Appendix A

SPSS 11.x in 30 Minutes

For use with

Exploring Research (5/e)
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Lesson 1
Starting SPSS

After This Lesson, You Will Know

- How to start SPSS
- What the opening SPSS screen looks like

Key Words

- Data View
- Variable View
- Data Editor
- Viewer

With this lesson you will start your journey on learning how to use SPSS, the most powerful and easiest-to-use data analysis package available.

Keep in mind that throughout these lessons we expect you to work along with us. It's only through hands-on experiences that you will master the basic and advanced features of this program.

Starting SPSS

SPSS is started by clicking the icon (or the name representing the program) that represents the application either on the Start Menu in Windows or on the desktop on the Macintosh.

Tip: To place SPSS on the Windows Start menu in Windows, open the Explorer, locate the SPSS executive file (spss.exe), and drag and drop it on to the Start menu. To place it on the Mac desktop, just locate it (perhaps using Sherlock) and drag it to the desktop.

The SPSS Opening Window

As you can see in Figure 1, the opening window presents a series of options that allow you to select from running the SPSS tutorial, entering data, posing an established query, creating a new query using the Database Wizard, or opening an existing source of data (an existing file). Should you not want to see this screen each time you open SPSS, then click on the Don't show this dialog in the future box in the lower left corner of the window.

Figure 1 The Opening SPSS Window

The SPSS for Windows dialog box

For our purposes, we will click the Type in data option since it is likely to be the one you fist select upon opening and learning SPSS. Once you do this, the **Data View** window (also called the **Data Editor**) you see in Figure 2 becomes active. This is where you enter data you want to use with SPSS once that data has been defined. Although you cannot see it when SPSS first opens, there is another open (but not active) window as well. This is the **Variable View** where variables are defined and the parameters for those variables are set. We will cover the Data and Variable Views in Lesson 5.

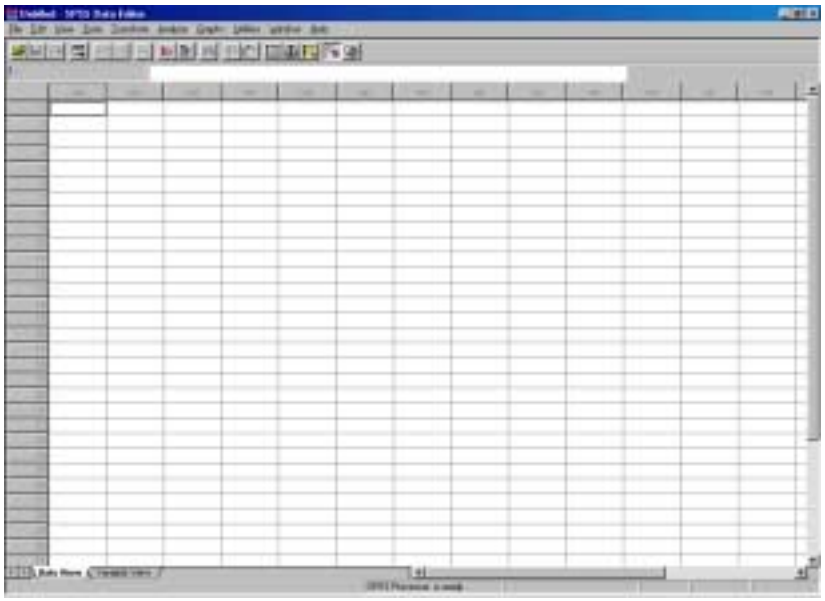

Figure 2 The Data View window

The **Viewer** displays statistical results and charts that you create. An example of the Viewer window is shown in Figure 3. A data set is created using the Data Editor and once the set is analyzed or graphed, you examine the results of the analysis in the Viewer.

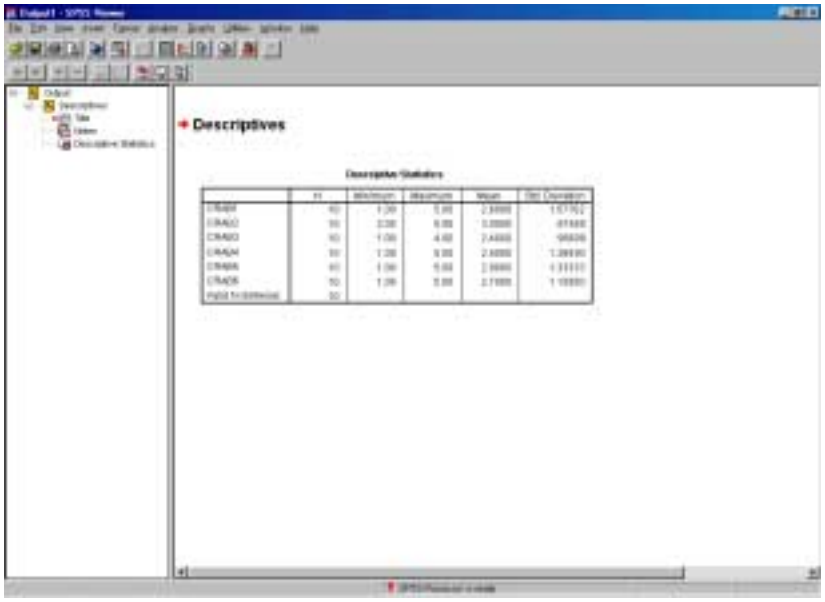

Figure 3 The Viewer

If you think the Data Editor is similar to a spreadsheet in form and function, you are right. In form, it certainly is, since the Data Editor consists of rows and columns just like in Excel and Lotus 2-3. Values can be entered and then manipulated. In function as well, the Data Editor is much like a spreadsheet. Values that are entered can be transformed, sorted, rearranged, and more. In addition, SPSS can use formulas to compute new variables and values from existing ones, as you will learn in Lesson 12.

As you will learn in Lesson 10, one of the many conveniences of SPSS is its ability to import data from a spreadsheet accurately and efficiently. This ability makes SPSS particularly well suited and powerful for further analysis of data already in spreadsheet form.

Lesson 2
The SPSS Main Menus and Toolbar

After This Lesson, You Will Know

- Each of the SPSS main menus and what the commands on the menus do
- The icons on the toolbar

Key Words

- Analyze menu
- Data menu
- Edit menu
- File menu
- Graphs menu
- Open dialog box
- Status Bar
- Toolbar
- Transform menu
- Utilities menu
- View menu

Menus are the key to operating any Windows or Mac application, and that is certainly the case with SPSS. Its 10 main menus (including the standard Windows and Help menus for the Windows version and the Help menu for the Mac version) provide access to every tool and feature that SPSS has to offer. In this lesson, we will review the contents of each of these menus and introduce you to the toolbar, a set of icons that takes the place of menu commands. The icons make it quick and easy to do anything, from saving a file to printing a chart.

The SPSS Main Menus

SPSS comes to you with 10 main menus, as you see in the opening screen in Figure 4.

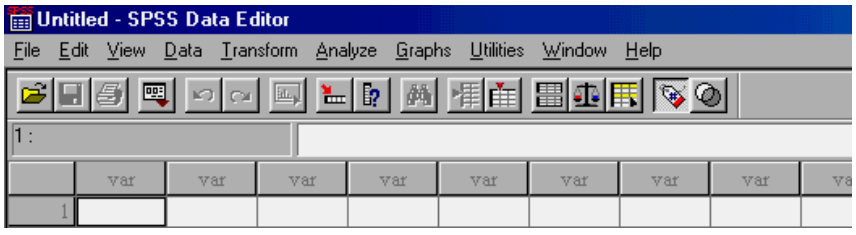

Figure 4 The 10 main SPSS menus

While you think you may know all about the File menu and what options are available on it, stick with us through the rest of this lesson to see exactly what the File menu, and the other nine menus, can do for you.

The File Menu

The purpose of the **File menu** (Figure 5) is to work with files. Using the options on this menu, you create new files, open existing ones, save files in a variety of formats, display information about a file, print a file, and exit SPSS. The File menu also lists the last few documents that were accessed (File _> Recently used files) , so you can quickly return to a previous document.

Tip: Want to set the number of files that SPSS lists on the File menu? Click Edit→Options and change the value in the Recently used file list box.

Figure 5 The File Menu

For example, when it comes time to start working with the file named Teacher Scale Results, you would select Open from the File menu and then select the file name from the Open dialog box. You will learn more about this process in Lesson 7.

The Edit Menu

When it comes time to cut or copy data and paste it in another location in the current, or another, data file, you will go to the **Edit menu**. You will also seek out options on the Edit menu to search for data or text, replace text, and set SPSS preferences (or default settings). All these activities and more are found on the Edit menu shown in Figure 6.

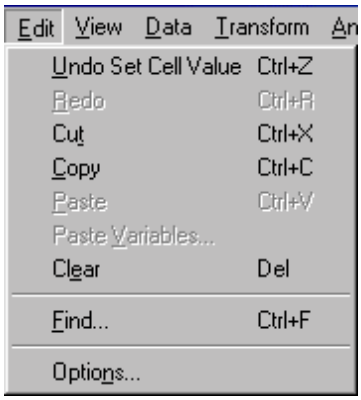

Figure 6 The Edit Menu

Tip: When items on a menu are dimmed, it means they are not available.

For example, if you wanted to find what Mary Jones scored on test 1, you could search for "Mary Jones" and then read across the file to find her score on the variable named test 1. You would use the Find command on the Edit menu to search for that information.

The View Menu

Here's a chance to customize your SPSS desktop. Using various commands on the **View menu**, you can choose to show or hide toolbars, **Status bar**, and grid lines in the Data Editor, change fonts, and use Value Labels. You can see these commands in Figure 7.

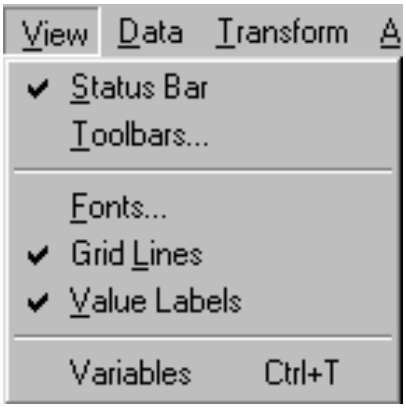

Figure 7 The View Menu

Tip: If you use labels for your variables, make sure that the Value Labels option is checked on the Vie menu. Otherwise, you won't see them at all.

For example, if we didn't want to use labels for variables, we would be sure that the Value Labels option was not selected (as it is in Figure 7).

The Data Menu

Variables and their values are the central element in any SPSS analysis, and you need powerful tools to work with variables. You have them on SPSS. On the **Data menu** you see in Figure 8, you can see commands that allow you to define and sort variables, work with templates, go to a specific case, merge and aggregate files, and weigh cases as you see fit.

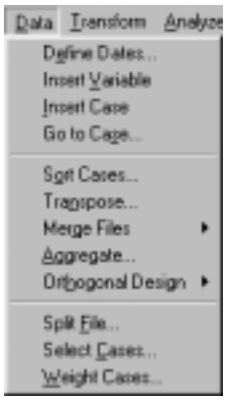

Figure 8 The Data Menu

Tip: When a menu options is followed by three dots (called an ellipsis), clicking on that option opens an additional dialog box with other options.

For example, if we want to insert a new variable after data has already been entered, this is the menu you would use and the Insert Variable options is the menu options that would be selected.

The Transform Menu

There will be times when a variable value needs to be transformed or converted to another form or another value. That's where the commands on the **Transform menu** you see in Figure 9 come in handy. On this menu, you will find commands that allow you to compute new values, create a set of random values, recode values, replace missing values, and do more.

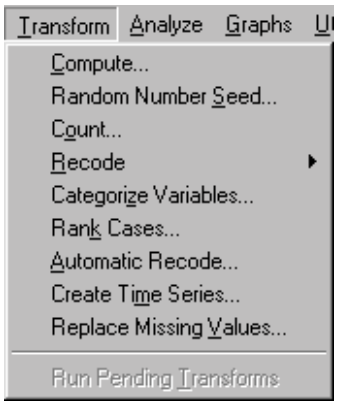

Figure 9 The Transform Menu

For example, you could easily compute a new variable that represents the mean of a set of items using the Compute command on the Transform menu.

The Analyze Menu

Here's the meat-and-potatoes menu! As you can see in Figure 10, there are 17different options on the **Analyze menu** that lead to almost any statistical analysis technique you might want to use. These range from a simple computation of a mean and standard deviation to time series analysis and multiple regression.

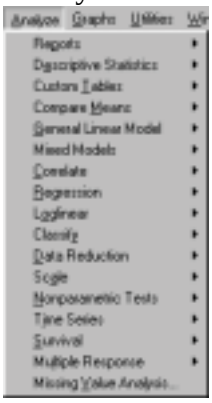

Figure 10 The Analyze Menu

For example, if you wanted to determine if there is a significant difference between the average rating that Professor 6 received on a teaching evaluation form versus the average rating received by Professor 4, you could look to the Compare Means option on the Analyze menu.

The Graphs Menu

Want to see what those numbers *really* look like? Go to the **Graphs menu** where you can create bar, line, area, and some 16 other types of graphs. Graphs make numbers come alive, and you should pay special attention to later lessons where we show you

how to create, edit, and print them. Take a look at Figure 11 (at the top of page 9) to see what graph options are available.

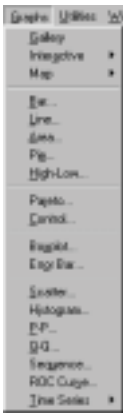

Figure 11 The Graphs Menu

For example, if you want to see test scores as a function of gender, a bar graph (on the Graphs menu) could do it quite nicely.

The Utilities Menu

Here you can find out information about variables and files, and you can define and use sets of variables. You can see these options in Figure 12 on the **Utilities menu**.

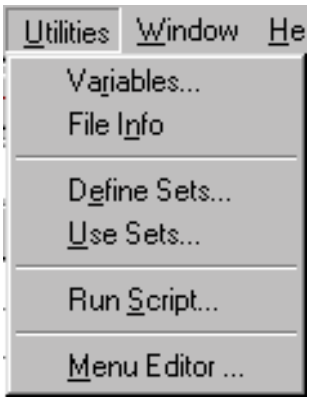

Figure 12 The Utilities Menu

For example, the File Info option (for File Information) on the Utilities menu can tell us that the file named *Teacher Scores* contains 50 cases and 8 variables.

The Window and Help Menus

These two menus function much like any other Windows application menus. The **Window menu** helps you switch from one window to another and minimize the SPSS Data Editor or Viewer.

The Help menu provides online help. We will focus on the Help menu in the next lesson.

The SPSS Toolbar and Status Bar

What's the easiest way to use SPSS? Clearly, through the use of the **toolbar**, the set of icons that are underneath the menus. You can see the Data Editor toolbar in Figure 13 and a description of what each icon, which represents a command on an SPSS menu, does. Click on the icon, and the command is performed. So, instead of going to the Utilities menu to select variables, you can just click on the Variables icon on the toolbar. Table 1 presents the toolbar icon, it's title and what it does.

Figure 13 The Data Editor toolbar

Different screens have different toolbars. For example, as you will see in Lesson 15, when you create a chart, a new set of icons becomes available on the toolbar.

Tip: You can always find out what an icon does by placing the mouse cursor on top of it. A toolbar tip should popup.

Another useful tool is the Status Bar located at the bottom of the SPSS window. Here, you can see a one-line report as to what activity SPSS is currently involved in. Messages such as "SPSS Processor is ready" tell you that SPSS is ready for your directions or input of data. Or, "Running Means …" tells you that SPSS is in the middle of the procedure named Means.

The Data Files

An important part of learning how to use SPSS and using this book, is using the sample files included on the student disk. Throughout Part I of the text, titled "Introducing SPSS," we will use two separate sets of data to illustrate various SPSS features, such as entering and working with data. A detailed description of each of these files shown in Appendix A.

Tip: If you are performing an analysis and nothing seems to be happening, look in the Status Bar before you panic and conclude that SPSS or Windows has locked up. Large numbers and complex analyses often take computer resources and time to complete.

The Crab Scale File

The first data set is a collection of scores on the Crab Scale and some biographical information for 10 college professors who completed a measure of crabbiness. Table 1 gives a summary of the variables, their definition and their range of values.

Variable	Definition	Range
id_prof	professor's identification number	1 through 10
Sex_prof	professor's gender	1 or 2
Age	professor's age	33 through 64
Rank	professor's rank	Assistant, Associate, or Full Professor
School	professor's school	Liberal Arts, Business School
crab1	Score on item 1 on the Crab Scale	
crab2	Score on item 2 on the Crab Scale	
crab3	Score on item 3 on the Crab Scale	
crab4	Score on item 4 on the Crab Scale	
crab5	Score on item 5 on the Crab Scale	
crab6	Score on item 6 on the Crab Scale	

Table 1
Crab Scale Summary

The Crab Scale includes the following six items:

1. I generally feel crabby if someone tries to help me.
2. I generally feel happy when I watch the news.
3. I generally feel crabby when I watch mothers and fathers talk baby talk to their babies.
4. I generally feel happy when I am able to make sarcastic comments.
5. I generally feel crabby when I am on a family vacation.
6. I generally feel happy when I am beating someone at a game.

A teacher responds to each item on the following 5-point scale:

1. Totally agree
2. Agree
3. In a quandary
4. Disagree
5. Vicious lies

The Crab Scale yields two scores:

1. *The Cross-Situational Crab Index:* This index tries to assess whether individuals refuse to be happy regardless of the situation.
2. *The True Crab Scale:* This index attempts to assess whether an individual is acting in a true crablike fashion: crabby when confronted with a pleasant stimulus and happy when confronted with an unpleasant stimulus.

Items 1 through 6 are summed to yield a total score. For the Cross-Situational Crabbiness Index, all scores are summed together. Items 2, 4, and 6 are happiness items, and the scores on these items must be reversed so that higher scores indicate more crabbiness as shown here.

Original Scoring Recoded Scoring

1	5
2	4
3	3
4	2
5	1

You can see the actual set of data on your SPSS student disk as Crab Scale Results.

The Teacher Scale File

No teacher escapes being rated by students. The second set of data we will deal with in Part I of *Using SPSS for Analyzing and Understanding Data for Windows and the Macintosh* is a set of responses by students concerning the performance of these 10 professors.

The second data set is a collection of scores on the Teacher Scale and some biographical information for 50 students who completed the Teacher Scale. Scores on the Teacher Scale that make up this sample file are also shown in Appendix A. They are contained on the student disk under the file name Teacher Scale Results.

Table 2 shows the biographical information we collected on each student and their responses to the 5-point scale. We will be using them in examples throughout this part of the book.

Variable	Name	Range
id_stud	student's identification number	1 through 50
id_prof	professor's identification number	1 through 5
Sex_stud	student's gender	1 or 2
teacher1	score for item 1 on the Teacher Scale	1 through 5
teacher2	score for item 2 on the Teacher Scale	1 through 5
teacher3	score for item 3 on the Teacher Scale	1 through 5
teacher4	score for item 4 on the Teacher Scale	1 through 5
teacher5	score for item 5 on the Teacher Scale	1 through 5

Table 2
Teacher Scale Summary

The Teacher Scale contains the following five items:

1. I love that teacher.
2. My teacher says good stuff.

3. The teacher has trouble talking.
4. The teacher is a jerk.
5. My teacher made the boring lively, the unthinkable thinkable, the undoable doable.

Items 3 and 4 must be reversed so that higher scores indicate effectiveness as follows.

Original Scoring	Recoded Scoring
1	5
2	4
3	3
4	2
5	1

Lesson 3
Using SPSS Help

After This Lesson, You Will Know

- About the contents of the SPSS Help menu
- How to use the F1 function key for help
- What Help options are available
- How to use the Find option to search for particular words

Key Words

- Ask Me
- Contents
- F1 function key
- Find
- Help menu
- Index
- SPSS Help
- Topics

If you need help, you've come to the right place. SPSS offers help that is only a few mouse clicks away. It is especially useful when you are in the middle of creating a data file and need information about a specific SPSS feature. Help is so comprehensive that even if you're a novice SPSS user, SPSS Help can show you the way.

How to Get Help

You can get help in SPSS in several ways. The easiest and most direct is by pressing the **F1 function** key or by using the **Help menu**.

As you can see, there are seven options on the Help menu.

- **Topics** list the topics for which you can get help. You can click on any one of these. As you enter the topic, SPSS searches its internal database to find what you need.
- Tutorial takes you through a step-by-step tutorial for major SPSS topics.
- SPSS Home Page uses your Internet connection to take you to the home page of SPSS on the Internet. Syntax Guide provides you with help using SPSS' powerful syntax feature.
- Syntax Guide provides you with information on SPSS programming language. (Note: this option does not appear in the Macintosh version of SPSS).
- Statistics Coach walks you through the steps you need to determine what type of analysis you want to conduct.
- About … tells you the version of SPSS that you are currently using. (Not for the Mac!).

- Register Product … helps you register your copy of SPSS. (Not for the Mac here either).
-

Using the F1 Function Key

The F1 function key is a quick way to get help, but it only opens the **Help Topics** dialog box you see in Figure 14. It is not context sensitive. In other words, it produces the same outcomes as the Help→Topics click combination. Here, you can click **Contents, Index or Find**.

Figure 14 The F1 Help options

Using the Topics Option

The Topics option on the SPSS Help menu provides an alphabetical listing of help topics by Contents, an Index option, and the Find option.

Using the Contents Option

The Contents tab presents the major headings for help. Double-clicking on any one provides a list of possible topics that you might want to consult for the help you need. For example, if you want help on how to compare the means of two samples, you would follow these steps:

1. Press F1.
2. Click the **Contents tab**.
3. Double-click Statistical analysis, and you will see a list of the topics within this general heading.
4. Double-click the topic labeled Compare Means.
5. Double-click the topic labeled Independent-Samples T Test procedure. You will see Help, as shown in Figure 15.

Figure 15 Getting Help on a particular procedure using the Contents Tab.

Other tabs in the Help Topics dialog box are as follows:

- The Index tab, when clicked, lists all the SPSS topics in alphabetical order
- The Find tab, when clicked, allows you to search for a topic on which you need help.

Tip: Once you find help on the subject you want (such as information about the mean), you can click on the Options button in the Help window (or right-click anywhere in the window) and perform a variety of tasks. For example, you can annotate the Help screen with your own information, copy the Help content to the clipboard, print out the content of the Help menu, change the size of the fonts of the Help windows, or change the position of Help on the screen.

Using the Index Option

The Index tab provides an alphabetical listing of all the topics in SPSS. To find help on a particular topic, follow these steps. For example, here's how you could use the Index option to find help on means.

1. Click **Help→Topics**.
2. Click the **Index tab**.
3. Type mean.

As you enter the letters of the term for which you need help, SPSS Help tries to identify the topic listing. You can then get help by clicking on any topic within the more general topic of mean. In Figure 16, you can see the definition of the mean, one of the options available in the Help window.

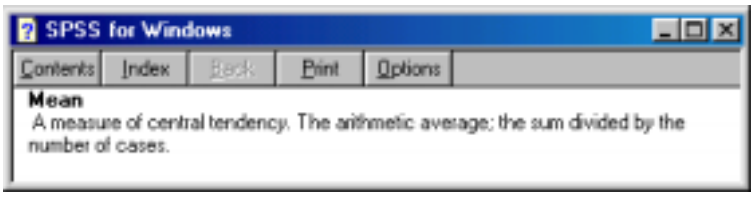

Figure 16 The definition of the mean obtained through the use of the Index tab.

Tip: Many Help screens include a How To button, which walks you through the actual steps to complete the process or analysis you want to perform.

Using the Find Option

What if you can't find a term in the Index, but you need help anyway? The Find option in the Help Topics dialog box allows you to enter any words that may be part of a Help screen rather than just a category. In effect, you are searching all the words in all the topics.

For example, let's use the Find option and the term "variance" and see what SPSS delivers. Follow these steps. If the Help window is opened, close it now.

1. Press F1. (If you are using the Mac version then you have click Help → Topics).
2. Click the **Find tab**.
3. Type "variance," and SPSS returns a list of topics for which the word is relevant. (For the Mac version, you have to click the Search button).

In Figure 17, you can see the topics related to the word "variance" for which you can get additional help by double-clicking on any of the items.

Figure 17 Using the Find feature

The Find feature is very sensitive to what words you select. For example, if you need help on the word "mean," SPSS will turn up lots of references since the word (as written) is the most general. The word "Mean," however, is more specific, and the word "MEAN" even more so (since MEAN is the specific procedure in SPSS syntax). If you know exactly what you're looking for, you can be specific, but be careful because specificity can cause you to miss what you are looking for if you are not sure of your topic's exact terminology.

Tip: Click on the How To or See Also buttons to get step-by-step instructions on how to complete the procedure you need help on or to get additional help.

Options in Any SPSS Help Window

Within any one of the SPSS Help windows, (such as the one you see in Figure 15) there are various other options you can use.

Tip: Using the Print option in Help allows you to print items that you may frequently need to refer to and to keep the hard copy organized for easy reference.

- The Contents button returns you to the list of topics in Help (see Figure 14).
- The Index button returns you to the Index.
- The Back option takes you back to the previous Help screen.
- The Print option prints out the contents of the Help window.
- The Options option provides the various options mentioned earlier in this lesson, such as copy and annotate.
- The How To option provides a step-by-step description of how to perform the procedure.
- The See Also option provides additional topics.

Lesson 4
A Brief SPSS Tour

After This Lesson, You Will Know

- How to open a file
- Some of the basic functions that SPSS can perform

Key Words

- Fonts
- Open

In the first three lessons of *Using SPSS*…, you learned how to start SPSS, took a look at the SPSS main menus, and found out how to use SPSS Help.

Now, sit back and enjoy a brief tour of SPSS activities. Nothing fancy here. Just creating some new variables, simple descriptions of data, a test of significance, and a graph or two. What we're trying to show you is how easy it is to use SPSS. We will spend all of Part II of *Using SPSS*… concentrating on exactly how to use SPSS' analytic procedures.

Opening a File

You can enter your own data to create a new SPSS data file, use an existing file, or even import data from such applications as Microsoft Excel into SPSS. Any way you do it, you need to have data to work with. In Figure 18 you can see we have a screen full of data, part of the Teacher Scale Results file mentioned earlier and available on the disk that accompanies this book. We opened it using the Open option on the File menu.

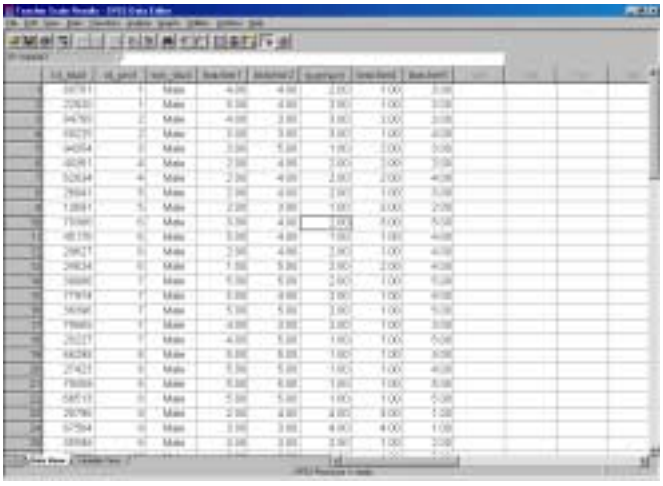

Figure 18 Opening a File

If you use a spreadsheet application, then the structure of the data file appears familiar; it has rows and columns, with cases for rows and variables for columns.

Working with Appearance

Everyone has his or her preference on how things look. In Figure 18, the data appear in a sans serif font named Arial and 12 points (with one point being equal to 1/72 of an inch) in size. For whatever reason, you may want to select another font and change the style in which the values or headings appear.

Tip: If you want to open saved output, then you have to select the Output option on the File → Open menu, or the Syntax or Script option or whatever you want to open.

Simply by using the Fonts option on the View menu, we changed the font to Times New Roman 10 point. We also used the Grid Lines option on the View menu to turn off the grid lines. The partial screen showing the data file appears in Figure 19.

Figure 19 Changing the appearance of data

Tip: A quick way to change the appearance of data in the Data Editor is to right click in any cell and click Grid Font. Then select the font, size and style.

Creating a New Variable

As you know, the Teacher Scale is a five-item measure of teacher effectiveness. Let's assume that we want to compute a new variable that is the average of the five items, so that each student's ratings have an average score.

To create a new variable, we use the Compute option on the Transform menu. The finished result (the new variable named average) is shown in Figure 20.

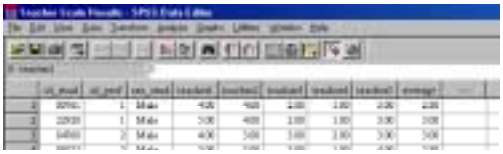

Figure 20 Using the Compute Command to create a new variable

A Simple Table

Now it's time to get to the reason why we're using SPSS in the first place, the various analytical tools that are available. First, let's say we want to know the general distribution of males and females. That's all, just a count of how many males and how many females are in the total sample.

In Figure 21, you can see an output window that provides exactly the information we asked for, which was the frequency of the number of males and females. We clicked Analyze→Descriptive Statistics→Frequencies to compute these values. We could have computed several other descriptive statistics, but just the count is fine for now. Here's your first look at real SPSS output, contained in the Viewer window and the outline pane on the left which lists all the output available.

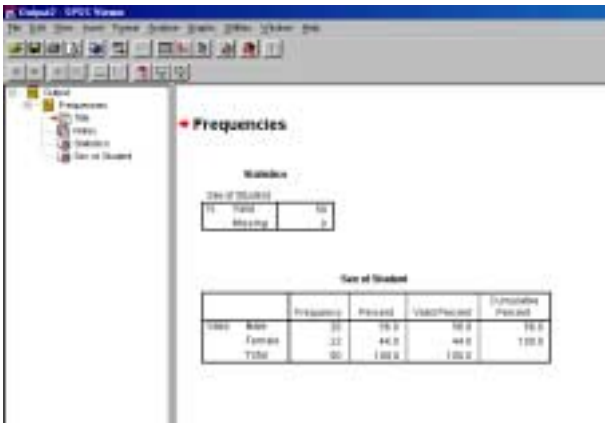

Figure 21 A simple SPSS table

Guess what? With just another few clicks, we can create the bar chart you see in Figure 22). This graph also shows the special graphing tools on the toolbar in the SPSS Chart Editor. Also, you should notice that as additional items are added to the Viewer, the outline pane to the left of the viewer lists those as well. There are lots of ways to jazz up this graph, many of which we will discuss in Lesson 16.

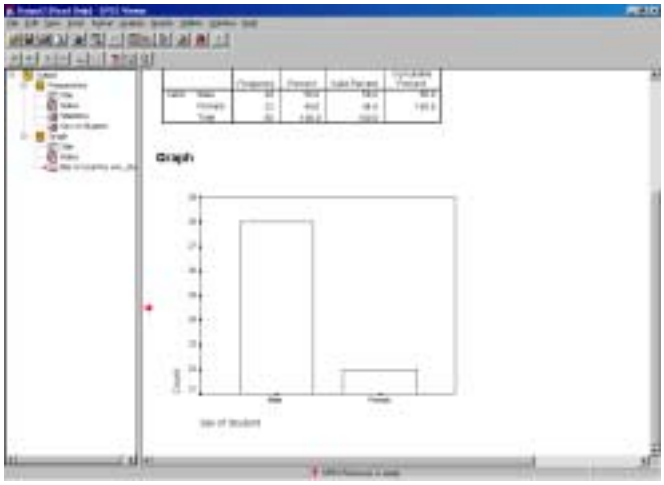

Figure 22 A simple SPSS chart

A Simple Analysis

Let's see if males and females differ in their average Teach scores. This is a simple analysis requiring a t test for independent samples. You may already know about this procedure from another statistics class you have had, or it may be entirely new. The procedure is a comparison between the mean for the group of males and the mean for the group of females.

In Figure 23, you can see a partial summary of the results of the t test. Notice that the listing in the left pane of the Viewer now shows the Frequencies, Graph, and T-Test procedures listed. To see any part of the output, all we need to do is click on that element, in the left pane of the Viewer, as we did with Frequencies. The large arrow (which appears in red on the screen) indicates which of the various outputs you have highlighted in the output pane.

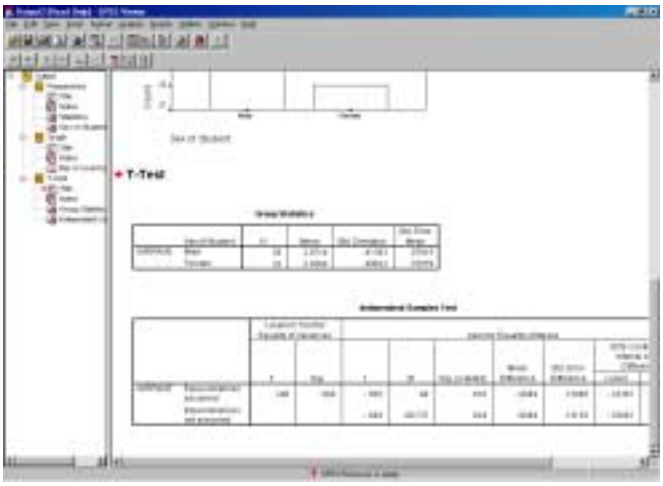

Figure 23 A simple SPSS analysis

Lesson 5
Defining Variables

After This Lesson, You Will Know

- How to open a new data file
- How to define an SPSS variable's characteristics

Key Words

- Column
- Row
- Variable View window
- Data View window
- Variable information bar

Here's where all the work begins, with the entry of data into the SPSS spreadsheet like structure, the Data View (as you saw in Figure 18). When you first open SPSS, the Data Editor window is labeled Untitled - SPSS Data Editor, and it's ready for you to enter variables as well as cases. You can just begin entering data in Row 1, Column 1 and as you can see in Figure 24, SPSS will record that as the first data point for var00001 (which SPSS will automatically name the column or variable). In SPSS, rows always represent cases and columns always represent variables.

Figure 24 Entering Data in Data View Window

Creating a SPSS New Window

If you are already working within SPSS and want to create a new Data View window, follow this step.

1. Click **File → New→ Data**. You will see a blank Data View window and you are ready to either define or enter data.

Having SPSS Define Variables

Now that the new data window is open, you can do one of two things. The first is to enter data into any cell in the Data View Window and press the Enter key (which is the standard way of entering data). For example, you could enter the value 87 in row 1, column 1 and press the Enter key. Since SPSS must have a variable name to work with, SPSS will automatically name the variable var00001. If you did this in row 1, column 5, then SPSS would name the variable var00005 and also number the other columns sequentially, as you see in Figure 25.

Figure 25 SPSS can automatically define variables.

Note also that right below the main menu in the upper left-hand corner of the Data View window is an indicator of what cell is being highlighted. For example, in Figure 25, you can see that 1:var00005 represents row 1, variable 5.

Custom Defining Variables: Using The Variable View Window

However, a critical part of dealing with data is defining those variables that you intend to enter. And by defining, we mean everything from providing a name for the variable (or the column in the Data View window), the type of variable it is, how many decimal places it will use and so forth.

In order to define a variable, one must first go to the Variable View Windows by clicking the Variable View tab at the bottom of the SPSS screen. Once that is done, you will see the Variable View window as shown in Figure 26 and be able to define any one variable as you see fit.

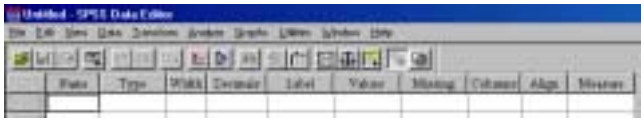

Figure 26 The Variable View Window

Tip: With previous versions of SPSS, you could right click on a column in the Data Editor window and then define a variable. Not so with version 11. All definitions have to take place in the Variable View window.

Once in the Variable View window, you can define variables along the following parameters:

- Name provides a name for a variable up to eight characters
- Type defines the type of variable such as text, numeric, string, scientific notation, etc.
- Width defines the number of characters wide the column housing the variable will occupy.
- Decimals define the number of decimals that will appear in the Data View.
- Label defined as a label up to 256 characters for the variable

- Values defines the labels that correspond to certain numerical values (such as 1 for male and 2 for female).
- Missing indicates how missing data will be dealt with.
- Columns define the number of spaces allocated for the variable in the Data View window.
- Align defines how the data is to appear in the cell (right, left or enter aligned
- Measure defines the scale of measurement that best characterizes the variable (nominal, ordinal, or interval).

The general way in which these characteristics of a variable are defined is by clicking on the cell for that particular variable (variable 1, variable 2, etc.) and then specifying the particulars of those characteristics for the variable under question.

Each of these is described as follows. We use the file named Crab Scale Results and discuss how we defined these available. The Variable View of their file is shown in Figure 27.

Figure 27 The Variable View of the Crab Scale Results file

Defining Variable Names

To define the name of a variable, follow these steps.

1. Click on a cell in the **Name column** in the Variable View window.

Press the Enter key. The name for the first variable was id_prof.

Defining Variable Types

If you click on a cell in the Type button, and the ellipsis in it (see Figure 27), you see the Variable Type dialog box. Its variable definitions include numeric (e.g., 3435.45), comma (e.g., 3,435.45), dot (e.g., align) (e.g., 3.43545), scientific notation (e.g., 3.4E+03), date (e.g., 12-FEB-1996), dollar (e.g., $3,435.45), custom currency (as you design it), or a string (such as William). In our example, all variables are defined as numeric.

Figure 28 Defining the type of variable

Defining Variable Widths

To define the width of a variable, follow these steps.

1. Click on a cell in the **Width column** for the corresponding variable (in the Variable View screen).
2. Enter the number of characters you want to use to define the variable or click on the up and down triangles (see Figure 29) to change the value.

Figure 29 Changing the width of a variable

Defining Variable Decimals

To define the number of decimals used to define variable, follow these steps.

1. Click on the **Decimal column** for the corresponding variable
2. Enter the number of characters you want to use to define the number of decimals or click on the up and down triangles to change the number in the cell.

Defining Variable Labels

To define the Label used for a variable, follow these steps.

1. Click on the **Label column** for the corresponding variable.

Enter the up to 256 characters for the label, including spaces. Labels appear in SPSS output and are not visible in the Data View window. Of example, in Figure 27, you can see how the variable named sex_prof is accompanied by the label Sex of Teacher.

Defining Variable Values

Values are used to represent the contents of a variable in the Data View window. For example, we will show you how we defined the sex of the teacher using 1's and 2's and 3's for the variable named rank, while those 1's and 2's and 3's appear as assistant, associate and full professor in the Data View window.

In general, it makes more sense to work with numbers than with string or alphanumeric variables in an analysis. In other words, values such as 1 for assistant professor, 2 for associate professor, and 3 for full professor provide more information than the actual text that describes the levels of the variable named rank.

Just the same, it sure is a lot easier to look at a data file and see words rather than numbers. Just think about the difference between a data file with numbers representing various levels (such as 1, 2, and 3) of a variable and the actual values (such as assistant professor, associate professor, or full professor).

To define the Values used for a variable, follow these steps.

1. Click on the **Values column** for the corresponding variable. In this case, we are using rank as the example.
2. Click on the **ellipsis** to open the Value Labels dialog box as shown in Figure 30.

Figure 30 The Value Labels dialog box

3. Enter a value for the variable. This is what will appear in the data file window, such as 1, 2, or 3.
4. Enter the value label for the value such as assistant, associate or full.
5. Click **Add**.
6. Click **Continue**. When you finish your business in the Define Labels dialog box, click **OK**, and the new labels will take effect.

Tip: Once a variable is defined, you can easily change the value by just clicking on the arrow of a highlighted cell in the Data View.

Defining Missing Values for a Variable

To define the Values used for a variable, follow these steps.

1. Click on the **Missing column** for the corresponding variable
2. Click the **ellipsis** and you will see the Missing Values dialog box. The various options you can select are as follows.
    - The No missing values option treats all values as being valid, such that no missing values are present in the data file.
    - The Discrete missing values option allows you to enter up to three values for a missing variable.
    - The Range plus one discrete missing value option will identify as missing all the values between the low and high values you identify, plus one additional value outside the range.

Defining Variable Columns

To define the variable Columns Values follow these steps.

1. Click on the **Columns** column for the corresponding variable
2. Enter the value you want for the width of the column or click on one of the up or down triangle to set the width.

Tip: Don't confuse variable width and variable columns defining characteristics. Width refers to the number of characters used to define the display in the Data View window. Columns refers to the number of columns used to define the variable.

Tip: To change the width of a column (in the Data View or Variable View windows), you can drag on the vertical lines that separate the columns from one another.

Defining Variable Alignment

To define the alignment used for a variable, follow these steps.

1. Click on the **Align** column for the corresponding variable.
2. From the drop down menu, select Left, Right or Center.

]

Defining Variable Measure

To define the Measure used for a variable, follow these steps.

1. Click on the **Measure column** for the corresponding variable.
2. From the drop down menu, select Scale, Ordinal or Nominal as the level of measurement you want to use for this variable.

In sum, we have defined 11 different variables as shown in Figure 27. Each has particular setoff characteristics and any of these can be changed quickly and easily be clicking on the Variable View window tab and then changing the variable attribute you want.

Lesson 6
Entering and Editing Data

After This Lesson, You Will Know

- How to enter data into an SPSS Data Editor window
- About editing data in SPSS

Key Words

- Active cell
- Save File As dialog box
- Save Data As dialog box

You just learned how to define a set of variables. Now it's time to enter data that correspond to the set of variables. We'll also learn how to edit data. The file that you will create is already on your SPSS work disk and is named Lesson 6 Data File 1. It consists of 10 cases and three variables (id, sex, and test1), and you can see what it looks like in Figure 31.

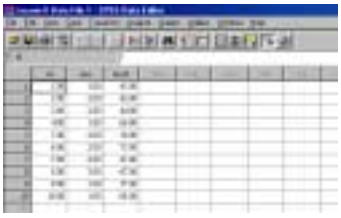

Figure 31 A simple data file

Getting Ready for Data

Let's start at the beginning. First, we'll define each of the three variables in the data file you see in Figure 31. Start with an empty Data Editor window.

1. Click the **Variable View tab** in the opening window.
2. In cell 1, row 1, type the variable name id.
3. Press the Enter key and you will see SPSS complete the default definition for each of the variables characteristics.
3. In cell 1, row 2, type the variable name sex.
4. Press the Enter key and you will see SPSS complete the default definition for each of the variables characteristics.
4. In cell 1, row 2, type the variable name test.
5. Press the Enter key and you will see SPSS complete the default definition for each of the variables characteristics. Each row (representing a variable) should contain the information necessary to define three variables; id, sex, and test as you see in Figure 32.

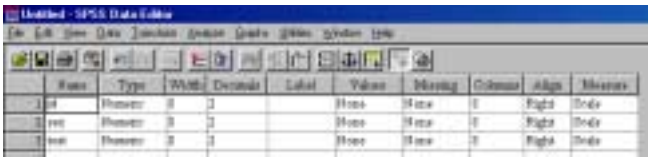

Figure 32 Defining three variables

6. Click on the **Data View tab** to return to the Data Editor window as you will see the three variables defined as shown in Figure 33.

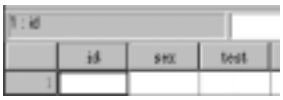

Figure 33 Waiting for data entry

Entering Data

Entering data into the Data Editor window and creating a data file is as simple as entering data in a spreadsheet or creating a table using a word processor. You just click in the cell where you want to enter data (which then appears as outlined), click, and type away. Let's enter data for the first case.

1. Place the cursor on row 1, column 1.
2. Click once. The cell borders of the individual cell in the data file will be outlined.
3. Type 1 for id
4. Press Tab to move to the next variable in the current case. You can also press the down arrow (↓) key to move to the next case within the same variable. SPSS will enter the value 1.00 since the default format is two decimal places. The next cell in the row will then be highlighted. You'll notice that as you enter values into cells in the Data Editor the value appears in the data entry information bar right above the column headings.

The cell in the Data Editor that is highlighted and that shows the value in the information bar is the active cell. In Figure 34 the active cell has a value of 1.

Figure 34 Entering the first data point in the Data Editor.

5. Type 1 for sex.
6. Press the tab key to move to the column labeled "test1." The Shift+Tab key combination moves one cell to the left.

7. Type 45. To get to the next case, press the Home key and the down arrow (↓) key. Compare your Data Editor to the one you see in Figure 34 to be sure you are entering data in the correct locations.
8. Continue entering data in the Data Editor until all the data you see (all 10 cases) are entered.

If you make an error, just backspace. Or, just don't worry about it! You will learn how to correct such errors in the next section in this lesson.

Editing Data

Editing data in a data file is simply a matter of locating the data you want to edit and then changing them. There are several techniques you can use to do this including a simple click and edit or cutting and pasting. You'll learn about them all in this part of the lesson.

Changing a Cell Value

Let's say that you want to change the value of test1 for case 3 from 44 to 54. You made an error in data entry and want to correct it. Here's how.

1. Click on the cell you want to change, which in this case is the cell in test1, case 3 with a value of 44. When you click on the cell, its value will appear in the data information bar or the cell editor area.
2. Type 54. As you begin typing the new value, it replaces the old one.
3. Press Enter. The new value is now part of the data file.

Tip: As with any Windows operation, double-clicking on the contents of a cell selects all the material in that cell. You can just double click and type the replacement.

Editing a Cell Value

You can also edit an existing value without replacing it. For example, you may want to change the test1 value for case 1 from 45 to 40, and you just want to change the last digit rather than replace the entire value. Here's how.

1. Click the cell containing the value you want to edit. In this case it is the cell for test1, case 1, which contains the value 45.
2. Click to the right of the last digit in the data entry information bar. A blinking horizontal line will appear in the cell editor following the last digit of the cell entry.
3. Backspace once to delete the 5.
4. Type 0.
5. Press Enter or move to another cell. The new value is now part of the data file.

If you wanted to change a value such as 4565 to 4665, you would use the mouse pointer to insert the blinking cursor between the first 5 and the 6, press the backspace key once, and then enter the new value. If you wanted to insert a value in an existing

one (such as changing 198 to 1298), you would place the cursor where you want the new values to be inserted and just enter them.

Saving a Data File

This is the easiest operation of all, but it may be the most important. As you know from your experience with other applications, saving the files that you create is essential. First, saving allows you to recall the file to work on at a later time. Second, saving allows you to back up files. Finally, you can save a file under a new name and use the copy for a purpose different from the original purpose.

Don't wait to save until your data file is entered and you are sure there are no errors. Why should you save a file before it is entered exactly as you want it? It's a matter of being "safe rather than sorry."

Tip: How often should you save? You should save after a set amount of work (either time or pages worth). One general rule is to save as often as necessary so that you can easily recreate any work you might lose between saves—every time you finish entering 10 cases or after 30 minutes of work might be a good starting guideline.

When you are creating a data file document (and before you save it for the first time), the only "copy" of it is stored in the computer's memory. If, for some reason, the computer malfunctions or the power (and the computer) goes off, whatever is stored in this temporary memory will be lost. It literally disappears, whether it is a data file with three variables and 10 cases or 300 variables and 10,000 cases. Save data files as you work!

Before saving a file for the first time, however, the first order of business is deciding on a name for the file.

To save a data file, you must assign a unique file name to it. For example, if you were to name a file "data" you might find it confusing, because you will surely be creating more than one file, and "data" describes virtually all of them. Also, should you try to save a file to a directory containing an identically named file with different contents, the new file will overwrite the original file. You lose the original file and all your work.

For these reasons, use a name that describes the contents of the data file. SPSS also automatically attaches the .sav extension to all saved files.

With Windows, file names can be up to 225 characters long, so you shouldn't have any difficulty being sufficiently descriptive, although being wordy has problems, too. Try to find a middle ground between describing the file and not having a name so long that it can't easily fit on the screen.

To save the data document that is active (which has the data you entered, as you saw in Figure 31), follow these steps:

1. Click **File → Save**. When you do this, you will see the Save Data As dialog box which you should be familiar with by now.

2. Select the directory in which you want to save the data. If you are saving to a hard drive and you are working in a computer lab, be sure you have permission. If you are saving to a floppy disk, select drive a or drive b.
3. Enter the file name you want to use in the File Name text box to save the data that has been entered. We used Lesson 6 Data File 1.
4. Click OK.

The data you entered will then be saved as a data file, and the name of the file will appear in the title bar of the Data Editor window. The next time you select Save Data from the File menu, you will not see the Save Data As dialog box. SPSS will just save the changes under the name you originally assigned to the data file. And remember, SPSS will save the data in the active directory. In most cases, that will be the same directory that contains SPSS, a situation you may or may not want.

Tip: You can have Windows hide file extensions by going to the Explorer, right clicking, selecting properties and asking Windows to hide extensions.

The Save As option on the file menu allows you to save a file under another name or under another format. For example, if you select the Save As options, you can select from such formats as Excel and Lotus 2-3—very handy for exporting your SPSS file to another application.

Tip: Unlike other Windows applications, you must first enter data before you can save the data as an SPSS file. SPSS will not let you save a blank Data Editor window.

Saving a File in a New Location

You can easily select any other location to save a file. Perhaps you want to keep the application and data files separate. For example, many SPSS users have a separate directory for each project. That way, files from different projects don't get mixed together. Or, you may want to save a file to a floppy disk and then take the disk home for safekeeping.

Here's how to save a file to another location:

1. Click **File → Save As**. You'll see the Save Data As dialog box.
2. Enter the name of the file in the File Name text box.
3. In the Save In section of the Save As dialog box, click the directory where you want the file saved. For example, if you want to save the file to a disk in drive B, click [-b-].
4. Click OK, and the file is saved to the new location.

You can save to any location by clicking a series of drives and directories.

Opening a File

Once a file is saved, you have to open or retrieve it when you want to use it again. The steps are simple.

1. Click **File → Open**, and you will see the Open File dialog box as you see in Figure 35.

Figure 35 The Open File dialog box

2. Find the file you want to open, and double-click on the file name to open it or highlight the file name and click OK.

Lesson 7
Inserting and Deleting Cases and Variables

After This Lesson, You Will Know

- How to insert and delete a case
- How to insert and delete a variable
- How to delete multiple cases and variables

Key Words

- Insert
- Delete

More often than not, the data you first enter to create a data file need to be changed. For example, you may need to add a variable or delete a case. You learned in the last lesson how to enter and edit data and then save all the data as a data file. But the simple editing may not be enough.

There are times when you want to add one or more cases, or even an entirely new variable, to a data set. A subject might drop out of an experiment and you may choose to delete a case, or for measurement or design reasons an entire variable may no longer be useful and need to be deleted from a data file. In this lesson, we will show you how to insert and delete both cases and variables.

The SPSS file we'll work with in this lesson is shown in Figure 36. It contains three variables (age in years, social class, and preference for soft drink) and five cases, and it is saved on the student disk as Lesson 7 Data File 1.

Figure 36 Data File Lesson 7 Data File 1

Inserting a Case

Notice in Figure 36 that the cases are sorted by age in ascending order from the youngest subject (aged 44) to the oldest subject (age 67). Let's say we want to add a new case. We'll place it between the second and third cases.

Tip: When inserting a case, you can select any cell in the row above which you want to insert the case.

1. Select a cell in the row above which you want to insert the new case. In this example, it is row 3 since we want the new case to appear right above row 3. You can select any cell in the row.

2. Click **Data →Insert Case**, or click the Insert Case button on the toolbar. As you can see in Figure 37 an entire new row opens up, providing room to enter the data for the new case.

Figure 37 Inserting a case

You'll notice that when you add a case, dots appear in the blank cells indicating that there are missing data. Now you can enter the data that make up the new case. Enter any data you want.

Inserting a Variable

Now let's say that you need to add an additional variable to the data file. For example, you want to add the variable weight in pounds so that it appears before the variable labeled "pref," for preference.

1. Select a cell in the column to the right of where you want to insert the new variable. We selected a cell in column 3 (labeled pref) since we want to insert a new variable just to the left of pref.
3. Click **Data→Insert Variable**, or click the Insert Variable button on the toolbar. As you can see in Figure 38, an entire new column opens up providing room to enter the data for the new variable. As you can also see, the new variable is automatically named by SPSS as var00001.

Figure 38 Inserting a new variable

You'll notice that when you add a variable, dots appear in the blank cells, indicating that there are missing cases. You can define the variable (we named it weight) and enter the data for each case. The data file with a new case and variable added, and with data added as well, appears in Figure 39.

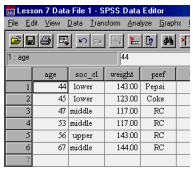

Figure 39 The edited data file

Deleting a Case

Now it comes time to learn how to delete a case that you no longer want to be part of the data file. For example, let's delete the fourth case in the data file you now see in Figure 39.

1. Click on the case number (not any cell in the row) to highlight the entire row as you see in Figure 40.

Figure 40 Select a case to delete

2. Click **Edit → Clear**. You can also press the Del key, or right-click and click Clear, and the case will be deleted.

Tip: Oops! Inadvertently delete something? Select the Undo command on the Edit menu or use the Ctrl→Z key combination to undo the last action.

Deleting a Variable

We're sure you know what's next, deleting a variable. Needing to delete a variable is probably a rare occurrence; you would have thought through your data collection procedures well enough to avoid collecting data you don't need. Nonetheless, the situation does arise.

Tip: To delete more than one case or more than one variable, drag over the cases or variables and select them all and then press the Del key.

For example, perhaps you find out after the fact that data you collected (such as social class) are confidential and cannot be used. You therefore need to delete the variable across all cases. Here's how.

1. Click on the variable or column to highlight the entire column.
2. Click the **Edit → Clear**. You can also press the Del key, and the variable will be deleted, or right-click and click Clear

Lesson 8
Selecting, Copying, Cutting, and Pasting Data

After This Lesson, You Will Know

- How to select data
- How Cut and Copy and Paste can be used in a data file
- How to cut and paste data
- How to copy and paste data
- What the clipboard does, and what its limitations are

Key Words

- Buffer
- Clipboard
- Copy
- Cut
- Paste

This last lesson on editing a data file has to do with some Windows techniques that you may already be familiar with: selecting, cutting, copying, and pasting. In fact, these simple operations can save you time and trouble, especially when you want to move the value of one or more cells from one location to another, or to repeat columns or rows.

Copying, Cutting, and Pasting

With the Cut, Copy, and Paste tools located on the Edit menu, you can easily move cell entries (be it one or more cells) from one part of a data file to another part of the same data file. You can also move cell entries from one data file to another entirely different data file or even to another Windows application!

In general, the steps you take to cut or copy and paste are as follows:

1. Select the data you want to cut or copy by dragging over the data with the mouse pointer. It can be an individual cell, row, column, or more than one row or column. Rows and columns can also be selected by clicking on them at the top (for a column) or at the left (for a row). A range of cells defines a rectangular- or square-shaped set of cells.

Tip: The Shift+arrow key combination can be used to select a range of cells as well. Click in an "anchor" cell, the use the Shift up, down, right or left arrows to select what you want.

2. Click **Edit→ Cut** or Copy. Unfortunately, unlike in other Windows applications, there are not cut, copy, and paste buttons on the toolbar.

*3. Select the destination, or target cell, where you want the data pasted. The destination, or target cell, you select will act as the upper left-hand anchor if you are cutting or copying more than one cell.

4. Click **Edit → Paste**.

The selected data will appear in the new location. Here is an example of cutting and pasting and copying and pasting. The data that we're using, which you see in Figure 41, is contained in the file named Lesson 8 Data File 1 on the student disk. It consists of five cases of three variables (weight in pounds, height in inches, and strength ranking).

Figure 41 Lesson 7 Data File 1

Selecting Data

Before you can cut, copy, or paste anything, you first have to highlight what you want to cut or copy. You are probably used to the most direct way of highlighting data, which is through the drag technique. For example, if you want to highlight a particular section of a data file, just drag the mouse pointer over that section.

Thus, any set of data, cases, or variables can be highlighted by just dragging over the information using the mouse. An individual cell is automatically highlighted when you click on that cell.

What if you're not a mouser? Not to worry. Here's an easy-to-use summary (Table 4) that will tell you how to use the keyboard to select any amount of text you want.

Table 4
Keyboard Strokes for Selecting

To select	Use these keys
One cell down	↓ or the Enter key
One cell up	↑
One cell to the right	→
One cell to the left	←
The first cell in a case	Home
The last cell in a case	End
The first case in a variable	Ctrl + ↑
The last case in a variable	Ctrl + ↓
An entire case	Shift + Space
An entire variable	Ctrl + Space
a block of cells	Shift + ↑ or ↓ or ← or →

Cutting and Pasting

Data are cut from a data file when you want to remove them from their original locations and paste them into another location.

Here's an example of cutting data to rearrange the order in which variables appear. We'll be showing you this activity in Figures 42 and 43 where part of the data file is be copied to a new location. Specifically, we'll move the height variable so that it is after strength.

1. Highlight the data you want to cut as you see in Figure 42. In this example, we are highlighting the variable (and not just the data in that column) named height. Remember, when data are cut, they disappear from the original location. When you select, be sure to click on the variable name.

Figure 42 Highlighting a variable to be moved

2. Click **Edit → Cut**. When you do this, the variable height disappears from the Data View window.
3. Move the insertion point to the location where you want to insert, or paste, the data. Click at the top of the column where the new variable name will appear so you highlight the entire column.
3. Click **Edit →Paste**. The data that were cut will then appear as you see in Figure 43. This is a pretty efficient way of getting data from one place to another.

Figure 43 Pasting a variable in a new location

Tip: When cutting, copying as pasting, SPSS has right-click features where you can highlight and then right click to select Cut, Copy or Paste. You can also use keyboard command to Copy (Ctrl+C), Cut (Ctrl+X), and paste (Ctrl +V).

This is an example of cutting and pasting text within the same data file. Should you want to cut and paste between data files, the process is much the same. Here are the general steps.

1. Highlight the data you want to cut and paste.
2. Click **Edit → Cut**.

3. Open a new data file or the one into which you want the data pasted.
4. Move the insertion point to the location where you want to insert, or paste, the data.
5. Click **Edit → Paste**. Data will appear in the new location.

In Figure 44, you can see the results of pasting them into a Windows Word Pad document. Notice that only the data and not the column headings are transferred.

Figure 44 The results of cutting and pasting

Copying and Pasting

Copying data is not much different from cutting data, except that the data remain in their original locations. Copying is the ideal tool when you want to duplicate data within a document or between documents.

Tip: Want to paste the same data in several locations? Just continue to select the Paste option from the File menu or the right-click menu.

For example, the weight, strength, and height data may be part of one data file, and you want to copy only the first two variables (weight and strength) to a new data file. You will add additional variables and cases to the new file, but you want to preserve the original.

The steps for copying and pasting are basically the same as cutting and pasting except for one different command. Here are the steps.

1. Highlight the data you want to copy. Remember, when data is copied, the data remains where it was originally located.
2. Click **Edit → Copy**.
3. Move the insertion point to the target cell where you want to insert or paste the copied data.
4. Click **Edit → Paste**. The data that were copied will then appear.

A good use of copy and paste would be to copy data from a master data file that you want to use over and over, don't want to change, and need to borrow from in the future. Using copy and paste will leave the master document intact while you copy what you need.

Where Copy or Cut Data Go

What happens to data that you cut or copy? When you cut or copy data, they are placed in a buffer, an area reserved for temporary memory. This buffer is called the

clipboard. The data are retrieved from the buffer when you select Paste. In fact, whatever information is in the buffer stays there until it is replaced with something else.

For this reason you can paste the contents of the buffer into documents over and over again until something new has been cut or copied, replacing what was in the buffer. That's why the Paste button is always darkened (or active) since it's ready to paste whatever is in the buffer.

Want to see the contents of the clipboard? Here's how.

1. Click **Start → Programs → Accessories → Clipboard Viewer**. You'll see the current contents of the clipboard.

It's useful to remember some things about the clipboard.

First, this buffer can hold only one thing at a time. As soon as you cut or copy something new, the new data replace whatever was first in there.

Second, when you quit SPSS, the contents of the clipboard disappears. The clipboard is a temporary place so anything you want to save permanently, you should save to a file with a unique name.

Lesson 9
Printing and Exiting an SPSS File

After This Lesson, You Will Know

- How to print a data file
- How to print a selection from a data file
- How to print output from an analysis or a chart

Key Word

- Print dialog box

Once you've created a data file or completed any type of analysis or chart, you probably will want to print a hard copy for safekeeping or for inclusion in a report or paper. When your SPSS document is printed and you want to stop working, it's time to exit SPSS. You probably already know the way to exit an application is not by turning off the computer! Rather, you need to give your application (and your operating system) time to do any necessary housekeeping (closing and ordering files, and so forth). In this lesson, we will show you how to print and safely exit SPSS.

Printing with SPSS

Printing is almost as important a process as editing and saving data files. If you can't print, you have little to take away from your work session. You can export data from an SPSS file to another application, but getting a hard copy right from SPSS is often more timely and more important.

In SPSS, you can print either an entire data file or a selection from that file. We'll show you how to do both.

Printing an SPSS Data File

Let's begin with data files. It's simple to print a data file.

1. Be sure that the data file you want to print is the active window.
2. Click **File → Print**. When you do this, you will see the Print dialog box shown in Figure 45.

Figure 45 The Print dialog box

Tip: You can easily print a file with one click; just click the Print icon on the toolbar.

As you can see, you can choose to print the entire document or a specific selection (which you would have already made in the Data Editor window), and increase the number of copies from 1 to 9999 (that's the limit).

3. Click OK and whatever is active will print.

Look at the printed output in Figure 46, and then read the comments below.

Figure 46 SPSS Output

First, you can see the title of the name assigned to the data file at the top of the page. In this case, it's Lesson 9 Data File 1. This is a convenient reminder of what's being printed.

Second, a footer with the date and time and page numbers is automatically generated and printed at the bottom of the page.

Third, the default is to print gridlines. If you do not want the grid lines to print, click Grid Lines from the View menu (so it is not checked) and the grid lines will not appear, either on screen or on the hard copy. If you want value labels printed, then select Value Labels from the View menu, and those labels will appear in cells, rather than the actual value you entered.

Finally, the default for the orientation is to print in Portrait, which means the short edge of the paper is horizontal. If you want to switch to Landscape, you have to select Properties from the Print dialog box and then click Landscape on the Paper tab.

Tip: The Properties dialog box (File → Print → Properties) allows youth do some pretty cool things. For example, you can print out put so that there are two or four pages on a sheet. Perfect for reviewing the results of an analysis before it is printed up for the final draft of an article or report. (Note: You will not find this dialog box in the Mac version).

Printing a Selection from an SPSS Data File

Printing a selection from a data file follows exactly the steps that we listed for printing a data file, except that in the Print dialog box, you click the Selection option in the Print dialog box.

1. Be sure that the data you want to print is selected (using the techniques we discussed in the last lesson).
2. Click **File → Print** or click the Print icon on the toolbar. When you do this, you will see the Print dialog box.
3. Click Selection if it is not already selected.
4. Click **OK**, and whatever you selected will be printed.

Printing from the Viewer Window

When you complete any type of analysis in SPSS or create a chart, the results appear in the Viewer window. To print the output from such a window, follow exactly the same procedures as you did for printing any data file.

Clicking OK in the Print dialog box will print all the contents of the Viewer. To print a selection from the Viewer, first make the selection by either clicking on the actual material in the right-pane of the Navigator, or clicking on the name of the material you want to print in the left pane of the Viewer. Then select the Print option from the File menu and click Selection in the Print dialog box. If the Selection option is dimmed in the Print dialog box, it means that you didn't make a selection and, therefore, cannot print it.

Tip: You can select more than one item from the Viewer by holding down the Crtl key as you select different output elements.

Tip: The Page Setup menu on the File menu (when the Viewer is active) allows you a great deal of flexibility in printing out he contents of the Viewer window. You can set margins and orientation, and even click the Options button and create a highly customized header or footer.

Exiting SPSS

How do you end your SPSS session and close up shop for the day? Easy.

1. Click **File → Exit SPSS**. SPSS will be sure that you get the chance to save any unsaved or edited windows and will then close. (Note: For the Mac, click File and then Click Quit.)

Lesson 10
Exporting and Importing SPSS Data

After This Lesson, You Will Know

- How to export a data file to another application
- How to export a chart to another application
- How to import data from another application

Key Words

- Export
- Import

You already know how to open an SPSS data file by selecting Open from the File menu, locating the file, and clicking OK. But what if you created a file in another application, such as Excel or Lotus 2-3 or Word for Windows, and want to use that file as a data file in SPSS? Or what if you want to use an SPSS data file or a chart in a report you created with Word for Windows? Does that mean reentering all the data? Not at all. SPSS lets you export and import data, and in this lesson you will learn how to do both.

Tip: You export data from SPSS to another application and import data from another application to SPSS.

Getting Started Exporting and Importing Data

When you export an SPSS data file, you are sending it to another application. Just as one country exports products to other countries, so you are exporting data from SPSS to another application.

When you import data from another application, you are going to use it with SPSS. It may be a file created in Word or Excel or dBase. Just as one country imports products from other countries, so you are importing data from another application to SPSS.

Tip: If you have trouble exporting a file created with another application to SPSS, try and convert the file to a text or ASCII file within the application where it was originally created. SPSS can more easily read ASCII files than any others.

In general, the more commercially popular an application is, the more different types of data it supports. For example, Word can translate more than 30 different data formats. SPSS was designed for a more narrow audience than such a popular word processor, so fewer applications can directly read SPSS files. With the increasing popularity of SPSS and with the release of version 11 however, SPSS is more compatible with other applications than ever before.

Exporting Data

Here's just the situation where you would be interested in exporting data. You have been using SPSS to analyze data, and you want to use the results of the analysis in another application. To do so, you want to export data from SPSS. Let's go through the steps of both exporting data, exporting an analysis of that data, and exporting a chart.

Why might you want to export data? One good example is when you want to create an appendix of the raw data used in the analysis. You could just print the data file but, SPSS is limited in that you cannot use more than eight characters to name a variable or change the height of rows (or cases). You, however, want longer variable names or taller rows. So, you'll export the data to Microsoft Excel, which has much greater flexibility in formatting. And since you are writing your report in Microsoft Word for Windows, an Excel-generated appendix is completely compatible.

The first and most important thing to remember about exporting data to another application is the SPSS data must be saved in a format that the other application can understand. Fortunately, SPSS can save data files under a wide variety of formats. Just by examining Table 5, you can get a general idea as to what applications data files can be exported to. The SPSS data file must be saved using the appropriate extension for the application you are exporting to.

Table 5
Application Extension

Application	Extension
SPSS	.sav
SPSS/PC+	.sys
SPSS Portable	.por
Tab Delimited	.dat
Fixed ASCII	.dat
Excel	.xls
2-3 Release	.sk1 (v3), .wk1 (v2), wks (v1)
Sylk	.slk
dBase	.dbf

(Note: The Mac version also has an SPSS 7.0 and dBase IV, III, and II options).

Let's go through some examples, beginning with exporting the file we named Teacher Scale Results to Excel for Windows.

1. Be sure the data file you want to export is active.
2. Click **File → Save As**.
3. In the "Save as type" area type scores, select the format used by the application you are exporting to. When you make the selection, the file extension changes. In this example, it would be .xls (for Excel). Be sure to

provide a name for the new file. In this case, it is scores, and the file will be saved as scores.xls.

4. Click **OK**. A new file is created under the file name scores.xls, which can now be read by Excel. When you do export a file, SPSS confirms the export by giving you a message Internet he Viewer window regarding the number of variables and number of cases exported. It's a nice confirmation.
5. Open Excel.
6. In Excel, click **File → Open**.
7. Open the new exported file. Excel displays the file as shown in Figure 47.

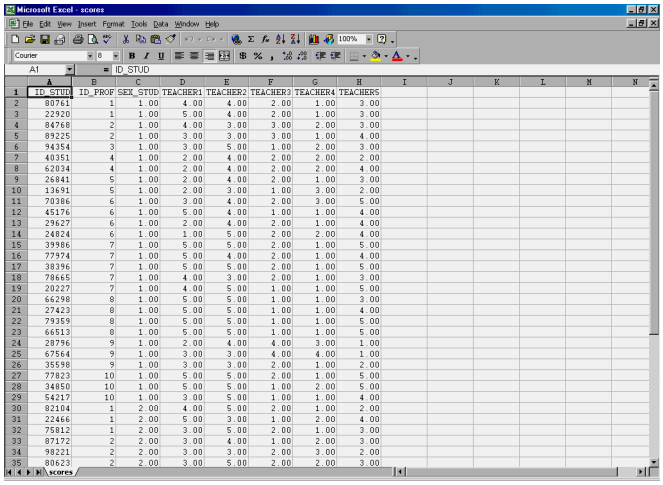

Figure 47 An SPSS file exported into Excel

What if the application you want to export data into is not listed in the above table? Almost every application can read Tab Delimited or Fixed ASCII data. For example, let's say you wanted to export an SPSS data file into Word for Windows (which saves files with a .doc extension). You could save it as a Tab Delimited file, and then have Word read it, as we did in Figure 48). Now, it "ain't purty," but the information is all there. With some changing of font size and spacing, it could appear quite nice and fit well into any document.

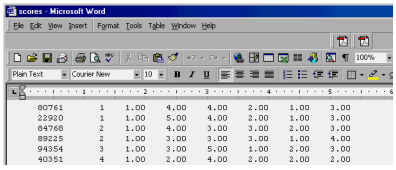

Figure 48 Importing a tab delimited file

SPSS has some pretty terrific charting features. You saw what an SPSS chart looks like in Lesson 4, and you'll learn more about them later in Part I of Using SPSS… It

won't be uncommon for you to need to create a chart and export it into another application. Let's export a graph into a Word file.

1. Create the graph you want to export. Be sure it is active.
2. Click on the actual graph in the right pane of the Viewer. When the graph is selected and ready to be exported, it will be surrounded with a thin black line.
3. Click **Edit → Copy**, or right-click, and click then Copy or Copy objects (depending upon the application).
4. Open the application into which you want to export the chart. In this example, the application is Word.
5. Click **File → Paste** or Paste Special (depending upon the application), or right-click, and then click Paste. The chart should appear in the new document.

Exporting the Results of SPSS Output

Here's the situation. You've just done a simple t-test using SPSS, and you want to export the results of that analysis into another document. In effect, output is treated just like text. It can be cut or copied and pasted, and exporting output is identical to what you just did with a chart.

Why retype all that information when you can just paste it right in? Here's how.

1. Run the analysis you want.
2. Right click on the output you want to export in the right pane of the Viewer.
4. Click **Edit → Copy**, or right-click, then click Copy or Copy objects depending the how you want the format of the copied results to appear. If you chose Copy, then the contents of the output will be copied, without any special format and these contents can be edited. If you chose Copy objects, then the exact format you see in the output will be copied. The two are show in Figure 49 with the results of the simple Copy command shown above the results of the Copy objects command.
5.

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference Lower	Upper
TEACHER1	Equal variances assumed	3.391	.072	1.324	48	.192	.4610	.34821	-.23908	1.16116
	Equal variances not assumed			1.353	47.781	.182	.4610	.34076	-.22418	1.14626

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference Lower	Upper
TEACHER1	Equal variances assumed	3.391	.072	1.324	48	.192	.4610	.34821	-.23908	1.16116
	Equal variances not assumed			1.353	47.781	.182	.4610	.34076	-.22418	1.14626

Figure 49 Using the Copy and Copy objects commands when pasting a chart into another application.

Tip: SPSS creates objects as output and cannot be directly edited when exported. They need to be edited within SPSS or exported using the simple copy command.

4. Open the document into which you want to paste the output.
5. Click Edit → Paste, or right-click, and then click Paste.

Here's an important caution, however. If you copy results as an object, then you will not be able to edit it in the new application. An object is a bit-mapped image, much like a picture. If you simply copy them (and not use the Copy objects option), the data will be exported as text and you can edit it, but it will lose it's original format. The best advice? Make your SPSS results to be exactly as you would like (by double-clicking on, editing the table within SPSS) them to appear and then copy them as an object.

Importing Data

Here's the situation. You are a user of Excel or Lotus 2-3 and you've entered your data into one of these spreadsheets. Or perhaps you choose to enter your data into one of the many word processors available, such as Word for Windows or WordPerfect. Now you want to analyze the data using SPSS.

This might be the situation if you did not have access to SPSS when it came time to enter the original data or if you just feel more comfortable using some other application to enter data.

1. Click **File → Open**.
2. Locate the file you want to import, highlight it, select the type of file it is from the drop-down file type menu and then click OK. When you do this, you will see the data in the SPSS Data Editor window appearing exactly as it would if you entered directly into SPSS.

Just as you can export from SPSS to other applications, so you can import from a variety of different applications. A word of caution, however. Even though SPSS can read certain file formats (such as .xls for Excel files), it may not mean that SPSS can read the latest version of Excel. Revisions of many products occur soften it is impossible for them all to stay synchronized as far as versions are concerned. So, before you start entering loads of data to import, check to see if it's even possible.

The most important thing to remember about exporting and importing is finding the right format. You need to save a file in the right format so it can easily be exported or imported. Almost any set of data can be imported and exported as an ASCII file. When you want the data to remain intact as far as format and such, you'll have to look for a different format and experiment to see which format works best. At the very least, you should be able to simply select the data and import or export it to and from SPSS using the Copy and Paste commands available on the main menu and when you right-click.

Lesson 11
Finding Values, Variables, and Cases

After This Lesson, You Will Know

- How to find variables, cases, and values
- How to find text

Key Words

- Case
- Case sensitive
- Go To Case dialog box
- Search for Data dialog box
- Value
- Variable
- Variables dialog box

Just imagine you have a data file that contains 500 cases and 10 variables. You know that the entry for age (one of the 10 variables) for case 147 was entered incorrectly. You can either scroll down to find that case or use one of the many find tools that SPSS provides. We'll go through those tools and how to use them in this lesson.

Finding Things

Before we begin showing you how to find things, let's pause for a moment to distinguish among variables, cases, and values. Even if we've covered some of this before, it's a good idea to see all of it in one place.

A value (also called a cell entry) is any entry in a cell, or the intersection of a row and a column. Values can be numerical such as 3, 56.89 or $432.12, or alphanumerical or text such as Sam, Sara, or Julie.

A variable is something that can take on more than one value. Age, weight, name, score on test1, and time measured in seconds are all variables. Variables are defined in SPSS by columns.

Tip: Any search operation requires you to enter the search information in a dialog box, which may block your view of the data editor. You'll have to move the dialog box to view the results of the search. Do this by dragging on the title bar.

A case is a collection of values that belong to a unique unit in the data file, such as a person or a teacher or a school. Cases are defined in SPSS by rows.

With a small data file, you can just eyeball what is on the screen to find what you need. With a large data file, however, you could spend a good deal of time trying to find a case or variable, and even more time trying to find a particular value. If you have 10 variables and 500 cases and no missing data, you have 5,000 cell entries (all of which

are values). Trying to find a particular one could take all day! Thus, the SPSS features that can find variables, cases, and values are most welcome.

Finding Variables

For the example in this lesson, we'll use the data file named Crab Scale Results on the student disk. Open that file now. We'll find the variable named rank.

1. Make sure the data file is active.
3. Click **Utilities → Variables**. When you do this, you will see the Variables dialog box, as shown in Figure 50.

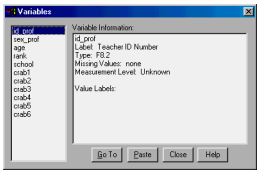

Figure 50 The Variables dialog box

3. Click **Rank**. The Variables dialog box provides a good deal of information about the variable, including its name, label, type, missing values that are included, and value labels (Assistant Professor, etc.).
4. Click **Go To**, and SPSS will highlight the first cell in the column containing the variable.

You're now ready to perform any type of operation on that variable, such as working with labels, transformation, recoding, and more.

Finding Cases

Now that you know how to find any variable in a data file, it's time to see how you can find any case. In the Crab Scale Results example, let's assume that you need to locate case 8. You can do that by scrolling through the data file, which is simple enough. If the cases number in the hundreds, however, it's not so simple a task. To save you time and trouble, SPSS finds cases like this.

1. Click **Data → Go To Case**. When you do this, you will see the Go To Case dialog box, as shown in Figure 51.

Figure 51 The Go To Case dialog box

2. Type 8.
3. Click **OK**. SPSS will highlight the row corresponding to the number you entered, for whatever column or variable the cursor is currently located in. For example, if we just found the variable named rank and then (as a separate

operation) located case 8, the highlighted cell would be the rank for case 8, which is Assistant Professor.

Finding Values

Finding values is the most useful of all the search tools, but in one important way it also is the most limited. It's the most useful because any data file has more values than it does variables or cases. It's the most limited because it can only search for a value within one variable.

For example, let's say we want to find the case with an age value of 36.

1. Click the column labeled age. You may highlight any cell in the variable (or column) in which you want to search for the value, such as age.
2. Click **Edit → Find**. When you do this, you will see the Find Data in Variable Age dialog box, as you see in Figure 52.

Figure 52 The Find Data in Variable dialog box

3. Type 36. You can search either forward or backward through the variable. If you highlighted the first cell in the column, you cannot search backwards since there's no place to go.
4. Click **Find Next** to search through the variable. SPSS will highlight the value when it is found. If SPSS cannot find the value, you will get a Not Found message.

You can also use the Search for Data option to search for values entered as numbers but appearing as text (if they have been assigned labels). For example, if you wanted to find the first occurrence of Female in the variable named sex_prof, you would do as follows:

1. Highlight any cell in the variable (or column) named sex_prof.
2. Click **Edit → Find**.
3. Type Female in the Search for Data dialog box.
4. Click **Find Next**. SPSS will highlight the first occurrence of the value Female.

The value Female was not originally entered in the cell. Instead, the value 2 was entered, and through the definition of the variable the label Female was assigned to that value. If you searched for the value 2 in the same column (sex_prof), SPSS would stop on all occurrences of what you now read as Female. That's because SPSS is looking for *data*, and not necessarily for numbers or text, and Female and 2 are both data. And, if you entered the value female, SPSS would find Female as well, since it looks for whatever it can find that corresponds to what you enter in the Find Data dialog box.

If you want the search to be case sensitive (where upper and lower case letters are distinguished from one another such as Doctor and doctor), then be sure the Ignore case of text in strings box is checked.

Lesson 12
Recoding Data and Computing Variables

After This Lesson, You Will Know

- How to recode data and create new variables
- How to compute new values
- How to recode into Same Variables dialog box
- How to recode into Same Variables: Old and New Values dialog box

Key Words

- Compute
- Compute Variable dialog box
- Formula
- Function
- Recode

There are often situations where you need to take existing data and convert them into a different variable, or to take existing variables and combine them to form an additional variable. For example, you may want to compute the mean or standard deviation for a set of variables and enter those values as a separate variable in the data file. Or you may want to recode data so that, for example, all values of 10 or greater equal 1, and all values less than 10 equal 0. Your needs for transforming or recoding data will depend on the nature of your data and the purpose of your analysis. In either case, SPSS provides some easy-to-use and powerful tools to accomplish both tasks, which we will show you in this lesson.

Recoding Data

You can recode data in one of two ways. First, you can recode a variable to create a new variable. Or you can recode a variable and modify the variable that has already been entered. In this lesson you will use the data saved in the file named Crab Scale Results on the student disk.

As you may remember, the Crab Scale includes the following 6 items:

1. I generally feel crabby if someone tries to help me.
2. I generally feel happy when I watch the news.
3. I generally feel crabby when I watch mothers and fathers talk baby talk to their babies.
4. I generally feel happy when I am able to make sarcastic comments.
5. I generally feel crabby when I am on a family vacation.
6. I generally feel happy when I am beating someone at a game.

Each item is ranked on the following 5-point scale.

1. Totally agree
2. Agree
3. In a quandary

4. Disagree
5. Vicious lies

Since some of the crabbiness items (2, 4, and 6) are reversed, these items need to be recoded. For example, if someone totally agrees (a value of 1) with item 2, it means they are happy when they watch the news. Since we are measuring crabbiness and since the lower the score the more crabby someone is, the accurate scoring of this item should be reversed, as shown in Table 6.

Table 6
Reversed Crab Scale Scores

Original response	Recorded response
1	5
2	4
3	3
4	2
5	1

Here's how to do just that.

1. Be sure the file named Crab Scale Results is active.
3. Click **Transform → Recode → Into Same Variables**, since we want the transformed variable to replace the values in the current variable that is being transformed. You should see the Recode into Same Variables dialog box, as shown in Figure 53.

Figure 53 The Recode into Same Variables dialog box

3. Double-click crab2 to move the variable into the Numeric Variables box.
4. Click the **Old and New Values** … button, and you will see the Recode into Same Variables: Old and New Values dialog box, as shown in Figure 54.

Figure 54 Recode into Same Variables: Old and New Values dialog box

5. Type 5 in the Value area under Old Values.
6. Type 1 in the Value area under New Values.
8. Click **Add**. The variable is added to the Old -- New box, as you see in Figure 55. When SPSS encounters a 5 for variable 2, it will recode it as a 1.

Figure 55 The Old → New Values

8. Click **Continue**, and you will be returned to the Recode into Same Variables: Old and New Values dialog box.
9. Click **OK**, and the actual values entered in the cells will change according to the way in which they were recorded. For example, if someone responded with a 5 to item 2 on the Crab Scale (as was the case for Professor 3), the recorded value would be 1.

To recode more than one variable at a time (such as items 2, 4, and 6), just add all of them to the Numeric Variables box in the Recode into Same Variables dialog box.

Computing Values

Computing a value means taking existing data and using them to create a new variable in the form of a numeric expression.

To show you how to do that, we will compute a total score for any one individual on the crabbiness scale based on a custom formula. To do this, we will simply add together the scores for variables crab1 through crab5. Keep in mind that SPSS comes with 70 predesigned functions (a predesigned formula) that will automatically perform a specific computation.

For example, we could tell SPSS to compute a new variable that is the addition of items crab1, crab2, crab3, crab4, and crab5. Or, we could use the SUM function that SPSS provides to accomplish the same end. We'll show you how to do both.

Creating a Formula

Let's create a formula that will add together the values of all five crabbiness items.

1. Click **Transform → Compute**. When you do this, you will see the Compute Variable dialog box, as shown in Figure 56.

Figure 56 The Compute Variable dialog box

2. Click the **Target Variable text box** and enter the name of the new variable to be created. We named it tot_crab, which is the sum of items 1 through 6 on the Crab Scale.
3. Click the **Numeric Expression text box**.
4. Click **crab1**, the first variable you want to include in the formula.
5. Click the ▶ to add it to the Numeric Expression text box.
6. Type +.
7. Continue adding variables and using the + key to add them together. The completed formula looks like this.
   crab1+crab2+crab3+crab4+crab5+crab6
9. Click **OK**. As you can see in Figure 57, the variable named tot_crab was added to the existing data file.

Figure 57 Adding a new variable to a data set

For example, the tot_crab score for case 1 is 16, the simple addition of all the crab items (appropriately recoded, we might add!). If you wanted the average, you could just edit the formula in the Numeric Expression text box to read as

(crab1+crab2+crab3+crab4+crab5+crab6)/6

In fact, you can perform any type of mathematical computation you see fit.

Using a Function

Functions are predesigned formulas. So instead of

crab1+crab2+crab3+crab4+crab5+crab6

you can enter

SUM(crab1,crab2,crab3,crab4,crab5,crab6)

which will accomplish the same thing.

There are more than 70 different functions including arithmetic functions, statistical functions, distribution functions, logical functions, date and time functions, cross-case functions, and string functions. It's beyond the scope of *Using SPSS*… to go into each one and provide examples, but regardless of how complex or simple functions are, they are all used the same way.

We'll show you how to use one of the most simple and common functions, SUM, which adds a group of values together.

1. Click **Transform → Compute**. If the dialog box is not clear, click Reset.
2. Type tot_crab in the Target Variable text box.

3. In the list of functions, scroll down (if necessary) and find the function you want to use.
5. Double-click on that function to place it in the Numerical Expression box.
6. Now, add variables by double clicking them or by typing their names. The finished dialog box appears in Figure 58. Notice there are no "+" signs, but commas that separate the variables in the formula expression.

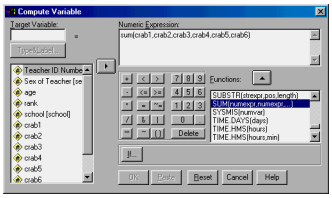

Figure 58 Entering and using an SPSS function

7. Click **OK** and the new variable is created.

An alternative to typing in each variable in the list is to use the "to" operator. Instead of crab1,crab2, … through crab6, you could type crab1 to crab6 so you have

SUM(crab1 to crab6)

as the operators in the Numeric Expression box.

Lesson 13
Sorting, Transposing, and Ranking Data

After This Lesson, You Will Know

- The differences among sorting, transposing, and ranking data
- How to sort cases on one or more than one variable
- How to transpose a data file
- How to rank data

Key Words

- Data
- Rank
- Sort Cases
- Transpose

As you have seen in the last few lessons, working with data includes importing, transforming, and recoding data. Working with data also involves sorting, transposing, and ranking data, techniques every SPSS user needs to know to create a data file that exactly fits data analysis needs. We'll look at each of these techniques in this lesson.

Sorting Data

The first of the three data tools is sorting. Sorting data involves reordering of data given the value of one or more variables. Sorting is an invaluable tool when it comes to organizing information.

For example, if you wanted the data for the Crab Scale Results organized by the variable named rank, you would sort on that variable. If you wanted to sort on more than one variable, you can do that easily as well, such as a sex within rank sort.

Sorting Data on One Variable

Sorting data is as simple as identifying the variable on which you want to sort and directing SPSS to sort.

1. If it is not already opened, open the file named Crab Scale Results.
2. Click **Data → Sort Cases**. When you do this, you will see the Sort Cases dialog box, shown in Figure 59.

Figure 59 The Sort Cases dialog box

3. Double click Rank to move rank from the variable list to the Sort by: text box. The Ascending that appears next to rank in the sort box means that the variable will be sorted in ascending order and ascending is the default

condition. If you want, select descending order by clicking in the Descending button.

5. Click **OK**.

In Figure 60, you can see the data sorted by rank. After the sort, assistant, associate, and full professors are grouped together. As you can see, when alphanumeric information is sorted in ascending order, the sort is from A to Z.

Figure 60 A completed ascending sort on one variable (rank)

Tip: When you sort, the results are sorted according to the values in the cells (such 1 for male and 2 for female) and not the labels. If it were sorted according to the labels, then the sort would be with females first since ascending order for text is A through Z.

Sorting Data on More Than One Variable

Sorting data on more than one variable follows exactly the same procedure as the one just outlined, except that you need to select more than one variable to sort on. SPSS will sort in the order they appear in the Sort by list in the Sort Cases dialog box. For example, if you want to sort on gender within rank, then rank should be the first selection in the Sort Cases dialog box and gender (sex_prof) would be the second, as you see in Figure 61.

Figure 61 Sorting on more than one variable

1. Click **Data → Sort Cases**.
2. Click **Rank** to move rank from the variable list to the Sort by: text box.
3. Select whether you want to sort in ascending or descending order.
4. Double click **Sex of Teacher** to move sex_prof from the variable list to the Sort by text box.
5. Select whether you want to sort in ascending or descending order.
6. Click **OK**.

The cases have been sorted on the variable named rank, such that assistant, associate, and full professors are grouped together, and within rank they are sorted on sex_prof.

Transposing Cases and Variables

As you already know, an SPSS data file is constructed with cases represented by rows and variables represented by columns. This is the way that most data are entered in any type of data collection form, including spreadsheets and other data collection applications.

There may be occasions, however, where you want cases listed as columns and variables listed as rows. In other words, you want variables and cases transposed. This is most often the case when you are importing data (see lesson 10) from a spreadsheet where the data were not entered as cases (rows) and variables (columns). Now that you've imported the data, you want to switch them to fit the conventional SPSS format. Here's how to do it.

1. Click **Data → Transpose**.
2. In the Transpose dialog box, click the variable name and then the ▶ button to insert the variable in the Variables text box. Note that you cannot double-click to move the variable name as you can in other dialog boxes.
3. Repeat steps 2 and 3 until all the variables that you want to become cases have been entered.
4. Click **OK**. All the variables that were not transposed will be lost, so if you transpose either all the variables in the data file or just some, the ones you don't will not appear after the operation is performed.

Ranking Data

The final data manipulation technique we will deal with is ranking data. Let's say that we used the Compute feature (on the Transform menu) to create a sum of all Crab scores as we did earlier.

Tip: When you want to use a procedure using the same dialog box, use the Recall dialog box button on the toolbar and select the dialog box you want to use.

Now let's say that we are not interested in the absolute value of the Crab score, but rather in the relative rank of professors according to their Crab score. Here's how to do it.

1. If you have not done so already, create a new variable (using the Compute command on the Data menu) named tot_crab, a total of all six crab item scores.
3. Click **Transform → Rank Cases**. You'll see the Rank Cases dialog box, as shown in Figure 62.

Figure 62 The Rank Cases dialog box

4. Click on **tot_crab** and click on the ▶ button to move the variable into the Variable(s): text box.
5. Click on the **Largest value** button in the Assign Rank 1 to area.
6. Click **OK**, and a new variable, named rtot_cra, will be created, as you see in Figure 63, reflecting the ranking of all cases (from 1 through 10) on the variable tot_crab. Cases 4 and 8 have the same tot_crab score (13), and, therefore, the same rank (5.5). Cases 9 and 10 also have the same (tied) rank.

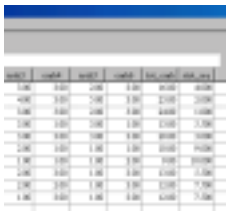

Figure 63 The completed ranking of data

If you select more than one variable on which cases will be ranked, then a separate and new variable will be created for each one of those rankings, and the relative rankings will be listed as well.

Tip: If you want to clear entries in any Variables dialog box, click on the Reset button.

Lesson 14
Splitting and Merging Files

After This Lesson, You Will Know

- How to split a file
- How to merge more than one file and more than one case

Key Words

- Add Cases from … dialog box
- Add Cases: Read File dialog box
- Add Variables from … dialog box
- Add Variables: Read File dialog box
- Merge
- Split
- Split File dialog box

The last skills you need to master before you move on to creating and working with SPSS charts are how to split and merge files. When you split a file, you are dividing it into two new and separate files for separate analysis. When you merge files, you are combining two files keyed on the same variable or variables, or the same cases using different variables. In this lesson, we'll look at how to do each of these.

Splitting Files

Throughout this first part of *Using SPSS*, you have used the Crab Scale Results and Teacher Scale Results to perform simple and complex procedures. We'll use the file named Teacher Scale Results to demonstrate how to split a file.

In general, you split a file when you want to create two separate files, both having at least one variable in common. Creating two separate files might be a choice if you want to produce individual listings of data or prepare data in a way that a particular section, split or organized using a particular variable, can be cut or copied.

For example, in this lesson we will split the Teacher Scale Results file using the variable named sex_stud into two separate files. One file will be named Sex Males, and the other will be Sex Females. Then we can do analysis of variance or regression on the separate files.

Tip: You can tell that a file has been split when the words Split File On are showing in the right hand side of the Status Bar.

Splitting a file is not a particularly difficult process. In fact, it's only a matter of selecting the variable on which you want to split.

For example, for the Teacher Scale Results we'll split on sex_stud by following these steps:

1. Open the file names Teacher Scale results on the data disk.

2. Click **Data → Split File**. When you do this, you will see the Split File dialog box, as shown in Figure 64.

Figure 64 Split File dialog box

3. Click **Organize output by groups** since you are presumably splitting the files to create data for two separate analyses.
3. Double click **sex_stud**.
4. Click **OK**. The file will then be organized such that all male students are grouped together as are all female students.

Once the split is completed, SPSS will not create two physically separate files. Rather, for the rest of the SPSS session, SPSS will perform every procedure as if the file was physically split into two separate files. A simple descriptive analysis results in descriptive statistics for both males and females.

For example, if you calculate simple descriptive statistics on the variable named Teacher1, then you will get separate output for both males and females without having to identify an independent variable named sex_stud. The results of such an analysis are shown in the Viewer in Figure 65. Notice that the analysis was automatically done for both males and females.

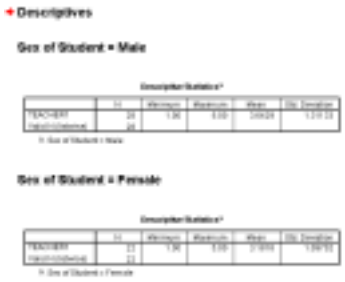

Figure 65 A simple analysis on a split file

Any analysis is performed on each split of the file. For example, if you split on sex_stud (2 levels) and id_prof (10 levels), you would have 20 different descriptive analyses.

Merging Files

Merging files is just as useful as splitting files. Files can be merged, or combined, in two different ways.

First, you can combine two files that contain the same variable or variables but different cases. This would be the setting if more than one researcher were collecting data on the same variables but for different cases (or subjects), and you need to combine the two data files. For example, the Teacher Scale Results survey could have been administered to more than one group of students, and we eventually might want to combine the results of each administration.

Second, you can combine two files that contain different variables but the same cases. For example, you might be having one person collect data using a certain sample and then another person collecting a different set of data on the same sample. Then you want these two combined. Let's look at these possibilities.

Merging Same Variables and Different Cases

In this example, we are going to combine, merge, or add (your choice of words) a new set of five cases of Teacher Scale data to the existing file named Teacher Scale Results. You can see the new data in Figure 66 (on page 73). These data are saved as Teacher Scale Results—Additional Data on your data disk.

Figure 66 Teacher Scale Results—Additional Data

In this example one researcher collected data on 50 students, and another researcher collected data on five students. The Teacher Scale Results should be open.

1. Click **Data → Merge Files**, then click **Add Cases**. When you do this, you will see the Add Cases: Read File dialog box, as shown in Figure 67. This looks like an Open or a Save dialog box, and in a sense you are opening a new file and merging it with another.

Figure 67 The Add Cases: read File dialog box

2. Locate and double-click on the name of the file to which you want to add cases. In this example, the file name is Teacher Scale Results—Additional Data. You are adding the additional data of five cases to the file that contains 50 cases. You will see the Add Cases from … dialog box, as shown in Figure 68.

Figure 68 The Add Cases…dialog box

3. Click **OK**, and the file named Teacher Scale Results—Additional Data is added to the file named Teacher Scale Results, and the total file now has 55 cases (50 cases from Teacher Scale Results—Additional Data and 5 from Teacher Scale Results—Additional Data).

Merging Different Variables and Same Cases

Now we have the example where you have two files that contain a different set of variables for the same cases. For example, we want to combine the Teacher Scale Results—Additional Data and Crab Scale Results files where the common variable is id_prof.

What SPSS will do in this case is combine cases in the Teacher Scale Results file with cases in the Crab Scale Results file, using the variable named id_prof as a common link.

1. Be sure that the file names Teacher Scale Results—Additional Data is open.
2. Click **Data → Merge**, then click **Add Variables**. You will see the Add Variables: Read File dialog box.
2. Select the file to which you want to add this set of cases. In this example, the file name is Crab Scale Results.
3. Click **Open** and you will see the Add Variables from … dialog box, as shown in Figure 69. As you can see, SPSS has already identified that id_prof is common to the two files and has listed it in the Excluded Variables area.

Figure 69 The Add Variables from dialog box

4. Click **OK**.

The result of this merging, shown in Figure 70, is a file larger than either of the two files that share the variable named id_prof. If you recall the file named Teacher Scale Results, you will see it does not contain any demographic information, such as gender or age, but the merged file including Teacher Scale information does, since it was merged with the Crab Scale data.

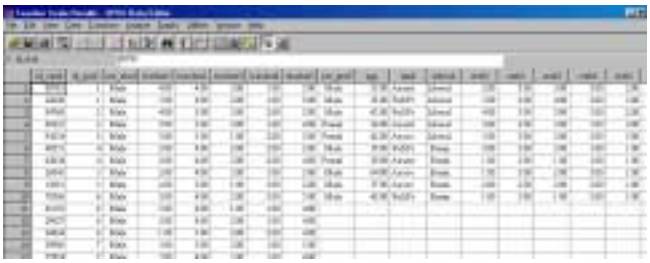

Figure 70 Merging two files

Lesson 15
Creating an SPSS Chart

After This Lesson, You Will Know

- How to create a simple line chart
- About some of the different charts that you can create with SPSS

Key Words

- Area chart
- Bar chart
- Define Simple Line: Values of Individual Cases Dialog box
- Line Charts dialog box
- Pie chart
- .spo

SPSS offers you just the features to create charts that bring the results of your analyses to life. In this lesson, we will go through the steps to create several different types of charts and provide examples of different charts. In Lesson 16, we'll show you how to modify a chart by adding a chart title, adding labels to axes, modifying scales, and working with patterns, fonts, and more. One note of caution: Throughout this unit of *Using SPSS*…, we'll use the words graph and chart interchangeably.

Creating a Simple Chart

The one thing that all charts have in common is that they are based on data. Although you may import data to create a chart, in this example we'll use the data you see here to create a line chart of test scores by grade. These data are available on the student disk in the file named Lesson 15 Data File 1.

Grade	Score
1	45
2	56
3	49
4	57
5	67
6	72

Creating a Line Chart

The steps for creating any chart are basically the same. You first enter the data you want to use in the chart, select the type of chart you want from the Graph menu, define how the chart should appear, and then click OK. Here are the steps we followed to create the chart you see in Figure 71.

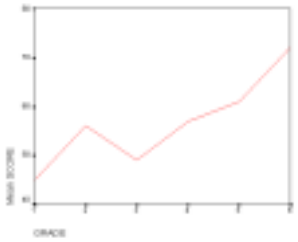

Figure 71 A simple line chart

1. Enter the data you want to use to create the chart.
2. Click **Graphs → Line**. When you do this, you will see the Line Charts dialog box, as shown in Figure 72.

Figure 72 The Line Charts dialog box

3. Click **Simple** and you will see the Define Simple Line dialog box.
4. Click **grade**, click ▶ to move the variable to the Category Axis: area.
5. Click the **Other Summary Function** button.
6. Click **score**, and then click ▶ to move the variable to the Variable: area.
7. Click **OK**, and you see the chart in the Output Navigator, as shown in Figure 73.

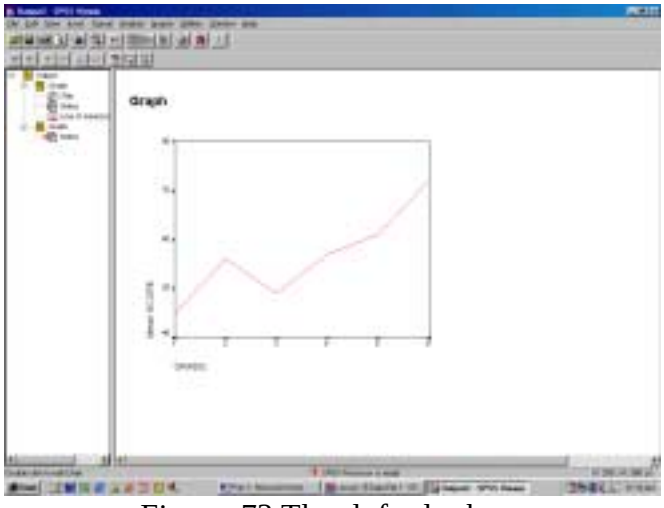

Figure 73 The default chart

Saving a Chart

A chart is only one possible component of the Output Navigator window. The chart is not a separate entity that stands by itself, but part of all the output generated and displayed in the Viewer. To save a chart, you have to save the entire contents of the Output Navigator. To do so, follow these steps:

1. In the Output Navigator window, click **File** → **Save**.
2. Provide a name for the Output Navigator window.
4. Click **OK**. The Output Navigator is saved under the name that you provide with an .spo extension (attached to all Viewer files). If you want to open this file later, you have to select this extension from the Files of type drop-down menu.

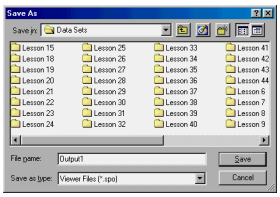

Figure 74 Output is saved with the .spo extension as you can see in this dialog box.

Printing a Chart

There are several ways to print a chart. The first way is to print from the Output Navigator by selecting the chart and then selecting Print.

1. Be sure that the chart you want to print is in the active Viewer window.
2. Click on the chart so that it is selected.
3. Click on the Print icon on the Toolbar or click **File** → **Print** and then **OK**. The chart will be printed.

Tip: You can print only one or more elements in the Viewer by first selecting the element by clicking on it once and then select File → Print, click Selection and then click OK. To select more than none, hold down the Ctrl key as you click.

Different SPSS Charts

SPSS offers 17 different types of chart (all of which you can see samples of at Graphs → Gallery). While some types of chart may be used in lieu of others, each has its own purpose. The purpose depends on the type of data being charted as well as the research question being asked. It's beyond the scope of this book (but just click on any icon in the Graphs → Gallery help area) to detail each chart and all the possible combinations, but you should see how some of the simple charts appear.

Following are examples of some of these simple charts. Keep in mind that there is an almost infinite number of variations of the charts you can create using SPSS. You'll

learn about modifying charts in Lesson 16. All sample charts that follow appear as they are first created, with no modification.

The Bar Chart

A bar chart represents values as separate bars with each bar corresponding to the value in the Data Editor. Bar charts are often used because they are easy to understand and require little attention to detail. In Figure 75, you can see an example of a bar chart of the number of males and females.

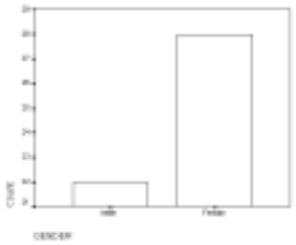

Figure 75 A simple bar chart

Tip: Charts can be easily copied (use the Edit menu) and pasted into other Windows applications.

The Area Chart

An area chart represents the proportions of the whole that each data point contributes. In Figure 76, you can see an example of average product preference as a function of earning power (high, moderate, and low).

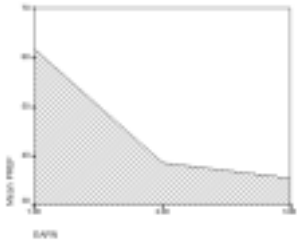

Figure 76 A simple area chart

The Pie Chart

The pie chart is a circle divided into wedges, with each wedge representing a proportion of the whole. Pie charts provide a clear picture of the relative contribution that a data point makes to the overall body of information. In Figure 77, you can see a simple pie chart for expenses (rent, insurance, and miscellaneous).

Figure 77 A simple pie chart

Keep in mind that when you first create a chart, all the SPSS defaults are used. You can easily change type size and font and many other characteristics. You will learn how to do that in the next lesson.

Lesson 16
Enhancing SPSS Charts

After This Lesson, You Will Know

- How to modify chart elements, including titles, axes, colors, and patterns

Key Words

- Category Axis
- Category Axis dialog box
- Colors dialog box
- Patterns dialog box
- Pattern dialog box
- Scale Axis
- Scale Axis dialog box
- SPSS Chart Editor
- Text Styles dialog box
- Titles dialog box

A picture might be worth a thousand words, but if your pictures or charts don't say what you want, what good are they? Once you create a chart, as we showed you in the last lesson, you can finish the job by editing the chart to reflect exactly your meaning. Color, shapes, scales, fonts, text, and more can be altered, and that is what you'll do in this lesson. We'll be working with the line chart that was first shown to you in Figure 71. Only in this case we've made all the modifications.

Modifying a Chart

The first step with the modification of any chart is to double-click on the chart in the right pane of the Output Navigator to access the SPSS Chart Editor and then click the maximize button on the Application title bar. As you can see in Figure 78, there is a Chart toolbar containing a set of buttons across the top of the chart. In Figure 79, you can see each button better and what each represents.

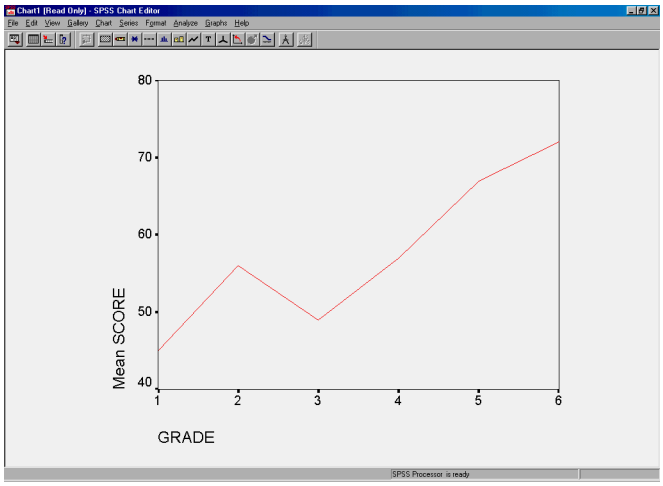

Figure 78 The Chart Editor

Figure 79 The Chart Editor tools

One cautionary note before we begin. The most basic reason for modifying a chart should be to increase the chart's ability to communicate your message. If you get caught up in Chart Junk (a close cousin to Font Junk), you'll have a mess on your hands. Modify to make better, not to show your reader that you know how to use SPSS.

One instructional note before we begin. The general strategy for changing any element in a chart is to select the chart element and then make the change. You select a chart element much as you select any Windows element, by clicking on it. If you single-click, you then must select the menu command for the item you want to change. If you double-click in some cases, you will go immediately to the dialog box in which you can make the change.

Working with Titles and Subtitles

Our first task is to enter the title and a subtitle for the chart you see in Figure 71.

1. With the Chart editor open, Click **Chart → Title**. When you do this, you will see the Titles dialog box, as shown in Figure 80.

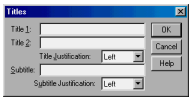

Figure 80 The Title dialog box

2. Type Score by Grade in the Title 1: section.
3. Press the Tab key.
4. Type 10/8/2001 in the Title 2: section.

5. Click Center from the drop-down menus for justification of the titles.
6. Click **OK**.

The titles (and subtitle if you entered one) appear as elements on the chart. If you want to edit a title or a subtitle, just be sure that the chart is active and select Title from the Chart menu.

Working with Fonts

Now it's time to work with the font used to represent any text in the chart. You can do this one of two ways, with each way yielding the same dialog box used to change fonts.

1. Select the area of the chart containing the font you want to change. When you select text, it appears with a solid line around it. In this example, we selected the title of the chart, Score by Grade. Once selected, it appears with a box around it.
2. To select a new font and size, you can either select Text from the Format menu or click on the Text button on the toolbar. When you do either of these, you will see the Text Styles dialog box, shown in Figure 81.

Figure 81 The Text Styles dialog box

3. Select the font and size you want to use.
4. Click **Apply**, and the font will change in the chart. The Text Styles dialog box will remain on the screen until you close it. That way you can make several text style changes without having to reselect the Text Styles dialog box.

The font size was set at 14 point for the first title and 12 point for the second title. The font used was Book Antigua for both title elements. You cannot highlight more than one text area at a time, so you have to highlight each one and then select the font you want to use.

Tip: A definitely forward thinking feature of SPSS is that dialog boxes often can stay open as you apply changes so that you can immediately see the effect of the change. You can also make several changes without have to open and close the dialog box each time.

Working with Frames

SPSS, by default, places a frame around the top and right side of the chart, an inside frame. And if you want, it can also place a frame around the entire chart, called an outside frame. To include or exclude an inner and outer frame, select the option (Inner Frame or Outer Frame or both) from the Chart menu. In our graph, the graph's inner frame was removed, making for a less cluttered appearance.

Working with Axes

The X and Y axes provide the calibration for the independent (usually the X axis) variable and the dependent (usually the Y axis) variable. SPSS names the Y axis the Scale Axis and the X axis the Category Axis. Each of these axes can be modified in a variety of ways. To modify either axis, double-click on the title of the axis.

How to Modify the Scale (Y) Axis

For example, to modify the Y axis, follow these steps:

1. Double-click on the label (**Mean SCORE**) of the axis, and not the axis itself. When you do this, you will see the Scale Axis dialog box, as shown in Figure 82.

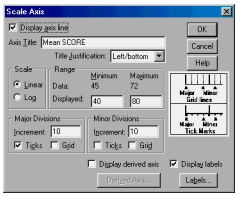

Figure 82 The Scale Axis dialog box

2. Select the options you want from the Scale Axis dialog box. We changed the label Value Score to Score and centered the axis title. We could have done several other things, such as changing the range of the scale (which is 40 to 80 based on data values of 45 and 72) and working with major divisions and minor divisions.

Working with the Category (X) Axis

Working with the X axis is exactly the same as working with the Y axis. Here's how the X axis was modified.

1. Double-click on the label of the X axis. The Category Axis dialog box opens as shown in Figure 83.

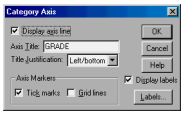

Figure 83 The Category axis dialog box

2. Select the options you want from the Category Axis dialog box. We changed the Category title from GRADE to Grade and centered it. Our finished and modified line chart is shown in Figure 84. We got back to the output window by closing the Chart Editor when we were done modifying the chart.

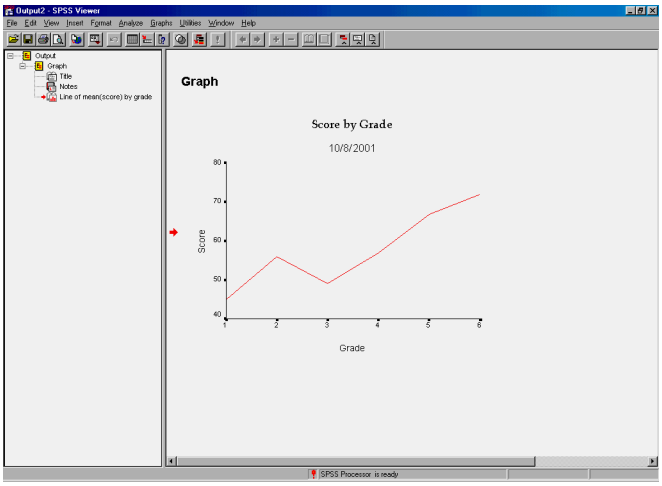

Figure 84 A modified line chart.

Working with Patterns and Colors

Time to have some fun (and be practical besides). When SPSS creates a chart, and if you have a color monitor, it assigns different colors or symbols to different elements in a chart. We'll use two tools, one to work with patterns and one to work with colors. We'll use a simple bar chart, as shown in Figure 85, as an example.

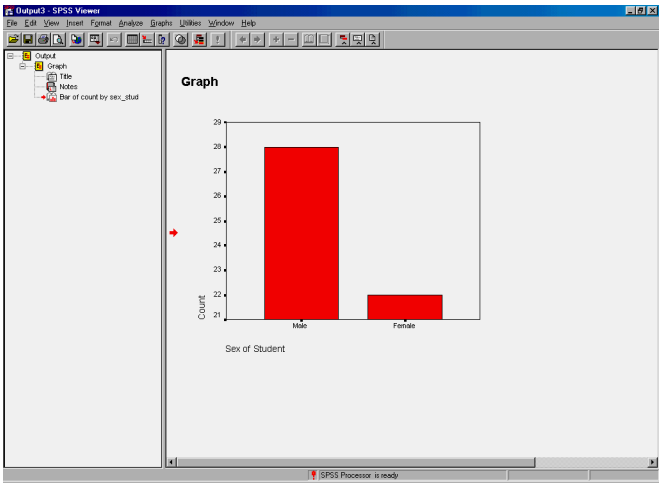

Figure 85 A simple bar chart

<u>Changing Patterns</u>

To change the patterns of any element in a chart, follow these steps:

1. Double-click to open the Chart Editor.
2. Click on the chart element you want to select. When you select a chart element, handles are placed on the edges of all the elements that are identical. In this case, we will click on one of the bars and all the bars are selected.

3. Click on the **Fill Pattern** button or click **Format → Fill Pattern** and you will see the Pattern dialog box shown in Figure 86.

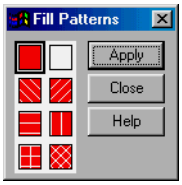

Figure 86 The Fill Pattern dialog box

4. Click on the pattern you want to use.
5. Click Apply, and the pattern used in the bars will change. In the bar chart you see in Figure 87, the hatched pattern was used for the Sex of Student variable.

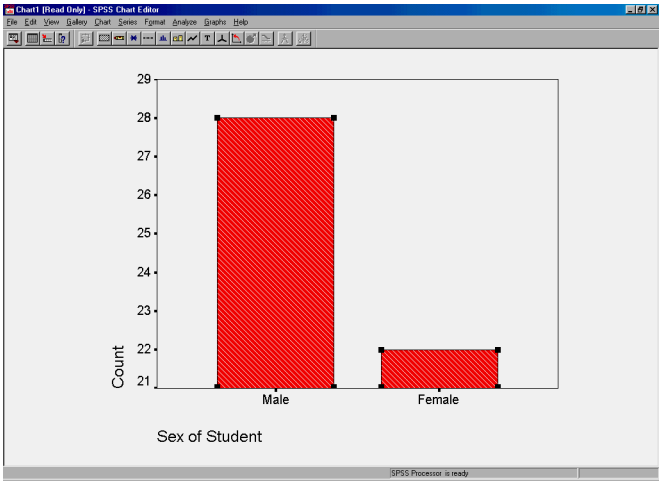

Figure 87 Changing the fill pattern for a bar chart

Now that the patterns are straight, we have one more step. We will eliminate the color from the bars since printing on color (your printer will see the colors as being black or a shade of gray) uses lots of toner.

Changing Colors

To change the color of any element in a chart, follow these steps:

1. Click on the chart element you want to select if it is not already selected.
2. Click on the **Color** button, or click **Format → Color**. When you do this, you will see the Colors dialog box shown in Figure 88.

Tip: You can customize chart colors by clicking Edit in the Colors dialog box.

Figure 88 The Colors dialog box

3. Select the color you want to use to fill the bar, which in our example is white.
4. Click **Apply**.
5. Select the color you want to use (if any) for the border of the bar, which in this example is black.
6. Click **Apply** and you have your newly patterned and colored bar chart as shown in Figure 89.

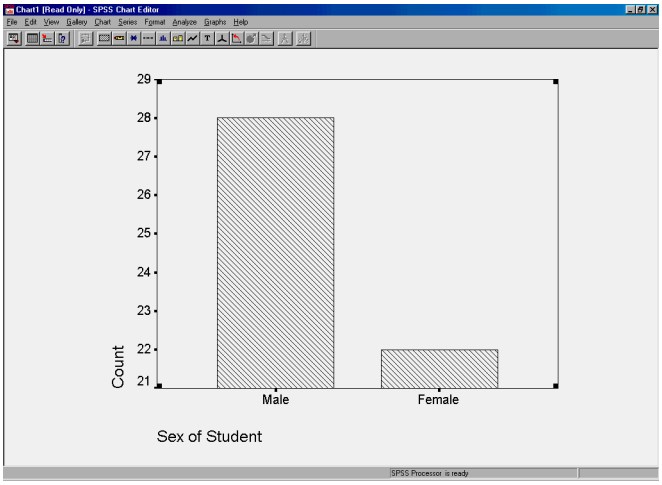

Figure 89 Changing the pattern and color in a simple bar chart.

Setting Chart Preferences

Now that you know something about creating and modifying charts, you should know there are certain default settings that you can set before you create a chart under Options on the Edit menu. They allow you to choose a particular format for viewing your charts. These settings, shown in Figure 90, allow you to set the following visual elements:

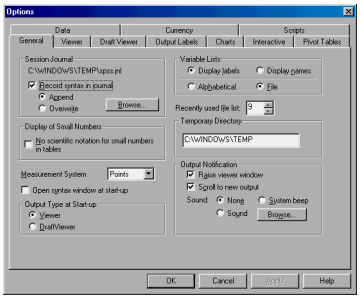

Figure 90 The Options dialog box

Tip: You can set the Chart (and other) defaults you want to use in the Options dialog box at Edit

- the font used in the chart
- the nature of how items are filled with patterns or colors
- the height to width ratio of the chart
- the presence of a frame (inside and / or outside)
- the presence of grid lines

For example, if you want the initial chart to use Times Roman as a font, specify it in the SPSS Options dialog box you access through the Edit menu in the Chart Editor.

Getting Fancy

Before we finish with this bar chart and with your introduction to SPSS charts, let's add just a few more things to jazz up the bar chart.

First, let's click on the Bar Label Styles button and place the corresponding Y axis value at the top of each bar. This simple change increases the informative nature of the chart. Let's make some changes in axis labels and add a footnote and you see the finished chart in Figure 91.

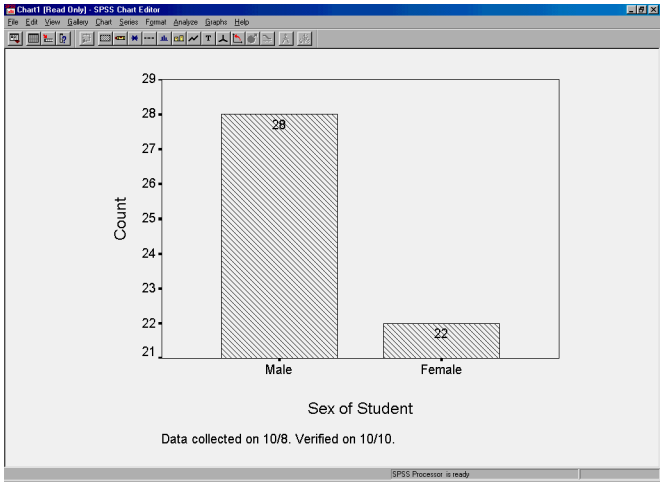

Figure 91 A more informative bar chart

Lesson 17
Using the Viewer

After This Lesson, You Will Know

- The use of the two panes in the Viewer
- How to save output
- How to show and hide results in the Viewer window
- How to print output
- How to delete output
- How to move output

Key Words

- Contents pane
- Outline pane

The Viewer

When you complete any type of procedure in SPSS, be it the creation of a simple chart or the results of a complex analysis, the output appears in the Viewer. The Viewer is a separate SPSS screen that lists all operations performed on a set of data in the order in which they were completed.

For example, in Figure 92, you can see the Viewer showing a bar chart (Graph).

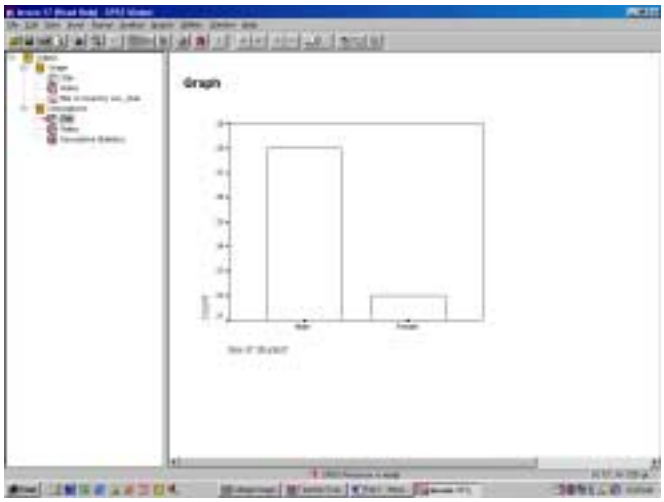

Figure 92 SPSS results in the Viewer window

Until you save the contents of the Viewer using a new name, the Viewer window will keep the name that SPSS assigned when it was first created. Unless named by you, the names automatically assigned are Output1, Output2, etc.

The Viewer consists of two panes. The **Outline pane** on the left side of the Viewer and the **Results pane** on the right side of the Viewer.

The Outline pane lists in outline form all the analyses that have been completed during the current session. The Contents pane contains the results of the analyses.

Saving Viewer Output

Once output is generated, you will probably want to save it for later use or even to add it to another work session. To save output from the Viewer, follow these steps:

1. Click **File → Save**.
2. Provide a name for the output.
3. Click **OK**. The output will be saved using the file name that you provided, along with the .spo extension. When you want to open the Viewer you saved, you will have to specify the .spo extension in the File Type drop-down menu in the SPSS Open dialog box.

To Selectively Show and Hide Results

You can choose to show or hide any results that appear in the Viewer window. You may generate results that you want to hide while you print out others, a convenient way to be selective as you focus your discussion of the results.

To hide a table or chart without deleting it, follow these steps:

1. Click on the item in the Outline pane.
2. Click **View → Hide**.

Tip: The red arrow in the Outline or Results pane indicates which element in the Viewer is active.

To show a table or chart once it has been hidden, follow these steps:

1. Click on the item icon in the Outline pane. If you click on the item name, then you will simply highlight the name and the Show option on the View menu will not be active.
2. Click **View → Show**. The item reappears in the Contents pane.

You'll want to hide and show output as you decide what you want to appear in a hard copy of the Viewer.

Printing the Contents of the Viewer Window

To print the entire contents of the Viewer, follow these steps:

1. Click **File → Print**.
2. Click **OK**. All the tables and charts in the Viewer will be printed.

Printing a Selection from the Viewer Window

To print a specific selection from the Viewer window such as a table or a chart, follow these steps:

1. Click on the table, chart, or both that you want to print in the Viewer window. You can select more than one element by holding down the Shift or Ctrl key when you click each element.
2. Click **File → Print**.

3. Click **Selection → OK**. The element or elements you selected will be printed.

Any element surrounded by a black line is selected and will print. You can select as many elements as appear in the Contents pane to print at once.

Deleting Output

To delete output from the Viewer, follow these steps:

1. Click on the output you want deleted, either in the Outline or Contents pane of the Viewer window.
2. Click **Edit → Delete**, or press the Del key.

Tip: If you select an item in the Results pane and press the Del key, the item will be deleted and can be recovered using the Ctrl+Z key combination.

Moving Ouput

Although the results in the Viewer window appears in the order it was created, you can change the order in which it appears. To change the order, do the following.

In the Outline pane of the Viewer, drag the icon (not the name) representing the output to its new location.

For example, in Figure 93, you can see that the element titled Descriptive Statistics is being moved to the place above the element titled Notes and below Title and how the Outline pane appears after the move in Figure 94. Remember that the order in which elements appear in the Outline pane directly reflects their order in the Results pane.

Figures 93 and 94 Moving results in the Outline pane.