ConstructMap v4.6
Instructions for Generating the Chapter 7 Examples[1]

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FIGURE 7.1 – THE STANDARD ERROR OF MEASUREMENT FOR THE PF-10 INSTRUMENT

1. Select the menu option **Estimation Tasks → Proficiency Estimation Options** and confirm that Estimation Type is set to MLE.
2. Select the menu option **Reports → Group Reports → Ability Estimates with Fit Statistics**.
3. Enter a Title of Proficiency Estimates.
4. Browse to the directory where you want to store the file and enter a filename of `mlepf10`. Click on Save.
5. Confirm that the Item Set is set to base (not required for ConstructMap Lite).
6. Confirm that the Respondent Detail option is set to Yes.
7. Confirm that the Import Matrices option is set to No.
8. Set the Show Estimation Type option to No, and then click on OK.

The proficiency estimates and standard errors for each person will be displayed on the screen and also stored on your system in the folder you specified with the filename `mlepf10.txt`.

mlepf10.txt
Nov 5, 2012 10:45:33 AM

Ability Estimates
base

Variable: pf

#	Name	Raw	Max	Est.	Err.	infit	t	outfit	t
1	911583E	1	20	-4.0757	1.09332	0.40	-0.89	0.22	-0.15
2	716405B	1	20	-4.0757	1.09332	0.40	-0.89	0.22	-0.15
3	313711P	1	20	-4.0757	1.09332	0.40	-0.89	0.22	-0.15
4	3724442	1	20	-4.0757	1.09332	0.40	-0.89	0.22	-0.15
5	5899716	1	20	-4.0757	1.09332	0.40	-0.89	0.22	-0.15
6	664294X	1	20	-4.0757	1.09332	0.40	-0.89	0.22	-0.15
7	167385Y	1	20	-4.0757	1.09332	0.40	-0.89	0.22	-0.15
8	879205B	2	20	-3.1938	0.82647	0.61	-0.44	0.43	0.13
9	887311E	2	20	-3.1938	0.82647	0.69	-0.29	0.47	0.17
10	559913T	2	20	-3.1938	0.82647	0.80	-0.08	0.65	0.33
11	892282R	2	20	-3.1938	0.82647	0.49	-0.69	0.25	-0.09

Figure 1. Excerpt from the Ability Estimates with Fit Statistics report generated by ConstructMap.

[1] These instructions assume the reader is continuing after completing the Chapter 6 instructions.

9. Start Excel and open `mlepf10.txt` by using **File → Open**, and selecting Files of type: All Files (*.*).
10. The Text Import Wizard will be displayed. Select Fixed Width, set the Start import at row option to 11, and then click on Next.
11. Scroll down to verify that the vertical lines are properly placed between each data column (between the Case Number, Name, Raw score, Maximum score, Estimate, Error, Infit, Outfit, and t-statistic columns). Drag lines to the proper positions as needed. You may need to add a line between the Estimate and Error columns (around character 40).
12. Click on Finish.

	A	B	C	D	E	F	G	H	I	J
1	1	911583E	1	20	-4.0757	1.09332	0.4	-0.89	0.22	-0.15
2	2	716405B	1	20	-4.0757	1.09332	0.4	-0.89	0.22	-0.15
3	3	313711P	1	20	-4.0757	1.09332	0.4	-0.89	0.22	-0.15
4	4	3724442	1	20	-4.0757	1.09332	0.4	-0.89	0.22	-0.15
5	5	5899716	1	20	-4.0757	1.09332	0.4	-0.89	0.22	-0.15
6	6	664294X	1	20	-4.0757	1.09332	0.4	-0.89	0.22	-0.15
7	7	167385Y	1	20	-4.0757	1.09332	0.4	-0.89	0.22	-0.15
8	8	879205B	2	20	-3.1938	0.82647	0.61	-0.44	0.43	0.13

Figure 2. Excerpt of data after transferring into Excel.

13. Highlight the data in the Estimate and Error columns (rows 1 through 2054 in columns E and F in the spreadsheet). Make sure you only have the data selected, and not the extra rows at the bottom. Create an XY (Scatter) chart or a Marked Scatter chart.
14. Right-click on the X-axis to access the Format Axis dialog window. Click on the Scale tab and change the Crosses at value to –6, and then click on OK.
15. Save the spreadsheet with **File → Save As.**

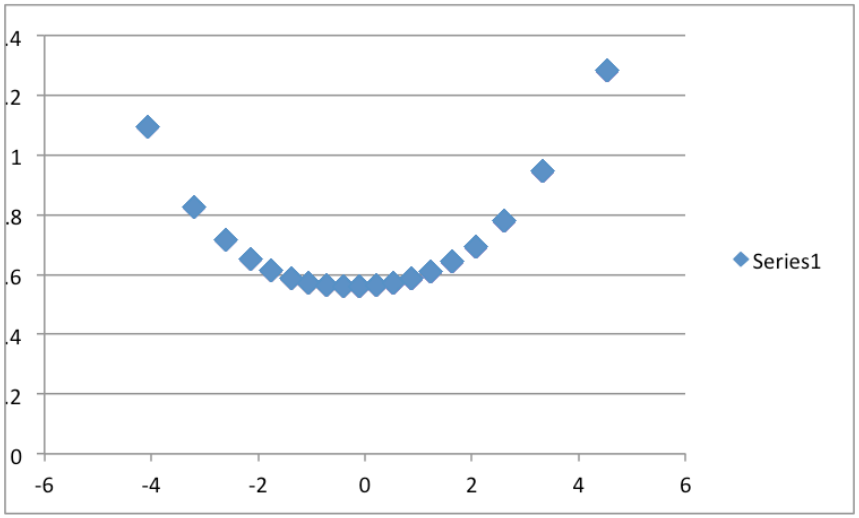

Figure 3. Chart as it appears in Excel.

FIGURE 7.2 – THE INFORMATION FOR THE PF-10 INSTRUMENT

1. Go to **Estimation Tasks → Proficiency Estimation Options** and confirm that Estimation Type is set to MLE.
2. Select the menu option **Reports → Item Reports →Test Information Curve**.
3. Enter a Title of Test Information.
4. For Cases to Include, select With No Missing Data.
5. Set the Logit Range to have a maximum of 4 and a minimum of -4.
6. Click on OK.

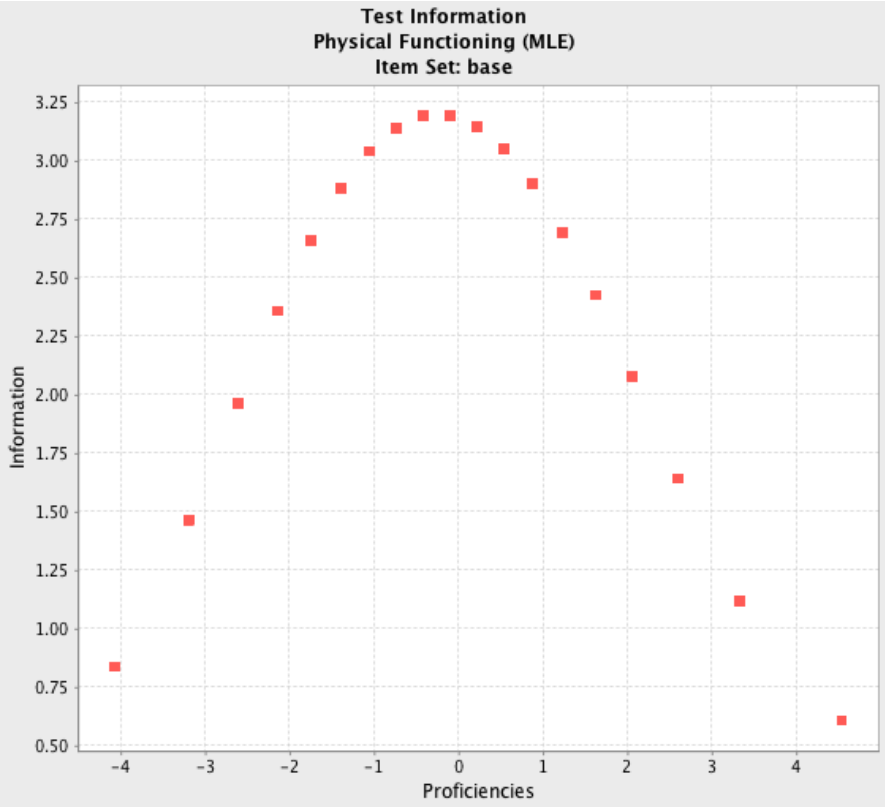

Figure 4. Test information curve for PF10 Trichotomous data produced by ConstructMap.

VALUES IN SECTION 7.2.1

1. Start with the spreadsheet you saved above. Insert a header row at the top.
2. Insert a column to the right of the standard errors, which are in column F. Label this column “err2” (for squared error). In the second cell (G2), enter the formula “=F2 * F2”.
3. Insert another column to the right and enter the formula for the inverse of the square of the standard error for each row (i.e. =1/G2). Label this column "Information."
4. Highlight and drag the two formulas to the bottom of the table area (or use the “Fill Down” command) to copy them into each row.
5. In a blank cell, enter the formula to compute the variance of the proficiency estimates (i.e. =var(E2:E2055)). This should return a value of 4.47. Label this "total variance".
6. In the next cell down, enter the formula to compute the sum of the squared errors divided by N (i.e. =AVERAGE(G2:G2055). This should return a value of .678. Label this "MSE".
7. In the next cell down, enter the formula to compute the difference between the total variance and the MSE. This should return a value of 3.79. Label this "variance accounted for by model".
8. In the next cell down, enter the formula for r (variance by model/total variance) and label it "reliability". This should return a value of .85.
9. Save the spreadsheet with a new name.