IRTPRO™

Contents

1. Data import and manipulation

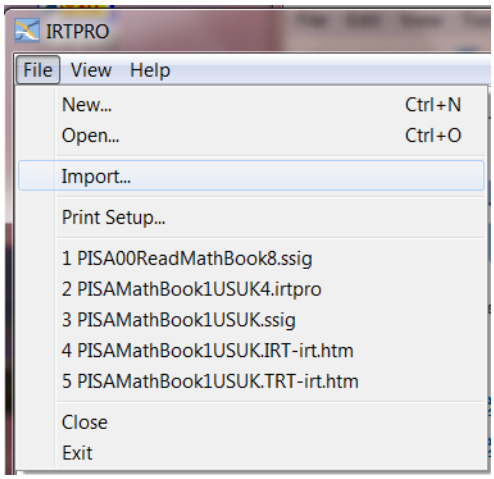
There are many ways to import data into IRTPRO for analysis. In this chapter, we briefly describe procedures for data-import from three commonly used formats: the **.sav** file format used by SPSS, fixed-format ASCII data, and comma-delimited text files.

In all cases, data are "imported" into IRTPRO (fixed-format input uses the **Open** command, but the effect is the same), and then re-saved as an IRTPRO system data (**.ssig**) file that is subsequently opened for analysis.

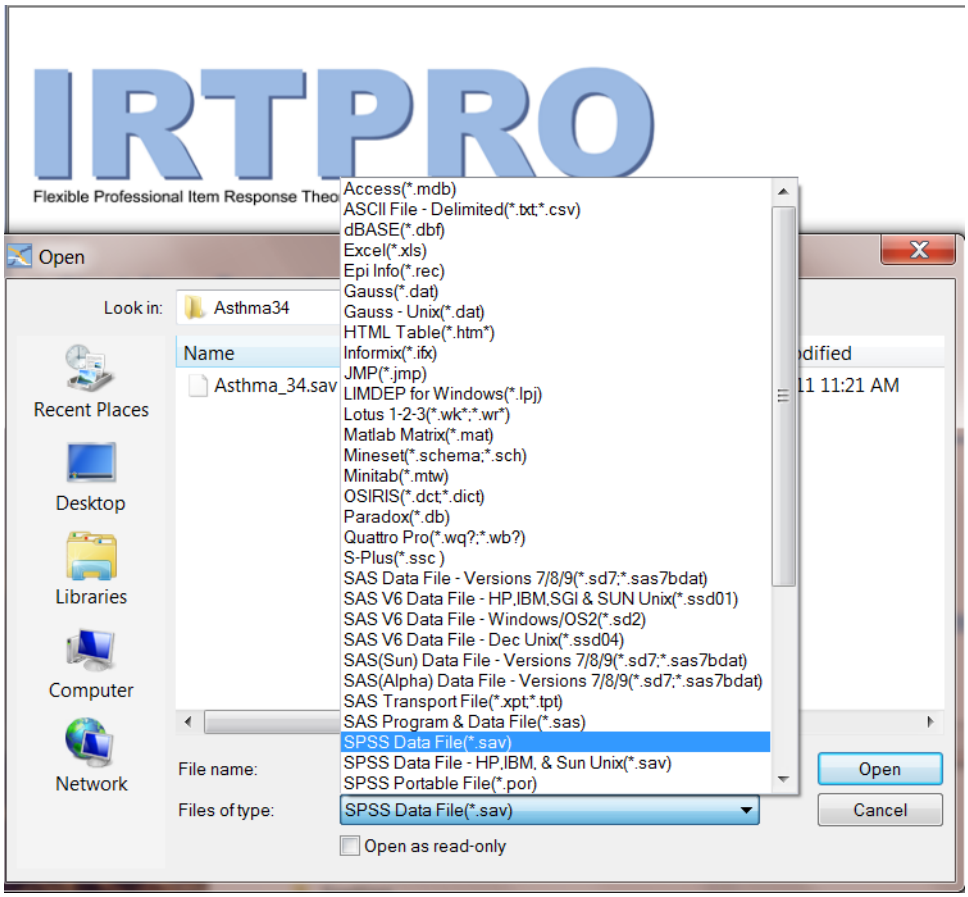
1.1 Importing Data from SPSS .sav Files

SPSS **.sav** files represent one example of many proprietary formats from which IRTPRO can import data.

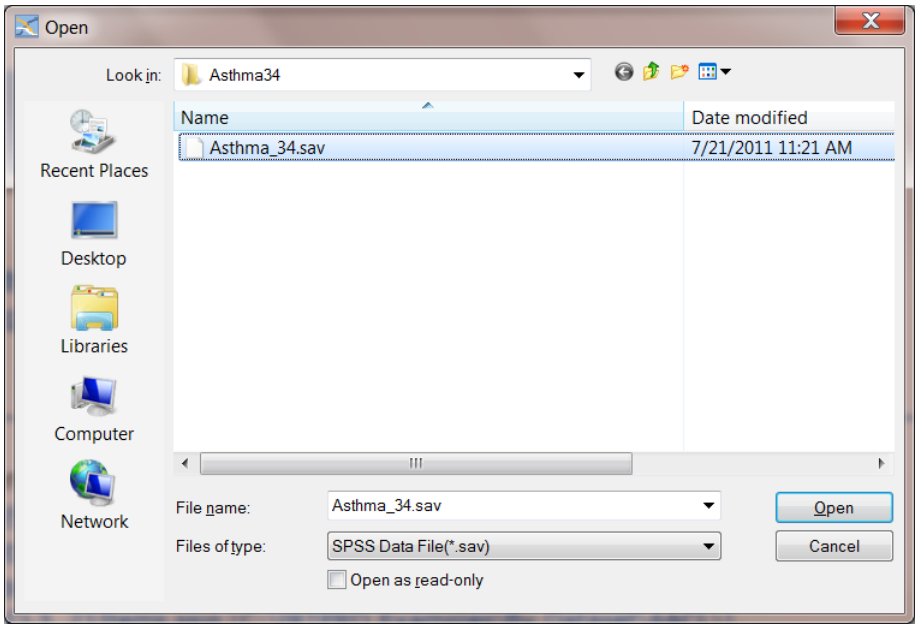
To begin the data-import process, one starts IRTPRO and selects **Import…** under the **File** menu:



This brings up a standard **Open File** dialog; in the lower center is a pop-up menu from which the user may select one of a large number of formats.

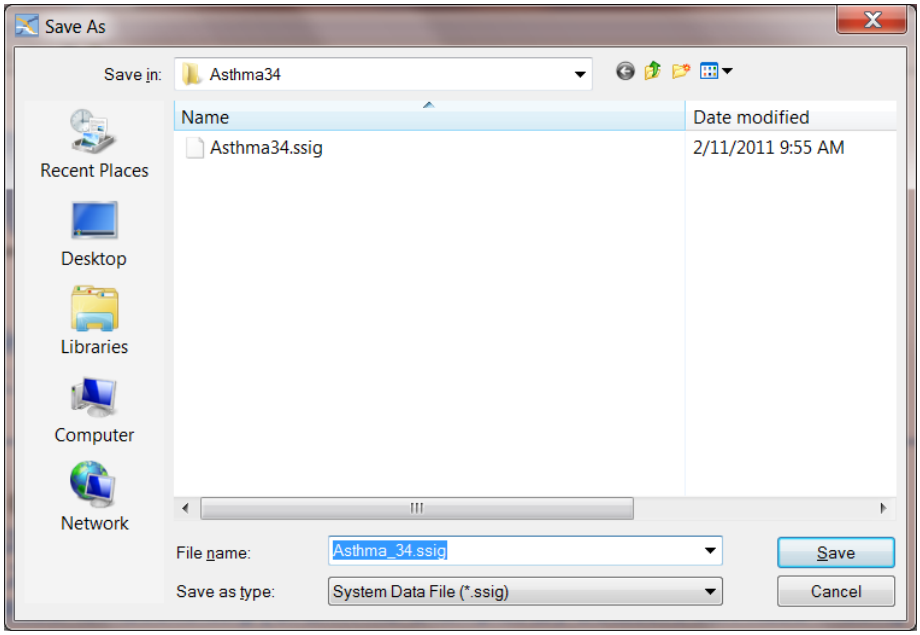


Here we select **SPSS Data File (*.sav)**; then, after navigating to the folder that contains the .**sav** file from which we wish to import data, we **Open** the file:

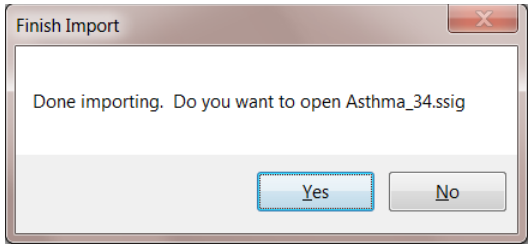


The next thing that happens is a standard **Save As** dialog appears, which has as its default to save the data as a .**ssig** file with the same name as the .**sav** file (in the case of this example, **Asthma_34**).

The user may (optionally) change the first part of the name; however, the extension should remain **.ssig**. Click the **Open** button to start the data import process.



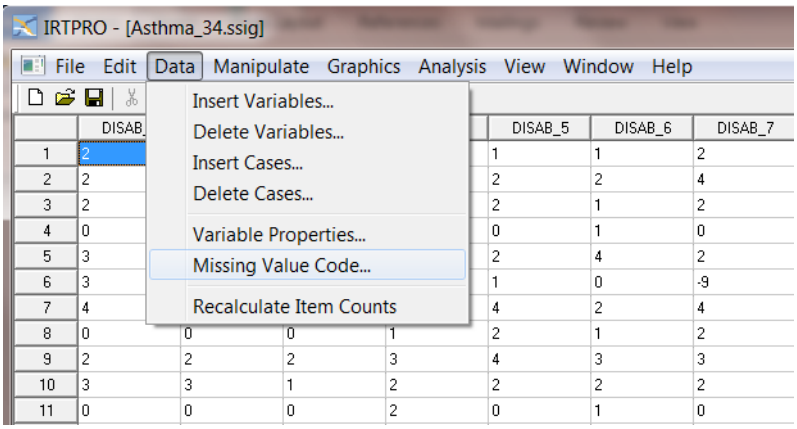
After one clicks **Save** the file is saved as an **.ssig** file, and the user has the opportunity to **Open** it to begin the analysis:



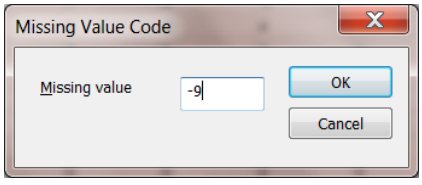
If one clicks **Yes,** the file opens.

A very important first thing to do the first time a new .**ssig** file is opened, is to enter missing the code that represents missing data in the dataset. This code must be numeric; there can only be a single missing data code, common to all of the items; and the missing data code cannot also be a valid item response code for any item. For data coded 0, 1, 2, 3, …, it is common to use -9 as the missing value code. Note that the default missing value code in IRTPRO is -1.

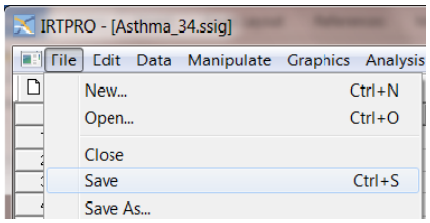
To set the missing value code, select the **Missing Value Code…** entry under the **Data** menu:



That brings up a **Missing Value Code** dialog into which the user may enter the code, and click on **OK**.



After that is done, it is important to **Save** the **.ssig** file:

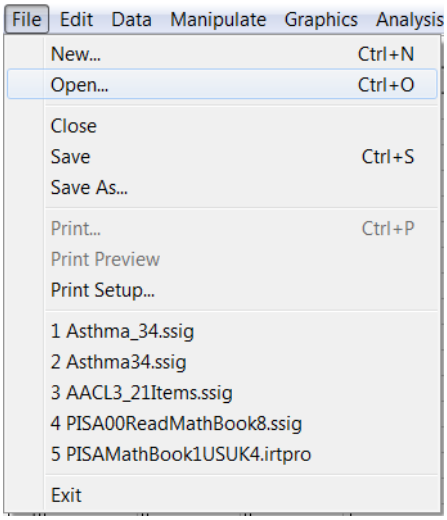


Once the missing value code has been set, and the **.ssig** file has been saved, the missing data code will be stored within the **.ssig** file and IRTPRO will "remember" the code in subsequent uses of the data.

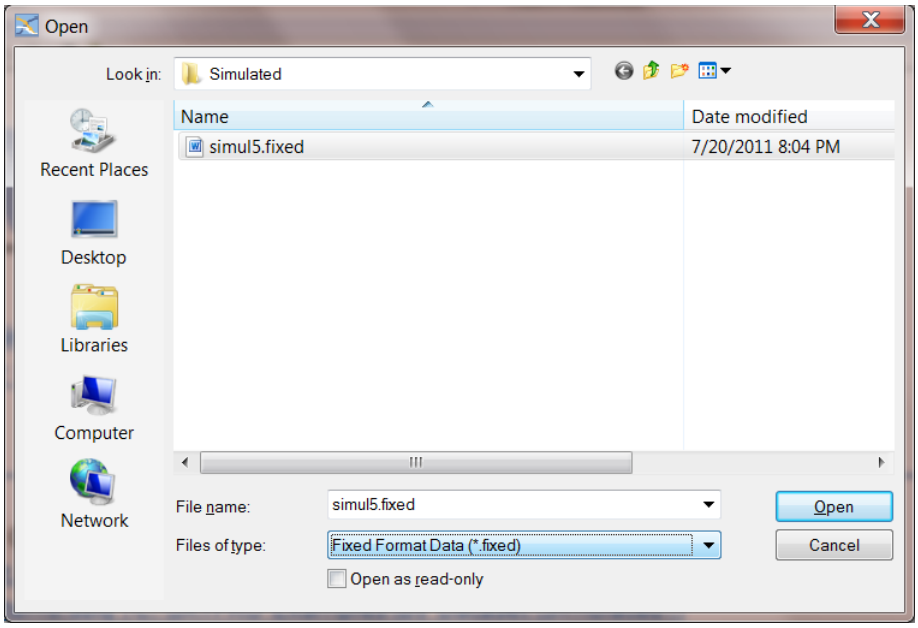
The file is now ready, and the user may proceed with analyses as described in Chapters 4 to 5.

1.2 Opening Fixed-Format Data Files

To bring in data from a fixed-format file, there is a slightly different procedure. It begins with the **Open** option under the **File** menu:

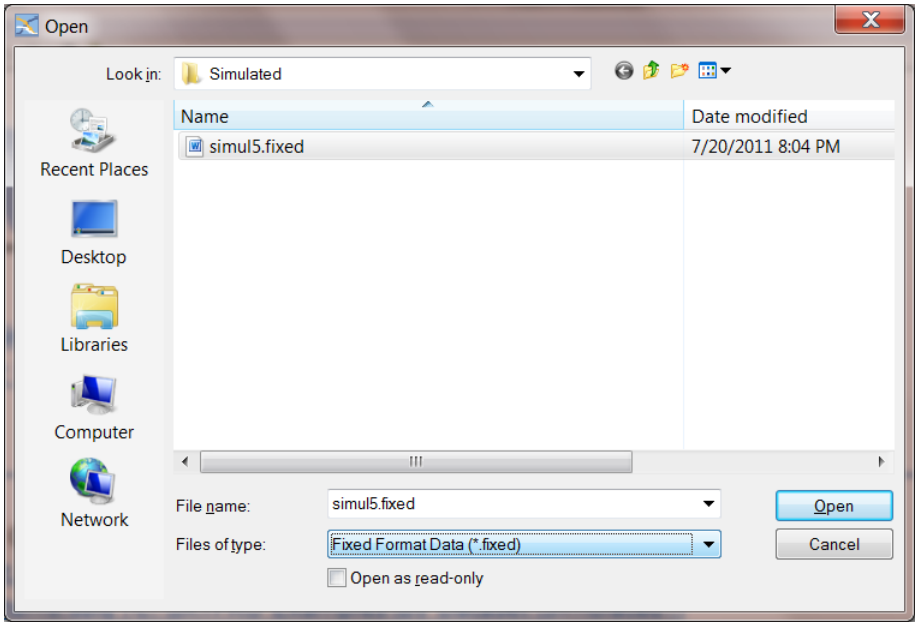


which brings up a standard **Open** dialog. In the lower center of this dialog, the user selects **Fixed Format Data (*.fixed)** from the pop-up menu, identifying **Files of type:**

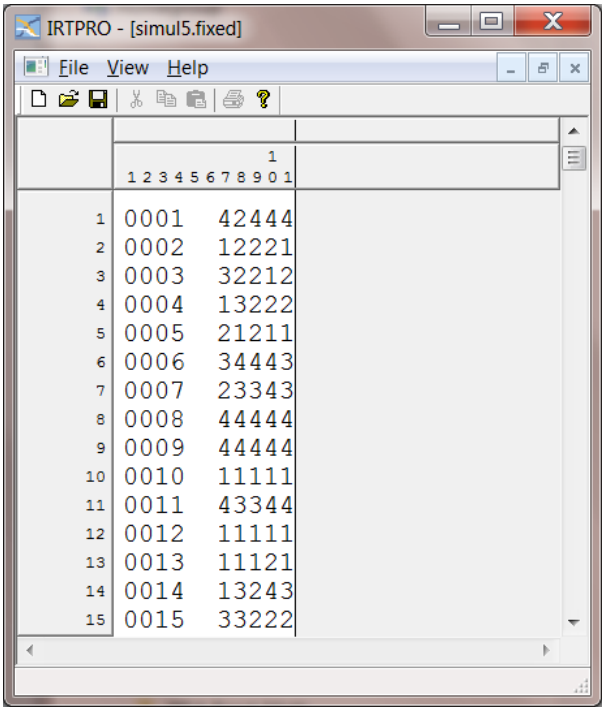


Then one opens the file; here we use as an example the file **simul5.fixed stored in the folder IRTPRO Examples\By Dataset\Simulated.** The data consists of five multiple category items. The simulated data represents 1000 examinees drawn at random from a population with mean ability score of 0.0 and standard deviation of 1.0.

Note that it is necessary that the fixed-format data file has the extension **.fixed**.

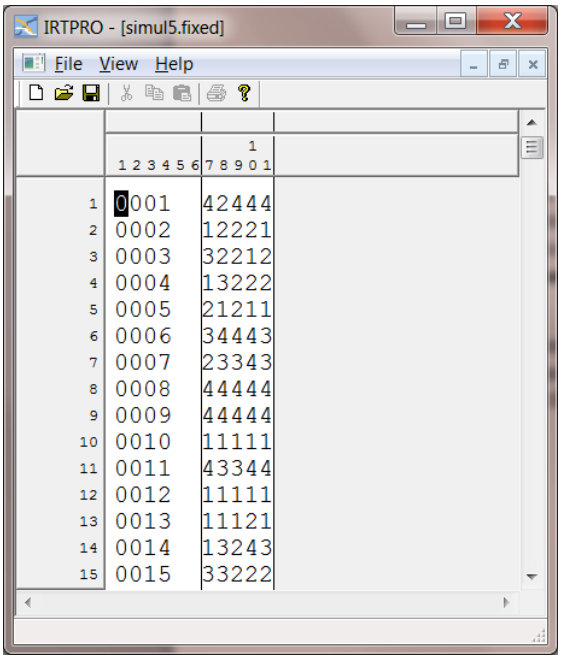


After the user clicks **Open,** an image of the file appears on the screen:

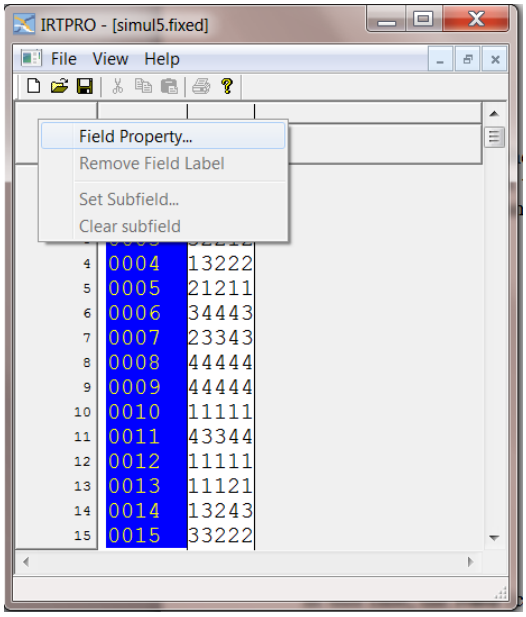


In the file **simul5.fixed** there is a **Case Number** variable in columns 1 to 4 (its values are 0001 to 1000), and item responses for five items, each of which is in a one-column field, in columns 7 to 11. To bring those data into IRTPRO as an **.ssig** file, the user must indicate the division of the file into (sets of) columns, or **Fields**, and assign names to the variables.

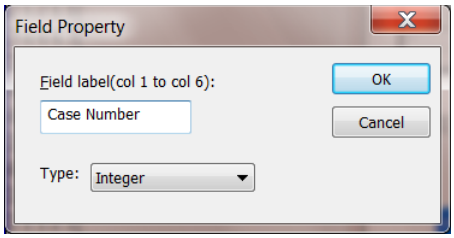
To indicate that columns 1 to 6 should be separated from columns 7 to 11, the user double-clicks between the small **6** and **7** in the gray column-header; after that is done; a vertical line appears between columns 1 to 6 and the subsequent columns:



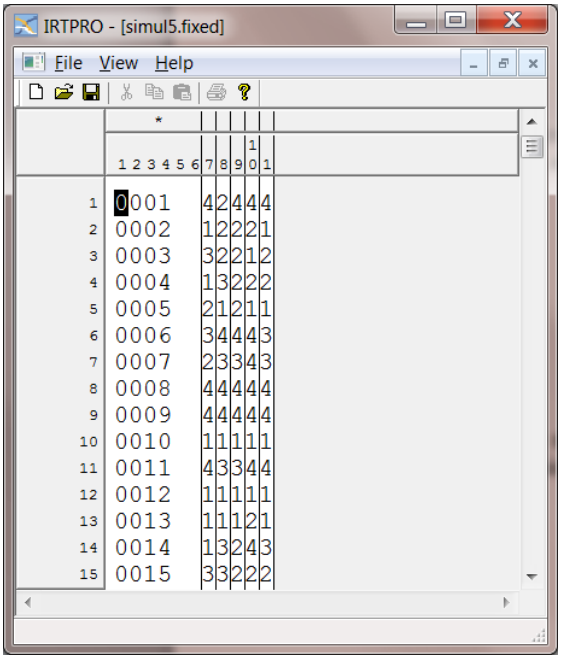
After that is accomplished, there is a small rectangular box above the column-header numbers **1** to **6**. A right-click within that box brings up a menu within which the user selects the entry **Field Property ...** to give a name to this **Field**:



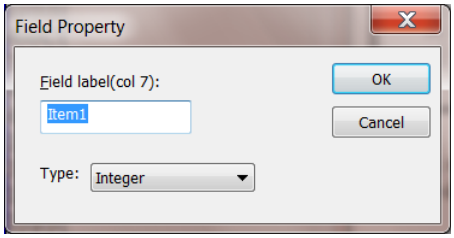
In this case, the **Field** (columns **1** to **6**) contains the data for the **Case Number** variable, so we give it the label **Case Number**, and click **OK**:



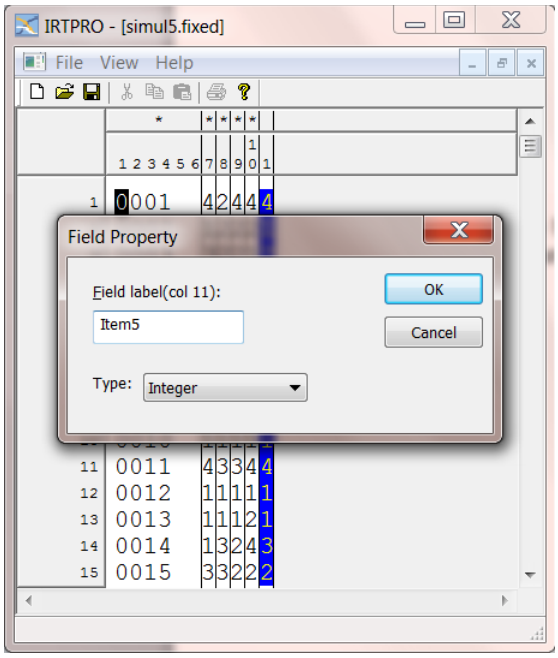
Then we move to the right, and double-click between the column headers **7** and **8**; then **8** and **9** then **9** and **10**; and then **10** and **11** to get the vertical separation lines shown below.



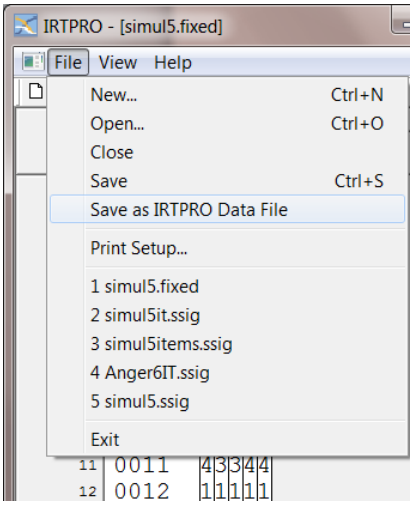
Once this is done, we right-click on the empty gray rectangle above the column heading **7**; that again brings up the **Field Property** dialog. In this case, we enter the label **Item1** and click **OK**:



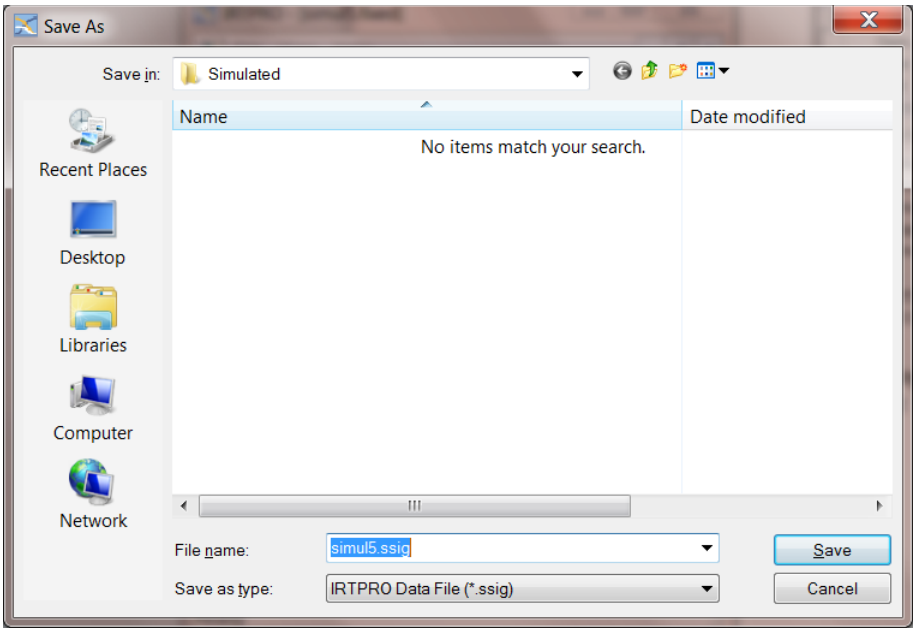
Repeat this procedure by right-clicking, in turn, on the empty gray rectangles above the column headings **8**, **9**, **10** and **11** and enter the item names **Item2, Item3, Item4,** and **Item5 respectively.**



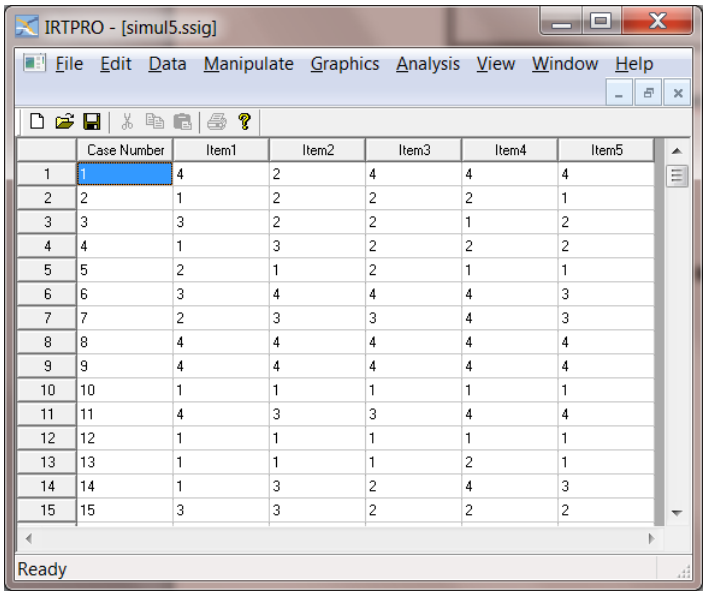
Once the **OK** button is clicked (see image above) after entering the last item name, each rectangle will be marked by an * symbol, and the **File** menu becomes active. We select **Save as IRTPRO Data File** from the **File** menu:



This brings up the standard **Save As** dialog, and we save the file as **Simul5.ssig** (or whatever name we might prefer, with the extension**.ssig**):

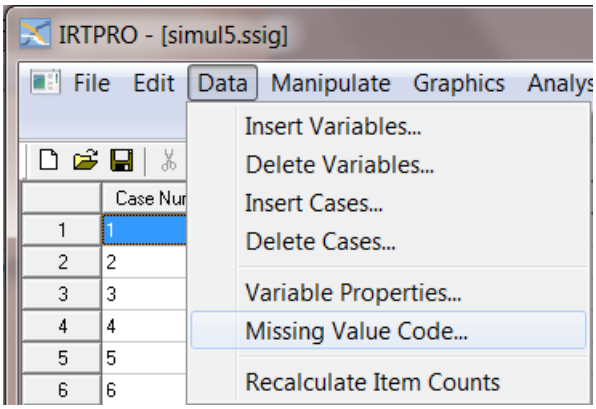


In this case, unlike when the **Import** option is used, the new **.ssig** file opens immediately.



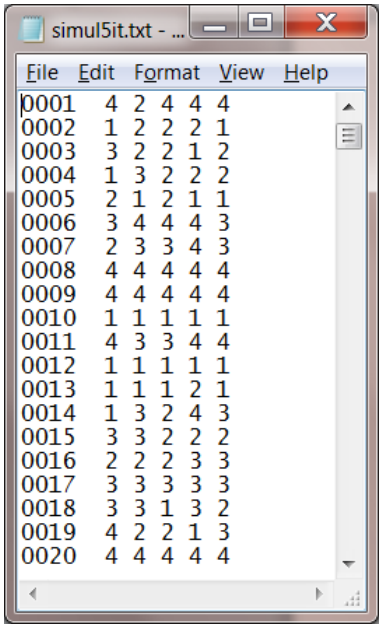
	Case Number	Item1	Item2	Item3	Item4	Item5
1	1	4	2	4	4	4
2	2	1	2	2	2	1
3	3	3	2	2	1	2
4	4	1	3	2	2	2
5	5	2	1	2	1	1
6	6	3	4	4	4	3
7	7	2	3	3	4	3
8	8	4	4	4	4	4
9	9	4	4	4	4	4
10	10	1	1	1	1	1
11	11	4	3	3	4	4
12	12	1	1	1	1	1
13	13	1	1	1	2	1
14	14	1	3	2	4	3
15	15	3	3	2	2	2

It is important to remember to set the **Missing Value Code, if there are missing values in the data,** as described in the previous section:

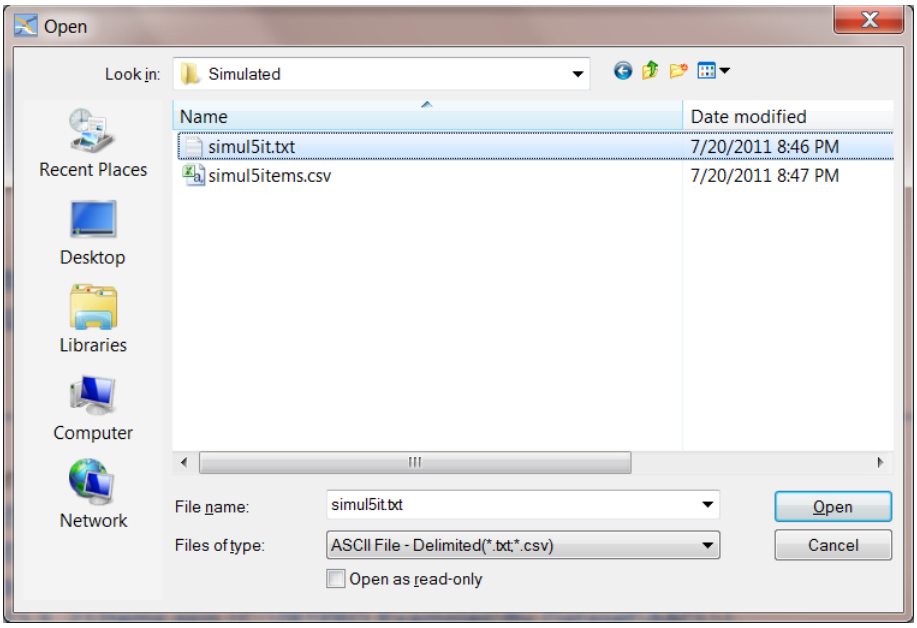


Importing space delimited fixed-format files

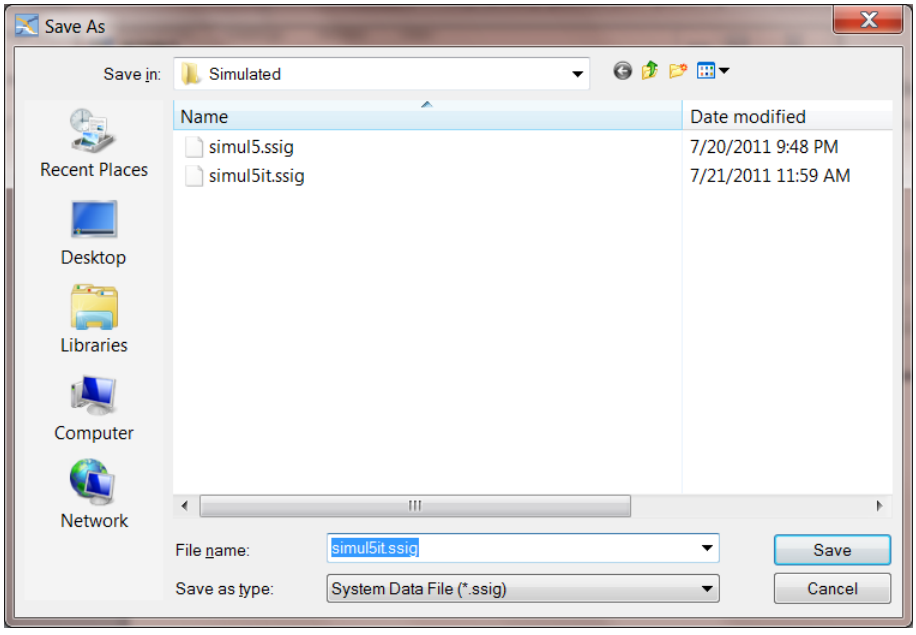
If there are spaces between the columns in a fixed format file, one can import the file directly if the file is saved with an extension **.txt**. As an illustration, consider the same simulated dataset used above, but in this instance saved with spaces between each variable:



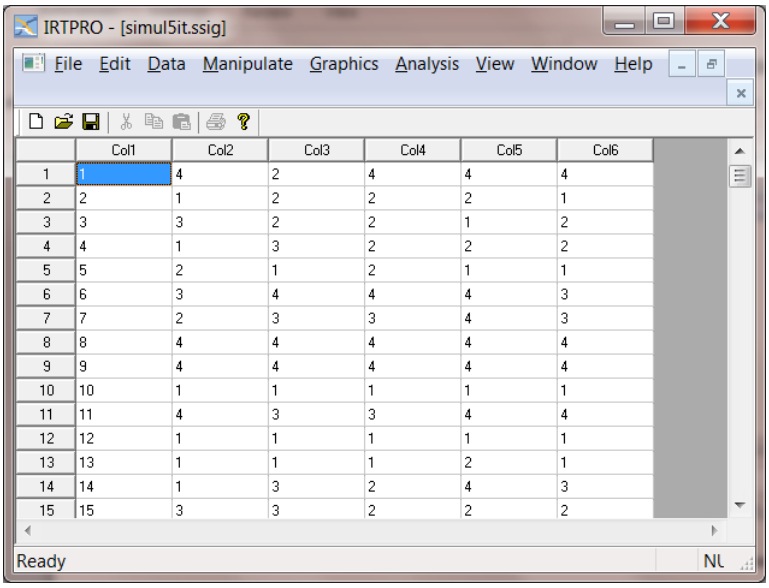
Use the **File, Import** option and select files of type (***.txt**, ***.csv**). Browse for the file **simul5it.txt stored in the folder IRTPRO Examples\By Dataset\Simulated** and click the **Open** button:



This action will prompt the user to save the IRTPRO data file:



A portion of this file is shown below.



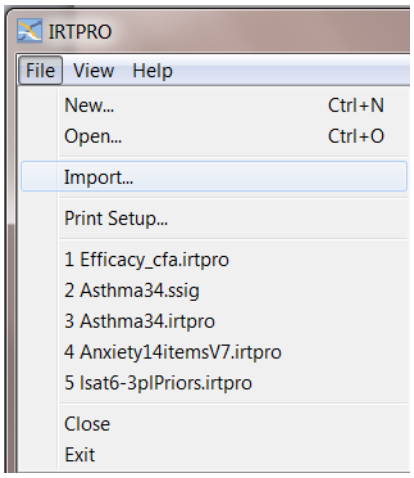
	Col1	Col2	Col3	Col4	Col5	Col6
1	1	4	2	4	4	4
2	2	1	2	2	2	1
3	3	3	2	2	1	2
4	4	1	3	2	2	2
5	5	2	1	2	1	1
6	6	3	4	4	4	3
7	7	2	3	3	4	3
8	8	4	4	4	4	4
9	9	4	4	4	4	4
10	10	1	1	1	1	1
11	11	4	3	3	4	4
12	12	1	1	1	1	1
13	13	1	1	1	2	1
14	14	1	3	2	4	3
15	15	3	3	2	2	2

The default column names are Col1, Col2,… . To rename, use the **Data, Variable Properties…** option.

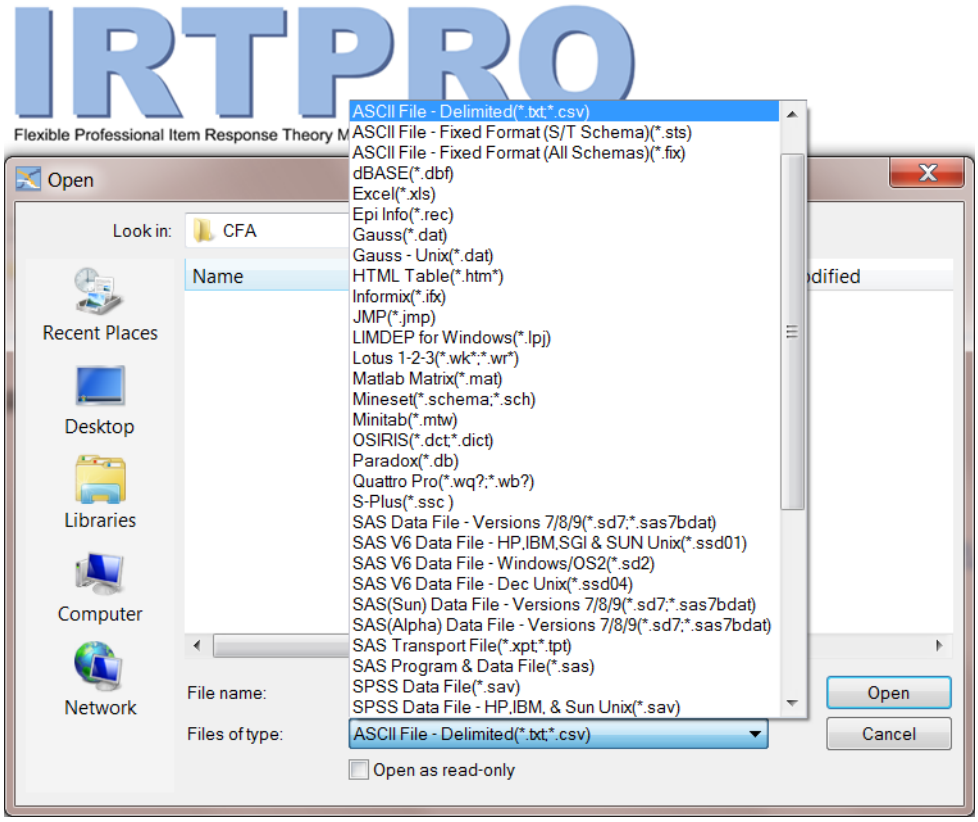
1.3 Importing Comma-delimited Data

Comma-delimited **.csv** files represent another commonly used format from which IRTPRO can import data. While it is possible that IRTPRO will not properly open certain types of Excel "**.xls**" worksheet files, Excel will also save data as comma-delimited, and that can be used if the data are in an Excel-readable format. While tab- or space-delimited data are also commonly used, IRTPRO cannot currently open those files. However, one can use a text editor to change tabs to commas, and then one has a comma-delimited file that IRTPRO can open.

To begin the data-import process, one starts IRTPRO and selects **Import…** under the **File** menu:

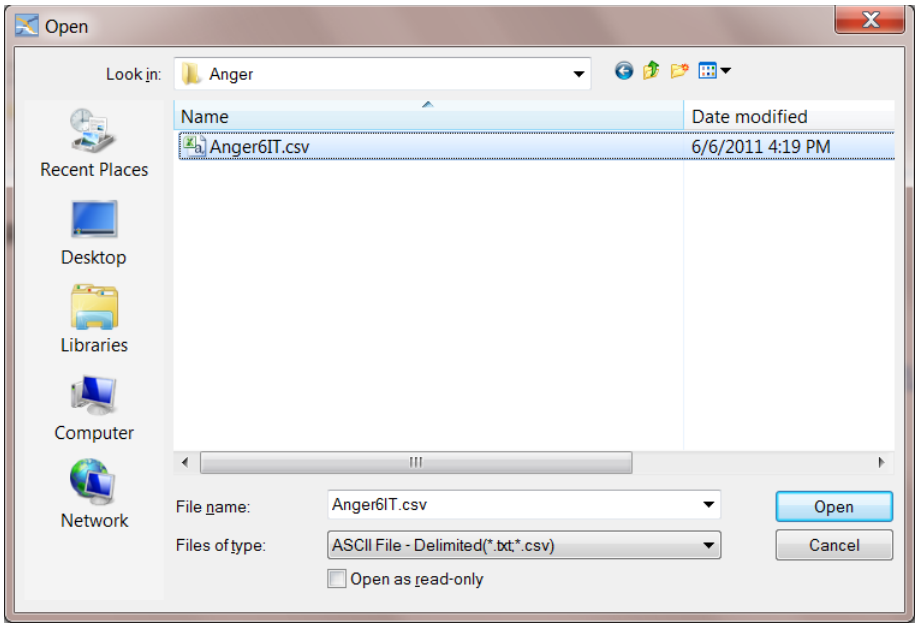


This brings up a standard **Open File** dialog; in the lower center is a pop-up menu from which the user may select one of a large number of formats:

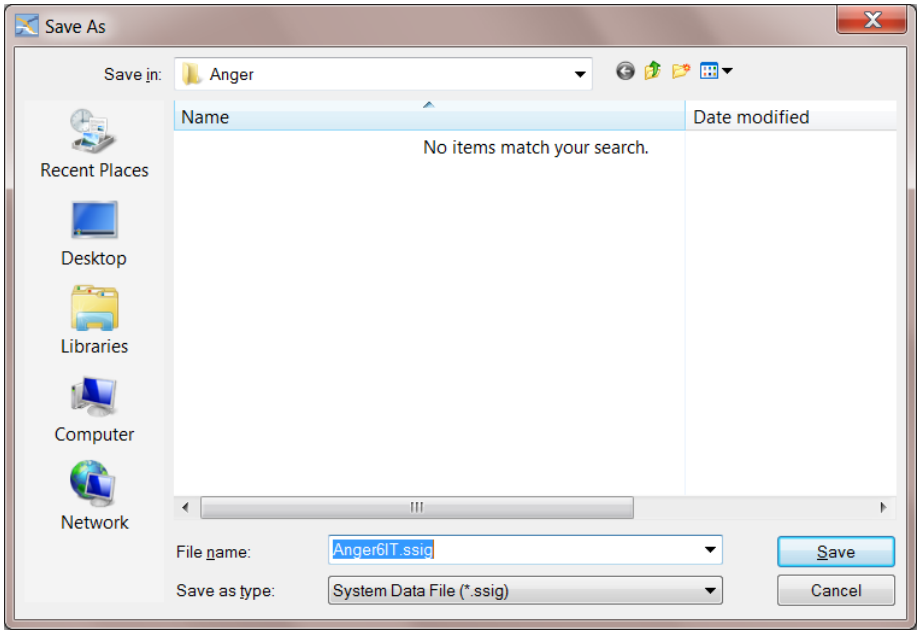


Here, we select **ASCII File – Delimited (*.txt,*.csv)**.

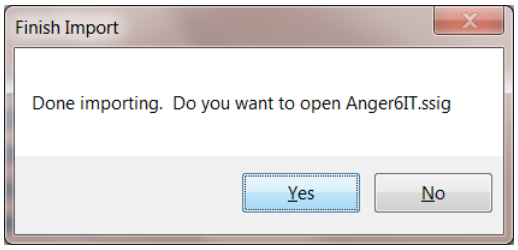
Then we navigate to the folder that contains the **.csv** file we wish to import, and **Open** it:



In this case, as an example, we are using the file **Anger6IT.csv** which contains the same data as the **Anger6IT.fixed** file used in the previous section, except that the data in **Anger6IT.csv** are comma-delimited, one line per observation, instead of in fixed columns. When we **Open** the file, a standard **Save As** dialog appears

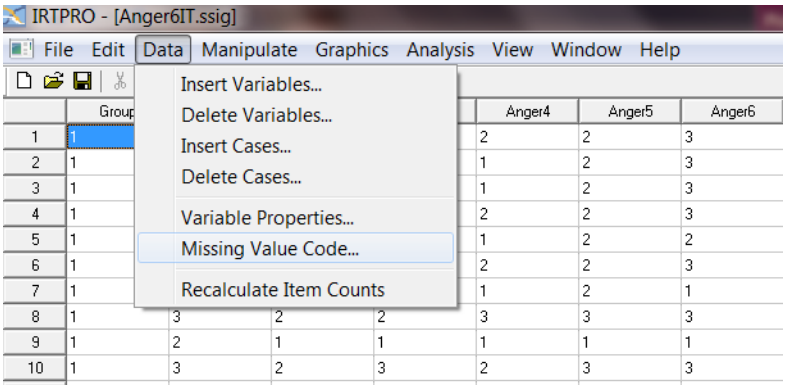


and we **Save** the file as **Anger6IT.ssig**. After one clicks **Save**, the file is saved as an **.ssig** file, and the user has the opportunity to **Open** it to begin the analysis:



If one clicks **Yes,** the file opens.

It is again important to remember to set the **Missing Value Code** as described in Section 1.1.

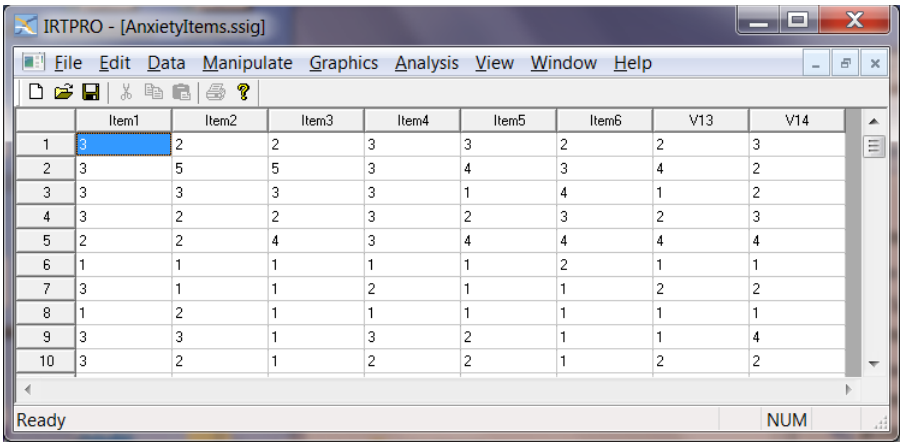


There are many other ways to "get data into" IRTPRO, but they are variations on the procedures described in this document. If you encounter difficulties opening a file of some particular format, please let us know. However, in the interim, a good work-around would be to re-write or save the file in one of the formats that IRTPRO *does* successfully read, and proceed from there.

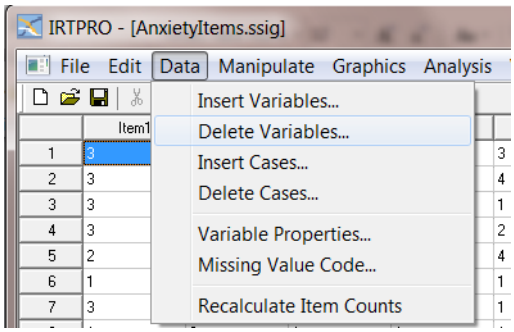
1.4 Data Manipulation: Data menu

1.4.1 Introduction

To demonstrate the data manipulation options available in IRTPRO, we use the dataset **AnxietyItems.ssig.** To see the data, use the **Open** file dialog under the **File** menu, navigate to the **C:\IRTPRO Examples\By Dataset\Anxiety14** folder, select **Files of type: IRTPRO Data File (*.ssig)** in the **Open File** dialog, and open the file **AnxietyItems.ssig**. There are eight variables and the first ten cases are shown below.

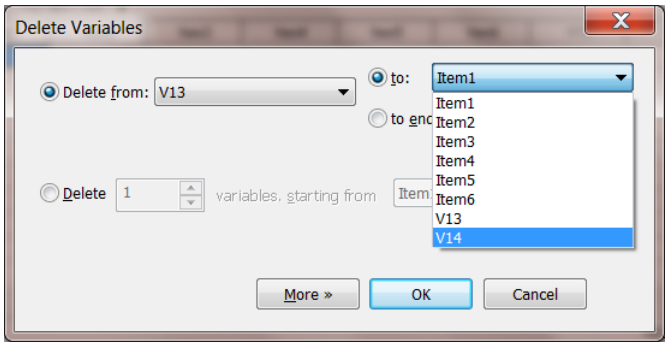


If the spreadsheet is the current window, the main menu bar displays the **Data**, **Manipulate**, **Graphics** and **Analysis** options. The list of available options from the **Data** drop-down menu is next.



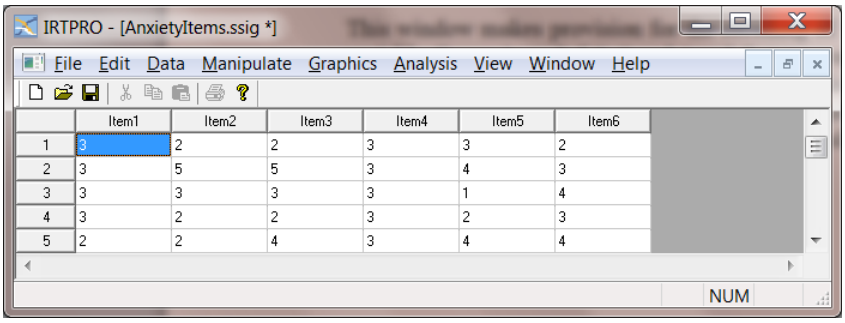
1.4.2 Delete variables or cases

Selection of the **Data, Delete Variables…** option provides the user with access to the **Delete Variables** dialog. In the following demonstration, the variables V13 to V14 are deleted by selecting the **Delete from:** drop-down list and then the **Delete to:** drop-down list.

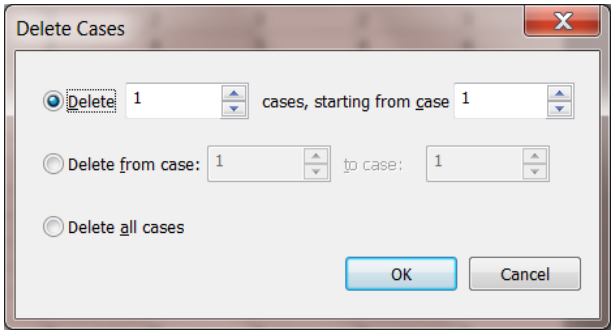


By clicking the **OK** button, the revised spreadsheet is displayed. These changes have not

been made to the original data yet and therefore an asterisk (*) sign is appended to the file name, as shown in the top pane of the IRTPRO window. Use the **File, Save** option to make the changes permanent.

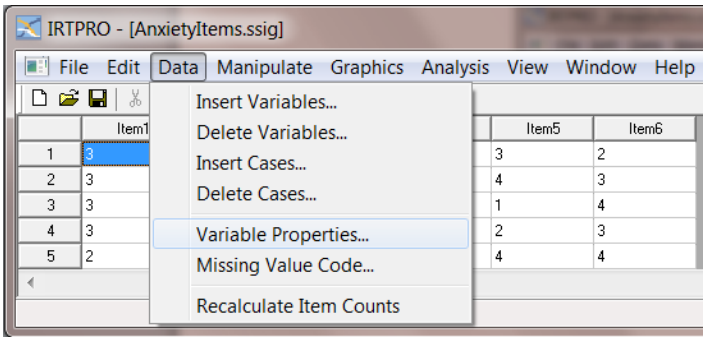


To delete cases from the data, select the **Data, Delete Cases…** option and make the required selections using the **Delete Cases** dialog.



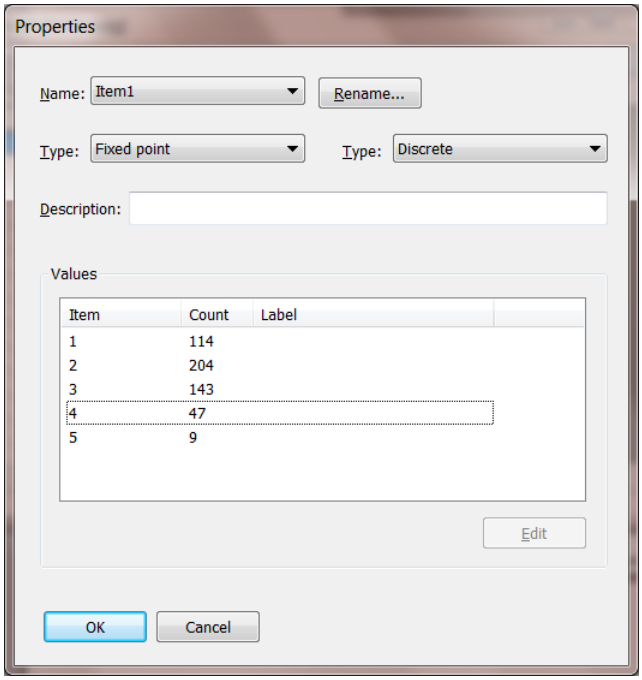
1.4.3 Renaming Variables

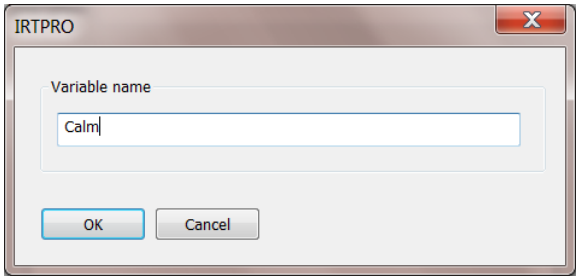
Next, we would like to rename the variable names Item1 to Item6. These names are to be replaced by Calm, Tense, Regretful, AtEase, Anxious, and Nervous. Select the **Variable Properties…** option from the **Data** menu to activate the **Properties** dialog.



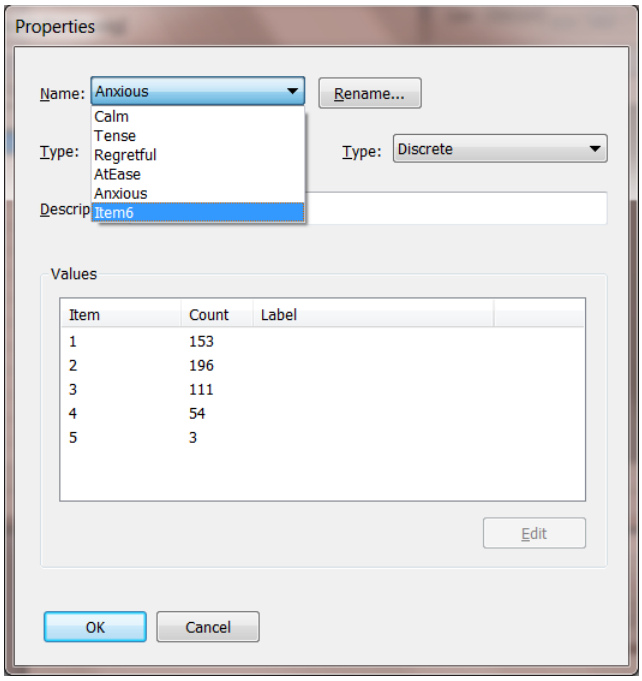
Starting with Item1 in the **Name:** drop-down list, click the **Rename…** button and change the

name to Calm (see the two dialogs below).

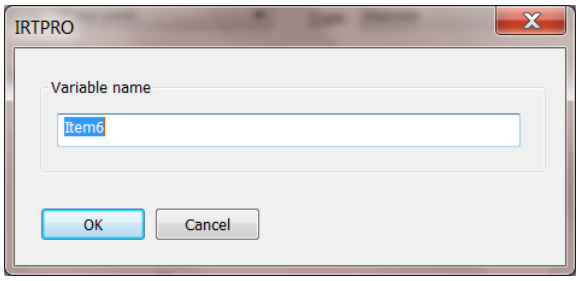




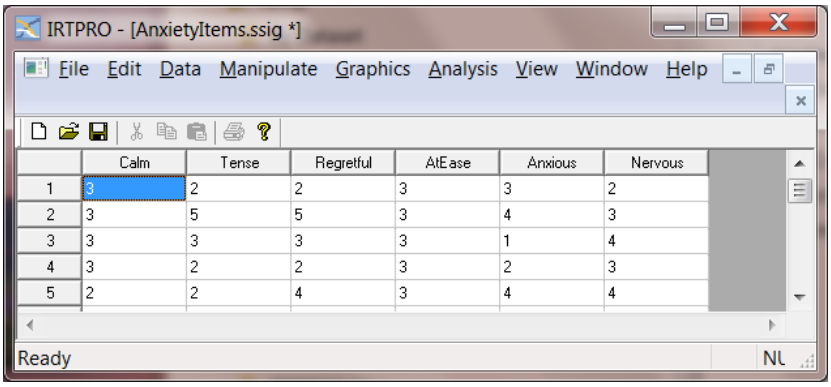
Click the **OK** button to return to the **Properties** dialog. Repeat the above procedure for Item2 to Item6.



Once the last variable has been renamed by using the **Variable name** text box, click the **OK** button to return to the **Properties** dialog.

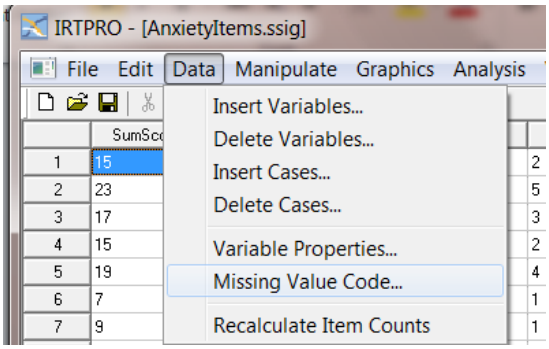


When the **Properties** dialog is displayed, use the **OK** button to display the revised spreadsheet and then use the **File, Save** option to make the changes to **AnxietyItems.ssig** permanent.

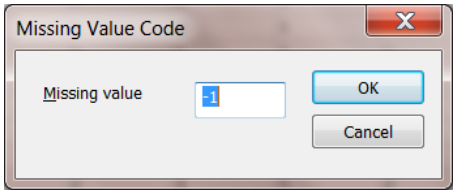


1.4.4 Missing value code

To set the missing value code, select the **Missing Value Code…** entry under the **Data** menu:



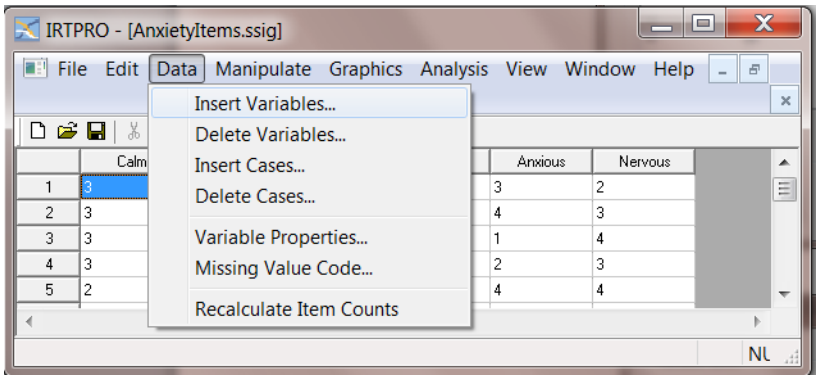
That brings up a **Missing Value Code** dialog into which the user may enter the code (-1 is the default, but is also the code for this data) and click on **OK**.



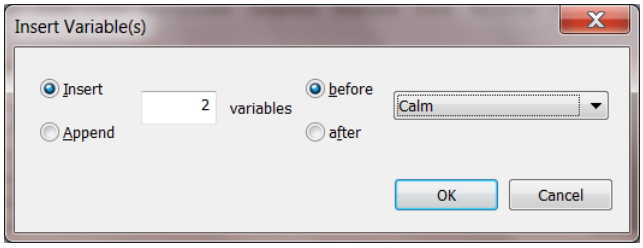
After that is done, it is important to **Save** the **.ssig** file by using the **File, Save** option. Once the missing value code has been set, and the **.ssig** file has been saved, the missing data code will be stored within the **.ssig** file and IRTPRO will "remember" the code in subsequent uses of the data.

1.4.5 Insert variables or cases

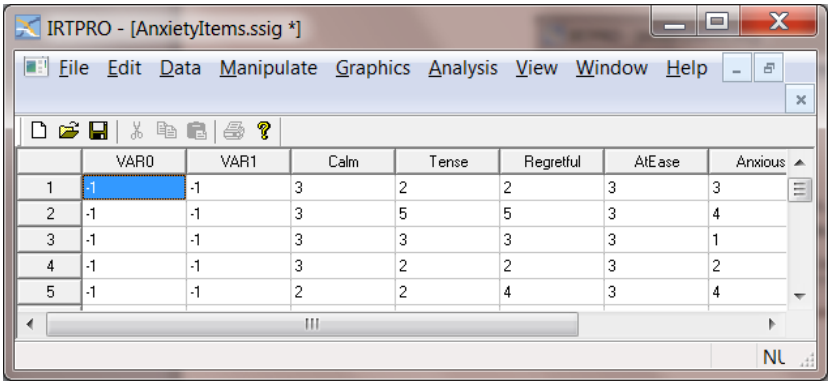
Suppose that we want to insert two new variables into **AnxietyItems.ssig** before the item Calm and then rename the new variables to SumScore and CalmRecoded. To proceed, select the **Data, Insert Variables…** option.



Selection of this option activates the **Insert Variable(s)** dialog. Make the selections shown below and click **OK**.



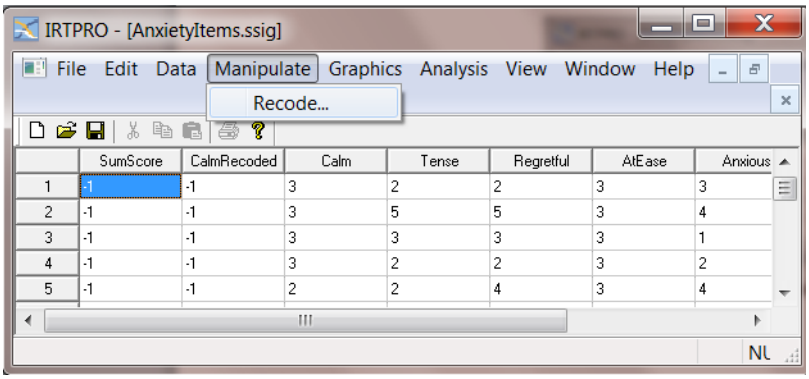
The revised spreadsheet is displayed with default variable names VAR0 and VAR1 and with all the corresponding data cells filled with the missing value code. Use the **File, Save** option to make the changes to **AnxietyItems.ssig** permanent.



Rename VAR0 to SumScore and VAR1 to CalmRecoded.

1.5 Data Manipulation: Manipulate menu

Currently, the only option available from the **Manipulate** menu, is the **Recode…** option as shown. This option is selected in what follows.



1.5.1 Recoding item scores

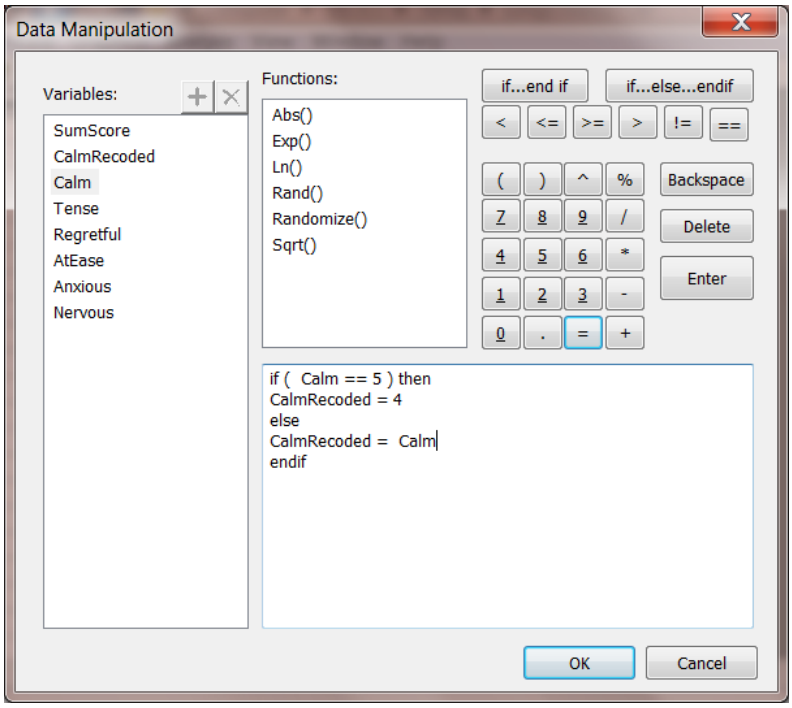
Suppose, for example, that we want to define a new variable called CalmRecoded by combining the fourth and fifth categories of the item Calm. In Section 1.4.3 the **Properties** dialog showed that the five distinct values of Calm are 1, 2, 3, 4, and 5. Therefore, we want to recode these values so that, for the new variable CalmRecoded 5 = 4 and all the remaining data values remain unchanged. This recoding is accomplished by selection of the **Manipulate, Recode…** option to invoke the **Data Manipulation** window.

When using the if ( ) statement, follow the next rules:

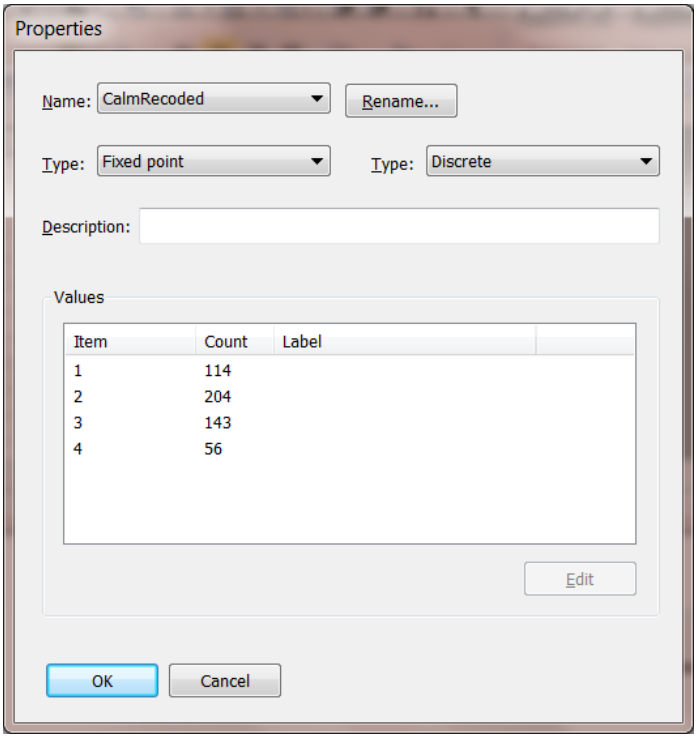
Click with mouse pointer within the ( ) brackets, then double-click on Calm or drag Calm to within the ( ) brackets.

Click on the appropriate operator from the following list:

- **<** (Less than)
- **<=** (Less than or equal to)
- **>=** (Greater than or equal to)
- **>** (Greater than)
- **!=** (Not equal to)
- **==** (Equal to, see usage below)

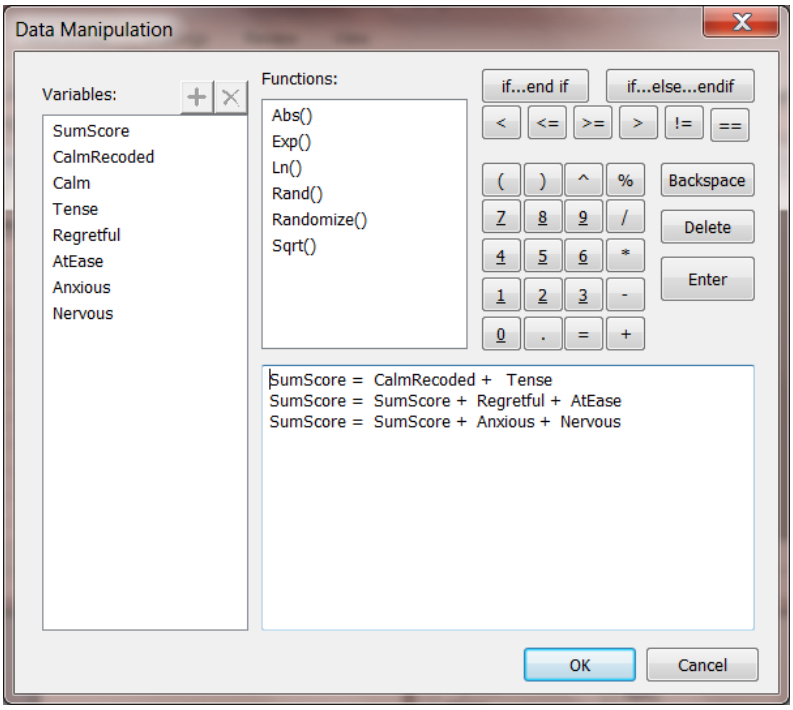


Click **OK**, then save the data file and select **Data, Properties...** from the main menu bar to verify that CalmRecoded has four categories.



1.5.2 Calculating the sum of two or more variables

Suppose that the new variable SumScore equals the sum of the six items, CalmRecoded and Tense to Nervous. In the illustration below we used three statements. After the first statement is entered, use the **Enter** button to advance to the next line. Variables are entered onto the **Compute** window by either double-clicking or dragging.



Click the **OK** button and use the **File, Save** option to make the changes to the file **AnxietyItems.ssig** permanent. The distribution of the SumScore values is shown below.