

## ConstructMap v4.3

### Instructions for Generating the Chapter 5 Examples

by Cathleen A. Kennedy updated 9/30/06

#### Figures 5.3 and 5.4 – Relationship between respondent location ( $\theta$ ) and probability of a response of “1” for an item with difficulty 1.0.<sup>1</sup>

1. Select the menu option **File – New Project** and answer **Yes** when asked if you are sure you want to do this.
2. Select the menu option **System – Import Model Specification**.
3. Navigate to the **pf10\_dich** folder.
4. Select (double click) the file **items.txt**.
5. Select the menu option **File – Import Student Data**.
6. Select (double click) the file **students.txt**.
7. Select the menu option **Reports & Maps – Report Options**.
8. Enter a **Project Title** of **PF10 Dichotomous**.
9. Enter a **Case** descriptor of **Respondent**.
10. Click on **OK**.
11. Select the menu option **File – Save**. Click on **OK** when complete.
  
12. Select the menu option **Estimation Tasks – Compute Item Parameters**.
13. Set **Reset Parameters** to **Yes** and set **Import Matrices** to **No**, then click on **OK**.
14. When asked if you want to accept the parameters, click on **YES**.
15. Select the menu option **File – Save**. Click on **OK** when complete.
  
16. Select the menu option **Estimation Tasks – Results – Item Characteristic Curves**.
17. Enter a **Title** of **ICC Graph**.
18. Use the **Browse** button to select the **WalkMile** item.
19. Set the **Ability on X-axis** value to **No**.
20. Set the **Min. Proficiency** to **-6** and the **Max. Proficiency** to **6**.
21. Set the **Show in Gray Scale** option to **Yes**.
22. Set the **Background Color** to white.
23. Click on **OK**.
24. The graph will be displayed. If necessary, drag the right edge of the window to the left to reduce the width of the graph to look more similar to Figure 5.3. Note that ConstructMap displays both the  $P(x=0)$  curve (the dashed line) and the  $P(x=1)$  curve (the solid line). Click on **OK** at the bottom of the graph to close the window.
25. To obtain the orientation shown in Figure 5.4, repeat steps 15 and 16, then set the **Ability on X-axis** value to **Yes**, and click on **OK**.
26. Again, the graph will be displayed and if necessary you can drag the bottom edge of the window upwards to reduce the height of the graph to look more similar to Figure 5.4. Note again that ConstructMap displays both the  $P(x=0)$  curve (the dashed line) and the  $P(x=1)$  curve (the solid line). Click on **OK** at the bottom of the graph to close the window.

---

<sup>1</sup> These instructions assume the reader is referring to the Tables and Figures shown in the book.

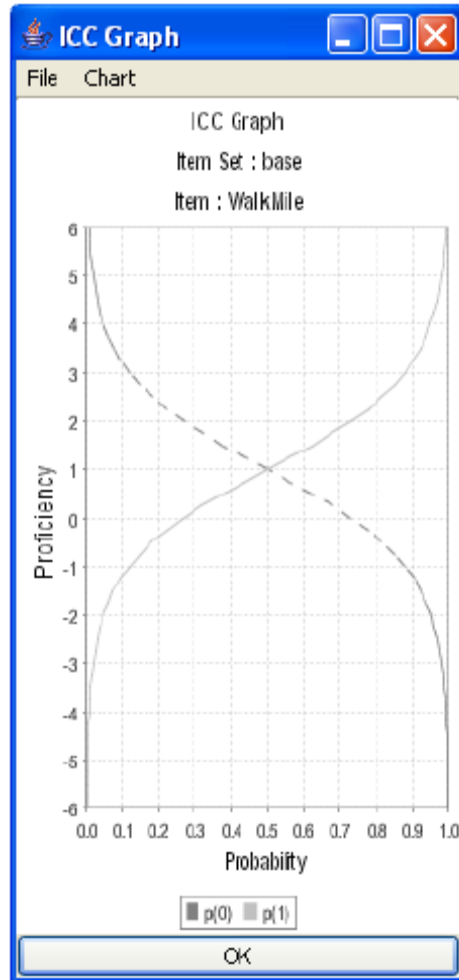


Figure 1. Item Characteristic Curve for item WalkMile from ConstructMap. Item has difficulty of 1.00. Respondent locations along the y-axis.

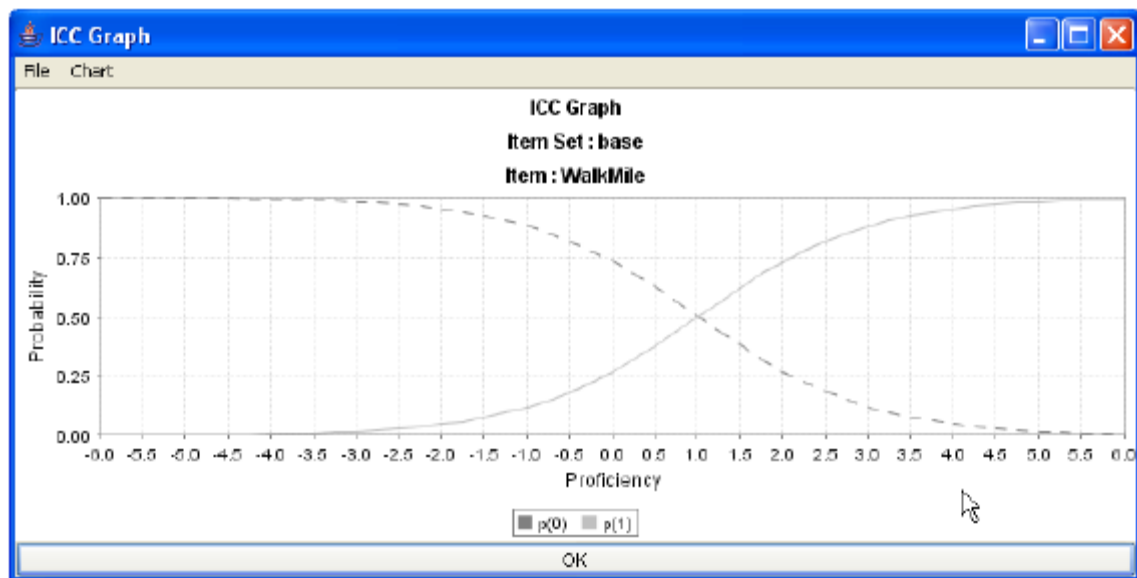


Figure 2. ICC for item WalkMile with respondent locations along the x-axis.

### Figure 5.7 – A Wright map for the dichotomized PF-10 instrument

1. Continuing from the example above, select **Estimation Tasks – Proficiency Estimation Options** and confirm that the Estimation Type is MLE. Click on **OK** to continue.
2. Select the menu option **Estimation Tasks – Results - Wright Map**.
3. Enter a **Title** of **Wright Map**.
4. **Browse** to the directory where you want to store the file (for example, `c:/measurement/files`) and enter a **File name** of **wmpf10\_1**, then click on **Save**.
5. Confirm that the **Item Set** is set to **base** (not required for ConstructMap Lite).
6. Confirm that **Display Raw Scores** is set to **Yes**.
7. Confirm that **Display Item Names** is set to **Yes**.
8. Set the **Show Estimate Type** to **No**.
9. Set the **Display Step Map** to **No**.
10. In the **Defined Range** section, enter the **Max. Range** is **5.0**, the **Min. Range** is **-5.0**, and set the **Rows** to **51**.
11. Click on **OK**

The Wright map will be displayed on the screen and also stored on your system in the folder you specified. In addition, ConstructMap will automatically store the Thurstonian thresholds in a file named `tt_filename.txt` (the filename you entered in step 16) in the same folder.

12. Close the display by clicking on the close box in the upper right-hand corner.

Note that you can modify the output files generated by ConstructMap. Simply open a file in Word and modify the content. For example, you can remove header lines, change column headings, etc. by typing right in the file. You may want to save the file with a new name to preserve your original output.

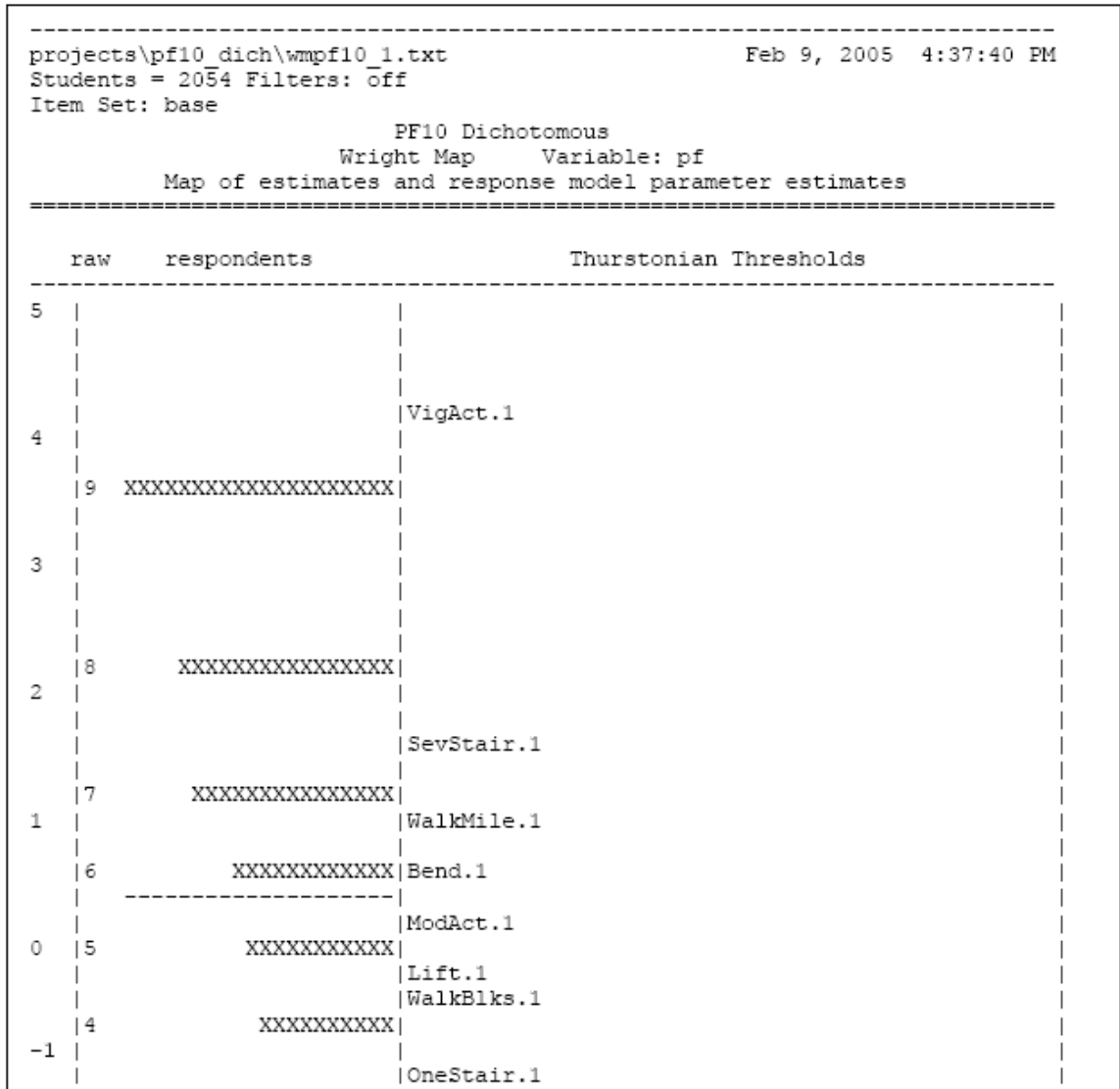


Figure 3. Excerpt from the Wright Map as generated by ConstructMap, before modifications in Word.

To get Figure 5.7, as displayed in the text:

- Delete the heading rows at the top of the page
- Add the column heading for the Logit column
- Change the "raw" column heading to "Raw Score"
- Change the "Thurstonian Thresholds" column heading to "Item Responses"
- Delete the ".1"s from each item label
- Delete the extra logit rows above VigAct and below the last row of XXXXX

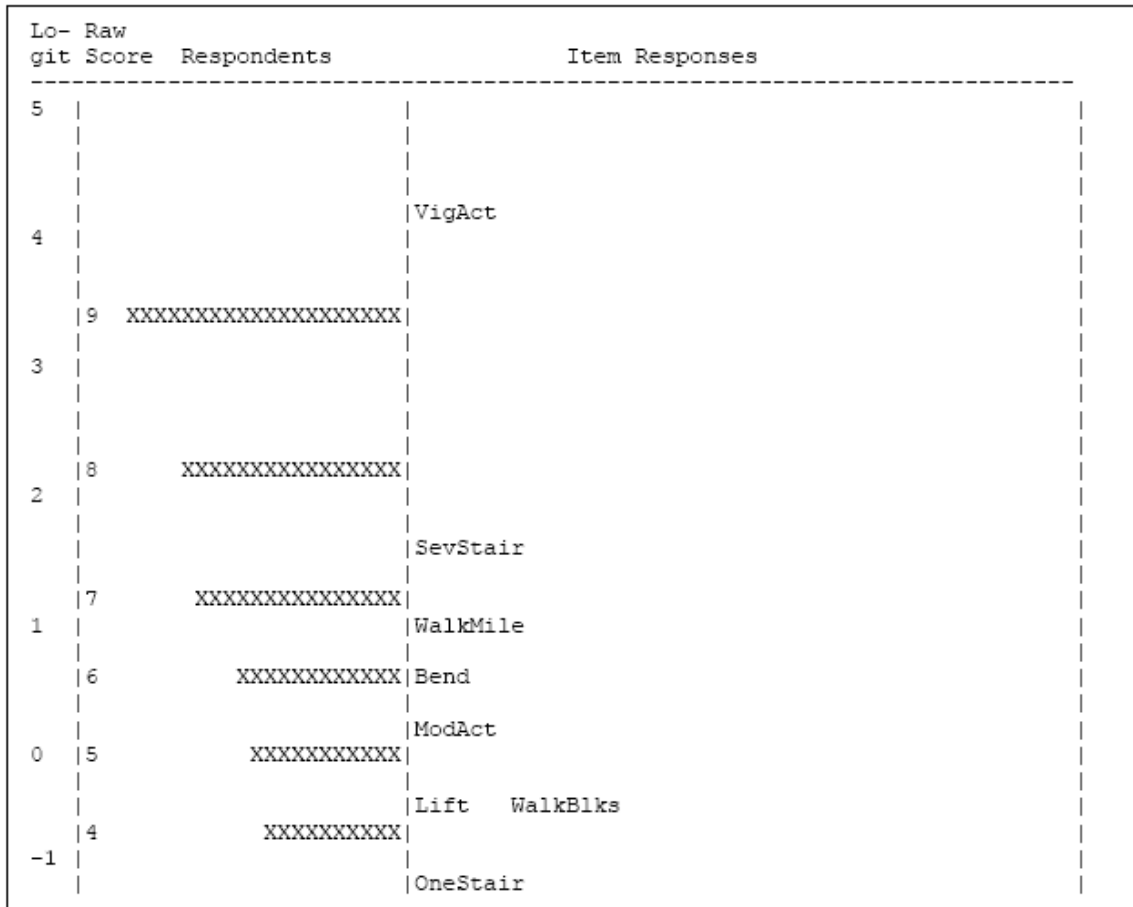


Figure 4. Excerpt of Wright Map from Figure 3 after updating in Word.

**Figure 5.8 – Item response function for  $\xi_i=0$  for an item with difficulty 1.0.**

1. This curve is already displayed in Figure 1 from ConstructMap. It is the dashed line.

**Figure 5.9 – The cumulative category response functions for a polytomous item.**

1. Select the menu option **File – New Project**.
2. Select the menu option **System – Import Model Specification**.
3. Navigate to the **pf10\_trich** folder.
4. Select (double click) the file **items.txt**.
5. Select the menu option **File – Import Student Data**.
6. Select (double click) the file **students.txt**.
7. Select the menu option **Reports & Maps – Report Options**.
8. Enter a **Project Title** of **PF10 Trichotomous**.
9. Enter a **Case** descriptor of **Respondent**.
10. Click on **OK**.
11. Select the menu option **File – Save**. Click on **OK** when complete.
12. Select the menu option **Estimation Tasks – Compute Item Parameters**
13. Set **Reset Parameters** to **Yes**, then click on **OK**. When asked if you want to accept the parameters, click on **YES**.
15. Select the menu option **File – Save**. Click on **OK** when complete.

16. Select the menu option **Estimation Tasks – Results – Item Cumulative Probability Curves**.
17. Enter a **Title of Cumulative Probability**.
18. Use the **Browse** button to select the **WalkMile** item.
19. Set the **Ability on X-axis** value to **No**.
20. Set the **Min. Proficiency** to **-6** and the **Max. Proficiency** to **6**.
21. Set the **Show in Gray Scale** option to **Yes**.
22. Set the **Background Color** to white.
23. Click on **OK**.
24. The graph will be displayed. If needed, drag the right edge of the window to the left to reduce the width of the graph to look more similar to Figure 5.9. Click on **OK** to close the graph window.

Note that ConstructMap displays cumulative probabilities such that the first curve is the probability of being in score category 1 or higher (denoted as  $P(1,2)$  in the legend), the second curve is the probability of being in score category 2 or higher, etc. (in this case, there were only 3 categories, with scores 0, 1 and 2). Note in the chart produced by ConstructMap that at an ability level of 0 the respondent is more likely to have a score of 1 than a score of 2. The probability of having a score of 1 or 2 is 0.5, while the probability of having a score of 2 is 0.05.

The representation in Figure 5.9 in the book is the reverse. The first curve is the probability of being in score category 0, the second is the probability of being in score categories 0 or 1.

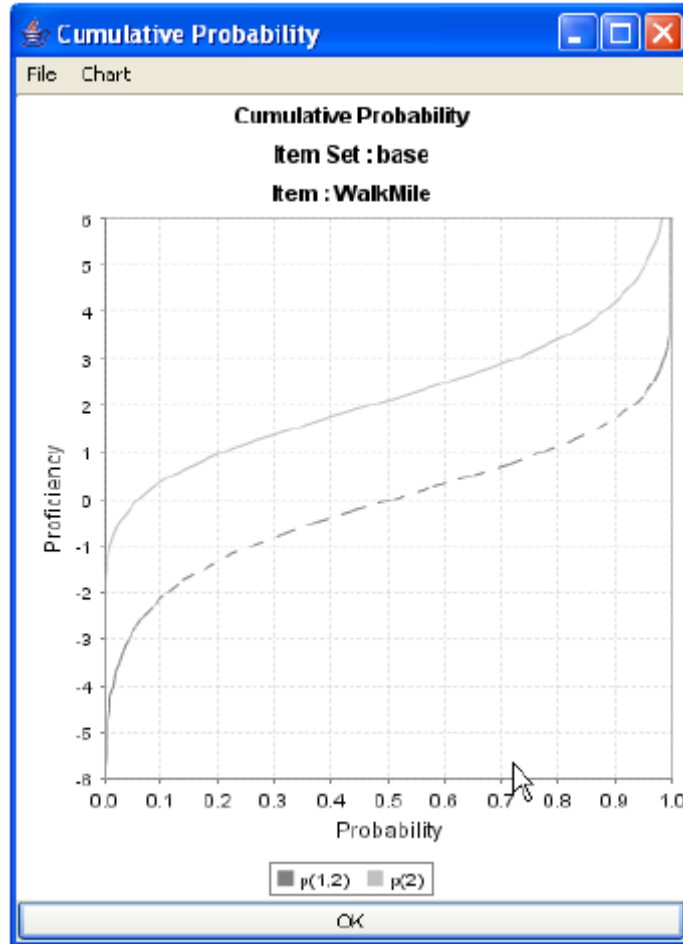


Figure 5. Item Cumulative Probability Curves for a polytomous item. Respondent locations along the y-axis.

**Figure 5.10 – A Wright map for the trichotomous PF-10 instrument**

1. Select the menu option **Estimation Tasks – Results - Wright Map**.
2. **Enter a Title of Wright Map**.
3. **Browse** to the directory you want to store the file in and enter a **File Name** of **wmpf10\_2**, then click on **Save**.
4. Confirm that the **Item Set** is set to **base** (not required for ConstructMap Lite).
5. Confirm that **Display Raw Scores** is set to **Yes**.
6. Confirm that **Display Item Names** is set to **Yes**.
7. Set the **Show Estimate Type** to **No**.
8. Set the **Display Step Map** to **No**.
9. In the **Defined Range** section, confirm that the **Max. Range** is **5.5**, the **Min. Range** is **-4.5**, and set the **Rows** to **50**.
10. Click on **OK**.

The Wright map will be displayed on the screen and also stored on your system in the folder you specified. Again, ConstructMap will automatically store the Thurstonian thresholds in a file named **tt\_filename.txt** (the filename you entered in step 2) in the same folder.

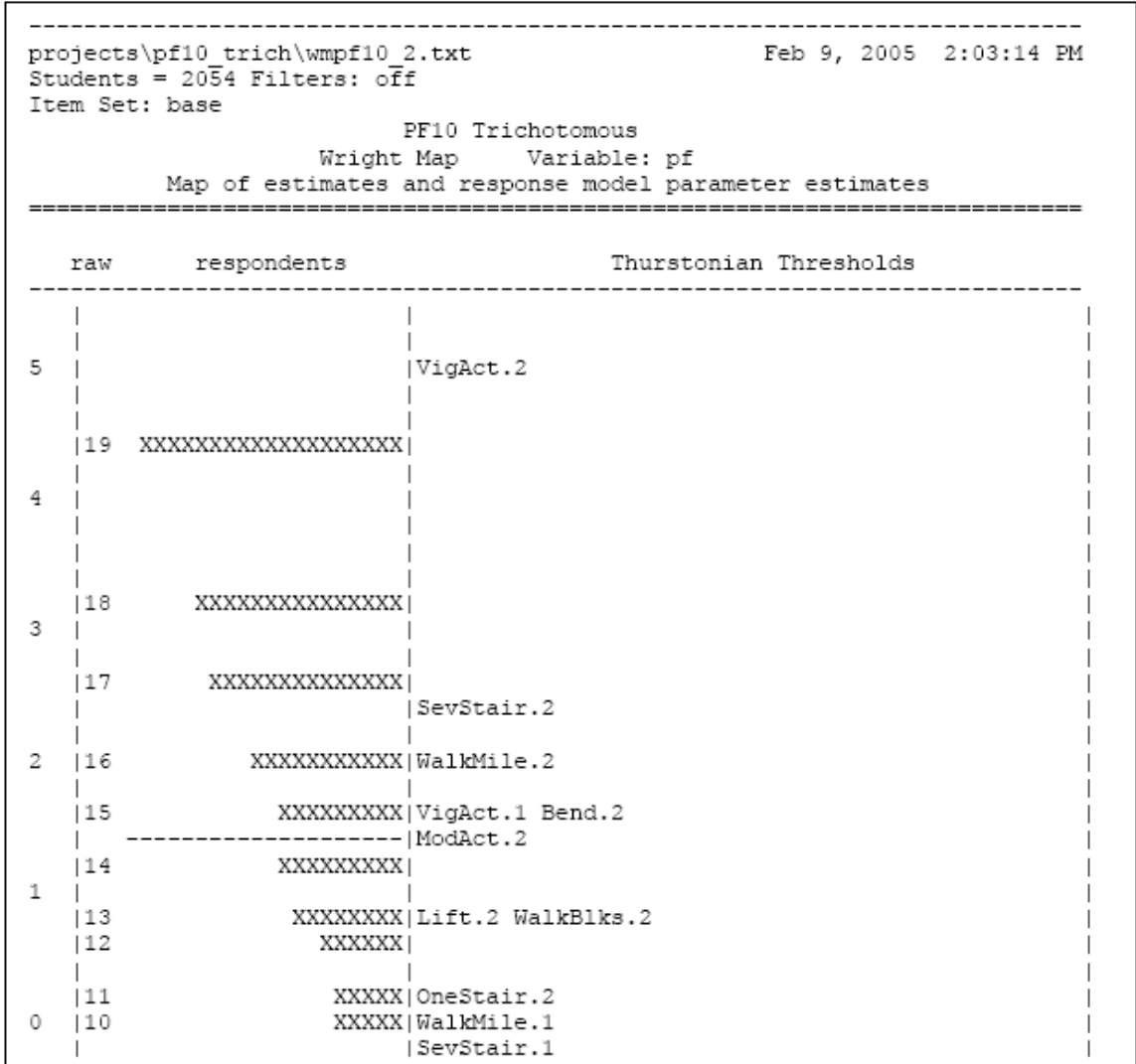


Figure 6. Excerpt of the Wright Map generated by ConstructMap, before updating in Word.

By default, ConstructMap displays all the item threshold labels in one column. To get the map shown in Figure 5.10:

- Change the column headings and remove the extra rows as noted for Figure 5.7
- above (do not delete the ".1"s and ".2"s from the item labels yet!)
- Add column headings for "0 vs 1&2" and "0&1 vs 2" within the Item Responses
- column
- Align all of the .2 step labels into the "0&1 vs 2" column
- Remove the ".1"s and ".2"s from the item labels
- Remove the rows above 5 and below -4.

Lo- git	Raw Score	Respondents	0 vs 1&2	Item Responses	0&1 vs 2
5					VigAct
	19	XXXXXXXXXXXXXXXXXXXXX			
4					
	18	XXXXXXXXXXXXXXXXXXXXX			
3					
	17	XXXXXXXXXXXXXXXXXXXXX			SevStair
2					WalkMile
	16	XXXXXXXXXXXXX			Bend ModAct
	15	XXXXXXXXXX	VigAct		
	14	XXXXXXXXXX			
1					Lift WalkBlks
	13	XXXXXXXXX			
	12	XXXXXX			
	11	XXXXX			OneStair
0					
	10	XXXXX	WalkMile		
			SevStair		

Figure 7. Excerpt of the Wright Map from Figure 6 after updating in Word.