IRTPRO™

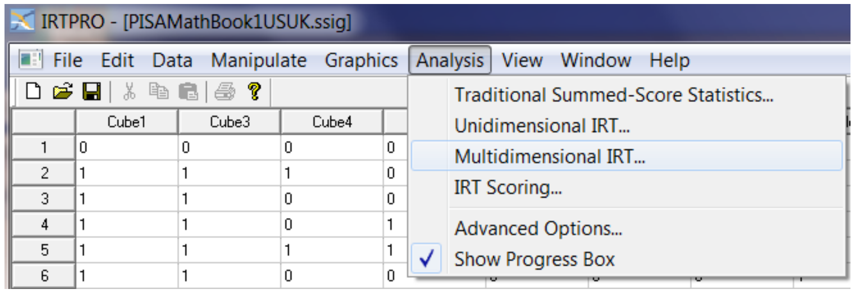
Contents

1. Testlet Response Theory (TRT) analysis of the PISA data

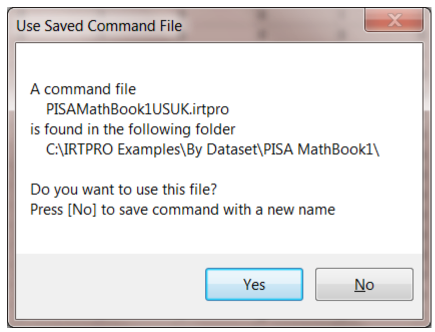
The Program for International Student Assessment (PISA), conducted triennially by the Organization for Economic Co-operation and Development (OECD) since year 2000, is an international educational assessment system that focuses on the 15-year olds' reading literacy, mathematics literacy, and science literacy. The format of the PISA can be best described as testlet-based. A testlet in this instance is a collection of test items organized around the same stimulus. For instance, it is standard practice in reading assessments to base several questions on one reading passage so that each question can measure a different aspect of the examinee's comprehension of the passage. PISA is noteworthy in that testlets are employed in all three sections namely reading, math, and science. For instance, a typical form of PISA mathematics assessment (in year 2000) consists of 14 items that can be divided into five testlets made up of nonoverlapping sets of items. Some testlets are longer, with more than two items, and some are shorter, with only 2 items. Critically, an item belongs to one and only one testlet.

The analysis of a testlet response theory (TRT) model based on the PISA data is given in this section. For the TRT analysis, a multidimensional model for more than one group is fitted. The mean and variance of the primary math dimension is freely estimated in the UK group and the additional dimensions are there to account for local item dependence in the same testlet.

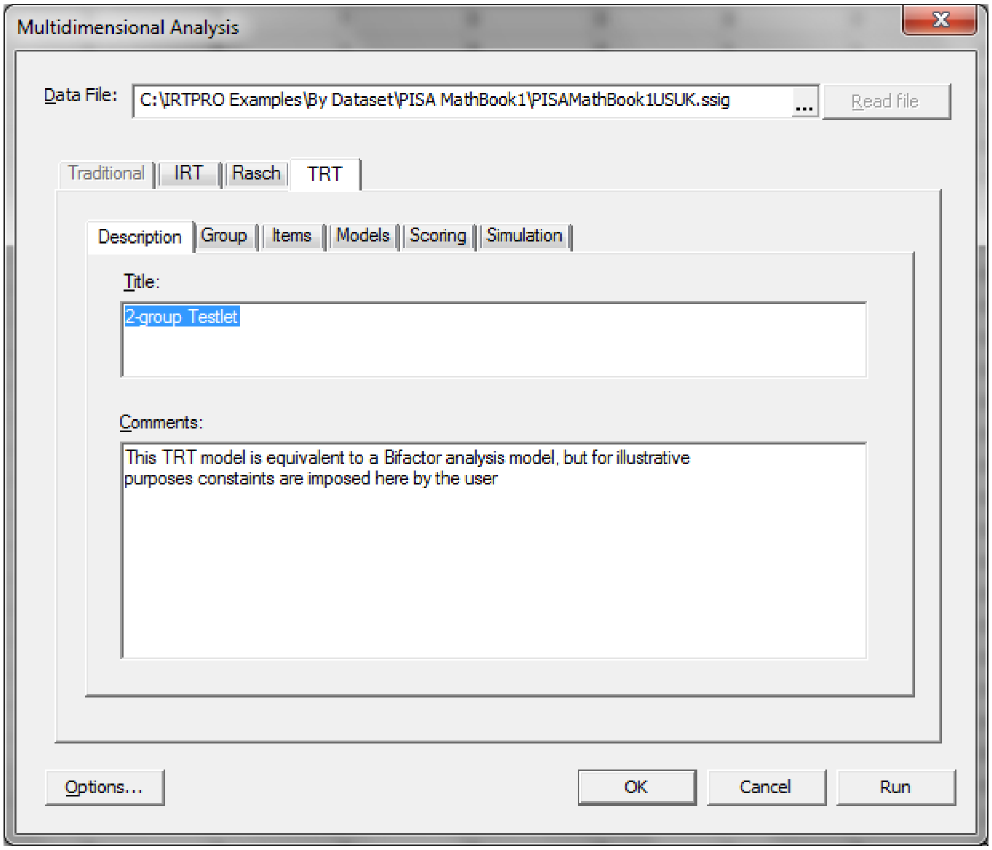
The dataset **PISAMathBook1USUK.ssig** is located in the folder **IRTPRO Examples\By Data Set\PISA MathBook1\.** To start the analysis open this file and from the main menu bar select the **Analysis, Multidimensional IRT…** option.



Once this option is selected, the following message will be displayed if the analyses described elsewhere were performed.



Click **Yes** to use the same command file. This action produces the **Multidimensional Analysis** window. To proceed, right-click next to the **Rasch** test tab (right-hand side) to insert a fourth test. The default tab is **Test4**. Rename to **TRT** by right-clicking this tab and then selecting the **Rename** option. Once done, add a title and (optional) comments.

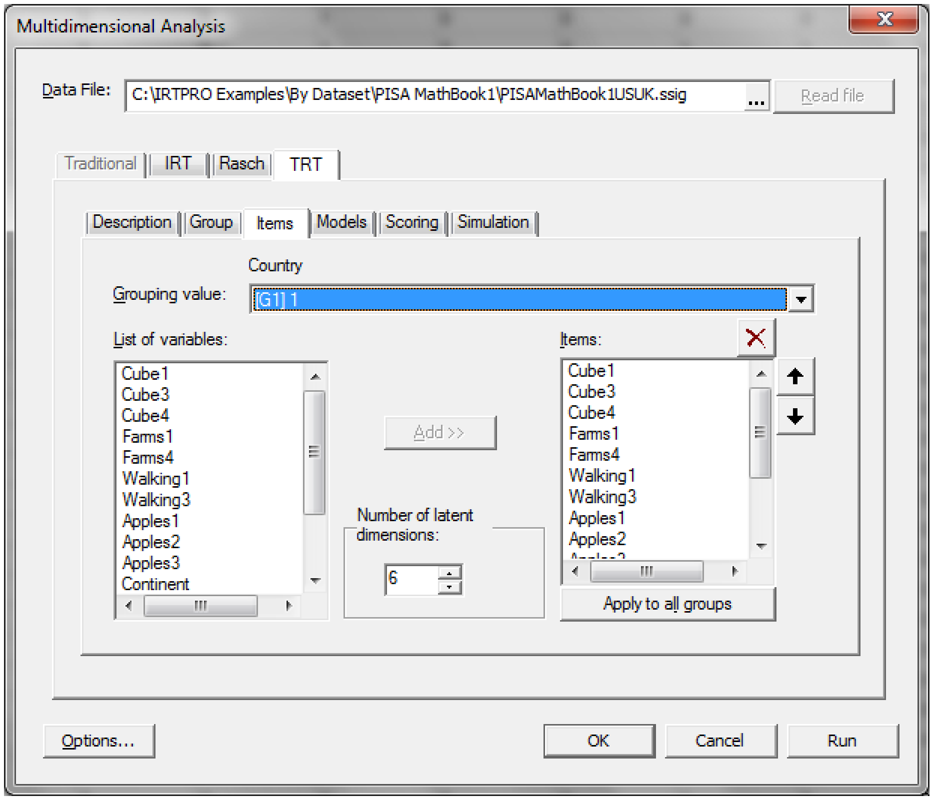


Once this action is completed, click the **Group** tab and select Country as the grouping variable (1 = US, 2 = UK). Next, use the **Items** tab to select the 14 items for the first group and the click the **Apply to all groups** button to select the same set of items for the UK group. As mentioned at the start, the 14 items can be regarded as consisting of five testlets. The five testlets are as follows:

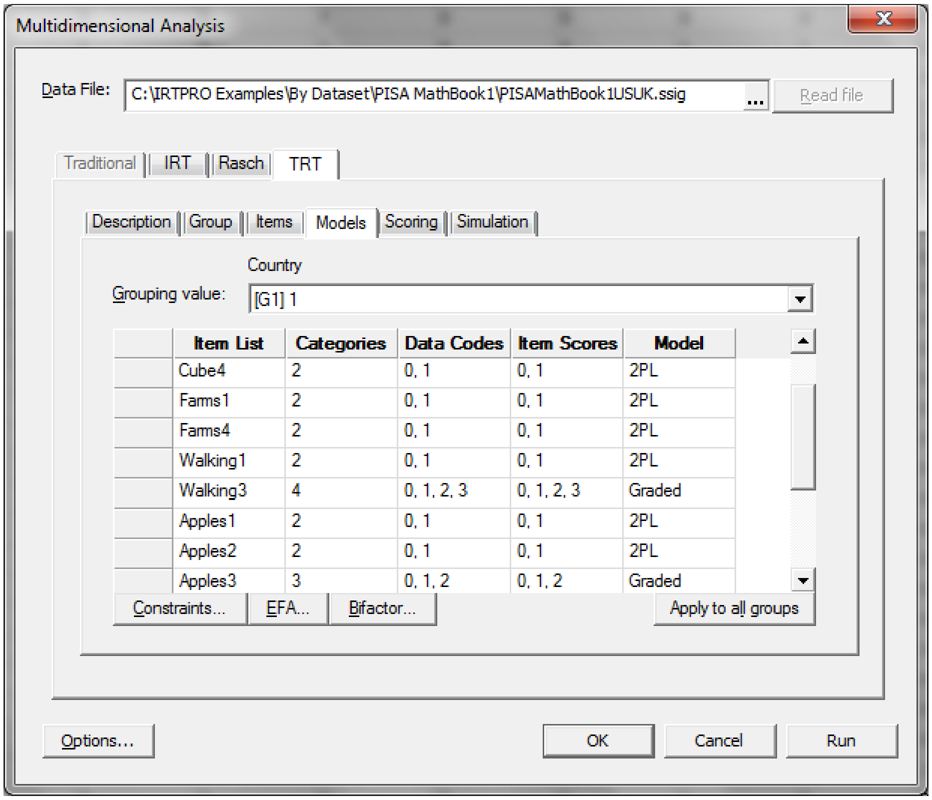
- Testlet 1: Cube1, Cube2 and Cube3
- Testlet 2: Farms1 and Farms4
- Testlet 3: Walking1 and Walking3
- Testlet 4: Apples1, Apples2 and Apples3
- Testlet 5: Grow1, Grow3 and Grow2

In what follows, we postulate that there are six factors, the first being a general mathematics achievement factor and the last five describing each testlet. It is further assumed that these testlets are mutually uncorrelated. The testlets are related to the general factor, but the testlet-specific factors in the TRT model are not correlated with the first/general dimension. This assumption allows one to solve the likelihood and derivatives equations using two-dimensional, rather than six-dimensional quadrature. Note that the item Continent is assigned to the general factor only.

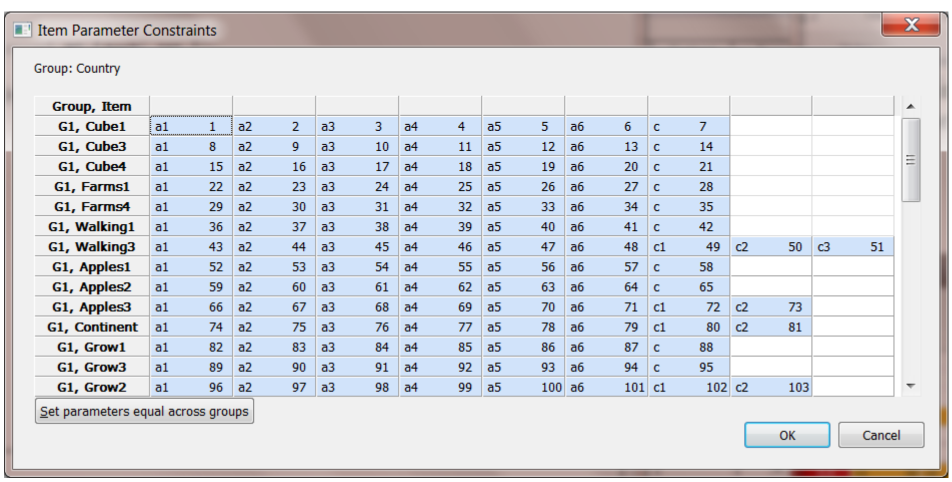
Before proceeding to the **Models** tab, change the **Number of latent dimensions** to 6 as shown.



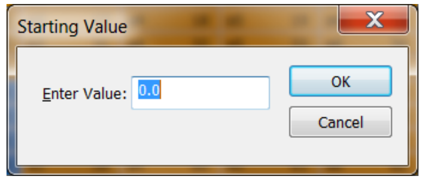
For illustrative purposes, the default model types (2PL and Graded) are used.



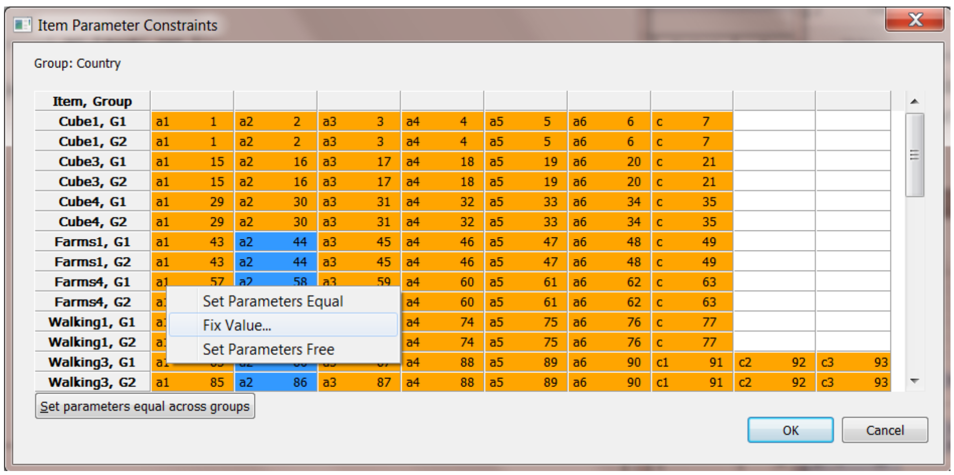
To specify that the five testlets are mutually uncorrelated, contraints are imposed on the slope parameters. Access to the **Item Parameter Constraints** window is obtained by clicking on the **Constraints…** button in the **Models** window.



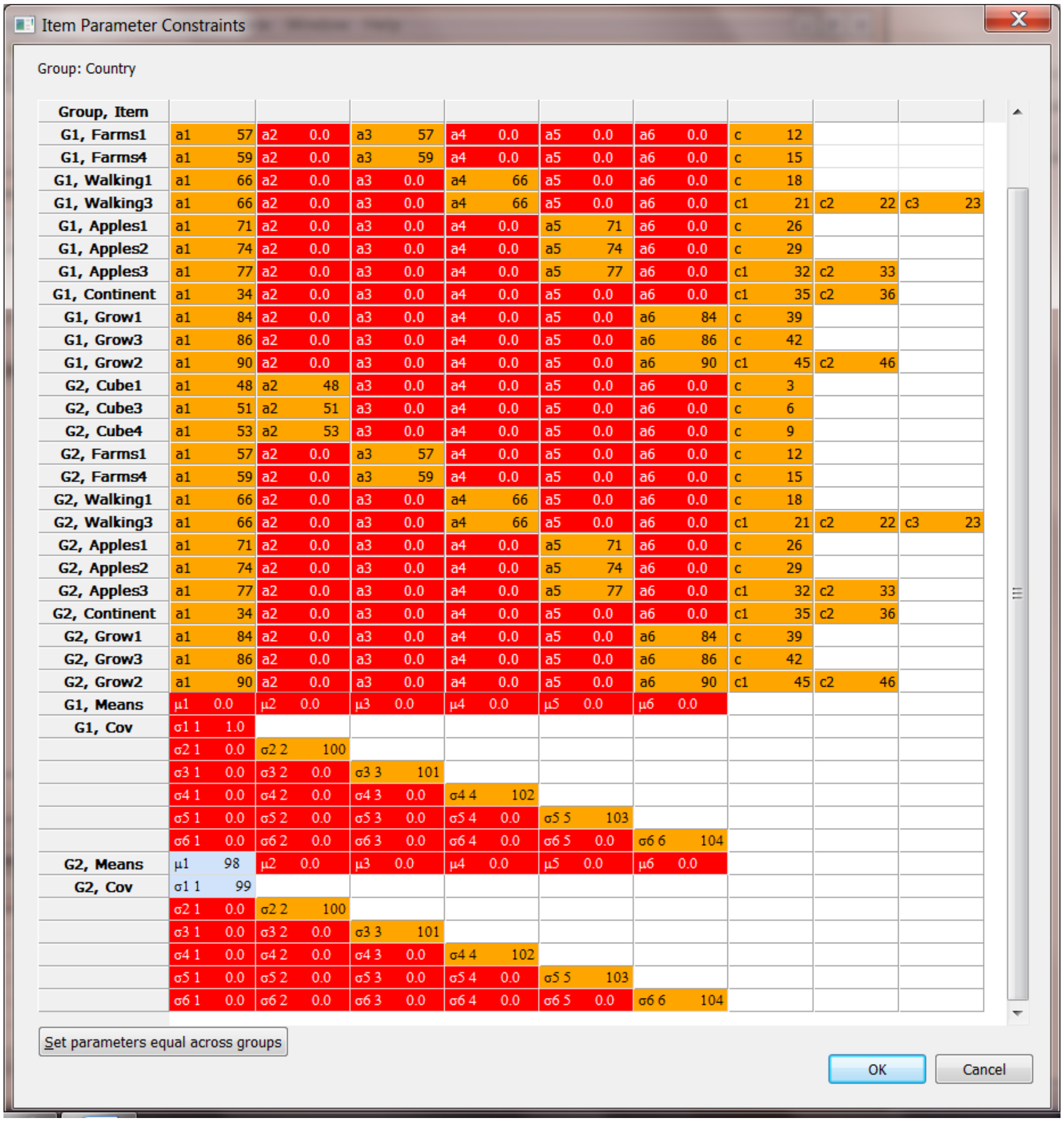
Double-click the **Group, Item** button to change the sorting order to **Item, Group**. Once this is done, click the **Set parameters equal across groups** button and then start by selecting all the a2 cells below the Cube4, G2 cell. Right-click and from the drop-down menu, select the **Fix Value…** option.



The default value is 0.0 and by clicking **OK**, all the selected cells will become red in color and show a value of 0.0.



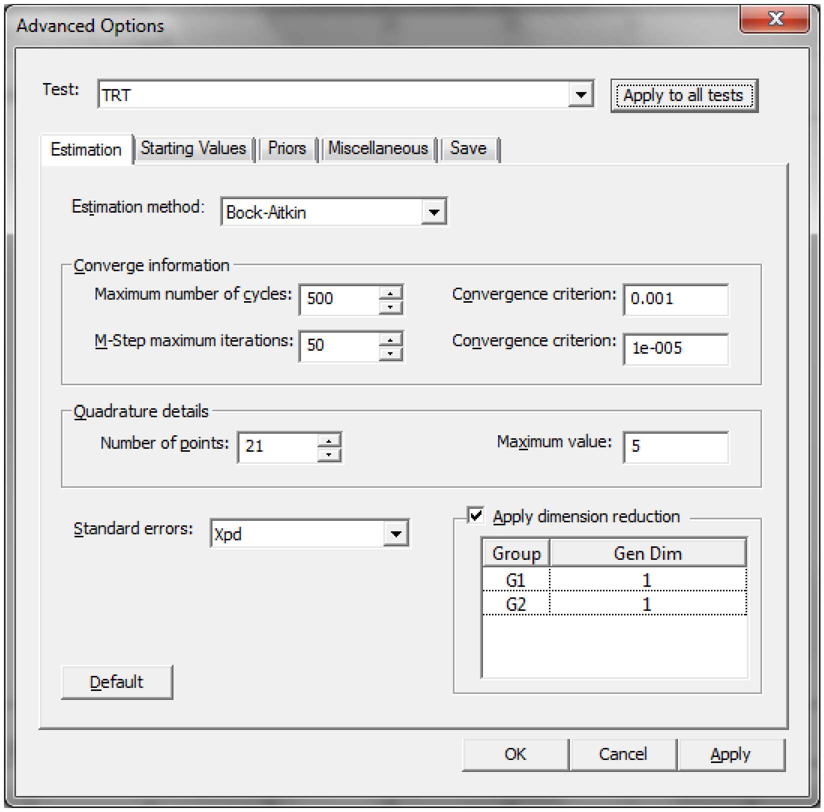
Repeat this procedure for testlets 2 to 5 by fixing all the cells, not belonging to a specific testlet, equal to zero as shown below.



Group, Item									
G1, Farms1	a1 57	a2 0.0	a3 57	a4 0.0	a5 0.0	a6 0.0	c 12		
G1, Farms4	a1 59	a2 0.0	a3 59	a4 0.0	a5 0.0	a6 0.0	c 15		
G1, Walking1	a1 66	a2 0.0	a3 0.0	a4 66	a5 0.0	a6 0.0	c 18		
G1, Walking3	a1 66	a2 0.0	a3 0.0	a4 66	a5 0.0	a6 0.0	c1 21	c2 22	c3 23
G1, Apples1	a1 71	a2 0.0	a3 0.0	a4 0.0	a5 71	a6 0.0	c 26		
G1, Apples2	a1 74	a2 0.0	a3 0.0	a4 0.0	a5 74	a6 0.0	c 29		
G1, Apples3	a1 77	a2 0.0	a3 0.0	a4 0.0	a5 77	a6 0.0	c1 32	c2 33	
G1, Continent	a1 34	a2 0.0	a3 0.0	a4 0.0	a5 0.0	a6 0.0	c1 35	c2 36	
G1, Grow1	a1 84	a2 0.0	a3 0.0	a4 0.0	a5 0.0	a6 84	c 39		
G1, Grow3	a1 86	a2 0.0	a3 0.0	a4 0.0	a5 0.0	a6 86	c 42		
G1, Grow2	a1 90	a2 0.0	a3 0.0	a4 0.0	a5 0.0	a6 90	c1 45	c2 46	
G2, Cube1	a1 48	a2 48	a3 0.0	a4 0.0	a5 0.0	a6 0.0	c 3		
G2, Cube3	a1 51	a2 51	a3 0.0	a4 0.0	a5 0.0	a6 0.0	c 6		
G2, Cube4	a1 53	a2 53	a3 0.0	a4 0.0	a5 0.0	a6 0.0	c 9		
G2, Farms1	a1 57	a2 0.0	a3 57	a4 0.0	a5 0.0	a6 0.0	c 12		
G2, Farms4	a1 59	a2 0.0	a3 59	a4 0.0	a5 0.0	a6 0.0	c 15		
G2, Walking1	a1 66	a2 0.0	a3 0.0	a4 66	a5 0.0	a6 0.0	c 18		
G2, Walking3	a1 66	a2 0.0	a3 0.0	a4 66	a5 0.0	a6 0.0	c1 21	c2 22	c3 23
G2, Apples1	a1 71	a2 0.0	a3 0.0	a4 0.0	a5 71	a6 0.0	c 26		
G2, Apples2	a1 74	a2 0.0	a3 0.0	a4 0.0	a5 74	a6 0.0	c 29		
G2, Apples3	a1 77	a2 0.0	a3 0.0	a4 0.0	a5 77	a6 0.0	c1 32	c2 33	
G2, Continent	a1 34	a2 0.0	a3 0.0	a4 0.0	a5 0.0	a6 0.0	c1 35	c2 36	
G2, Grow1	a1 84	a2 0.0	a3 0.0	a4 0.0	a5 0.0	a6 84	c 39		
G2, Grow3	a1 86	a2 0.0	a3 0.0	a4 0.0	a5 0.0	a6 86	c 42		
G2, Grow2	a1 90	a2 0.0	a3 0.0	a4 0.0	a5 0.0	a6 90	c1 45	c2 46	
G1, Means	μ1 0.0	μ2 0.0	μ3 0.0	μ4 0.0	μ5 0.0	μ6 0.0			
G1, Cov	σ1 1 1.0								
	σ2 1 0.0	σ2 2 100							
	σ3 1 0.0	σ3 2 0.0	σ3 3 101						
	σ4 1 0.0	σ4 2 0.0	σ4 3 0.0	σ4 4 102					
	σ5 1 0.0	σ5 2 0.0	σ5 3 0.0	σ5 4 0.0	σ5 5 103				
	σ6 1 0.0	σ6 2 0.0	σ6 3 0.0	σ6 4 0.0	σ6 5 0.0	σ6 6 104			
G2, Means	μ1 98	μ2 0.0	μ3 0.0	μ4 0.0	μ5 0.0	μ6 0.0			
G2, Cov	σ1 1 99								
	σ2 1 0.0	σ2 2 100							
	σ3 1 0.0	σ3 2 0.0	σ3 3 101						
	σ4 1 0.0	σ4 2 0.0	σ4 3 0.0	σ4 4 102					
	σ5 1 0.0	σ5 2 0.0	σ5 3 0.0	σ5 4 0.0	σ5 5 103				
	σ6 1 0.0	σ6 2 0.0	σ6 3 0.0	σ6 4 0.0	σ6 5 0.0	σ6 6 104			

A crucial step for the TRT model involves setting all the second tier slopes equal to each respective item's general factor slope, as shown above. Note also that the variances of factors two to six have been freed, and set equal across groups.

When done, click the **OK** button to return to the **Models** window, then click the **Options** button to obtain the **Advanced Options** window. Select the **Estimation** tab and set the number of quadrature points equal to 21 and the integration range from –5 to 5 (**Maximum value**: 5). Change the **Standard error estimation** method to **Xpd** and select the **Apply dimension reduction** option and set the number of general dimensions to 1 for both groups. Also change the convergence criteria values to those shown below.



Click **OK** and then the **Run** button to start the analysis. Portions of the output are shown below. First, the parameter estimates and estimated standard errors are given for all the items that have only two categories (2PL model) followed by the parameter estimates for the items associated with the Graded model.

2PL Model Item Parameter Estimates for Group 1, logit: aθ + c [(Back to TOC)]

Item	Label	a_1	s.e.	a_2	s.e.	a_3	s.e.	a_4	s.e.	a_5	s.e.	a_6	s.e.	c	s.e.
1	Cube1	[21] 0.99	0.12	[21] 0.99	0.12	0.00	-----	0.00	-----	0.00	-----	0.00	-----	[1] 0.62	0.10
2	Cube3	[22] 3.34	1.08	[22] 3.34	1.08	0.00	-----	0.00	-----	0.00	-----	0.00	-----	[2] 3.51	1.05
3	Cube4	[23] 1.24	0.15	[23] 1.24	0.15	0.00	-----	0.00	-----	0.00	-----	0.00	-----	[3] -1.26	0.15
4	Farms1	[24] 2.47	0.35	0.00	-----	[24] 2.47	0.35	0.00	-----	0.00	-----	0.00	-----	[4] -0.01	0.17
5	Farms4	[25] 0.75	0.09	0.00	-----	[25] 0.75	0.09	0.00	-----	0.00	-----	0.00	-----	[5] 0.20	0.08
6	Walking1	[26] 2.65	0.20	0.00	-----	0.00	-----	[26] 2.65	0.20	0.00	-----	0.00	-----	[6] -2.31	0.22
8	Apples1	[27] 1.51	0.15	0.00	-----	0.00	-----	0.00	-----	[27] 1.51	0.15	0.00	-----	[10] 0.25	0.12
9	Apples2	[28] 2.76	0.28	0.00	-----	0.00	-----	0.00	-----	[28] 2.76	0.28	0.00	-----	[11] -3.27	0.31
12	Grow1	[30] 1.25	0.13	0.00	-----	0.00	-----	0.00	-----	0.00	-----	[30] 1.25	0.13	[17] -0.04	0.11
13	Grow3	[31] 1.53	0.16	0.00	-----	0.00	-----	0.00	-----	0.00	-----	[31] 1.53	0.16	[18] 0.31	0.12

Graded Model Item Parameter Estimates for Group 1, logit: aθ + c [(Back to TOC)]

Item	Label	a_1	s.e.	a_2	s.e.	a_3	s.e.	a_4	s.e.	a_5	s.e.	a_6	s.e.
7	Walking3	[26] 2.65	0.20	0.00	-----	0.00	-----	[26] 2.65	0.20	0.00	-----	0.00	-----
10	Apples3	[29] 3.05	0.37	0.00	-----	0.00	-----	0.00	-----	[29] 3.05	0.37	0.00	-----
11	Continent	[16] 1.97	0.17	0.00	-----	0.00	-----	0.00	-----	0.00	-----	0.00	-----
14	Grow2	[32] 0.88	0.08	0.00	-----	0.00	-----	0.00	-----	0.00	-----	[32] 0.88	0.08

Graded Model Item Parameter Estimates for Group 1, logit: aθ + c

Item	Label	c_1	s.e.	c_2	s.e.	c_3	s.e.
7	Walking3	[7] -1.80	0.20	[8] -4.87	0.30	[9] -6.69	0.37
10	Apples3	[12] -4.04	0.44	[13] -6.14	0.57		
11	Continent	[14] -1.33	0.16	[15] -4.07	0.22		
14	Grow2	[19] 1.81	0.11	[20] -0.55	0.08		

Since the parameter estimates were constrained to be equal across groups, the corresponding results for the second group are not shown here. Note, however, that there are small differences between the factor loadings for the two groups. This can be attributed to the fact that the mean and variance associated with the general factor were estimated freely for the UK group. The factor loadings for the general factor and those associated with each testlet are larger or equal to 0.40 and highly significant (z-value = parameter estimate divided by standard error).

Factor Loadings for Group 1 (Back to TOC)

Item	Label	λ_1	s.e.	λ_2	s.e.	λ_3	s.e.	λ_4	s.e.	λ_5	s.e.	λ_6	s.e.
1	Cube1	0.44	0.06	0.44	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	Cube3	0.64	0.03	0.64	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	Cube4	0.50	0.05	0.50	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	Farms1	0.78	0.03	0.00	0.00	0.78	0.03	0.00	0.00	0.00	0.00	0.00	0.00
5	Farms4	0.40	0.07	0.00	0.00	0.40	0.07	0.00	0.00	0.00	0.00	0.00	0.00
6	Walking1	0.77	0.03	0.00	0.00	0.00	0.00	0.77	0.03	0.00	0.00	0.00	0.00
7	Walking3	0.77	0.03	0.00	0.00	0.00	0.00	0.77	0.03	0.00	0.00	0.00	0.00
8	Apples1	0.64	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.64	0.06	0.00	0.00
9	Apples2	0.79	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.79	0.04	0.00	0.00
10	Apples3	0.81	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.81	0.04	0.00	0.00
11	Continent	0.76	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12	Grow1	0.56	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.56	0.06
13	Grow3	0.63	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.63	0.05
14	Grow2	0.44	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.44	0.06

Factor Loadings for Group 2 (Back to TOC)

Item	Label	λ_1	s.e.	λ_2	s.e.	λ_3	s.e.	λ_4	s.e.	λ_5	s.e.	λ_6	s.e.
1	Cube1	0.45	0.06	0.45	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	Cube3	0.65	0.04	0.65	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	Cube4	0.50	0.06	0.50	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	Farms1	0.81	0.05	0.00	0.00	0.81	0.05	0.00	0.00	0.00	0.00	0.00	0.00
5	Farms4	0.40	0.07	0.00	0.00	0.40	0.07	0.00	0.00	0.00	0.00	0.00	0.00
6	Walking1	0.80	0.05	0.00	0.00	0.00	0.00	0.80	0.05	0.00	0.00	0.00	0.00
7	Walking3	0.80	0.05	0.00	0.00	0.00	0.00	0.80	0.05	0.00	0.00	0.00	0.00
8	Apples1	0.65	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.65	0.07	0.00	0.00
9	Apples2	0.82	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.82	0.05	0.00	0.00
10	Apples3	0.84	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.84	0.05	0.00	0.00
11	Continent	0.78	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12	Grow1	0.57	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.57	0.06
13	Grow3	0.64	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.64	0.06
14	Grow2	0.45	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.45	0.06

Group Parameter Estimates: (Back to TOC)

Group	Label	μ_1	s.e.	μ_2	s.e.	μ_3	s.e.	μ_4	s.e.	μ_5	s.e.	μ_6	s.e.
1	G1	0.00	-----	0.00	-----	0.00	-----	0.00	-----	0.00	-----	0.00	-----
2	G2	[33] 0.51	0.07	0.00	-----	0.00	-----	0.00	-----	0.00	-----	0.00	-----

Latent Variable Variance-Covariance Matrix for Group 1 (Back)

θ_1	s.e.	θ_2	s.e.	θ_3	s.e.	θ_4	s.e.	θ_5	s.e.	θ_6	s.e.
1.00	-----										
0.00	-----	[35] 1.19	0.22								
0.00	-----	0.00	-----	[36] 0.15	0.12						
0.00	-----	0.00	-----	0.00	-----	[37] 0.26	0.06				
0.00	-----	0.00	-----	0.00	-----	0.00	-----	[38] 0.21	0.06		
0.00	-----	0.00	-----	0.00	-----	0.00	-----	0.00	-----	[39] 0.32	0.10

Latent Variable Variance-Covariance Matrix for Group 2 (Back)

θ_1	s.e.	θ_2	s.e.	θ_3	s.e.	θ_4	s.e.	θ_5	s.e.	θ_6	s.e.
[34] 0.91	0.12										
0.00	-----	[35] 1.19	0.22								
0.00	-----	0.00	-----	[36] 0.15	0.12						
0.00	-----	0.00	-----	0.00	-----	[37] 0.26	0.06				
0.00	-----	0.00	-----	0.00	-----	0.00	-----	[38] 0.21	0.06		
0.00	-----	0.00	-----	0.00	-----	0.00	-----	0.00	-----	[39] 0.32	0.10

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

Statistics based on the loglikelihood	
-2loglikelihood:	21001.78
Akaike Information Criterion (AIC):	21079.78
Bayesian Information Criterion (BIC):	21279.79

The deviance statistic (-2 log likelihood) for the TRT model is reported above as 21001.78. The corresponding value for the IRT model is 21233.40. The χ^2 difference test therefore yields a value of 21233.40 - 21001.78 = 231.62. The degrees of freedom for testing between which of the TRT or IRT models provide the better fit are 17 (39 parameters were estimated in the case of the TRT model versus 22 for the IRT model). Since the χ^2 difference test is highly significant, we conclude that the TRT model provides a better fit to the item responses when compared to the IRT model. Information-theoretic indices of fit (AIC and BIC) also point to the TRT model as better fitting.

2. Two-tier analysis of PISA Read and Math items

Cai (2010) proposed a two-tier item factor analysis model that subsumes standard multidimensional IRT models, bifactor IRT models, and testlet response theory (TRT) models as special cases. Features of the model lead to a reduction in the dimensionality of the latent variable space and consequently significant computational savings.

Similar to the success story of full-information item bifactor analysis (see *e.g.*, Gibbons *et al*., 2007, 2008), the existence of certain special features and restrictions can result in significant computational savings for maximum marginal likelihood estimation while keeping the model flexible enough to represent a variety of structures commonly found in educational and psychological measurement.

The two-tier model also generalizes the bifactor or testlet models in the types of observed variables that can be included, permitting an arbitrary mixture of dichotomous, ordinal, and nominal items. Extending the subdomain scoring strategies discussed by Gibbons *et al*. (2007) for item bifactor models, the two-tier model conveniently provides individual response pattern based IRT scale scores (as posterior expected values) for all latent variables in the model. Finally, the two-tier item factor analysis (IFA) model highlights the benefit of analytically reducing the dimensionality of latent variable space whenever possible.

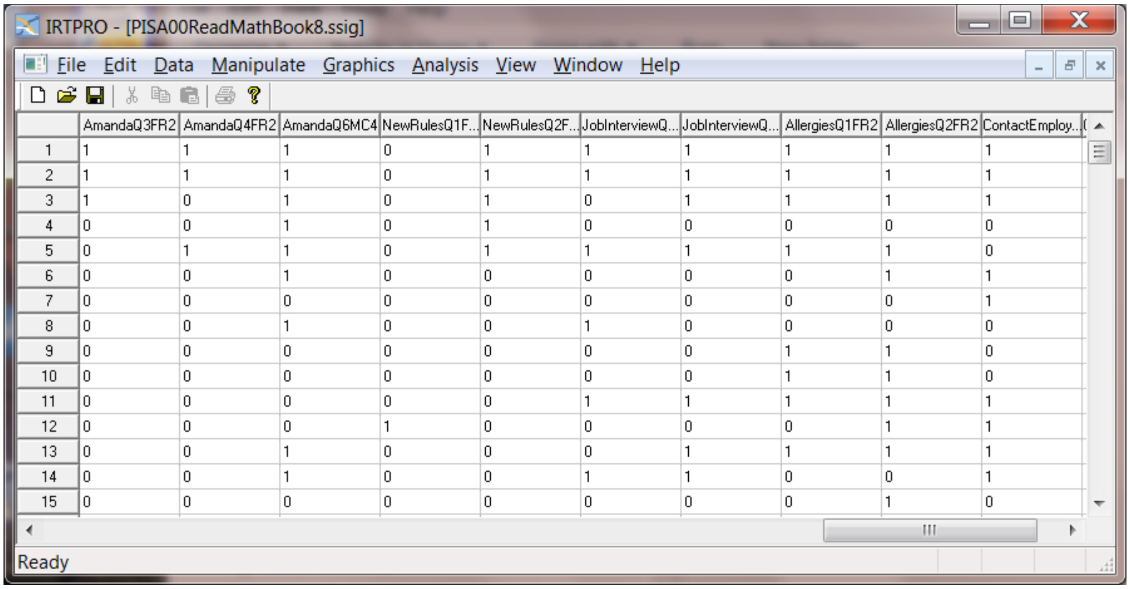
The key to the two-tier modeling framework rests on the recognition that the dimensions (latent variables, factors, latent traits, etc.) in an IFA model can be grouped into two tiers or classes: 1) primary dimensions, and 2) specific dimensions. The distinction is not based so much on the theoretical importance or breadth of the measured latent constructs as on the pattern of factor loadings and the factor inter-correlations. In the two-tier model, the primary dimensions and specific dimensions are uncorrelated. In addition, the specific dimensions are assumed mutually orthogonal and an item can load on at most one specific dimension, just as in a bifactor or testlet response model. On the other hand, the primary dimensions may be correlated among themselves, and the model imposes no further restrictions on the relation between items and primary dimensions beyond necessary conditions for identification.

The format of the PISA data can be best described as testlet-based. For instance, it is standard practice in reading assessments to base several questions on one reading passage so that each question can measure a different aspect of the examinee's comprehension of the passage. PISA is noteworthy in that testlets are employed in all three sections, namely reading, math, and science. For instance, a typical form of PISA reading assessment (in year 2000) consists of about 30 items that can be divided into 8 or 9 testlets made up of non-overlapping sets of items. Some testlets are longer, with 4 or 5 items, and some are shorter, with only 2 items. Critically, an item belongs to one and only one testlet.

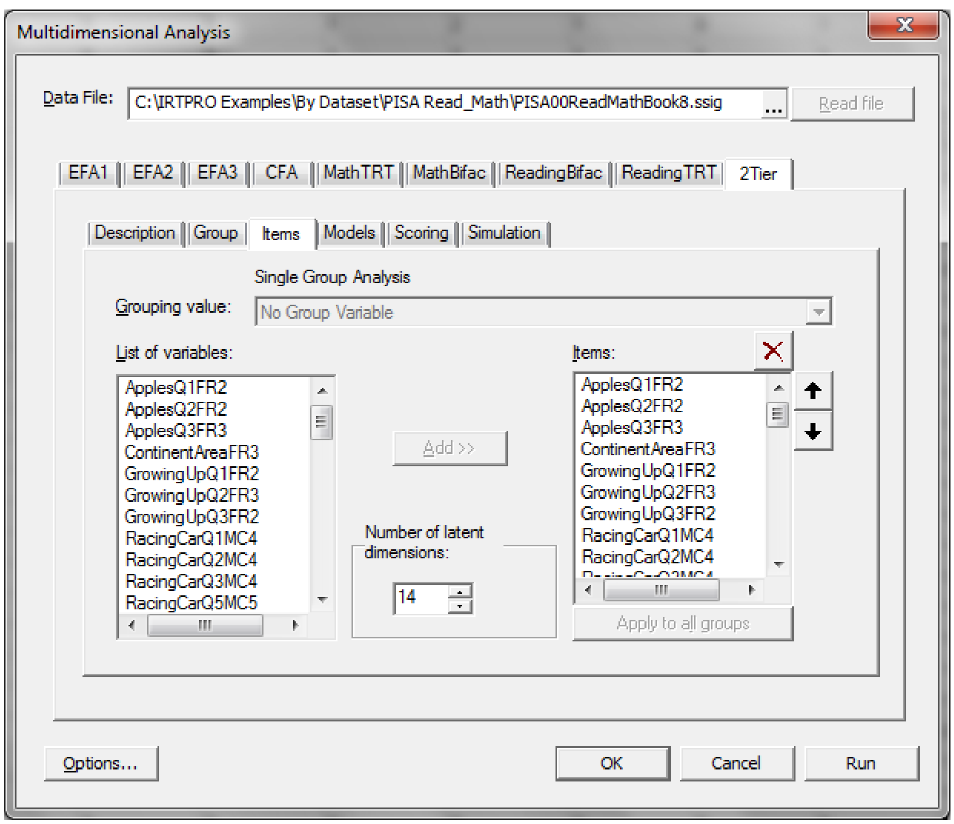
As an illustration, consider only the reading and mathematics sections. By design, the reading items measure reading literacy (primary dimension 1) and the math items measure mathematics literacy (primary dimension 2). Test construction results in two dimensions that are strongly correlated (Adams & Wu, 2002), which is understandable because before solving a math problem one must be able to read the instructions first. However, a two-factor model does not entirely reflect the underlying structure of PISA. A dominating feature of testlet-based assessments is that the item responses from within the same testlet tend to be more correlated than across testlets. In the case of PISA, within-testlet residual dependence remains even after controlling for the influence of the two primary dimensions.

One approach to analyzing the data would be to break the analysis into two parts and fit standard item bifactor (or testlet) models to the first set of math items and the second set of reading items separately. However, if indeed the two primary dimensions are correlated, the two-tier model can utilize that correlation to produce scores that are more accurate. The ability to "borrow strength" from other parts of the model to enhance statistical prediction is an essential benefit of the two-tier model over separate bifactor analyses that would ignore the correlations among the primary factors.

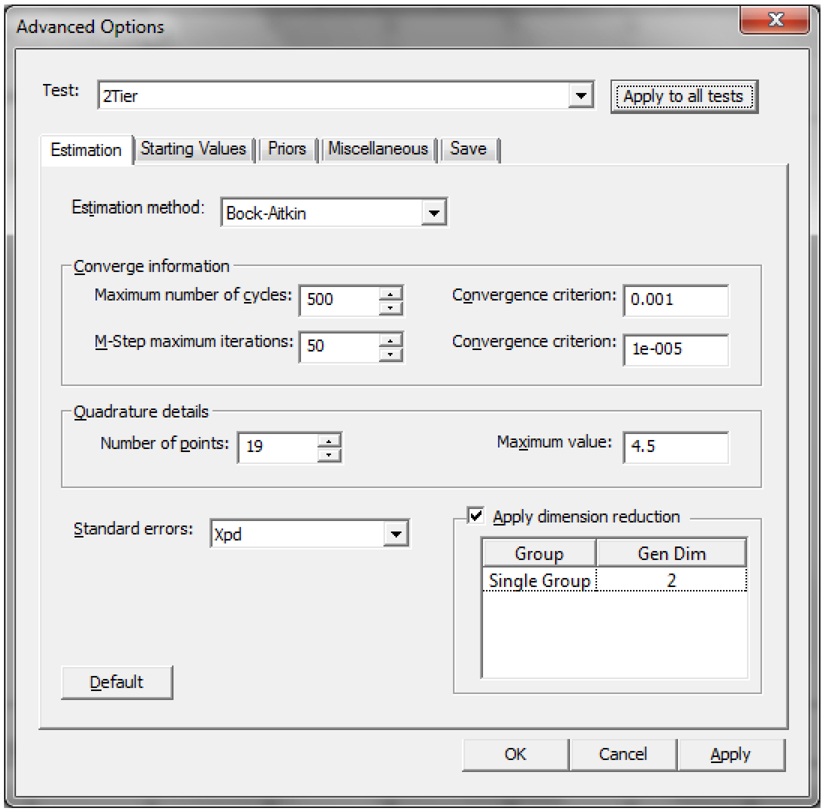
A set of examples based on the PISA math and read items is contained in the command file **PISAReadMathBook8.irtpro** and is based on the IRTPRO dataset **PISAReadMathBook8.ssig**. These files are located in the folder **IRTPRO Examples\By Dataset\PISA Read_Math**. The first 15 cases for a number of reading items are shown below. The reader is referred to Cai (2011) for a detailed description of this two-tier analysis.



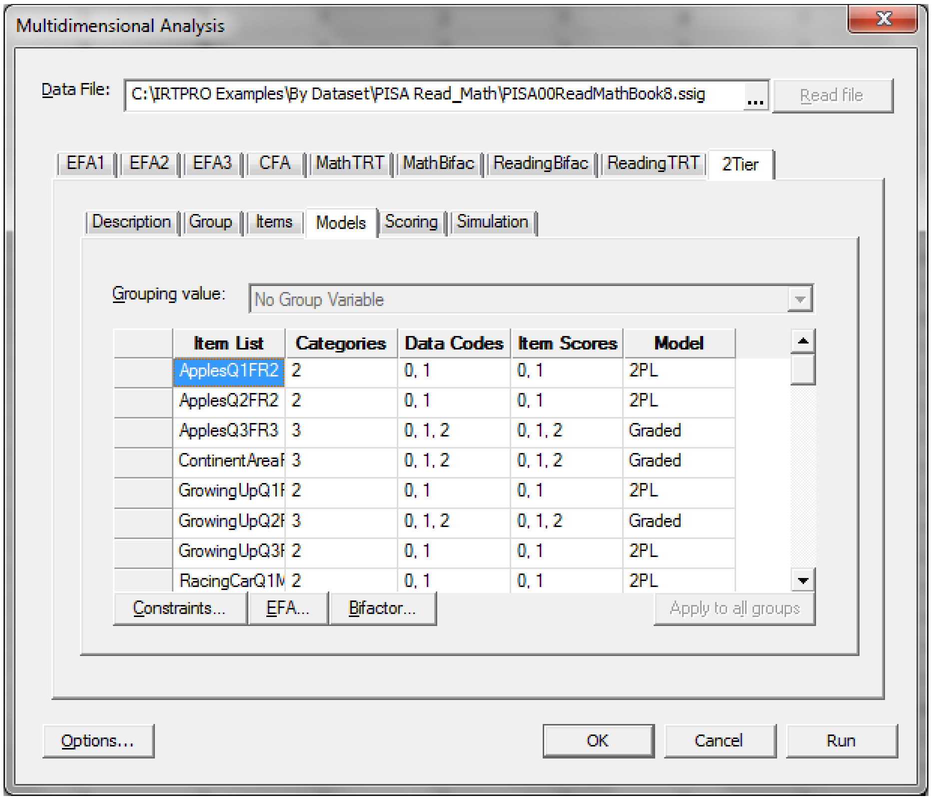
Select the **Analysis, Multidimensional** option and click **Yes** when prompted to use the existing command file. Select the **2Tier** test tab and then click the **Items** tab to obtain the display below. Note that there are 2 general dimensions and 12 testlets yielding a total of 14 dimensions.



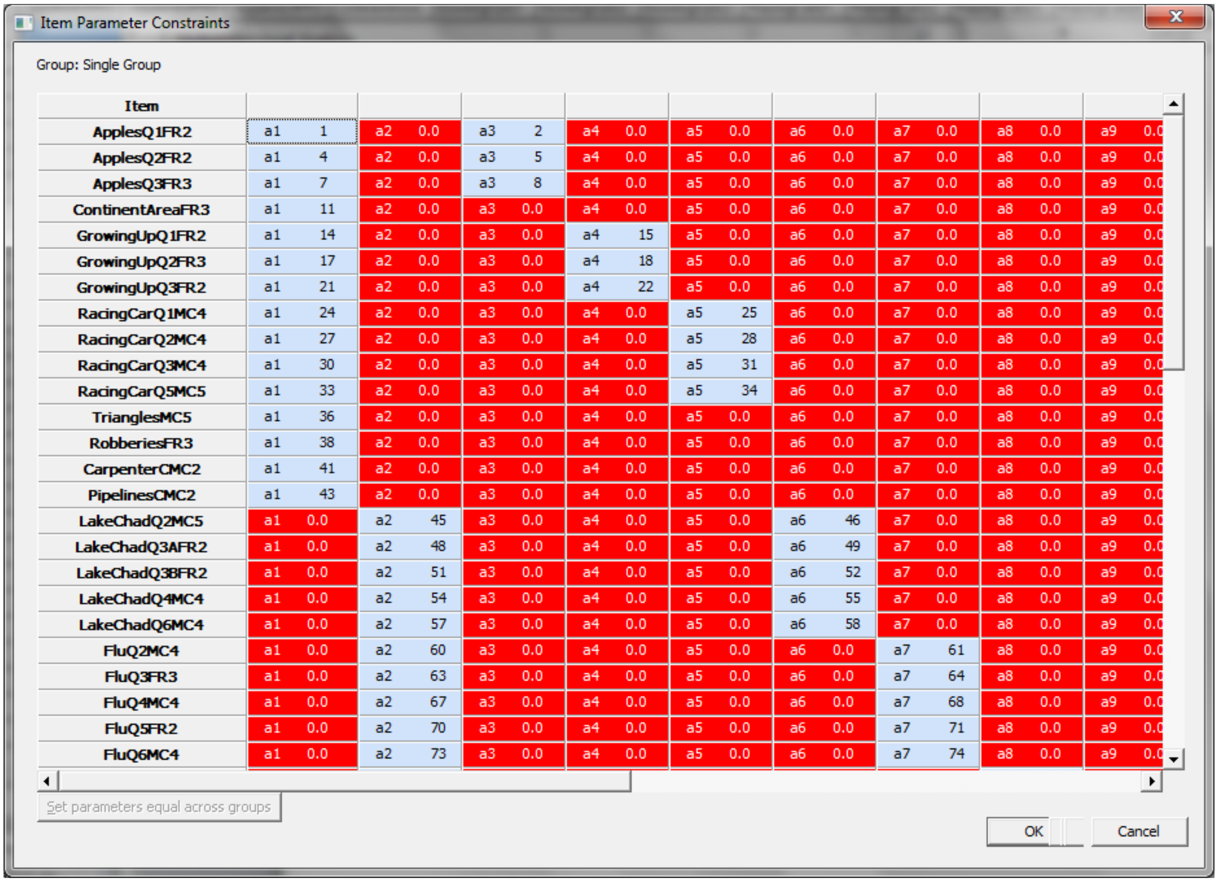
To view the estimation settings that were selected for the two-tier analysis, click the **Options…** button (see above). Note that the **Apply dimension reduction** option is selected and that the number of general dimensions is set to two. Also note that no grouping variable was selected for ths analysis thus assuming a single group.



Click the **OK** button to return to the **Multidimensional Analysis** window then click the **Models** tab to see the list of models that were selected.



Next click the **Constraints...** button to view the **Item Parameter Constraints** window. This window graphically illustrates that all the slope parameters are fixed at zero, except those belonging to the two main dimensions and to the various testlets.



Item Parameter Constraints

Group: Single Group

Item									
ApplesQ1FR2	a1 1	a2 0.0	a3 2	a4 0.0	a5 0.0	a6 0.0	a7 0.0	a8 0.0	a9 0.0
ApplesQ2FR2	a1 4	a2 0.0	a3 5	a4 0.0	a5 0.0	a6 0.0	a7 0.0	a8 0.0	a9 0.0
ApplesQ3FR3	a1 7	a2 0.0	a3 8	a4 0.0	a5 0.0	a6 0.0	a7 0.0	a8 0.0	a9 0.0
ContinentAreaFR3	a1 11	a2 0.0	a3 0.0	a4 0.0	a5 0.0	a6 0.0	a7 0.0	a8 0.0	a9 0.0
GrowingUpQ1FR2	a1 14	a2 0.0	a3 0.0	a4 15	a5 0.0	a6 0.0	a7 0.0	a8 0.0	a9 0.0
GrowingUpQ2FR3	a1 17	a2 0.0	a3 0.0	a4 18	a5 0.0	a6 0.0	a7 0.0	a8 0.0	a9 0.0
GrowingUpQ3FR2	a1 21	a2 0.0	a3 0.0	a4 22	a5 0.0	a6 0.0	a7 0.0	a8 0.0	a9 0.0
RacingCarQ1MC4	a1 24	a2 0.0	a3 0.0	a4 0.0	a5 25	a6 0.0	a7 0.0	a8 0.0	a9 0.0
RacingCarQ2MC4	a1 27	a2 0.0	a3 0.0	a4 0.0	a5 28	a6 0.0	a7 0.0	a8 0.0	a9 0.0
RacingCarQ3MC4	a1 30	a2 0.0	a3 0.0	a4 0.0	a5 31	a6 0.0	a7 0.0	a8 0.0	a9 0.0
RacingCarQ5MC5	a1 33	a2 0.0	a3 0.0	a4 0.0	a5 34	a6 0.0	a7 0.0	a8 0.0	a9 0.0
TrianglesMC5	a1 36	a2 0.0	a3 0.0	a4 0.0	a5 0.0	a6 0.0	a7 0.0	a8 0.0	a9 0.0
RobberiesFR3	a1 38	a2 0.0	a3 0.0	a4 0.0	a5 0.0	a6 0.0	a7 0.0	a8 0.0	a9 0.0
CarpenterCMC2	a1 41	a2 0.0	a3 0.0	a4 0.0	a5 0.0	a6 0.0	a7 0.0	a8 0.0	a9 0.0
PipelinesCMC2	a1 43	a2 0.0	a3 0.0	a4 0.0	a5 0.0	a6 0.0	a7 0.0	a8 0.0	a9 0.0
LakeChadQ2MC5	a1 0.0	a2 45	a3 0.0	a4 0.0	a5 0.0	a6 46	a7 0.0	a8 0.0	a9 0.0
LakeChadQ3AFR2	a1 0.0	a2 48	a3 0.0	a4 0.0	a5 0.0	a6 49	a7 0.0	a8 0.0	a9 0.0
LakeChadQ3BFR2	a1 0.0	a2 51	a3 0.0	a4 0.0	a5 0.0	a6 52	a7 0.0	a8 0.0	a9 0.0
LakeChadQ4MC4	a1 0.0	a2 54	a3 0.0	a4 0.0	a5 0.0	a6 55	a7 0.0	a8 0.0	a9 0.0
LakeChadQ6MC4	a1 0.0	a2 57	a3 0.0	a4 0.0	a5 0.0	a6 58	a7 0.0	a8 0.0	a9 0.0
FluQ2MC4	a1 0.0	a2 60	a3 0.0	a4 0.0	a5 0.0	a6 0.0	a7 61	a8 0.0	a9 0.0
FluQ3FR3	a1 0.0	a2 63	a3 0.0	a4 0.0	a5 0.0	a6 0.0	a7 64	a8 0.0	a9 0.0
FluQ4MC4	a1 0.0	a2 67	a3 0.0	a4 0.0	a5 0.0	a6 0.0	a7 68	a8 0.0	a9 0.0
FluQ5FR2	a1 0.0	a2 70	a3 0.0	a4 0.0	a5 0.0	a6 0.0	a7 71	a8 0.0	a9 0.0
FluQ6MC4	a1 0.0	a2 73	a3 0.0	a4 0.0	a5 0.0	a6 0.0	a7 74	a8 0.0	a9 0.0

Set parameters equal across groups

OK Cancel