IRTPRO Version 2.0
Output generated by IRTPRO estimation engine Version 4.54 (32-bit)

Project:	
Description:	
Date:	31 May 2018
Time:	10:55 AM

Table of Contents

Graded Model Item Parameter Estimates, logit: $a\theta + c$

Item	Label	a	s.e.	c_1	s.e.	c_2	s.e.	c_3	s.e.	c_4	s.e.	c_5	s.e.	c_6	s.e.
1	tol1.r	7 2.73	0.17	1 2.59	0.19	2 0.38	0.16	3 -1.33	0.17	4 -2.22	0.18	5 -3.22	0.21	6 -4.89	0.27
2	tol2	14 3.57	0.23	8 1.11	0.19	9 -1.34	0.20	10 -3.25	0.25	11 -4.20	0.27	12 -5.67	0.33	13 -7.33	0.44
3	tol3	21 3.79	0.24	15 1.88	0.21	16 -1.07	0.20	17 -2.88	0.24	18 -4.23	0.28	19 -5.57	0.33	20 -7.41	0.44
4	tol4	28 1.67	0.11	22 1.93	0.14	23 0.46	0.12	24 -0.52	0.12	25 -1.61	0.13	26 -2.96	0.17	27 -4.55	0.27
5	tol5.r	35 3.03	0.19	29 2.51	0.20	30 0.19	0.17	31 -2.07	0.19	32 -3.25	0.22	33 -4.39	0.26	34 -6.09	0.35
6	tol6.r	42 2.48	0.16	36 1.98	0.17	37 0.07	0.14	38 -1.64	0.16	39 -2.66	0.18	40 -3.81	0.22	41 -5.00	0.28
7	tol7	49 2.94	0.19	43 1.26	0.17	44 -0.75	0.17	45 -2.39	0.20	46 -3.10	0.21	47 -4.20	0.25	48 -5.48	0.31
8	tol8.r	56 3.87	0.24	50 2.50	0.23	51 -0.24	0.20	52 -2.56	0.24	53 -3.73	0.27	54 -5.11	0.32	55 -6.89	0.40
9	tol9	63 1.69	0.11	57 2.80	0.17	58 1.59	0.13	59 0.64	0.12	60 -0.45	0.12	61 -1.87	0.14	62 -3.13	0.18
10	tol10	70 4.28	0.29	64 0.63	0.22	65 -2.32	0.26	66 -4.21	0.31	67 -5.55	0.37	68 -7.41	0.46	69 -9.66	0.66
11	tol11	77 3.19	0.21	71 0.85	0.18	72 -1.66	0.19	73 -2.98	0.22	74 -4.41	0.27	75 -5.92	0.35	76 -9.15	0.77
12	tol12	84 3.15	0.20	78 1.04	0.18	79 -1.33	0.18	80 -2.82	0.22	81 -4.17	0.26	82 -5.76	0.33	83 -6.98	0.42
13	tol13	91 1.30	0.11	85 -0.18	0.11	86 -1.36	0.12	87 -1.93	0.13	88 -2.58	0.16	89 -3.17	0.19	90 -3.81	0.23
14	tol14	98 2.39	0.16	92 1.07	0.15	93 -0.80	0.15	94 -2.00	0.17	95 -3.16	0.20	96 -4.18	0.24	97 -5.26	0.30
15	tol15.r	105 3.50	0.22	99 2.67	0.22	100 -0.08	0.19	101 -2.27	0.22	102 -3.37	0.24	103 -4.84	0.29	104 -6.08	0.35
16	tol16.r	112 3.08	0.19	106 1.31	0.18	107 -0.89	0.17	108 -2.91	0.22	109 -4.50	0.27	110 -5.33	0.31	111 -6.59	0.40
17	tol17	119 2.02	0.13	113 1.91	0.15	114 0.25	0.13	115 -0.74	0.13	116 -1.86	0.15	117 -3.43	0.19	118 -5.24	0.32
18	tol18.r	126 3.13	0.19	120 2.49	0.20	121 -0.10	0.17	122 -2.07	0.19	123 -3.48	0.23	124 -4.76	0.27	125 -5.90	0.34

Graded Model Item Parameter Estimates for Group 1, logit: $a(\theta - b)$ (Back to TOC)

Item	Label	a	s.e.	b_1	s.e.	b_2	s.e.	b_3	s.e.	b_4	s.e.	b_5	s.e.	b_6	s.e.
1	tol1.r	7 2.73	0.17	-0.95	0.08	-0.14	0.06	0.49	0.06	0.81	0.06	1.18	0.07	1.79	0.10
2	tol2	14 3.57	0.23	-0.31	0.06	0.37	0.05	0.91	0.06	1.18	0.06	1.59	0.08	2.05	0.11
3	tol3	21 3.79	0.24	-0.50	0.06	0.28	0.05	0.76	0.05	1.12	0.06	1.47	0.07	1.96	0.11
4	tol4	28 1.67	0.11	-1.16	0.10	-0.28	0.07	0.31	0.07	0.97	0.08	1.78	0.12	2.73	0.20
5	tol5.r	35 3.03	0.19	-0.83	0.07	-0.06	0.06	0.69	0.05	1.07	0.06	1.45	0.08	2.01	0.11
6	tol6.r	42 2.48	0.16	-0.80	0.08	-0.03	0.06	0.66	0.06	1.07	0.07	1.54	0.09	2.02	0.12
7	tol7	49 2.94	0.19	-0.43	0.06	0.26	0.05	0.81	0.06	1.05	0.06	1.43	0.08	1.86	0.10
8	tol8.r	56 3.87	0.24	-0.64	0.06	0.06	0.05	0.66	0.05	0.96	0.05	1.32	0.07	1.78	0.09
9	tol9	63 1.69	0.11	-1.66	0.12	-0.94	0.09	-0.38	0.07	0.27	0.07	1.11	0.09	1.85	0.12
10	tol10	70 4.28	0.29	-0.15	0.05	0.54	0.05	0.98	0.05	1.30	0.06	1.73	0.09	2.26	0.13
11	tol11	77 3.19	0.21	-0.27	0.06	0.52	0.05	0.93	0.06	1.38	0.07	1.86	0.10	2.87	0.24
12	tol12	84 3.15	0.20	-0.33	0.06	0.42	0.05	0.89	0.06	1.32	0.07	1.83	0.10	2.21	0.13
13	tol13	91 1.30	0.11	0.14	0.08	1.04	0.10	1.48	0.13	1.98	0.16	2.44	0.20	2.93	0.25
14	tol14	98 2.39	0.16	-0.45	0.07	0.33	0.06	0.84	0.06	1.32	0.08	1.75	0.10	2.20	0.14
15	tol15.r	105 3.50	0.22	-0.76	0.07	0.02	0.05	0.65	0.05	0.96	0.06	1.38	0.07	1.74	0.09
16	tol16.r	112 3.08	0.19	-0.43	0.06	0.29	0.05	0.95	0.06	1.46	0.08	1.73	0.09	2.14	0.12
17	tol17	119 2.02	0.13	-0.95	0.08	-0.12	0.06	0.37	0.06	0.92	0.07	1.70	0.10	2.60	0.18
18	tol18.r	126 3.13	0.19	-0.80	0.07	0.03	0.05	0.66	0.05	1.11	0.06	1.52	0.08	1.89	0.10

Factor Loadings for Group 1 (Back to TOC)

Item	Label	λ_1	s.e.
1	tol1.r	0.85	0.02
2	tol2	0.90	0.02
3	tol3	0.91	0.02
4	tol4	0.70	0.04
5	tol5.r	0.87	0.02
6	tol6.r	0.82	0.03
7	tol7	0.87	0.02

8	tol8.r	0.92	0.02
9	tol9	0.70	0.04
10	tol10	0.93	0.01
11	tol11	0.88	0.02
12	tol12	0.88	0.02
13	tol13	0.61	0.06
14	tol14	0.82	0.03
15	tol15.r	0.90	0.02
16	tol16.r	0.88	0.02
17	tol17	0.76	0.03
18	tol18.r	0.88	0.02

Summed-Score Based Item Diagnostic Tables and X^2s for Group 1 (Back to TOC)

S-X^2 Item Level Diagnostic Statistics

Item	Label	X^2	*d.f.*	Probability
1	tol1.r	214.63	173	0.0172
2	tol2	206.42	133	0.0001
3	tol3	157.19	132	0.0665
4	tol4	259.24	193	0.0010
5	tol5.r	185.90	151	0.0281
6	tol6.r	297.72	173	0.0001
7	tol7	343.33	153	0.0001
8	tol8.r	188.24	142	0.0057
9	tol9	268.15	215	0.0080
10	tol10	142.77	108	0.0140
11	tol11	179.70	133	0.0043
12	tol12	167.94	136	0.0327
13	tol13	409.95	159	0.0001
14	tol14	396.46	165	0.0001
15	tol15.r	194.74	150	0.0082
16	tol16.r	181.16	141	0.0127
17	tol17	271.87	197	0.0003
18	tol18.r	170.17	148	0.1024

Group Parameter Estimates (Back to TOC)

Group	Label	μ	*s.e.*	σ^2	*s.e.*	σ	*s.e.*
1	Group 1	0.00	-----	1.00	-----	1.00	-----

Marginal fit (X^2) and Standardized LD X^2 Statistics for Group 1 (Back to TOC)

Item	Label	Marginal X^2	1	2	3	4	5	6	7	8	9	10
1	tol1.r	3.1										
2	tol2	7.0	10.2									
3	tol3	5.9	4.8	14.8								
4	tol4	2.8	9.8	4.6	8.3							
5	tol5.r	2.8	11.5	8.4	6.0	10.3						
6	tol6.r	4.0	3.7	17.9	15.4	11.1	5.4					
7	tol7	6.5	21.1	37.3	21.2	12.3	28.0	19.4				
8	tol8.r	4.7	9.5	5.1	10.2	7.4	7.5	4.5	27.0			
9	tol9	1.0	7.3	3.0	3.8	5.4	2.9	4.4	3.7	2.5		
10	tol10	3.9	10.0	10.8	6.0	11.9	5.9	14.2	35.8	7.6	4.1	
11	tol11	5.2	7.1	8.8	8.9	9.6	8.4	8.2	19.9	9.9	2.3	11.3
12	tol12	6.5	7.0	11.9	7.3	7.7	10.1	12.2	19.4	8.8	1.4	10.5
13	tol13	3.4	20.9	27.1	27.2	15.7	22.5	26.9	24.0	30.7	6.6	25.7
14	tol14	5.0	21.1	29.4	16.3	15.6	19.3	27.2	28.5	26.7	4.1	27.5
15	tol15.r	4.5	11.7	12.8	9.3	7.3	4.0	7.1	21.9	17.3	4.0	13.1
16	tol16.r	2.8	4.3	7.8	13.6	7.5	4.5	7.2	26.3	7.1	3.2	1.9
17	tol17	4.8	7.4	9.0	13.5	7.8	5.9	7.5	16.3	5.1	5.1	8.2
18	tol18.r	3.9	10.6	20.0	8.8	5.7	7.9	8.1	14.2	11.1	4.4	7.0

Item	Label	Marginal X^2	11	12	13	14	15	16	17
11	tol11	5.2							
12	tol12	6.5	19.0						
13	tol13	3.4	27.0	23.6					
14	tol14	5.0	28.1	28.8	23.7				
15	tol15.r	4.5	14.0	15.2	25.6	25.5			
16	tol16.r	2.8	6.0	9.8	28.1	35.6	7.7		
17	tol17	4.8	11.7	13.2	14.6	19.2	7.8	8.3	
18	tol18.r	3.9	5.4	12.0	31.9	24.6	9.8	10.7	8.5

Item Information Function Values for Group 1 at 15 Values of θ from -2.8 to 2.8 (Back to TOC)

Item	Label	θ: -2.8	-2.4	-2.0	-1.6	-1.2	-0.8	-0.4	-0.0	0.4	0.8	1.2	1.6	2.0	2.4	2.8
1	tol1.r	0.05	0.13	0.38	0.92	1.70	2.09	2.15	2.25	2.32	2.39	2.34	2.21	1.79	1.00	0.42
2	tol2	0.00	0.01	0.03	0.13	0.49	1.62	3.22	3.48	3.73	3.88	4.01	3.93	3.65	2.24	0.77
3	tol3	0.00	0.01	0.05	0.21	0.87	2.64	3.78	3.64	4.23	4.43	4.49	4.33	3.83	1.91	0.54

4	tol4	0.16	0.28	0.45	0.63	0.77	0.84	0.87	0.89	0.89	0.89	0.88	0.87	0.85	0.83	0.76
5	tol5.r	0.02	0.08	0.25	0.74	1.71	2.48	2.56	2.63	2.62	2.84	2.90	2.80	2.56	1.67	0.71
6	tol6.r	0.04	0.11	0.28	0.66	1.23	1.68	1.80	1.85	1.88	1.94	1.96	1.93	1.76	1.27	0.68
7	tol7	0.01	0.03	0.08	0.26	0.74	1.65	2.38	2.53	2.63	2.72	2.76	2.67	2.22	1.24	0.49
8	tol8.r	0.00	0.02	0.08	0.35	1.40	3.49	3.92	4.18	4.24	4.67	4.67	4.43	3.21	1.14	0.28
9	tol9	0.32	0.50	0.69	0.82	0.89	0.91	0.91	0.91	0.90	0.89	0.89	0.85	0.76	0.59	0.40
10	tol10	0.00	0.00	0.01	0.04	0.20	0.99	3.48	4.76	4.90	5.46	5.66	5.45	5.15	4.28	1.49
11	tol11	0.00	0.01	0.04	0.14	0.47	1.33	2.51	2.76	2.94	3.17	3.18	3.11	2.75	2.36	2.65
12	tol12	0.00	0.01	0.05	0.18	0.57	1.51	2.57	2.75	2.95	3.09	3.10	3.07	3.04	2.39	1.17
13	tol13	0.04	0.06	0.09	0.14	0.22	0.30	0.39	0.46	0.51	0.54	0.55	0.55	0.55	0.54	0.51
14	tol14	0.02	0.05	0.13	0.32	0.70	1.23	1.60	1.70	1.77	1.81	1.83	1.83	1.75	1.44	0.90
15	tol15.r	0.01	0.04	0.16	0.59	1.79	3.18	3.17	3.47	3.54	3.82	3.83	3.70	2.56	1.00	0.28
16	tol16.r	0.01	0.02	0.07	0.24	0.73	1.74	2.58	2.69	2.78	2.81	2.92	3.00	2.86	2.10	0.98
17	tol17	0.09	0.20	0.39	0.68	1.00	1.18	1.25	1.28	1.30	1.29	1.26	1.25	1.22	1.18	1.02
18	tol18.r	0.02	0.06	0.22	0.68	1.69	2.59	2.61	2.81	2.89	3.02	3.08	3.05	2.55	1.37	0.50
Test Information:		1.80	2.62	4.44	8.73	18.16	32.45	42.75	46.04	48.02	50.65	51.29	50.05	44.07	29.55	15.54
Expected s.e.:		0.75	0.62	0.47	0.34	0.23	0.18	0.15	0.15	0.14	0.14	0.14	0.14	0.15	0.18	0.25

Marginal Reliability for Response Pattern Scores: 0.96

Likelihood-based Values and Goodness of Fit Statistics (Back to TOC)

Statistics based on the loglikelihood	
-2loglikelihood:	28330.48
Akaike Information Criterion (AIC):	28582.48
Bayesian Information Criterion (BIC):	29137.34

Statistics based on the full item x item x ... classification

The table is too sparse to compute the general multinomial goodness of fit statistics.

Statistics based on one- and two-way marginal tables

M_2	Degrees of freedom	Probability	RMSEA
207.10	45	0.0001	0.08

Note: M_2 is based on ordinal subtables.

Note: Model-based weight matrix is used.

Summary of the Data and Control Parameters (Back to TOC)

Sample Size	604
Number of Items	18
Number of Dimensions	1

Item	Label	Categories	Model
1	tol1.r	7	Graded
2	tol2	7	Graded
3	tol3	7	Graded
4	tol4	7	Graded
5	tol5.r	7	Graded
6	tol6.r	7	Graded
7	tol7	7	Graded
8	tol8.r	7	Graded
9	tol9	7	Graded
10	tol10	7	Graded
11	tol11	7	Graded
12	tol12	7	Graded
13	tol13	7	Graded
14	tol14	7	Graded
15	tol15.r	7	Graded
16	tol16.r	7	Graded
17	tol17	7	Graded
18	tol18.r	7	Graded

Parameter Estimation Control Values

Bock-Aitkin EM Algorithm		
Maximum number of cycles:	500	
Convergence criterion:	1.00e-005	
Maximum number of M-step iterations:	50	
Convergence criterion for iterative M-steps:	1.00e-006	
Number of rectangular quadrature points:	49	
Minimum, Maximum quadrature points:	-6.00	6.00
SEM algorithm tolerance:	1.00e-003	
Standard error computation algorithm:	Supplemented EM	

Miscellaneous Control Values

Print parameter numbers?	Yes
Z tolerance, max. abs. logit value:	50.00
Number of processor cores used:	1
Number of cycles completed:	346
Maximum parameter change:	0.00e+000
Number of free parameters:	126

Processing times (in seconds)

E-step computations:	0.47
M-step computations:	0.67
Standard error computations:	1.53
Goodness-of-fit statistics:	11.79
Total:	14.46

Output Files

HTML results and control parameters: E:\Scale Construction\Recoded for higher=tolerance\Study 1\fullitems.Test1-irt.htm

Convergence and Numerical Stability

Engine status:	Normal termination
SEM algorithm status:	Normal
First-order test:	Convergence criteria satisfied
Condition number of information matrix:	6.99e+002
Second-order test:	Solution is a possible local maximum