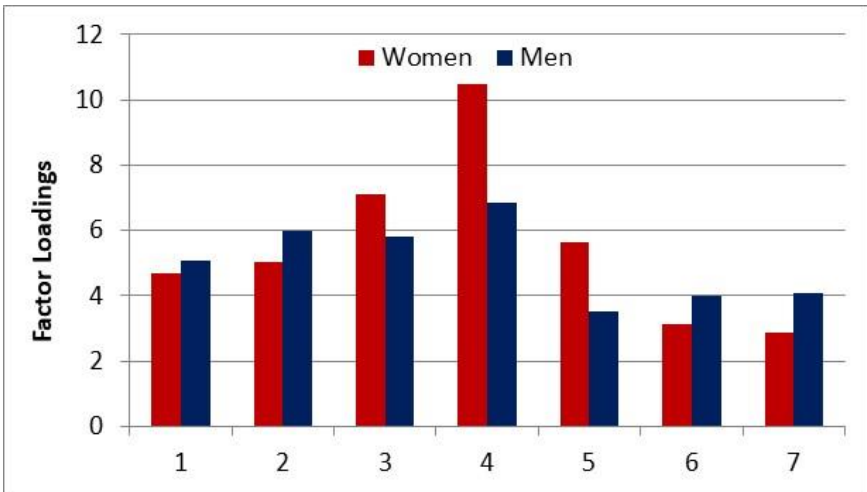


Example 7d: Testing Multiple-Group Measurement Invariance in Item Factor Models using ML in Mplus v. 8.8 (complete Mplus syntax and output is available electronically)

This example comes from the [Octogenarian Twin Study of Aging](#) in Sweden. The current analysis includes 634 older adults (age 80–100 years) on 7 items measuring the Instrumental Activities of Daily Living (IADL), as also used in Example 6a. We are examining differences for men (N=214) versus women (N=420) using **two** response options (for simplicity; ordinal data would proceed similarly), in which the proportion of y=1 responses is shown here for each item for men and women →

Item		Mean	
		Men	Women
1	Housework	0.596	0.657
2	Bedmaking	0.816	0.853
3	Cooking	0.687	0.814
4	Everyday shopping	0.743	0.622
5	Walking to places	0.751	0.603
6	Handling banking	0.767	0.716
7	Using a telephone	0.934	0.948

Multiple Group IFA Model Syntax and Truncated Output:

<pre> TITLE: Assess invariance for binary IADL items using ML DATA: FILE = Example7cd.csv; ! Don't need path if data in same folder FORMAT = free; ! Default TYPE = INDIVIDUAL; ! Default VARIABLE: NAMES = case female dial-dia7 cial-cia7; ! All vars in data USEVARIABLES = dial-dia7; ! All vars in model CATEGORICAL = dial-dia7; ! All ordinal outcomes CLASSES = group(2); ! 2 fake latent classes KNOWNCLASS = group(female=0 1); ! Latent classes = gender MISSING = ALL (9999); ! Missing value code IDVARIABLE = case; ! Person ID variable ANALYSIS: ESTIMATOR = ML; LINK = LOGIT; ! Full-info ML in logits CONVERGENCE = 0.0000001; ! For OS comparability TYPE = MIXTURE; ! For latent classes ALGORITHM = INTEGRATION; ! Required for latent classes !PLOT: TYPE = PLOT1 PLOT2 PLOT3; ! Get all the plots OUTPUT: STDYX TECH10; ! Local misfit, no mod indices for IFA in ML MODEL: ! MEN REFERENCE GROUP CONFIGURAL MODEL (will stay the same) %OVERALL% ! Needed for fake latent class model ! Proportion of men in logits [group#1@-0.67428]; ! Factor loadings all freely estimated, just labeled IADL BY dial-dia7* (L1-L7); ! Item thresholds all freely estimated, just labeled [dial\$1-dia7\$1*] (T1-T7); ! Factor mean=0 and variance=1 for identification [IADL@0]; IADL@1; ! WOMEN ALTERNATIVE GROUP 2 CONFIGURAL MODEL 1 %group#2% ! Needed for fake latent class model ! Factor loadings all freely estimated IADL BY dial-dia7*; ! Item thresholds all freely estimated [dial\$1-dia7\$1*]; ! Factor mean=0 and variance=1 for identification [IADL@0]; IADL@1; </pre>	<p>MODEL FIT INFORMATION</p> <p>Number of Free Parameters 28</p> <p>Loglikelihood H0 Value -1793.471</p> <p>Information Criteria Akaike (AIC) 3642.942 Bayesian (BIC) 3767.600 Sample-Size Adjusted BIC 3687.703 (n* = (n + 2) / 24)</p> <p>This will be our baseline configural model. 29 parameters estimated = 2*[7 loadings + 7 thresholds] = 28</p>  <table border="1" style="margin-top: 10px; width: 100%; text-align: center;"> <caption>Factor Loadings by Item and Gender</caption> <thead> <tr> <th>Item</th> <th>Women</th> <th>Men</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>4.8</td> <td>5.0</td> </tr> <tr> <td>2</td> <td>5.0</td> <td>6.0</td> </tr> <tr> <td>3</td> <td>7.0</td> <td>5.8</td> </tr> <tr> <td>4</td> <td>10.5</td> <td>6.8</td> </tr> <tr> <td>5</td> <td>3.5</td> <td>3.5</td> </tr> <tr> <td>6</td> <td>3.2</td> <td>4.0</td> </tr> <tr> <td>7</td> <td>3.0</td> <td>4.0</td> </tr> </tbody> </table>	Item	Women	Men	1	4.8	5.0	2	5.0	6.0	3	7.0	5.8	4	10.5	6.8	5	3.5	3.5	6	3.2	4.0	7	3.0	4.0
Item	Women	Men																							
1	4.8	5.0																							
2	5.0	6.0																							
3	7.0	5.8																							
4	10.5	6.8																							
5	3.5	3.5																							
6	3.2	4.0																							
7	3.0	4.0																							

Model 1. Configural Invariance Model
(Everything separate across groups *except* for parameters needed to be constrained for identification)

UNSTANDARDIZED MODEL RESULTS (IFA MODEL SOLUTION)						UNSTANDARDIZED MODEL RESULTS (IFA MODEL SOLUTION)					
		Estimate	S.E.	Est./S.E.	Two-Tailed P-Value			Estimate	S.E.	Est./S.E.	Two-Tailed P-Value
Latent Class 1 (0) - refers to female=0 from KNOWNCLASS						Latent Class 2 (1) - refers to female=1 from KNOWNCLASS					
IADL	BY --	FACTOR LOADINGS: dif in logit for unit dif in theta				IADL	BY --	FACTOR LOADINGS: dif in logit for unit dif in theta			
DIA1		5.076	1.291	3.932	0.000	DIA1		4.665	0.730	6.391	0.000
DIA2		5.974	1.772	3.371	0.001	DIA2		5.020	0.993	5.055	0.000
DIA3		5.794	1.552	3.733	0.000	DIA3		7.095	1.660	4.274	0.000
DIA4		6.835	2.126	3.214	0.001	DIA4		10.466	6.770	1.546	0.122!!!
DIA5		3.504	0.712	4.918	0.000	DIA5		5.627	1.114	5.052	0.000
DIA6		4.006	0.882	4.544	0.000	DIA6		3.141	0.422	7.440	0.000
DIA7		4.060	1.388	2.925	0.003	DIA7		2.856	0.610	4.681	0.000
Means: MEAN OF THETA FIXED=0 FOR IDENTIFICATION						Means: MEAN OF THETA FIXED=0 FOR IDENTIFICATION					
IADL		0.000	0.000	999.000	999.000	IADL		0.000	0.000	999.000	999.000
Thresholds: EXPECTED LOGIT (Y=0) IF THETA=0						Thresholds: EXPECTED LOGIT (Y=0) IF THETA=0					
DIA1\$1		-1.382	0.614	-2.250	0.024	DIA1\$1		-2.189	0.425	-5.150	0.000
DIA2\$1		-5.602	1.580	-3.546	0.000	DIA2\$1		-5.705	1.017	-5.608	0.000
DIA3\$1		-3.024	0.918	-3.295	0.001	DIA3\$1		-6.710	1.490	-4.505	0.000
DIA4\$1		-4.449	1.372	-3.243	0.001	DIA4\$1		-3.687	2.471	-1.492	0.136
DIA5\$1		-2.736	0.553	-4.946	0.000	DIA5\$1		-1.803	0.493	-3.658	0.000
DIA6\$1		-3.347	0.708	-4.726	0.000	DIA6\$1		-2.185	0.314	-6.953	0.000
DIA7\$1		-6.816	1.973	-3.454	0.001	DIA7\$1		-5.578	0.886	-6.296	0.000
Variances: VARIANCE OF THETA FIXED=1 FOR IDENTIFICATION						Variances: VARIANCE OF THETA FIXED=1 FOR IDENTIFICATION					
IADL		1.000	0.000	999.000	999.000	IADL		1.000	0.000	999.000	999.000
IRT PARAMETERIZATION						IRT PARAMETERIZATION					
Item Discriminations: slope where prob(y=1)=0.5						Item Discriminations: slope where prob(y=1)=0.5					
IADL	BY					IADL	BY				
DIA1		5.076	1.291	3.932	0.000	DIA1		4.665	0.730	6.391	0.000
DIA2		5.974	1.772	3.371	0.001	DIA2		5.020	0.993	5.055	0.000
DIA3		5.794	1.552	3.733	0.000	DIA3		7.095	1.660	4.274	0.000
DIA4		6.835	2.126	3.214	0.001	DIA4		10.466	6.770	1.546	0.122!!!
DIA5		3.504	0.712	4.918	0.000	DIA5		5.627	1.114	5.052	0.000
DIA6		4.006	0.882	4.544	0.000	DIA6		3.141	0.422	7.440	0.000
DIA7		4.060	1.388	2.925	0.003	DIA7		2.856	0.610	4.681	0.000
Item Difficulties: theta needed for prob(y=1)=0.5						Item Difficulties: theta needed for prob(y=1)=0.5					
DIA1		-0.272	0.091	-2.994	0.003	DIA1		-0.469	0.062	-7.588	0.000
DIA2		-0.938	0.103	-9.111	0.000	DIA2		-1.136	0.081	-14.007	0.000
DIA3		-0.522	0.089	-5.877	0.000	DIA3		-0.946	0.068	-13.839	0.000
DIA4		-0.651	0.091	-7.140	0.000	DIA4		-0.352	0.051	-6.915	0.000
DIA5		-0.781	0.107	-7.316	0.000	DIA5		-0.320	0.061	-5.257	0.000
DIA6		-0.835	0.105	-7.937	0.000	DIA6		-0.695	0.073	-9.574	0.000
DIA7		-1.679	0.179	-9.387	0.000	DIA7		-1.953	0.176	-11.105	0.000

Model 2a. Metric Invariance Model (IFA loadings held equal across groups – but IRT discriminations still vary via factor variances)

```

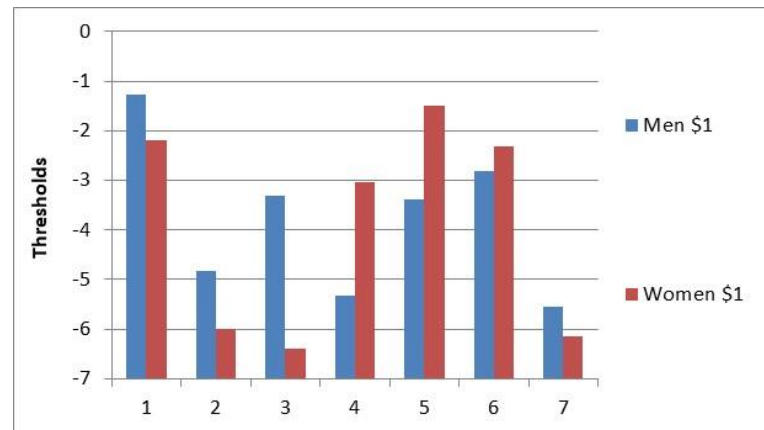
MODEL:
! MEN REFERENCE GROUP CONFIGURAL MODEL (will stay the same)
%OVERALL% ! Needed for fake latent class model
! Proportion of men in logits
[group#1@-0.67428];
! Factor loadings all freely estimated, just labeled
IADL BY dial-dia7* (L1-L7);
! Item thresholds all freely estimated, just labeled
[dial$1-dia7$1*] (T1-T7);
! Factor mean=0 and variance=1 for identification
[IADL@0]; IADL@1;

! WOMEN ALTERNATIVE GROUP 2 METRIC MODEL 2
%group#2% ! Needed for fake latent class model
! Factor loadings NOW CONSTRAINED EQUAL TO MEN VIA SAME LABELS
IADL BY dial-dia7* (L1-L7);
! Item thresholds all freely estimated
[dial$1-dia7$1*];
! Factor variance NOW ESTIMATED
IADL*;
! Factor mean fixed to 0 for identification
[IADL@0];

Number of Free Parameters          22
Loglikelihood
  H0 Value                          -1797.600

Information Criteria
  Akaike (AIC)                       3639.200
  Bayesian (BIC)                      3737.145
  Sample-Size Adjusted BIC            3667.298
    
```

Does the full metric invariance model (2a) fit significantly worse than the configural model (1)? Nope, $-2\Delta LL(df=6) = 8.26, p = .22$



	Estimate	S.E.	Est./S.E.	Two-Tailed P-Value
Latent Class 1 (0) - refers to female=0 from KNOWNCLASS				
IADL BY -- FACTOR LOADINGS: dif in logit(y=1) for unit dif in theta				
DIA1	4.415	0.660	6.691	0.000
DIA2	4.926	0.871	5.652	0.000
DIA3	6.249	1.206	5.182	0.000
DIA4	8.101	2.195	3.690	0.000
DIA5	4.403	0.635	6.930	0.000
DIA6	3.159	0.434	7.275	0.000
DIA7	3.028	0.591	5.121	0.000
Means: Factor mean fixed=0 for identification				
IADL	0.000	0.000	999.000	999.000
Thresholds: EXPECTED LOGIT(Y=0) IF THETA=0				
DIA1\$1	-1.268	0.452	-2.804	0.005
DIA2\$1	-4.816	0.853	-5.646	0.000
DIA3\$1	-3.320	0.803	-4.131	0.000
DIA4\$1	-5.313	1.483	-3.583	0.000
DIA5\$1	-3.382	0.573	-5.904	0.000
DIA6\$1	-2.825	0.432	-6.543	0.000
DIA7\$1	-5.549	0.902	-6.152	0.000
Variances: Factor variance fixed=1 for identification				
IADL	1.000	0.000	999.000	999.000
Latent Class 2 (1) - refers to female=1 from KNOWNCLASS				
IADL BY -- FACTOR LOADINGS: dif in logit(y=1) for unit dif in theta				
DIA1	4.415	0.660	6.691	0.000
DIA2	4.926	0.871	5.652	0.000
DIA3	6.249	1.206	5.182	0.000
DIA4	8.101	2.195	3.690	0.000
DIA5	4.403	0.635	6.930	0.000
DIA6	3.159	0.434	7.275	0.000
DIA7	3.028	0.591	5.121	0.000
Means: Factor mean fixed=0 for identification				
IADL	0.000	0.000	999.000	999.000
Thresholds: EXPECTED LOGIT(Y=0) IF THETA=0				
DIA1\$1	-2.200	0.397	-5.539	0.000
DIA2\$1	-5.989	0.908	-6.598	0.000
DIA3\$1	-6.395	1.114	-5.738	0.000
DIA4\$1	-3.034	0.950	-3.195	0.001
DIA5\$1	-1.495	0.360	-4.154	0.000
DIA6\$1	-2.314	0.314	-7.361	0.000
DIA7\$1	-6.150	0.885	-6.945	0.000
Variances: Factor variance now estimated				
IADL	1.192	0.268	4.441	0.000

Model 3a. Full Threshold Invariance Model (all IFA thresholds held equal across groups – but IRT difficulties still vary)

<p>MODEL:</p> <pre> ! MEN REFERENCE GROUP CONFIGURAL MODEL (will stay the same) %OVERALL% ! Needed for fake latent class model ! Proportion of men in logits [group#1@-0.67428]; ! Factor loadings all freely estimated, just labeled IADL BY dial-dia7* (L1-L7); ! Item thresholds all freely estimated, just labeled [dial\$1-dia7\$1*] (T1-T7); ! Factor mean=0 and variance=1 for identification [IADL@0]; IADL@1; ! WOMEN ALTERNATIVE GROUP 2 SCALAR MODEL 3 %group#2% ! Needed for fake latent class model ! Factor loadings still constrained equal to men IADL BY dial-dia7* (L1-L7); ! Item thresholds NOW CONSTRAINED EQUAL TO MEN (SAME LABEL) [dial\$1-dia7\$1*] (T1-T7); ! Factor mean NOW ESTIMATED ! Factor variance still estimated [IADL*]; IADL*; </pre> <p>MODEL FIT INFORMATION</p> <table border="0"> <tr> <td>Number of Free Parameters</td> <td style="text-align: right;">16</td> </tr> <tr> <td>Loglikelihood</td> <td></td> </tr> <tr> <td> H0 Value</td> <td style="text-align: right;">-1857.971</td> </tr> <tr> <td>Information Criteria</td> <td></td> </tr> <tr> <td> Akaike (AIC)</td> <td style="text-align: right;">3747.943</td> </tr> <tr> <td> Bayesian (BIC)</td> <td style="text-align: right;">3819.176</td> </tr> <tr> <td> Sample-Size Adjusted BIC</td> <td style="text-align: right;">3768.377</td> </tr> </table> <p>Does the full scalar invariance model (3a) fit significantly worse than the full metric model (2a)? Yep, $-2\Delta LL(df=6) = 120.74, p < .001$</p> <p>Based on the local misfit of the univariate distributions (from TECH10 output, see right), it looks like item 3 is the biggest problem... so the same steps would be followed as in our other examples. That is, we would try to free problematic thresholds until the scalar model fits not worse than the metric model (or the configural model, if you choose to constrain both loadings and thresholds at the same time).</p> <p>(See example 7c for a sample results section using WLSMV and polytomous versions of these items)</p>	Number of Free Parameters	16	Loglikelihood		H0 Value	-1857.971	Information Criteria		Akaike (AIC)	3747.943	Bayesian (BIC)	3819.176	Sample-Size Adjusted BIC	3768.377	<p>RESIDUAL OUTPUT</p> <p>UNIVARIATE DISTRIBUTION FIT FOR CLASS 1 - refers to female=0 from KNOWNCLASS</p> <table border="1"> <thead> <tr> <th>Variable</th> <th>Observed</th> <th>Estimated</th> <th>Residual (Obs.-Est.)</th> <th>Stand. Residual</th> </tr> </thead> <tbody> <tr><td colspan="5">DIA1</td></tr> <tr><td> Category 1</td><td>0.404</td><td>0.350</td><td>0.054</td><td>1.651</td></tr> <tr><td> Category 2</td><td>0.596</td><td>0.650</td><td>-0.054</td><td>-1.651</td></tr> <tr><td colspan="5">DIA2</td></tr> <tr><td> Category 1</td><td>0.184</td><td>0.166</td><td>0.018</td><td>0.724</td></tr> <tr><td> Category 2</td><td>0.816</td><td>0.834</td><td>-0.018</td><td>-0.724</td></tr> <tr><td colspan="5">DIA3</td></tr> <tr><td> Category 1</td><td>0.313</td><td>0.227</td><td>0.086</td><td>3.001</td></tr> <tr><td> Category 2</td><td>0.687</td><td>0.773</td><td>-0.086</td><td>-3.001</td></tr> <tr><td colspan="5">DIA4</td></tr> <tr><td> Category 1</td><td>0.257</td><td>0.331</td><td>-0.074</td><td>-2.296</td></tr> <tr><td> Category 2</td><td>0.743</td><td>0.669</td><td>0.074</td><td>2.296</td></tr> <tr><td colspan="5">DIA5</td></tr> <tr><td> Category 1</td><td>0.249</td><td>0.333</td><td>-0.084</td><td>-2.619</td></tr> <tr><td> Category 2</td><td>0.751</td><td>0.667</td><td>0.084</td><td>2.619</td></tr> <tr><td colspan="5">DIA6</td></tr> <tr><td> Category 1</td><td>0.229</td><td>0.259</td><td>-0.030</td><td>-0.993</td></tr> <tr><td> Category 2</td><td>0.771</td><td>0.741</td><td>0.030</td><td>0.993</td></tr> <tr><td colspan="5">DIA7</td></tr> <tr><td> Category 1</td><td>0.066</td><td>0.061</td><td>0.005</td><td>0.277</td></tr> <tr><td> Category 2</td><td>0.934</td><td>0.939</td><td>-0.005</td><td>-0.277</td></tr> </tbody> </table> <p>UNIVARIATE DISTRIBUTION FIT FOR CLASS 2 - refers to female=1 from KNOWNCLASS</p> <table border="1"> <thead> <tr> <th>Variable</th> <th>Observed</th> <th>Estimated</th> <th>Residual (Obs.-Est.)</th> <th>Stand. Residual</th> </tr> </thead> <tbody> <tr><td colspan="5">DIA1</td></tr> <tr><td> Category 1</td><td>0.343</td><td>0.370</td><td>-0.027</td><td>-1.138</td></tr> <tr><td> Category 2</td><td>0.657</td><td>0.630</td><td>0.027</td><td>1.138</td></tr> <tr><td colspan="5">DIA2</td></tr> <tr><td> Category 1</td><td>0.147</td><td>0.162</td><td>-0.015</td><td>-0.818</td></tr> <tr><td> Category 2</td><td>0.853</td><td>0.838</td><td>0.015</td><td>0.818</td></tr> <tr><td colspan="5">DIA3</td></tr> <tr><td> Category 1</td><td>0.186</td><td>0.231</td><td>-0.045</td><td>-2.170</td></tr> <tr><td> Category 2</td><td>0.814</td><td>0.769</td><td>0.045</td><td>2.170</td></tr> <tr><td colspan="5">DIA4</td></tr> <tr><td> Category 1</td><td>0.378</td><td>0.348</td><td>0.030</td><td>1.292</td></tr> <tr><td> Category 2</td><td>0.622</td><td>0.652</td><td>-0.030</td><td>-1.292</td></tr> <tr><td colspan="5">DIA5</td></tr> <tr><td> Category 1</td><td>0.397</td><td>0.351</td><td>0.046</td><td>1.979</td></tr> <tr><td> Category 2</td><td>0.603</td><td>0.649</td><td>-0.046</td><td>-1.979</td></tr> <tr><td colspan="5">DIA6</td></tr> <tr><td> Category 1</td><td>0.284</td><td>0.266</td><td>0.017</td><td>0.803</td></tr> <tr><td> Category 2</td><td>0.716</td><td>0.734</td><td>-0.017</td><td>-0.803</td></tr> <tr><td colspan="5">DIA7</td></tr> <tr><td> Category 1</td><td>0.052</td><td>0.053</td><td>-0.001</td><td>-0.084</td></tr> <tr><td> Category 2</td><td>0.948</td><td>0.947</td><td>0.001</td><td>0.084</td></tr> </tbody> </table>	Variable	Observed	Estimated	Residual (Obs.-Est.)	Stand. Residual	DIA1					Category 1	0.404	0.350	0.054	1.651	Category 2	0.596	0.650	-0.054	-1.651	DIA2					Category 1	0.184	0.166	0.018	0.724	Category 2	0.816	0.834	-0.018	-0.724	DIA3					Category 1	0.313	0.227	0.086	3.001	Category 2	0.687	0.773	-0.086	-3.001	DIA4					Category 1	0.257	0.331	-0.074	-2.296	Category 2	0.743	0.669	0.074	2.296	DIA5					Category 1	0.249	0.333	-0.084	-2.619	Category 2	0.751	0.667	0.084	2.619	DIA6					Category 1	0.229	0.259	-0.030	-0.993	Category 2	0.771	0.741	0.030	0.993	DIA7					Category 1	0.066	0.061	0.005	0.277	Category 2	0.934	0.939	-0.005	-0.277	Variable	Observed	Estimated	Residual (Obs.-Est.)	Stand. Residual	DIA1					Category 1	0.343	0.370	-0.027	-1.138	Category 2	0.657	0.630	0.027	1.138	DIA2					Category 1	0.147	0.162	-0.015	-0.818	Category 2	0.853	0.838	0.015	0.818	DIA3					Category 1	0.186	0.231	-0.045	-2.170	Category 2	0.814	0.769	0.045	2.170	DIA4					Category 1	0.378	0.348	0.030	1.292	Category 2	0.622	0.652	-0.030	-1.292	DIA5					Category 1	0.397	0.351	0.046	1.979	Category 2	0.603	0.649	-0.046	-1.979	DIA6					Category 1	0.284	0.266	0.017	0.803	Category 2	0.716	0.734	-0.017	-0.803	DIA7					Category 1	0.052	0.053	-0.001	-0.084	Category 2	0.948	0.947	0.001	0.084
Number of Free Parameters	16																																																																																																																																																																																																																																										
Loglikelihood																																																																																																																																																																																																																																											
H0 Value	-1857.971																																																																																																																																																																																																																																										
Information Criteria																																																																																																																																																																																																																																											
Akaike (AIC)	3747.943																																																																																																																																																																																																																																										
Bayesian (BIC)	3819.176																																																																																																																																																																																																																																										
Sample-Size Adjusted BIC	3768.377																																																																																																																																																																																																																																										
Variable	Observed	Estimated	Residual (Obs.-Est.)	Stand. Residual																																																																																																																																																																																																																																							
DIA1																																																																																																																																																																																																																																											
Category 1	0.404	0.350	0.054	1.651																																																																																																																																																																																																																																							
Category 2	0.596	0.650	-0.054	-1.651																																																																																																																																																																																																																																							
DIA2																																																																																																																																																																																																																																											
Category 1	0.184	0.166	0.018	0.724																																																																																																																																																																																																																																							
Category 2	0.816	0.834	-0.018	-0.724																																																																																																																																																																																																																																							
DIA3																																																																																																																																																																																																																																											
Category 1	0.313	0.227	0.086	3.001																																																																																																																																																																																																																																							
Category 2	0.687	0.773	-0.086	-3.001																																																																																																																																																																																																																																							
DIA4																																																																																																																																																																																																																																											
Category 1	0.257	0.331	-0.074	-2.296																																																																																																																																																																																																																																							
Category 2	0.743	0.669	0.074	2.296																																																																																																																																																																																																																																							
DIA5																																																																																																																																																																																																																																											
Category 1	0.249	0.333	-0.084	-2.619																																																																																																																																																																																																																																							
Category 2	0.751	0.667	0.084	2.619																																																																																																																																																																																																																																							
DIA6																																																																																																																																																																																																																																											
Category 1	0.229	0.259	-0.030	-0.993																																																																																																																																																																																																																																							
Category 2	0.771	0.741	0.030	0.993																																																																																																																																																																																																																																							
DIA7																																																																																																																																																																																																																																											
Category 1	0.066	0.061	0.005	0.277																																																																																																																																																																																																																																							
Category 2	0.934	0.939	-0.005	-0.277																																																																																																																																																																																																																																							
Variable	Observed	Estimated	Residual (Obs.-Est.)	Stand. Residual																																																																																																																																																																																																																																							
DIA1																																																																																																																																																																																																																																											
Category 1	0.343	0.370	-0.027	-1.138																																																																																																																																																																																																																																							
Category 2	0.657	0.630	0.027	1.138																																																																																																																																																																																																																																							
DIA2																																																																																																																																																																																																																																											
Category 1	0.147	0.162	-0.015	-0.818																																																																																																																																																																																																																																							
Category 2	0.853	0.838	0.015	0.818																																																																																																																																																																																																																																							
DIA3																																																																																																																																																																																																																																											
Category 1	0.186	0.231	-0.045	-2.170																																																																																																																																																																																																																																							
Category 2	0.814	0.769	0.045	2.170																																																																																																																																																																																																																																							
DIA4																																																																																																																																																																																																																																											
Category 1	0.378	0.348	0.030	1.292																																																																																																																																																																																																																																							
Category 2	0.622	0.652	-0.030	-1.292																																																																																																																																																																																																																																							
DIA5																																																																																																																																																																																																																																											
Category 1	0.397	0.351	0.046	1.979																																																																																																																																																																																																																																							
Category 2	0.603	0.649	-0.046	-1.979																																																																																																																																																																																																																																							
DIA6																																																																																																																																																																																																																																											
Category 1	0.284	0.266	0.017	0.803																																																																																																																																																																																																																																							
Category 2	0.716	0.734	-0.017	-0.803																																																																																																																																																																																																																																							
DIA7																																																																																																																																																																																																																																											
Category 1	0.052	0.053	-0.001	-0.084																																																																																																																																																																																																																																							
Category 2	0.948	0.947	0.001	0.084																																																																																																																																																																																																																																							