCE MATRIX WILL BE READ AND
! PROVIDES THE FILE LOCATION WITH FI=
!
DA NI=28 NO=399 NG=1 MA=CM
CM FI=HBAT.COV
!
!
! LA INDICATES THAT THE NEXT LINES WILL PROVIDE LABELS FOR EACH VARIABLE
! THE FIRST LABEL MATCHES THE FIRST VARIABLE, THE SECOND LABEL MATCHES THE
! SECOND VARIABLE AND SO FORTH.  SO, ITS IMPORTANT TO KNOW THE ORDER THAT
! THE VARIABLES WERE ORIGINALLY LISTED.  IF NO LABEL STATEMENT IS USED, THE
! VARIABLES WILL SIMPLY BE NUMBERED SEQUENTIALLY -- 1 2 3 .. 28
!
!
LA
ID JS1 OC1 OC2 EP1 OC3 OC4 EP2 EP3 AC1 EP4 JS2 JS3 AC2 SI1 JS4 SI2 JS5 AC3 SI3
AC4 SI4
C1 C2 C3 AGE EXP JP
!
! SE IS A SELECT LINE THAT CHOOSES THE VARIABLES INVOLVED IN THIS PARTICULAR
MODEL
! IT IS CONVENIENT TO GROUP THE VARIABLES TOGETHER IN SOME WAY THAT MAKES SENSE
!
SE
JS1 JS2 JS3 JS4 JS5  OC1 OC2 OC3 OC4  SI1 SI2 SI3 SI4  EP1 EP2 EP3 EP4 AC1 AC2
AC3 AC4 /
!
```

```
 ! THE LINES BELOW DESCRIBE THE MODEL AND THE PATTERN OF FREE AND FIXED
PARAMETERS
 ! MO STANDS FOR MODEL - VA FOR VALUE - FR FOR FREE - FI FOR FIXED
 MO NX=21 NK=5 LX=FU,FI PH=SY,FR TD=DI,FR
 VA 1.00 LX 1 1 LX 6 2 LX 10 3 LX 14 4 LX 18 5
 FR LX 2 1 LX 3 1 LX 4 1 LX 5 1  LX 7 2 LX 8 2 LX 9 2
 FR LX 11 3 LX 12 3 LX 13 3  LX 15 4 LX 16 4 LX 17 4 LX 19 5 LX 20 5 LX 21 5
 !
 ! LK IS A LABEL STATEMENT FOR THE KSI MATRIX
 ! THE LINE BELOW LK PROVIDES LABELS THAT WILL BE USED FOR EACH EXOGENOUS FACTOR
 !
 LK
 JS OC SI EP AC
 !
 ! PD IS AN OPTIONAL STATEMENT THAT WILL DRAW A PATH DIAGRAM AUTOMATICALLY
 !
 PD
 !
 ! OU IS THE LINE WHERE OPTIONS ARE REQUESTED
 ! IN THIS CASE - RS MEANS RESIDUALS - SC REQUESTS A STANDARDIZED SOLUTION
 ! AND MI REQUESTS MODIFICATION INDICES
 !
 OU RS SC MI ND=2

 TI CFA HBAT EXAMPLE

                          Number of Input Variables 28
                          Number of Y - Variables    0
                          Number of X - Variables   21
                          Number of ETA - Variables  0
                          Number of KSI - Variables  5
                          Number of Observations   399

 TI CFA HBAT EXAMPLE

         Covariance Matrix

              JS1        JS2        JS3        JS4        JS5        OC1
         --------   --------   --------   --------   --------   --------
     JS1       1.79
     JS2       1.02       1.88
     JS3       0.91       0.89       1.73
     JS4       0.88       0.92       0.86       1.64
     JS5       0.15       0.16       0.13       0.13       0.04
     OC1       0.21       0.19       0.24       0.19       0.04       6.38
     OC2       0.41       0.27       0.38       0.28       0.08       2.89
     OC3       0.37       0.27       0.19       0.29       0.05       1.97
     OC4       0.44       0.26       0.30       0.25       0.07       2.51
     SI1       0.13       0.15       0.17       0.13       0.03       0.40
     SI2       0.13       0.15       0.12       0.10       0.03       0.42
     SI3       0.06       0.14       0.22       0.19       0.03       0.35
     SI4       0.18       0.20       0.23       0.21       0.04       0.43
     EP1       0.16       0.42       0.35       0.27       0.06       0.52
     EP2       0.27       0.37       0.26       0.24       0.05       0.94
     EP3       0.18       0.29       0.26       0.19       0.06       0.41
     EP4       0.17       0.31       0.27       0.22       0.04       0.81
     AC1       0.08      -0.01       0.08       0.08       0.03       0.20
```

AC2	0.01	-0.03	0.02	0.03	0.03	0.45
AC3	-0.04	-0.05	-0.02	0.08	0.02	0.34
AC4	0.04	0.02	0.14	0.10	0.04	0.52

Covariance Matrix

	OC2	OC3	OC4	SI1	SI2	SI3
OC2	4.78					
OC3	2.14	3.08				
OC4	3.31	2.04	4.22			
SI1	0.82	0.35	0.68	0.76		
SI2	0.91	0.43	0.70	0.56	0.77	
SI3	0.80	0.36	0.63	0.51	0.56	1.03
SI4	0.97	0.44	0.82	0.56	0.62	0.66
EP1	1.01	0.76	1.05	0.54	0.60	0.61
EP2	1.33	1.06	1.26	0.49	0.56	0.57
EP3	1.02	0.74	0.79	0.34	0.38	0.41
EP4	1.01	0.91	0.94	0.48	0.45	0.51
AC1	0.80	0.33	0.43	0.28	0.24	0.29
AC2	0.80	0.27	0.60	0.29	0.29	0.29
AC3	0.84	0.30	0.60	0.25	0.26	0.29
AC4	1.02	0.45	0.81	0.29	0.32	0.32

Covariance Matrix

	SI4	EP1	EP2	EP3	EP4	AC1
SI4	0.94					
EP1	0.67	3.35				
EP2	0.71	1.78	2.65			
EP3	0.47	1.23	1.33	1.78		
EP4	0.53	1.45	1.48	1.24	1.95	
AC1	0.27	0.36	0.39	0.35	0.27	1.94
AC2	0.34	0.50	0.49	0.30	0.38	1.62
AC3	0.34	0.41	0.38	0.29	0.25	1.37
AC4	0.40	0.45	0.60	0.40	0.46	1.51

Covariance Matrix

	AC2	AC3	AC4
AC2	2.98		
AC3	1.69	2.01	
AC4	1.87	1.55	2.60

TI CFA HBAT EXAMPLE

Parameter Specifications

LAMBDA-X

	JS	OC	SI	EP	AC
JS1	0	0	0	0	0
JS2	1	0	0	0	0

JS3	2	0	0	0	0
JS4	3	0	0	0	0
JS5	4	0	0	0	0
OC1	0	0	0	0	0
OC2	0	5	0	0	0
OC3	0	6	0	0	0
OC4	0	7	0	0	0
SI1	0	0	0	0	0
SI2	0	0	8	0	0
SI3	0	0	9	0	0
SI4	0	0	10	0	0
EP1	0	0	0	0	0
EP2	0	0	0	11	0
EP3	0	0	0	12	0
EP4	0	0	0	13	0
AC1	0	0	0	0	0
AC2	0	0	0	0	14
AC3	0	0	0	0	15
AC4	0	0	0	0	16

PHI

	JS	OC	SI	EP	AC
JS	17				
OC	18	19			
SI	20	21	22		
EP	23	24	25	26	
AC	27	28	29	30	31

THETA-DELTA

JS1	JS2	JS3	JS4	JS5	OC1
32	33	34	35	36	37

THETA-DELTA

OC2	OC3	OC4	SI1	SI2	SI3
38	39	40	41	42	43

THETA-DELTA

SI4	EP1	EP2	EP3	EP4	AC1
44	45	46	47	48	49

THETA-DELTA

AC2	AC3	AC4
50	51	52

TI CFA HBAT EXAMPLE

Number of Iterations = 9

LISREL Estimates (Maximum Likelihood)

LAMBDA-X

	JS	OC	SI	EP	AC
JS1	1.00	- -	- -	- -	- -
JS2	1.03 (0.08) 13.65	- -	- -	- -	- -
JS3	0.90 (0.07) 12.49	- -	- -	- -	- -
JS4	0.91 (0.07) 12.93	- -	- -	- -	- -
JS5	0.15 (0.01) 13.38	- -	- -	- -	- -
OC1	- -	1.00	- -	- -	- -
OC2	- -	1.31 (0.11) 12.17	- -	- -	- -
OC3	- -	0.78 (0.08) 10.30	- -	- -	- -
OC4	- -	1.17 (0.10) 11.94	- -	- -	- -
SI1	- -	- -	1.00	- -	- -
SI2	- -	- -	1.07 (0.05) 19.52	- -	- -
SI3	- -	- -	1.06 (0.07) 16.01	- -	- -
SI4	- -	- -	1.17 (0.06) 19.18	- -	- -
EP1	- -	- -	- -	1.00	- -

EP2	- -	- -	- -	1.03	- -
				(0.07)	
				14.31	
EP3	- -	- -	- -	0.80	- -
				(0.06)	
				13.68	
EP4	- -	- -	- -	0.90	- -
				(0.06)	
				14.48	
AC1	- -	- -	- -	- -	1.00
AC2	- -	- -	- -	- -	1.24
					(0.07)
					18.36
AC3	- -	- -	- -	- -	1.04
					(0.06)
					18.82
AC4	- -	- -	- -	- -	1.15
					(0.06)
					18.23

PHI

	JS	OC	SI	EP	AC
JS	0.98				
	(0.12)				
	8.02				
OC	0.31	2.17			
	(0.09)	(0.36)			
	3.38	6.04			
SI	0.16	0.58	0.50		
	(0.04)	(0.08)	(0.05)		
	3.82	7.17	9.50		
EP	0.31	0.94	0.51	1.63	
	(0.08)	(0.14)	(0.07)	(0.22)	
	3.88	6.47	7.75	7.54	
AC	0.06	0.52	0.25	0.37	1.31
	(0.07)	(0.11)	(0.05)	(0.09)	(0.14)
	0.87	4.83	5.15	4.20	9.64

THETA-DELTA

JS1	JS2	JS3	JS4	JS5	OC1
0.81	0.83	0.93	0.83	0.02	4.21

(0.07)	(0.08)	(0.08)	(0.07)	(0.00)	(0.32)
10.93	10.79	11.88	11.54	11.11	13.14

THETA-DELTA

OC2	OC3	OC4	SI1	SI2	SI3
1.04	1.75	1.26	0.26	0.19	0.47
(0.15)	(0.14)	(0.14)	(0.02)	(0.02)	(0.04)
6.96	12.66	9.14	11.09	9.46	12.23

THETA-DELTA

SI4	EP1	EP2	EP3	EP4	AC1
0.26	1.72	0.91	0.73	0.62	0.63
(0.03)	(0.14)	(0.09)	(0.07)	(0.06)	(0.06)
9.93	12.14	10.03	11.08	9.61	10.54

THETA-DELTA

AC2	AC3	AC4
0.97	0.60	0.87
(0.09)	(0.06)	(0.08)
10.59	10.10	10.70

Squared Multiple Correlations for X - Variables

JS1	JS2	JS3	JS4	JS5	OC1
0.55	0.56	0.46	0.50	0.53	0.34

Squared Multiple Correlations for X - Variables

OC2	OC3	OC4	SI1	SI2	SI3
0.78	0.43	0.70	0.66	0.75	0.55

Squared Multiple Correlations for X - Variables

SI4	EP1	EP2	EP3	EP4	AC1
0.73	0.49	0.66	0.59	0.68	0.68

Squared Multiple Correlations for X - Variables

AC2	AC3	AC4
0.67	0.70	0.67

Goodness of Fit Statistics

Degrees of Freedom = 179
Minimum Fit Function Chi-Square = 236.62 (P = 0.0025)
Normal Theory Weighted Least Squares Chi-Square = 229.95 (P = 0.0061)
Estimated Non-centrality Parameter (NCP) = 50.95
90 Percent Confidence Interval for NCP = (15.98 ; 94.04)

Minimum Fit Function Value = 0.59
Population Discrepancy Function Value (F0) = 0.13
90 Percent Confidence Interval for F0 = (0.040 ; 0.24)
Root Mean Square Error of Approximation (RMSEA) = 0.027
90 Percent Confidence Interval for RMSEA = (0.015 ; 0.036)
P-Value for Test of Close Fit (RMSEA < 0.05) = 1.00

Expected Cross-Validation Index (ECVI) = 0.84
90 Percent Confidence Interval for ECVI = (0.75 ; 0.95)
ECVI for Saturated Model = 1.16
ECVI for Independence Model = 20.28

Chi-Square for Independence Model with 210 Degrees of Freedom = 8030.24
Independence AIC = 8072.24
Model AIC = 333.95
Saturated AIC = 462.00
Independence CAIC = 8177.01
Model CAIC = 593.37
Saturated CAIC = 1614.45

Normed Fit Index (NFI) = 0.97
Non-Normed Fit Index (NNFI) = 0.99
Parsimony Normed Fit Index (PNFI) = 0.83
Comparative Fit Index (CFI) = 0.99
Incremental Fit Index (IFI) = 0.99
Relative Fit Index (RFI) = 0.97

Critical N (CN) = 381.03

Root Mean Square Residual (RMR) = 0.086
Standardized RMR = 0.035
Goodness of Fit Index (GFI) = 0.95
Adjusted Goodness of Fit Index (AGFI) = 0.93
Parsimony Goodness of Fit Index (PGFI) = 0.73

TI CFA HBAT EXAMPLE

Fitted Covariance Matrix

	JS1	JS2	JS3	JS4	JS5	OC1
JS1	1.79					
JS2	1.02	1.88				
JS3	0.89	0.92	1.73			
JS4	0.90	0.92	0.81	1.64		
JS5	0.15	0.15	0.13	0.14	0.04	
OC1	0.31	0.32	0.28	0.28	0.05	6.38
OC2	0.40	0.41	0.36	0.36	0.06	2.85
OC3	0.24	0.25	0.22	0.22	0.04	1.70

OC4	0.36	0.37	0.32	0.32	0.05	2.53
SI1	0.16	0.17	0.15	0.15	0.02	0.58
SI2	0.17	0.18	0.16	0.16	0.03	0.62
SI3	0.17	0.18	0.15	0.16	0.03	0.61
SI4	0.19	0.19	0.17	0.17	0.03	0.67
EP1	0.31	0.32	0.28	0.28	0.05	0.94
EP2	0.32	0.33	0.28	0.29	0.05	0.97
EP3	0.25	0.25	0.22	0.22	0.04	0.75
EP4	0.27	0.28	0.25	0.25	0.04	0.84
AC1	0.06	0.06	0.05	0.05	0.01	0.52
AC2	0.07	0.07	0.06	0.06	0.01	0.64
AC3	0.06	0.06	0.05	0.05	0.01	0.54
AC4	0.07	0.07	0.06	0.06	0.01	0.59

Fitted Covariance Matrix

	OC2	OC3	OC4	SI1	SI2	SI3
OC2	4.78					
OC3	2.23	3.08				
OC4	3.32	1.98	4.22			
SI1	0.76	0.45	0.67	0.76		
SI2	0.81	0.48	0.72	0.54	0.77	
SI3	0.80	0.48	0.71	0.53	0.57	1.03
SI4	0.88	0.53	0.78	0.58	0.63	0.62
EP1	1.23	0.73	1.09	0.51	0.55	0.54
EP2	1.27	0.76	1.13	0.53	0.56	0.56
EP3	0.99	0.59	0.88	0.41	0.44	0.43
EP4	1.11	0.66	0.98	0.46	0.49	0.49
AC1	0.68	0.41	0.60	0.25	0.27	0.27
AC2	0.84	0.50	0.75	0.31	0.33	0.33
AC3	0.70	0.42	0.63	0.26	0.28	0.28
AC4	0.78	0.47	0.69	0.29	0.31	0.31

Fitted Covariance Matrix

	SI4	EP1	EP2	EP3	EP4	AC1
SI4	0.94					
EP1	0.59	3.35				
EP2	0.61	1.69	2.65			
EP3	0.48	1.31	1.35	1.78		
EP4	0.53	1.47	1.52	1.18	1.95	
AC1	0.29	0.37	0.38	0.30	0.33	1.94
AC2	0.36	0.46	0.47	0.37	0.41	1.62
AC3	0.30	0.39	0.40	0.31	0.35	1.36
AC4	0.33	0.43	0.44	0.34	0.38	1.51

Fitted Covariance Matrix

	AC2	AC3	AC4
AC2	2.98		
AC3	1.68	2.01	
AC4	1.86	1.56	2.60

Fitted Residuals

	JS1	JS2	JS3	JS4	JS5	OC1
JS1	0.00					
JS2	0.00	0.00				
JS3	0.02	-0.02	0.00			
JS4	-0.02	-0.01	0.05	0.00		
JS5	0.00	0.00	-0.01	0.00	0.00	
OC1	-0.10	-0.12	-0.03	-0.09	0.00	0.00
OC2	0.01	-0.15	0.02	-0.08	0.02	0.04
OC3	0.13	0.02	-0.02	0.07	0.01	0.27
OC4	0.09	-0.11	-0.02	-0.08	0.02	-0.02
SI1	-0.03	-0.02	0.03	-0.01	0.01	-0.17
SI2	-0.04	-0.03	-0.03	-0.06	0.00	-0.20
SI3	-0.11	-0.03	0.06	0.03	0.00	-0.27
SI4	-0.01	0.01	0.06	0.04	0.01	-0.24
EP1	-0.15	0.10	0.07	-0.01	0.01	-0.42
EP2	-0.05	0.05	-0.03	-0.05	0.00	-0.03
EP3	-0.06	0.03	0.04	-0.03	0.02	-0.34
EP4	-0.10	0.03	0.03	-0.03	0.00	-0.03
AC1	0.02	-0.07	0.03	0.03	0.02	-0.32
AC2	-0.06	-0.11	-0.04	-0.04	0.02	-0.19
AC3	-0.10	-0.11	-0.07	0.03	0.01	-0.20
AC4	-0.02	-0.05	0.09	0.05	0.03	-0.07

Fitted Residuals

	OC2	OC3	OC4	SI1	SI2	SI3
OC2	0.00					
OC3	-0.09	0.00				
OC4	-0.01	0.06	0.00			
SI1	0.07	-0.10	0.01	0.00		
SI2	0.10	-0.05	-0.02	0.02	0.00	
SI3	0.00	-0.12	-0.08	-0.02	-0.01	0.00
SI4	0.09	-0.08	0.04	-0.02	-0.01	0.04
EP1	-0.22	0.03	-0.04	0.04	0.05	0.07
EP2	0.06	0.30	0.13	-0.03	-0.01	0.01
EP3	0.03	0.15	-0.08	-0.07	-0.06	-0.03
EP4	-0.09	0.25	-0.04	0.02	-0.04	0.02
AC1	0.13	-0.08	-0.17	0.03	-0.02	0.02
AC2	-0.04	-0.23	-0.14	-0.01	-0.04	-0.04
AC3	0.14	-0.12	-0.02	-0.01	-0.02	0.01
AC4	0.23	-0.01	0.11	0.00	0.01	0.01

Fitted Residuals

	SI4	EP1	EP2	EP3	EP4	AC1
SI4	0.00					
EP1	0.07	0.00				
EP2	0.10	0.09	0.00			
EP3	-0.01	-0.08	-0.02	0.00		
EP4	0.00	-0.02	-0.04	0.06	0.00	
AC1	-0.02	-0.01	0.01	0.05	-0.07	0.00
AC2	-0.02	0.04	0.02	-0.07	-0.03	0.00
AC3	0.04	0.02	-0.02	-0.02	-0.10	0.01

AC4	0.06	0.03	0.15	0.06	0.07	0.00

Fitted Residuals

	AC2	AC3	AC4
AC2	0.00		
AC3	0.01	0.00	
AC4	0.01	-0.02	0.00

Summary Statistics for Fitted Residuals

```
Smallest Fitted Residual =   -0.42
  Median Fitted Residual =    0.00
 Largest Fitted Residual =    0.30
```

Stemleaf Plot

```
- 4|2
- 3|
- 3|42
- 2|7
- 2|43200
- 1|97755
- 1|4222111100000
- 0|999888888877777766665555
- 0|444444444333333333333322222222222222222221111111111111100000000000000+20
  0|11111111111111112222222222222223333333333333344444444
  0|5555566666667777779999
  1|00013334
  1|55
  2|3
  2|57
  3|0
```

Standardized Residuals

	JS1	JS2	JS3	JS4	JS5	OC1
JS1	- -					
JS2	0.06	- -				
JS3	0.62	-0.71	- -			
JS4	-0.61	-0.26	1.50	- -		
JS5	0.29	0.85	-1.48	-0.27	- -	
OC1	-0.69	-0.83	-0.23	-0.66	-0.09	- -
OC2	0.14	-1.55	0.17	-0.87	1.63	0.67
OC3	1.39	0.19	-0.24	0.79	0.98	2.18
OC4	0.94	-1.18	-0.20	-0.81	1.32	-0.23
SI1	-0.69	-0.47	0.61	-0.34	1.17	-2.15
SI2	-0.98	-0.69	-0.84	-1.44	0.72	-2.54
SI3	-2.07	-0.62	1.15	0.66	0.09	-2.68
SI4	-0.17	0.15	1.24	0.83	2.07	-2.74
EP1	-1.53	1.07	0.76	-0.12	0.93	-2.25
EP2	-0.62	0.63	-0.36	-0.62	-0.07	-0.18
EP3	-0.92	0.53	0.55	-0.45	2.00	-2.59
EP4	-1.58	0.42	0.37	-0.44	0.25	-0.26
AC1	0.27	-0.96	0.40	0.47	2.22	-2.24

AC2	-0.78	-1.28	-0.45	-0.43	1.34	-1.05
AC3	-1.49	-1.63	-1.02	0.44	0.60	-1.36
AC4	-0.29	-0.63	1.05	0.59	2.33	-0.43

Standardized Residuals

	OC2	OC3	OC4	SI1	SI2	SI3
OC2	- -					
OC3	-2.47	- -				
OC4	-0.53	1.19	- -			
SI1	1.45	-1.98	0.13	- -		
SI2	2.43	-1.02	-0.55	3.80	- -	
SI3	0.01	-1.84	-1.29	-1.40	-1.35	- -
SI4	1.99	-1.45	0.82	-2.40	-1.76	3.07
EP1	-1.80	0.21	-0.35	0.69	1.02	1.08
EP2	0.68	2.98	1.48	-0.79	-0.19	0.26
EP3	0.36	1.73	-1.02	-1.95	-1.87	-0.67
EP4	-1.28	2.88	-0.56	0.72	-1.32	0.53
AC1	1.51	-0.83	-1.98	0.76	-0.66	0.41
AC2	-0.42	-1.99	-1.34	-0.31	-0.94	-0.63
AC3	1.72	-1.25	-0.27	-0.14	-0.46	0.22
AC4	2.42	-0.10	1.13	0.10	0.25	0.24

Standardized Residuals

	SI4	EP1	EP2	EP3	EP4	AC1
SI4	- -					
EP1	1.36	- -				
EP2	2.44	2.09	- -			
EP3	-0.22	-1.85	-0.79	- -		
EP4	-0.14	-0.58	-2.25	3.28	- -	
AC1	-0.45	-0.15	0.11	0.76	-1.14	- -
AC2	-0.34	0.37	0.20	-0.87	-0.43	-0.15
AC3	0.92	0.23	-0.27	-0.36	-1.65	0.33
AC4	1.31	0.23	1.83	0.78	1.01	0.02

Standardized Residuals

	AC2	AC3	AC4
AC2	- -		
AC3	0.41	- -	
AC4	0.20	-0.81	- -

Summary Statistics for Standardized Residuals

Smallest Standardized Residual = -2.74
Median Standardized Residual = 0.00
Largest Standardized Residual = 3.80

Stemleaf Plot

- 2|77655
- 2|4222110000
- 1|988886665555

```
- 1|4444333333221100000
- 0|99998888888877777776666666666555555
- 0|444444333333333322222222211111100000000000000000000000
  0|11111112222222223333344444444
  0|55566666777777888888899999
  1|0001111122233344
  1|55556778
  2|0011223444
  2|9
  3|013
  3|8
```

Largest Negative Standardized Residuals

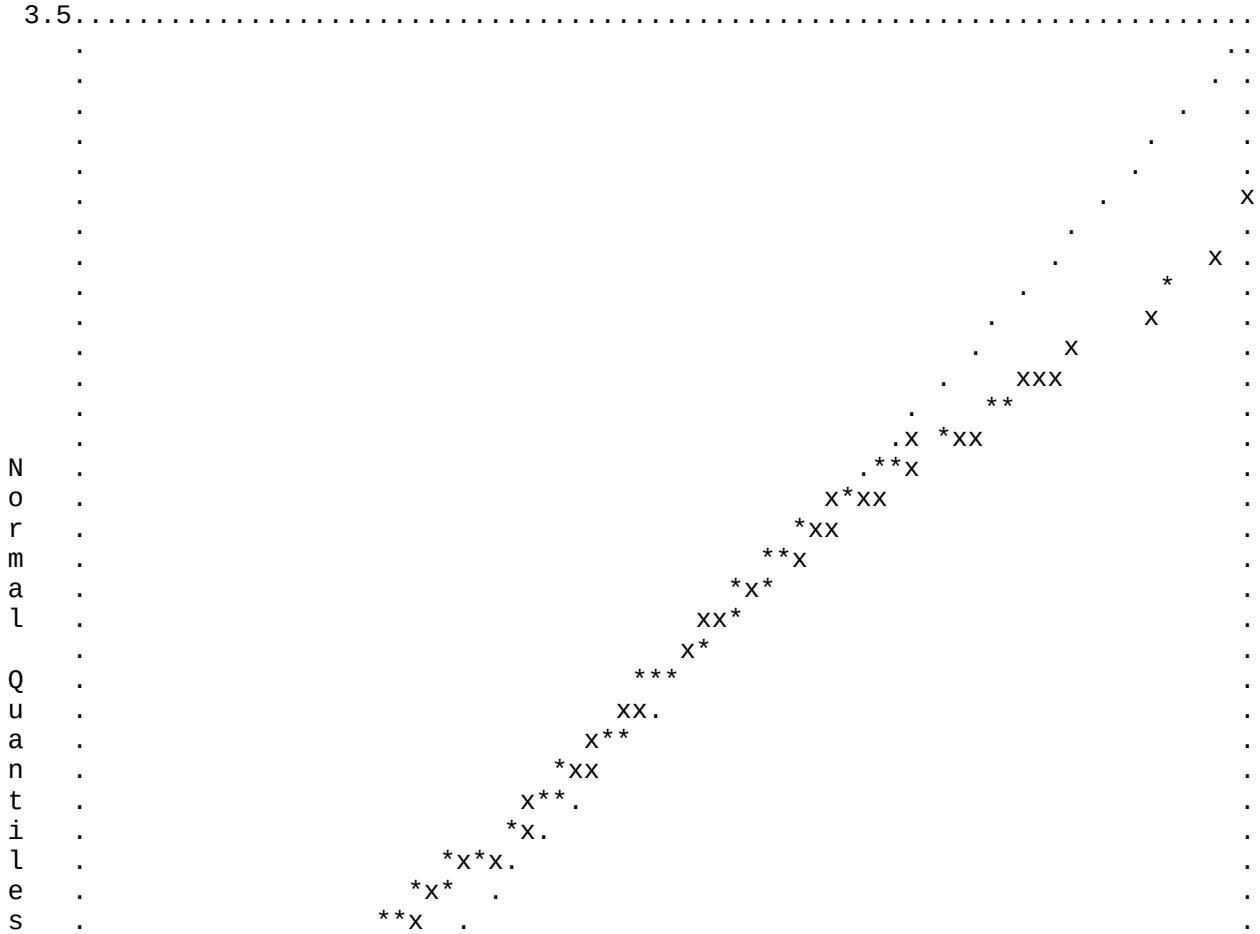
Residual for	SI3	and	OC1	-2.68
Residual for	SI4	and	OC1	-2.74
Residual for	EP3	and	OC1	-2.59

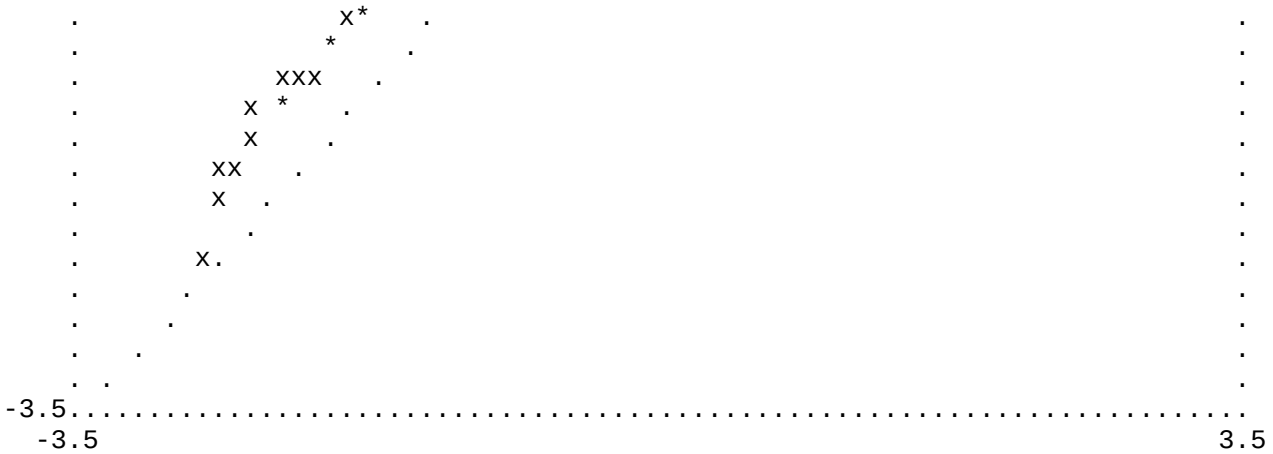
Largest Positive Standardized Residuals

Residual for	SI2	and	SI1	3.80
Residual for	SI4	and	SI3	3.07
Residual for	EP2	and	OC3	2.98
Residual for	EP4	and	OC3	2.88
Residual for	EP4	and	EP3	3.28

TI CFA HBAT EXAMPLE

Qplot of Standardized Residuals





TI CFA HBAT EXAMPLE

Modification Indices and Expected Change

Modification Indices for LAMBDA-X

	JS	OC	SI	EP	AC
JS1	- -	0.19	1.44	2.71	0.69
JS2	- -	2.11	0.32	0.53	2.55
JS3	- -	0.00	0.29	0.16	0.00
JS4	- -	0.59	0.09	0.40	0.10
JS5	- -	3.20	2.59	1.38	4.96
OC1	0.64	- -	10.86	3.02	2.75
OC2	0.07	- -	10.84	0.51	7.14
OC3	1.01	- -	3.15	7.59	1.86
OC4	0.00	- -	0.07	0.02	1.02
SI1	0.00	0.00	- -	0.29	0.02
SI2	1.89	0.08	- -	1.66	0.59
SI3	0.15	1.85	- -	0.10	0.00
SI4	2.78	0.55	- -	2.46	0.37
EP1	0.10	1.85	1.74	- -	0.05
EP2	0.11	3.48	0.78	- -	0.53
EP3	0.31	0.17	3.00	- -	0.00
EP4	0.17	0.17	0.11	- -	0.85
AC1	0.70	0.38	0.02	0.07	- -
AC2	0.43	2.45	0.84	0.22	- -
AC3	1.59	0.07	0.02	0.89	- -
AC4	1.29	3.70	0.89	3.01	- -

Expected Change for LAMBDA-X

	JS	OC	SI	EP	AC
JS1	- -	0.02	-0.09	-0.07	-0.04
JS2	- -	-0.06	-0.05	0.03	-0.08
JS3	- -	0.00	0.04	0.02	0.00
JS4	- -	-0.03	-0.02	-0.03	0.02
JS5	- -	0.01	0.02	0.01	0.02
OC1	-0.10	- -	-0.67	-0.19	-0.17

OC2	-0.02	- -	0.49	-0.06	0.19
OC3	0.08	- -	-0.24	0.20	-0.09
OC4	0.00	- -	-0.04	-0.01	-0.07
SI1	0.00	0.00	- -	-0.02	0.00
SI2	-0.04	0.01	- -	-0.04	-0.02
SI3	-0.02	-0.05	- -	0.01	0.00
SI4	0.06	0.02	- -	0.05	0.02
EP1	0.03	-0.09	0.18	- -	0.01
EP2	-0.02	0.10	0.10	- -	0.04
EP3	0.03	-0.02	-0.17	- -	0.00
EP4	-0.02	-0.02	-0.03	- -	-0.04
AC1	0.04	-0.02	-0.01	-0.01	- -
AC2	-0.04	-0.07	-0.08	-0.02	- -
AC3	-0.06	0.01	0.01	-0.04	- -
AC4	0.07	0.08	0.08	0.08	- -

Standardized Expected Change for LAMBDA-X

	JS	OC	SI	EP	AC
JS1	- -	0.02	-0.07	-0.09	-0.05
JS2	- -	-0.08	-0.03	0.04	-0.09
JS3	- -	0.00	0.03	0.02	0.00
JS4	- -	-0.04	-0.02	-0.04	0.02
JS5	- -	0.02	0.01	0.01	0.02
OC1	-0.10	- -	-0.47	-0.24	-0.20
OC2	-0.02	- -	0.35	-0.07	0.22
OC3	0.08	- -	-0.17	0.25	-0.11
OC4	0.00	- -	-0.03	-0.01	-0.08
SI1	0.00	0.00	- -	-0.02	0.00
SI2	-0.04	0.01	- -	-0.05	-0.02
SI3	-0.02	-0.07	- -	0.02	0.00
SI4	0.06	0.03	- -	0.07	0.02
EP1	0.03	-0.13	0.13	- -	0.02
EP2	-0.02	0.14	0.07	- -	0.05
EP3	0.03	-0.03	-0.12	- -	0.00
EP4	-0.02	-0.03	-0.02	- -	-0.05
AC1	0.04	-0.03	-0.01	-0.01	- -
AC2	-0.04	-0.10	-0.06	-0.03	- -
AC3	-0.06	0.01	0.01	-0.05	- -
AC4	0.07	0.12	0.06	0.10	- -

Completely Standardized Expected Change for LAMBDA-X

	JS	OC	SI	EP	AC
JS1	- -	0.02	-0.05	-0.07	-0.03
JS2	- -	-0.06	-0.02	0.03	-0.06
JS3	- -	0.00	0.02	0.02	0.00
JS4	- -	-0.03	-0.01	-0.03	0.01
JS5	- -	0.08	0.07	0.05	0.09
OC1	-0.04	- -	-0.19	-0.10	-0.08
OC2	-0.01	- -	0.16	-0.03	0.10
OC3	0.04	- -	-0.10	0.14	-0.06
OC4	0.00	- -	-0.01	-0.01	-0.04
SI1	0.00	0.00	- -	-0.02	0.01
SI2	-0.05	0.01	- -	-0.06	-0.03

SI3	-0.02	-0.07	- -	0.02	0.00
SI4	0.06	0.03	- -	0.07	0.02
EP1	0.01	-0.07	0.07	- -	0.01
EP2	-0.01	0.09	0.04	- -	0.03
EP3	0.02	-0.02	-0.09	- -	0.00
EP4	-0.02	-0.02	-0.02	- -	-0.04
AC1	0.03	-0.02	-0.01	-0.01	- -
AC2	-0.02	-0.06	-0.03	-0.02	- -
AC3	-0.04	0.01	0.00	-0.03	- -
AC4	0.04	0.07	0.04	0.06	- -

No Non-Zero Modification Indices for PHI

Modification Indices for THETA-DELTA

	JS1	JS2	JS3	JS4	JS5	OC1
JS1	- -					
JS2	0.00	- -				
JS3	0.38	0.50	- -			
JS4	0.37	0.07	2.25	- -		
JS5	0.08	0.73	2.18	0.07	- -	
OC1	0.43	0.12	0.12	0.03	0.26	- -
OC2	0.10	1.17	0.52	0.36	1.12	0.46
OC3	1.29	0.18	1.65	1.12	0.50	4.76
OC4	2.20	0.33	0.24	0.50	0.05	0.05
SI1	0.01	0.10	0.23	0.14	0.09	0.00
SI2	1.20	0.51	3.58	3.28	0.09	0.25
SI3	5.96	0.05	3.61	3.74	1.21	0.31
SI4	0.02	0.22	0.34	0.88	0.41	1.55
EP1	3.14	1.12	0.50	0.00	0.12	1.63
EP2	1.53	0.60	1.09	0.03	2.16	0.61
EP3	0.35	0.11	0.02	0.46	4.74	5.76
EP4	0.61	0.12	0.34	0.11	0.59	3.89
AC1	0.94	0.66	0.03	0.06	0.78	3.16
AC2	0.02	0.02	0.14	0.66	0.20	1.52
AC3	0.79	0.00	1.43	2.97	0.70	0.26
AC4	0.48	0.17	1.76	0.08	0.71	0.05

Modification Indices for THETA-DELTA

	OC2	OC3	OC4	SI1	SI2	SI3
OC2	- -					
OC3	6.10	- -				
OC4	0.28	1.41	- -			
SI1	0.28	2.56	0.30	- -		
SI2	3.57	0.08	1.72	14.44	- -	
SI3	0.00	0.29	0.44	1.97	1.82	- -
SI4	0.01	0.91	1.69	5.77	3.08	9.42
EP1	2.39	0.81	1.53	0.04	1.33	0.19
EP2	0.65	1.27	1.16	3.90	0.07	0.32
EP3	5.49	0.28	2.36	2.08	0.25	0.00
EP4	3.70	5.95	0.36	6.38	1.35	0.86
AC1	5.59	0.49	7.30	3.31	0.20	0.93
AC2	1.97	0.95	0.15	0.08	0.02	0.30
AC3	0.82	0.71	0.14	0.54	0.13	0.08

AC4	0.08	0.03	1.50	1.51	0.00	0.28

Modification Indices for THETA-DELTA

	SI4	EP1	EP2	EP3	EP4	AC1
SI4	- -					
EP1	0.02	- -				
EP2	6.72	4.37	- -			
EP3	0.16	3.41	0.63	- -		
EP4	3.07	0.33	5.04	10.75	- -	
AC1	3.21	0.17	0.17	3.91	1.41	- -
AC2	0.05	0.83	0.02	2.35	0.83	0.02
AC3	1.79	1.08	0.23	0.02	2.20	0.11
AC4	1.03	1.96	1.07	0.10	1.43	0.00

Modification Indices for THETA-DELTA

	AC2	AC3	AC4
AC2	- -		
AC3	0.17	- -	
AC4	0.04	0.66	- -

Expected Change for THETA-DELTA

	JS1	JS2	JS3	JS4	JS5	OC1
JS1	- -					
JS2	0.00	- -				
JS3	0.04	-0.04	- -			
JS4	-0.03	-0.02	0.09	- -		
JS5	0.00	0.01	-0.01	0.00	- -	
OC1	-0.07	0.04	0.04	0.02	-0.01	- -
OC2	-0.02	-0.07	0.05	-0.04	0.01	0.12
OC3	0.08	0.03	-0.09	0.07	-0.01	0.33
OC4	0.10	-0.04	-0.03	-0.05	0.00	-0.04
SI1	0.00	-0.01	0.01	-0.01	0.00	0.00
SI2	0.03	0.02	-0.05	-0.05	0.00	-0.03
SI3	-0.09	-0.01	0.07	0.07	-0.01	-0.04
SI4	0.00	-0.01	0.02	0.03	0.00	-0.08
EP1	-0.12	0.08	0.05	0.00	0.00	-0.19
EP2	0.07	0.04	-0.06	-0.01	-0.01	0.09
EP3	-0.03	-0.02	0.01	-0.03	0.02	-0.24
EP4	-0.04	0.02	0.03	0.02	-0.01	0.19
AC1	0.04	-0.04	0.01	-0.01	0.01	-0.17
AC2	0.01	0.01	-0.02	-0.04	0.00	0.15
AC3	-0.04	0.00	-0.06	0.08	-0.01	-0.05
AC4	-0.04	-0.02	0.07	-0.01	0.01	0.02

Expected Change for THETA-DELTA

	OC2	OC3	OC4	SI1	SI2	SI3
OC2	- -					
OC3	-0.31	- -				
OC4	-0.11	0.14	- -			

SI1	0.02	-0.06	0.02	- -		
SI2	0.07	0.01	-0.05	0.08	- -	
SI3	0.00	-0.03	-0.03	-0.03	-0.03	- -
SI4	0.00	-0.04	0.05	-0.05	-0.04	0.08
EP1	-0.14	-0.09	0.11	0.01	0.04	0.02
EP2	-0.06	0.09	0.08	-0.06	-0.01	-0.02
EP3	0.15	0.03	-0.10	-0.04	-0.01	0.00
EP4	-0.12	0.16	-0.04	0.07	-0.03	0.03
AC1	0.14	0.04	-0.16	0.05	-0.01	0.03
AC2	-0.10	-0.08	0.03	0.01	0.00	-0.02
AC3	0.05	-0.05	0.02	-0.02	-0.01	0.01
AC4	-0.02	0.01	0.08	-0.04	0.00	-0.02

Expected Change for THETA-DELTA

	SI4	EP1	EP2	EP3	EP4	AC1
SI4	- -					
EP1	-0.01	- -				
EP2	0.08	0.19	- -			
EP3	0.01	-0.14	-0.05	- -		
EP4	-0.05	-0.04	-0.17	0.19	- -	
AC1	-0.05	-0.03	-0.02	0.08	-0.05	- -
AC2	-0.01	0.07	0.01	-0.08	0.05	-0.01
AC3	0.04	0.07	-0.02	0.01	-0.06	0.02
AC4	0.03	-0.10	0.06	-0.02	0.06	0.00

Expected Change for THETA-DELTA

	AC2	AC3	AC4
AC2	- -		
AC3	0.03	- -	
AC4	0.01	-0.05	- -

Completely Standardized Expected Change for THETA-DELTA

	JS1	JS2	JS3	JS4	JS5	OC1
JS1	- -					
JS2	0.00	- -				
JS3	0.02	-0.02	- -			
JS4	-0.02	-0.01	0.05	- -		
JS5	0.01	0.03	-0.05	-0.01	- -	
OC1	-0.02	0.01	0.01	0.01	-0.02	- -
OC2	-0.01	-0.02	0.02	-0.01	0.02	0.02
OC3	0.03	0.01	-0.04	0.03	-0.02	0.07
OC4	0.04	-0.01	-0.01	-0.02	0.01	-0.01
SI1	0.00	-0.01	0.01	-0.01	0.01	0.00
SI2	0.02	0.02	-0.04	-0.04	0.01	-0.01
SI3	-0.07	-0.01	0.05	0.05	-0.03	-0.02
SI4	0.00	-0.01	0.01	0.02	0.01	-0.03
EP1	-0.05	0.03	0.02	0.00	0.01	-0.04
EP2	0.03	0.02	-0.03	0.00	-0.04	0.02
EP3	-0.02	-0.01	0.00	-0.02	0.06	-0.07
EP4	-0.02	0.01	0.02	0.01	-0.02	0.05
AC1	0.02	-0.02	0.00	-0.01	0.02	-0.05

AC2	0.00	0.00	-0.01	-0.02	0.01	0.03
AC3	-0.02	0.00	-0.03	0.04	-0.02	-0.01
AC4	-0.02	-0.01	0.03	-0.01	0.02	0.01

Completely Standardized Expected Change for THETA-DELTA

	OC2	OC3	OC4	SI1	SI2	SI3
OC2	- -					
OC3	-0.08	- -				
OC4	-0.02	0.04	- -			
SI1	0.01	-0.04	0.01	- -		
SI2	0.03	0.01	-0.03	0.10	- -	
SI3	0.00	-0.02	-0.02	-0.04	-0.03	- -
SI4	0.00	-0.02	0.03	-0.06	-0.05	0.08
EP1	-0.04	-0.03	0.03	0.00	0.03	0.01
EP2	-0.02	0.03	0.02	-0.04	-0.01	-0.01
EP3	0.05	0.01	-0.03	-0.03	-0.01	0.00
EP4	-0.04	0.06	-0.01	0.05	-0.02	0.02
AC1	0.05	0.02	-0.06	0.04	-0.01	0.02
AC2	-0.03	-0.02	0.01	0.01	0.00	-0.01
AC3	0.02	-0.02	0.01	-0.02	-0.01	0.01
AC4	-0.01	0.00	0.03	-0.03	0.00	-0.01

Completely Standardized Expected Change for THETA-DELTA

	SI4	EP1	EP2	EP3	EP4	AC1
SI4	- -					
EP1	0.00	- -				
EP2	0.05	0.06	- -			
EP3	0.01	-0.06	-0.02	- -		
EP4	-0.04	-0.02	-0.07	0.10	- -	
AC1	-0.04	-0.01	-0.01	0.05	-0.03	- -
AC2	0.00	0.02	0.00	-0.04	0.02	0.00
AC3	0.03	0.03	-0.01	0.00	-0.03	0.01
AC4	0.02	-0.03	0.02	-0.01	0.03	0.00

Completely Standardized Expected Change for THETA-DELTA

	AC2	AC3	AC4
AC2	- -		
AC3	0.01	- -	
AC4	0.01	-0.02	- -

Maximum Modification Index is 14.44 for Element (11,10) of THETA-DELTA

TI CFA HBAT EXAMPLE

Standardized Solution

LAMBDA-X

	JS	OC	SI	EP	AC
JS1	0.99	- -	- -	- -	- -

JS2	1.02	- -	- -	- -	- -
JS3	0.89	- -	- -	- -	- -
JS4	0.90	- -	- -	- -	- -
JS5	0.15	- -	- -	- -	- -
OC1	- -	1.47	- -	- -	- -
OC2	- -	1.93	- -	- -	- -
OC3	- -	1.15	- -	- -	- -
OC4	- -	1.72	- -	- -	- -
SI1	- -	- -	0.71	- -	- -
SI2	- -	- -	0.76	- -	- -
SI3	- -	- -	0.75	- -	- -
SI4	- -	- -	0.82	- -	- -
EP1	- -	- -	- -	1.28	- -
EP2	- -	- -	- -	1.32	- -
EP3	- -	- -	- -	1.03	- -
EP4	- -	- -	- -	1.15	- -
AC1	- -	- -	- -	- -	1.15
AC2	- -	- -	- -	- -	1.42
AC3	- -	- -	- -	- -	1.19
AC4	- -	- -	- -	- -	1.32

PHI

	JS	OC	SI	EP	AC
JS	1.00				
OC	0.21	1.00			
SI	0.23	0.55	1.00		
EP	0.24	0.50	0.56	1.00	
AC	0.05	0.31	0.31	0.25	1.00

TI CFA HBAT EXAMPLE

Completely Standardized Solution

LAMBDA-X

	JS	OC	SI	EP	AC
JS1	0.74	- -	- -	- -	- -
JS2	0.75	- -	- -	- -	- -
JS3	0.68	- -	- -	- -	- -
JS4	0.70	- -	- -	- -	- -
JS5	0.73	- -	- -	- -	- -
OC1	- -	0.58	- -	- -	- -
OC2	- -	0.88	- -	- -	- -
OC3	- -	0.66	- -	- -	- -
OC4	- -	0.84	- -	- -	- -
SI1	- -	- -	0.81	- -	- -
SI2	- -	- -	0.86	- -	- -
SI3	- -	- -	0.74	- -	- -
SI4	- -	- -	0.85	- -	- -
EP1	- -	- -	- -	0.70	- -
EP2	- -	- -	- -	0.81	- -
EP3	- -	- -	- -	0.77	- -
EP4	- -	- -	- -	0.82	- -
AC1	- -	- -	- -	- -	0.82

AC2	- -	- -	- -	- -	0.82
AC3	- -	- -	- -	- -	0.84
AC4	- -	- -	- -	- -	0.82

PHI

	JS	OC	SI	EP	AC
JS	1.00				
OC	0.21	1.00			
SI	0.23	0.55	1.00		
EP	0.24	0.50	0.56	1.00	
AC	0.05	0.31	0.31	0.25	1.00

THETA-DELTA

JS1	JS2	JS3	JS4	JS5	OC1
0.45	0.44	0.54	0.50	0.47	0.66

THETA-DELTA

OC2	OC3	OC4	SI1	SI2	SI3
0.22	0.57	0.30	0.34	0.25	0.45

THETA-DELTA

SI4	EP1	EP2	EP3	EP4	AC1
0.27	0.51	0.34	0.41	0.32	0.32

THETA-DELTA

AC2	AC3	AC4
0.33	0.30	0.33

Time used: 0.125 Seconds