Chapter **13**

Building Graphs Using Chart Builder

I n this chapter, you discover how to create all the different graph types by following simple, step-by-step procedures. Although we don't cover every combination of chart features, you can use the steps here to produce some neat graphs. When you get the basic idea of how to build graphs using Chart Builder, you can explore making some graphs on your own.

The first part of the chapter provides examples of simple graphs and charts and shows you how to build the graphs that you're already familiar with. Next, you see examples of graph types that may be less familiar and are more complex. The last part of the chapter focuses on creating maps.

You can work through the examples to get an overview of building graphs using SPSS — not a bad idea for a beginner — or simply choose the look you want for your data and follow the steps here to construct the chart that does the job. Either way, when you get a handle on the basics, you can step through the process again and again, using your data and trying variations until you get charts that appear the way you want them to.

TIP When you use Chart Builder, you can drag and drop any variables you want to see into your graph. If the variable doesn't make sense there, the drop will fail. Chart Builder in SPSS will tell you what will and won't work.

REMEMBER No matter what you try to do while building a graph, your data won't change.

Simple Graphs

The graphs in this section are a great way to use Chart Builder to show the distribution of a single variable or to display relationships between two variables. We cover the following types of graphs: scatterplot, dot plot, bar graph, error bar, histogram, population pyramid, and stacked area chart.

Simple scatterplots

A *scatterplot* is simply an xy plot where you don't care about interpolating the values — that is, the points aren't joined with lines. Instead, a disconnected dot appears for each data point. The overall pattern of these scattered dots often exposes a pattern or trend.

Follow these steps to construct a simple scatterplot:

1. **Choose File ➪ Open ➪ Data and open the Cars.sav file.**

   The file is not in the SPSS installation directory. You have to download it from the book's companion website at www.dummies.com/go/spss4e.

2. **Choose Graphs ➪ Chart Builder.**

3. **In the Choose From list, select Scatter/Dot.**

4. **Select the first scatterplot diagram (the one with the Simple Scatter tooltip), and drag it to the panel at the top.**

5. **In the Variables list, select Horsepower and drag it to the rectangle labeled X-Axis in the diagram.**

   REMEMBER In a scatterplot, both the x-axis and y-axis variables are scale. Look for the ruler icon when dragging your variable over.

6. **In the Variables list, select Miles Per Gallon (MPG) and drag it to the rectangle labeled Y-Axis in the diagram.**

7. **Click OK.**

   The chart in Figure 13-1 appears, where each dot in the scatterplot represents both the horsepower and miles per gallon for each car. As you can see, miles per gallon depends largely on horsepower. The pattern of the dots clearly shows a linear trend from the upper left to the lower right. The relationship between horsepower and miles per gallon is inverse: As the horsepower of a car increases, there is a decrease in the miles per gallon that the car gets.

FIGURE 13-1:
A simple scatterplot showing the effect of horsepower on miles per gallon.
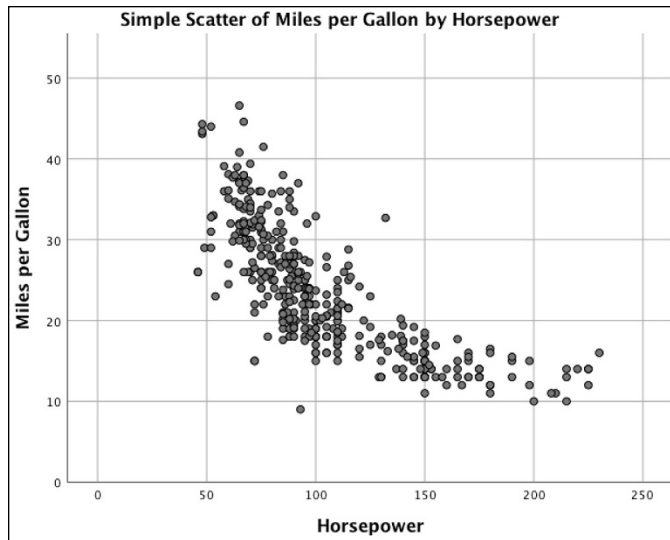
Simple dot plots

No plot is simpler to produce than the *dot plot.* It has only one dimension. Although SPSS groups it among the scatterplots, it displays data more like a bar chart. As you build this type of chart, you'll notice that you won't need a y–axis.

It's easy to create a dot plot. You select the dot plot as the type of graph you want and then select one variable. SPSS does the rest. The following steps guide you through the process of creating a simple dot plot:

1. **Choose File ⇨ Open ⇨ Data and open the Employee data.sav file.**

   The file is in the SPSS installation directory.

2. **Choose Graphs ⇨ Chart Builder.**

3. **In the Choose From list, select Scatter/Dot.**

4. **Select the seventh graph image (the one with the Simple Dot Plot tooltip) and drag it to the panel at the top.**

5. **In the Variables list, select Date of Birth and drag it to the X-Axis rectangle.**

6. **Click OK.**

   The chart shown in Figure 13-2 appears, displaying the number of people born each year. As you can see, more people were born between 1960 and 1970 than any other time periods.
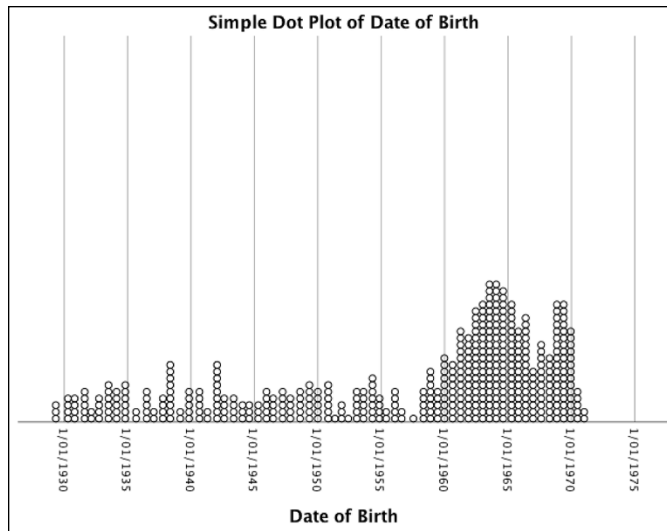
Simple bar graphs

A *bar graph* is a comparison of relative magnitudes. Simple bar graphs and simple line graphs are the most common ways of charting statistics. It would make an interesting statistical study to determine which is more common. The results could be displayed as either a bar graph or a line graph, whichever is more popular.

A fundamental bar graph is simple enough that the decisions you need to make when preparing one are almost intuitive. Follow these steps to generate a simple bar graph:

1. **Select File ⇨ Open ⇨ Data and open the Employee data.sav file.**

   The file is in the SPSS installation directory.

2. **Choose Graphs ⇨ Chart Builder.**

3. **In the Choose From list, select Bar.**

4. **Select the first graph image (the one with the Simple Bar tooltip) and drag it to the panel at the top of the window.**

5. **In the Variables list, select Employment Category and drag it to the X-Axis rectangle.**

6. **In the Variables list, select Current Salary and drag it to the Count rectangle.**

   The label changes from Y-Axis to Mean to indicate the type of variable that will now be applied to that axis.

7. **Click OK.**

The simple bar graph in Figure 13-3 appears. You can see that the average current salary for the manager employment category is much higher than the average current salary for the clerical and custodial employment categories.
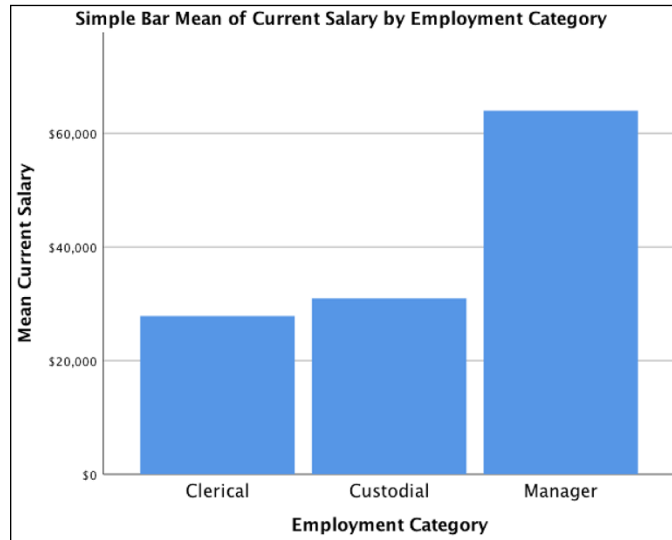
TIP

The display of data in a line chart and a bar chart is similar. If you decide to display data as a bar chart, you should probably try the same data as a line graph to see which you prefer.

Simple error bars

Some errors come from flat-out mistakes — but those aren't the errors we're talking about when we describe error bars. Statistical sampling can help you arrive at a conclusion, but that conclusion has a *margin of error.* This margin can be calculated and quantified according to the size of the sample and the distribution of the data. For example, suppose you want to know how typical a result is when you calculate the mean of all values for a particular variable — for any one case, the mean could be as big as the largest value or as small as the smallest value. The maximum and minimum are the extremes of the possible error. You can choose values and mark the points that contain, say, 90 percent of all values. Marking these points on a graph creates *error bars.*

You can add error bars to the display of most types of graphs. For example, you could add error bars to the simple bar graph presented earlier (refer to Figure 13-3) by making selections in the Element Properties dialog.

For an example of how to add error bars to a bar chart, follow the same procedure described previously in the "Simple bar graphs" section — but just before the final step (clicking OK to produce the chart), do the following:

1. **In the Element Properties window, make sure that a check mark appears in the Display Error Bars option and that Bar1 is selected.**

2. **Select Display Error Bars and make sure the Confidence Intervals value is 95% (the default).**

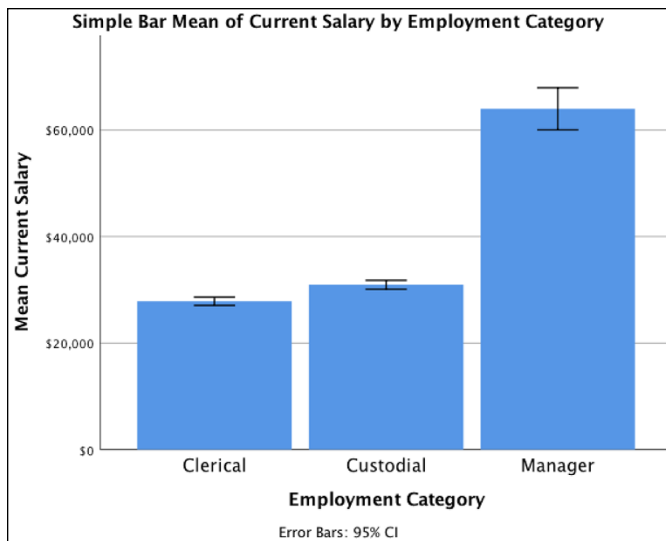3. **Click OK.**

   The chart shown in Figure 13-4 appears.

Another way to present the same data is to display the range of errors without displaying the full range of all values. To do so, follow these steps:

1. **Choose File ⇨ Open ⇨ Data and open the Employee data.sav file.**

   The file is in the SPSS installation directory.

2. **Choose Graphs ⇨ Chart Builder.**

3. **In the Choose From list, select Bar.**

4. **Select the seventh graph image (the one with the Simple Error Bar tooltip) and drag it to the panel at the top of the window.**

5. **In the Element Properties window, make sure the Point1 and Display Error Bars options are selected and that Confidence Intervals Level is set to 95%.**

6. **In the Variables list, select Employment Category and drag it to the X-Axis rectangle.**

7. **In the Variables list, select Current Salary and drag it to the Mean rectangle.**

The label changes from Y-Axis to Mean to indicate the type of data that will be displayed on that axis.

8. **Click OK.**

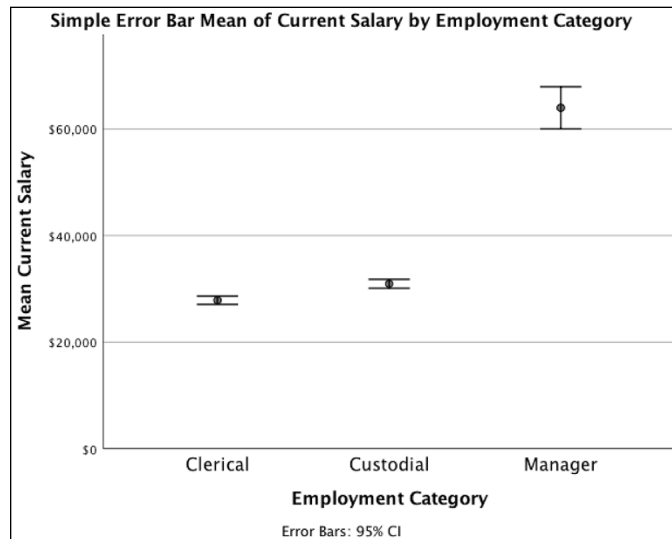The bar graph in Figure 13-5 appears.

FIGURE 13-5:
An error bar graph showing the mean values as dots and the upper and lower bounds of the error.

This example shows one way to make error calculations: The magnitude of the error is based on 95 percent of all values being within the upper and lower error bounds. If you prefer, you can base the error on the bell curve and mark the upper and lower errors at some multiple of the standard error or standard deviation.

Simple histograms

A *histogram* represents the number of items that appear within a range of values. You can use a histogram to look at a graphic representation of the frequency distribution of a variable's values. Histograms are useful for demonstrating the patterns in your data when you want to display information to others rather than discover data patterns for yourself.

You can use the following steps to create a simple histogram that displays the frequency of the ages at which the respondent's first child was born:

1. **Choose File ⇨ Open ⇨ Data and open the GSS2012 Abbreviated.sav file.**

   The file is not in the SPSS Statistics installation directory. Download it at `www.dummies.com/go/spss4e`.

2. **Choose Graphs ⇨ Chart Builder.**

   The Chart Builder dialog appears.

3. **In the Choose From list, select Histogram.**

4. **Drag the first graph diagram (with the Simple Histogram tooltip) to the panel at the top of the window.**

5. **In the Variables list, select the R'S AGE WHEN 1ST CHILD BORN variable and drag to the X-Axis rectangle in the panel.**

6. **Click OK.**

   The histogram shown in Figure 13-6 appears. (Although the graph looks like a bar chart, it's a histogram.) The majority of respondents had their first child when they were in their late teens through mid-twenties.
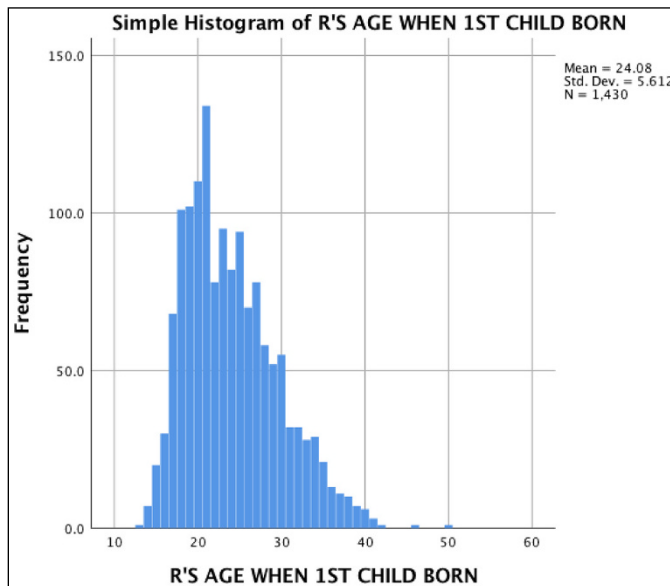

FIGURE 13-6:
A histogram displaying frequency of the age at which the respondent's first kid was born.

Population pyramids

A *population pyramid* provides an immediate comparison of the number of items that fall into different categories. It's called a pyramid because it often takes a triangular shape — wide at the bottom and tapering to a point at the top.

Follow these steps to build a pyramid histogram chart:

1. **Choose File ⇨ Open ⇨ Data and open the GSS2012 Abbreviated.sav file.**

   Download the file at www.dummies.com/go/spss4e.

2. **Choose Graphs ⇨ Chart Builder.**

3. **In the Choose From list, select Histogram.**

4. **Drag the fourth graph diagram (with the Population Pyramid tooltip) to the panel at the top of the window.**

5. **In the Variables list, do the following:**

   a. *Select the Respondent's Sex variable and drag it to the Split Variable rectangle.* This variable a categorical variable with two possible values, so one category will be placed on each side of the center line.

   b. *Select R'S AGE WHEN 1ST CHILD BORN and drag it to the Distribution Variable rectangle.*

6. **Click OK.**

   The chart shown in Figure 13-7 appears. You can see that males tended to be slightly older than females when they had their first child.
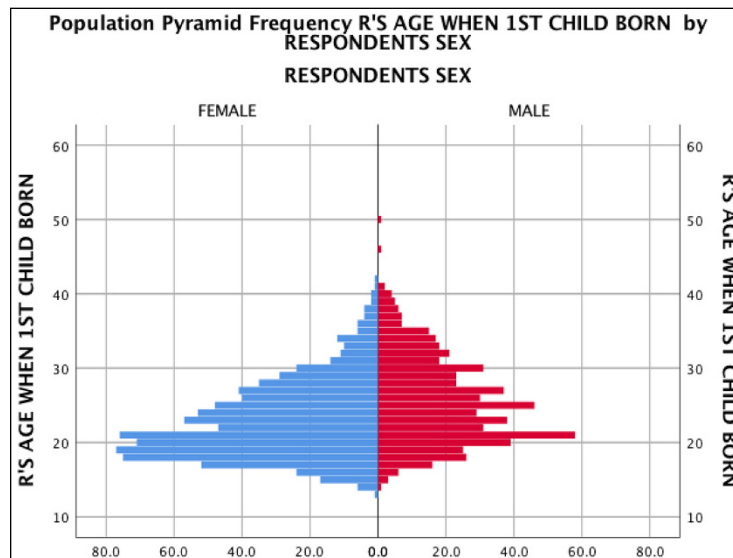

FIGURE 13-7: A population pyramid shows the occurrence of values within categories.

You can create pyramid histograms based on categorical variables with three, four, or more values. The plot produced will consist of as many pairs as needed (and even a single-sided pyramid for one category, if necessary) to display bars that show the relative number of occurrences of different values in the categories.

Stacked area charts

An *area graph* is really a line graph, or a collection of line graphs, with the areas below the lines filled in to represent the mean of one or more values at the various points.

In a *stacked area chart,* more than one variable is displayed along the x-axis. The values are stacked in such a way that the ups and downs of the lower value in the chart affect the upper values in the chart. That is, the chart is not a group of independent lines; instead, it represents a cumulative total — to which each variable displayed adds a value.

To include two or more variables in your chart, simply repeat Step 5c in the following procedure. They will all appear in the legend at the upper right, and each variable will provide the value for one layer of the stack.

If you include more than one variable, make sure that the variables you select for stacking have similar ranges of values so that the scale on the left will make sense for all of them. If, for example, one variable ranges in the thousands and the other doesn't go over a hundred, the smaller one will compress itself visually and appear in the final graph as a line.

REMEMBER

When you select multiple variables for stacking, be sure to select them in the order in which you want them stacked. The first one you select remains on top, the second one is placed under it, and so on.

TIP

The two types of area charts — simple and stacked — act the same when you construct them. You can select the stacked chart and produce a simple area chart, or you can start with the simple area chart and stack your variables.

Follow these steps to produce a stacked area chart with two stacked variables:

1. **Choose File ⇨ Open ⇨ Data and open the Employee data.sav file.**

   The file is in the SPSS installation directory.

2. **Choose Graphs ⇨ Chart Builder.**

3. **In the Choose From list, select Area.**

4. **Drag the second graph diagram (with the Stacked Area tooltip) to the panel at the top of the window.**

5. **In the Variables list, do the following:**

a. *Select the Educational Level variable, right-click it and change its measurement level to Nominal, and then drag it to the X-Axis rectangle.*

b. *Select Current Salary and drag it to the Y-Axis rectangle (now renamed Count).*

c. *Select Beginning Salary and drag it to the Current Salary rectangle.* A plus sign appears when you drag Beginning Salary over Current Salary. Be sure to drag Beginning Salary to the plus sign and not simply to the rectangle in general. (The plus sign appears at the top of the rectangle when you drag the new variable's name across it.)

The Create Summary Group dialog appears. After dragging in Beginning Salary, the Stacked: Set Color rectangle is relabeled Index.

6. **Click OK.**

The area chart shown in Figure 13-8 appears. Employees with at least a bachelor's degree (16 or more years of education) had a higher initial salary and their current salary increased at a much faster rate.
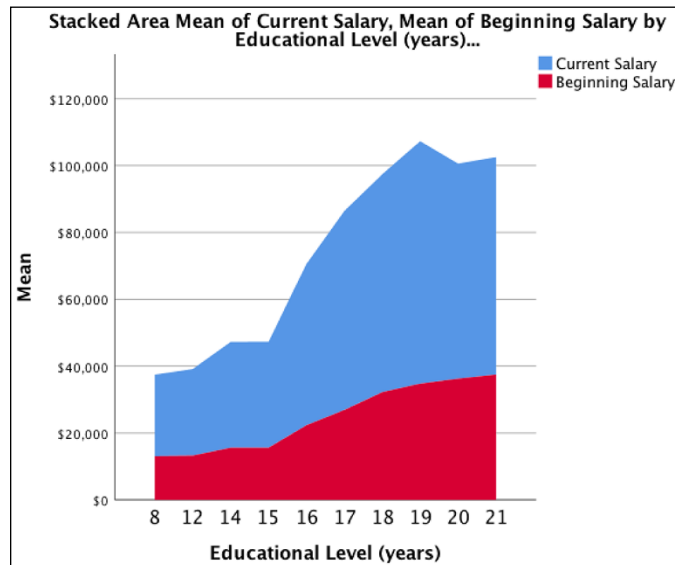

FIGURE 13-8:
A stacked area chart showing one variable added to another in the display.

Fancy Graphs

Fancy graphs are just like they sound: fancy. Whether you're trying to show relationships with lines, bars, dots, or more, you can use Chart Builder to create these graphs to show relationships between more than two variables.

Charts with multiple lines

A *line chart* works well as a visual summary of categorical values. They're useful also for displaying timelines because they demonstrate up and down trends so well. Line graphs are popular because they're easy to read. If they're not *the* most common type of statistical chart, they're a contender for the title.

You can have more than one line appear on a chart by adding more than one variable name to an axis. But the variables must contain a similar range of values so they can be properly represented by the same axis. For example, if one variable ranges from 0 to 1,000 pounds and another variable ranges from 1 to 2 pounds, the values of the second variable will show up as a straight line, regardless of how much the values fluctuate.

The following steps generate a basic multiline graph:

1. **Choose File ⇨ Open ⇨ Data and open the Cars.sav file.**

   Download the file at www.dummies.com/go/spss4e.

2. **Choose Graphs ⇨ Chart Builder.**

3. **In the Choose From list, select Line to specify the general type of graph to be constructed.**

4. **To specify that this graph should contain multiple lines, select the second diagram (with the Multiple Line tooltip) and drag it to the panel at the top.**

5. **In the Variables list, right-click Model Year and select Ordinal. Then select Model Year and drag it to the X-Axis rectangle in the diagram.**

6. **In the Variables list, select Engine Displacement and drag it to the Y-Axis rectangle in the panel at the top where it says Count.**

   The word *Mean* is added to the annotation because the values displayed on this axis will be the mean values of the engine displacement.

7. **In the Variables list, select Country of Origin and drag it to the Set Color rectangle in the panel at the top.**

8. **Click OK.**

   The chart shown in Figure 13-9 appears. The mean engine displacement for European and Japanese cars is similar across the years, whereas the values for American cars are different, especially in earlier years.
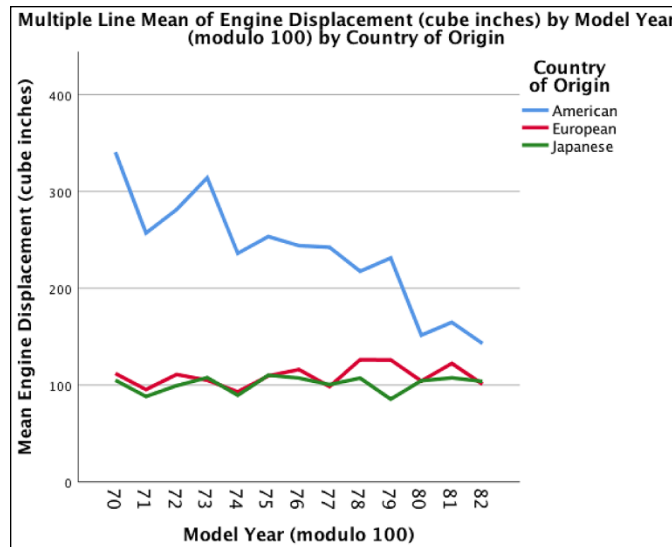
The following steps generate a multiline graph with two variables in the Y–axis:

1. **Choose File ⇨ Open ⇨ Data and open the Cars.sav file.**

   You can download the file at www.dummies.com/go/spss4e.

2. **Choose Graphs ⇨ Chart Builder.**

3. **In the Choose From list, select Line to specify the general type of graph to be constructed.**

4. **To specify that this graph should contain multiple lines, select the second diagram (with the Multiple Line tooltip) and drag it to the panel at the top.**

5. **In the Variables list, right-click Model Year and select Ordinal. Then select Model Year and drag it to the rectangle named X-Axis in the diagram.**

6. **In the Variables list, select Engine Displacement and drag it to the Y-Axis rectangle in the panel at the top where it says Count.**

   The word *Mean* is added to the annotation because the values displayed on this axis will be the mean values of the engine displacement.

7. **In the Variables list, select Horsepower and drag it to the Y-axis rectangle in the panel at the top.**

WARNING

Be careful how you drop Horsepower. To add Horsepower as a new variable, you want to drop it on the little box containing the plus sign, as shown in Figure 13-10. If you drop the new name on top of the one that's already there, the original variable could be replaced.
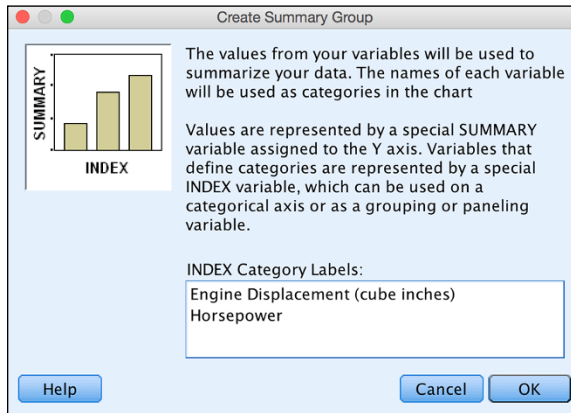
FIGURE 13-10:
Adding another variable to the y-axis.

8. **When the Create Summary Group window appears, telling you that SPSS is combining the two variables along the y-axis, click OK.**

9. **Click OK.**

The chart shown in Figure 13-11 appears.

The variables you choose as members of the y–axis must have a similar range of values to make sense. For example, if you were to choose Vehicle Weight and Engine Displacement to be charted together, the result wouldn't be all that interesting; the Vehicle Weight values would be in the thousands and the Engine displacement, regardless of their variation, would all appear in a single line at the bottom. In Chapter 24, we discuss how to edit these graphs to display information in a better way.

Colored scatterplots

Colored scatterplots can be dramatic in appearance, but clarity is not their strongest point. Because the scatterplot is drawn on a two–dimensional surface, you may find it difficult to envision where each point is supposed to appear in space. On the other hand, if your data distributes appropriately on the display, the resulting chart may demonstrate the concept you're trying to get across.
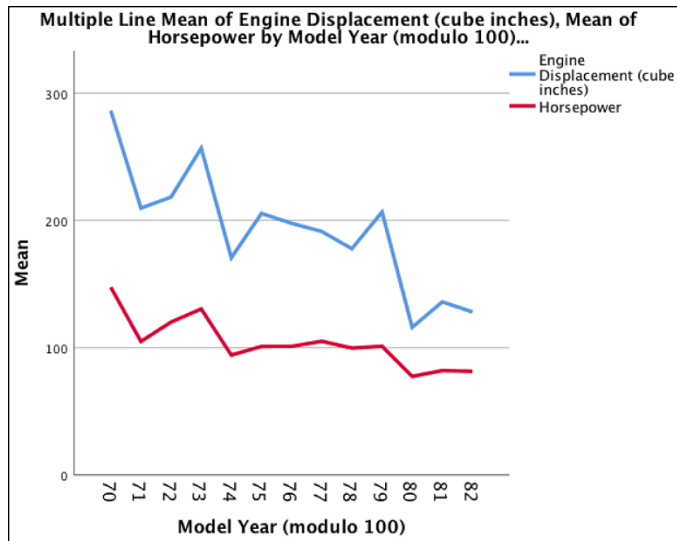
FIGURE 13-11: A line graph with two variables in the y-axis.

The following example uses the same data as in the preceding example but displays it as a three-dimensional plot:

1. **Choose File ⇨ Open ⇨ Data and open the Cars.sav file.**

   Download the file at www.dummies.com/go/spss4e.

2. **Choose Graphs ⇨ Chart Builder.**

3. **In the Choose From list, select Scatter/Dot.**

4. **Select the third scatterplot diagram (with the Grouped Scatter tooltip) and drag it to the panel at the top.**

5. **In the Variables list, do the following:**

   a. *Select Engine Displacement and drag it to the X-Axis rectangle.*

   b. *Select Miles Per Gallon and drag it to the Y-Axis rectangle.*

   c. *Select Country of Origin and drag it to the Set Color rectangle.*

6. **Click OK.**

   The graph shown in Figure 13-12 appears. In general, you can see that there is an inverse relationship between horsepower and miles per gallon: As the horsepower of a car increases, its miles per gallon decreases. Also, note how many of the Japanese and European cars are in the same area of the graph, whereas American cars tend to have much larger engine displacement values, which correspond to fewer miles per gallon.

   We recommend using a bubble chart rather than a 3D scatterplot when displaying three-scale variables because graphs are often not printed in color.
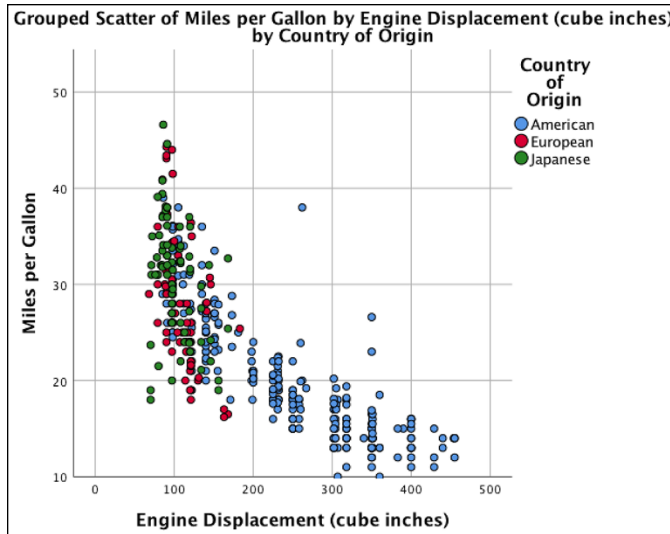
TIP

FIGURE 13-12:
A two-dimensional
colored
scatterplot.

Grouped Scatter of Miles per Gallon by Engine Displacement (cube inches) by Country of Origin

Miles per Gallon

Engine Displacement (cube inches)

Country of Origin
● American
● European
● Japanese

Scatterplot matrices

A *scatterplot matrix* is a group of scatterplots combined into a single graphic image. You choose a number of scale variables and include them as a member of your matrix, and SPSS creates a scatterplot for each possible pair of variables. You can make the matrix as large as you like — its size is controlled by the number of variables you include.

The following steps walk you through the creation of a matrix:

1. **Choose File ⇨ Open ⇨ Data and open the Cars.sav file.**

You can download the file at www.dummies.com/go/spss4e.

2. **Choose Graphs ⇨ Chart Builder.**

3. **In the Choose From list, select Scatter/Dot.**

4. **Select the eighth graph image (with the Scatterplot Matrix tooltip) and drag it to the panel at the top.**

5. **In the Variables list, drag Engine Displacement to the Scattermatrix rectangle in the panel.**

The selected name replaces the label in the rectangle.

6. **Drag the variable names Miles Per Gallon, Horsepower, and Vehicle Weight to the plus sign on the x-axis.**

The labels may or may not change with each variable you add, depending on their length and the amount of space available. All your labels appear in the list at the bottom of the Element Properties dialog.

7. **Click OK.**

The chart in Figure 13-13 appears. Each variable is plotted against each of the others. Note that the scatterplots along the diagonal from the upper left to the lower right are blank —because it's useless to plot a variable against itself.
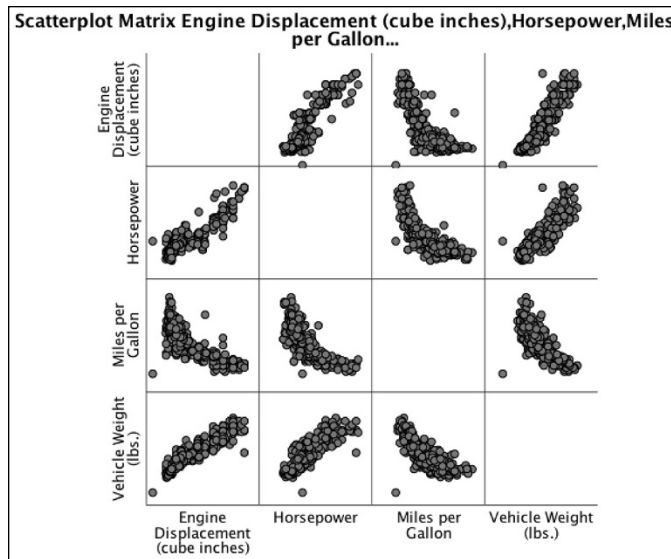
FIGURE 13-13:
A four-by-four matrix of scatterplots.

Stacked bar charts

A *stacked bar chart* is similar to the clustered bar chart in that it displays multiple values of a variable for each value of a categorical variable. But the stacked bar chart does so by stacking them instead of placing them side by side. The following chart displays the same data as the preceding example, but it emphasizes differ-ent aspects of the data.

Follow these steps to create a stacked bar chart:

1. **Choose File ➪ Open ➪ Data and open the Cars.sav file.**

Download the file from this book's companion website at `www.dummies.com/go/spss4e`.

2. **Choose Graphs ➪ Chart Builder.**

3. **In the Choose From list, select Bar.**

4. **Select the third graph image (with the Stacked Bar tooltip) and drag it to the panel at the top of the window.**

5. **In the Variables list, do the following:**

   a. *Right-click Model Year and select Ordinal.*

   b. *Drag Model Year to the X-Axis rectangle.*

   c. *Drag Miles Per Gallon to the Count rectangle.* The rectangle was originally labeled Y-Axis. The label changed to help you understand the type of variable that needs to be placed there.

   d. *Drag Country of Origin to the rectangle in the upper-right corner, the one now labeled Stack Set Color.*

6. **Click OK.**
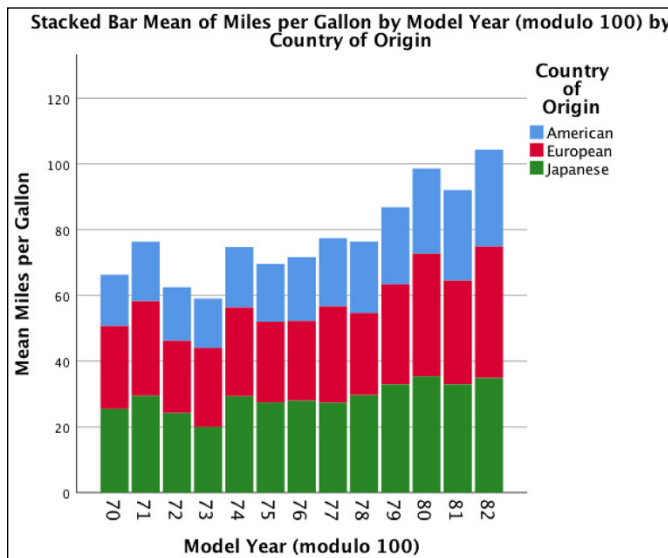
   The graph in Figure 13-14 appears.

Pie charts

Pie charts are the easiest graphs to spot — they're the only chart that shows up as a circle. The purpose of a *pie chart* is simply to show how something (the "whole") is divided into pieces — whether two, ten, or any other number. Each slice in the pie chart represents its percentage of the whole. For example, if a slice takes up 40 percent of the total pie, that slice represents 40 percent of the total number. A pie chart is also called a *polar chart,* so SPSS calls this option Pie/Polar.

In the following steps, you construct a pie chart:

1. **Choose File ➪ Open ➪ Data and open the Bank.sav file.**

Download the file at www.dummies.com/go/spss4e.

2. **Choose Graphs ➪ Chart Builder.**

3. **In the Choose From list, select Pie/Polar.**

4. **Drag the pie diagram to the panel at the top of the window.**

5. **Click the Groups/Point ID tab, and then click the Columns Panel variable.**

A rectangle with Panel should appear in the summary area.

6. **Click the Options tab, and then select Wrap Panels at the bottom.**

7. **In the Variables list, drag Sex of Employee to the Slice By rectangle at the bottom of the panel.**

8. **In the Variables list, drag Employment Category to the Panel rectangle at the top of the panel.**

9. **Click OK.**

The pie chart shown in Figure 13-15 appears, displaying the gender breakdown for each employment category.
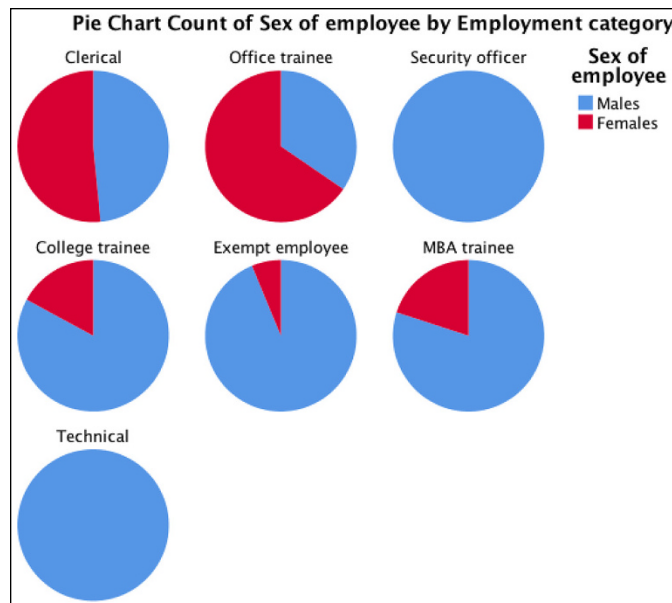

FIGURE 13-15: A pie chart displaying the number of employees in each employment category.

Clustered range bar graphs

The *clustered range bar graph* displays the relationship among five variables. No other chart can be used to so clearly display so many variables. This example demonstrates the relationships among five employee variables: years of employ-ment, income ranges, years with employer, ages, and the years they've lived at their current addresses.

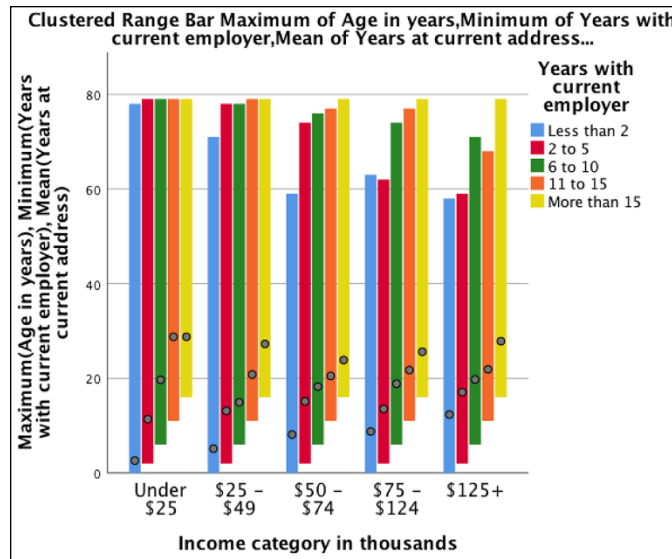Do the following to build a clustered range bar graph:

1. Choose File ⇨ Open ⇨ Data and open the Customer_dbase.sav file.

The file is in the SPSS installation directory.

2. Choose Graphs ⇨ Chart Builder.

3. In the Choose From list, select High-Low.

4. Drag the third graph diagram (with the Clustered Range Bar tooltip) to the panel at the top of the window.

5. In the Variables list, do the following:

  a. *Drag the Years With Current Employer [empcat] variable to the Cluster on X rectangle in the upper-right corner.*

  b. *Drag the Income Category in Thousands [inccat] variable to the X-Axis rectangle at bottom.*

  c. *Drag the Age In Years [age] variable to the High Variable rectangle at the top left.*

  d. *Right-click Years with Current Employer [employ] and make it Scale. Then drag the measure Years with Current Employer [employ] variable to the Low Variable rectangle at the center left.*

  e. *Right-click Years at Current Address [address] and make it Scale. Then drag the Years at Current Address [address] variable to the Close Variable rectangle at the bottom left.*

6. Click OK.

The high-low graph shown in Figure 13-16 appears.

Differenced area graphs

A *differenced area graph* provides a pair of line graphs that emphasize the differ-ence between two variables, filling the area between them with a solid color. The two graphs are plotted against the points of a categorical variable.

FIGURE 13-16:
A clustered range bar graph, displaying relationships among five variables.

The following steps produce a differenced area graph:

1. **Choose File ⇨ Open ⇨ Data and open the property_assess.sav file.**

   The file is in the SPSS installation directory.

2. **Choose Graphs ⇨ Chart Builder.**

3. **In the Choose From list, select High-Low.**

4. **Drag the fourth graph diagram (with the Differenced Area tooltip) to the panel at the top of the window.**

5. **In the Variables list, do the following:**

   a. Drag the Township variable to the X-Axis rectangle.

   b. Drag the Sale Value of House variable to either Y-Axis rectangle.

   c. Drag the Value at Last Appraisal variable to the other Y-Axis rectangle.

   Note that the color of the differenced area of the graph may be blue instead of red, depending on which variable is placed in which Y-Axis rectangle.

6. **Click OK.**

   The differenced area chart shown in Figure 13-17 appears. You can see the difference between the mean values for the sale and appraisal of homes broken down by region. In each region, the sale value was larger than the appraisal value, which is why the differenced area appears in the color associated with the larger value (red).
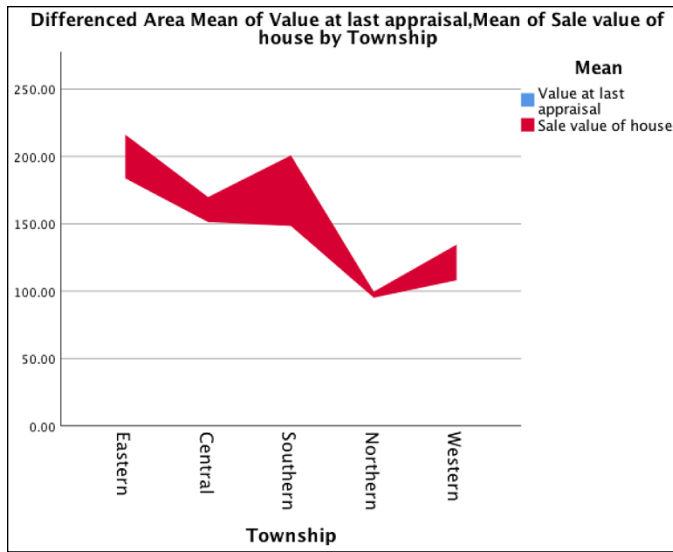
Differenced Area Mean of Value at last appraisal,Mean of Sale value of house by Township

FIGURE 13-17: In a differenced area chart, the filled region emphasizes the difference between two values.

Dual-axis graph

Many types of graphs allow you to plot two or more variables on the same chart, but they must always be plotted against the same scale. In the *dual-axis graph,* two variables are plotted and two different scales are used to plot them. As a result, the values don't require the same ranges (as they do in the other plots). The curves and trends of the two variables can be easily compared, even though they're on different scales.

Two variables with different ranges that vary across the same set of categories can be plotted together, as shown in the following example:

1. **Choose File ⇨ Open ⇨ Data and open the property_assess.sav file.**

   The file is in the SPSS installation directory.

2. **Choose Graphs ⇨ Chart Builder.**

3. **In the Choose From list, select Dual Axes.**

4. **Drag the first diagram (the Dual Y Axes with Categorical X Axis tooltip) to the panel at the top of the window.**

5. **In the Variables list, do the following:**

   a. *Drag the Value at Last Appraisal variable to the Y-Axis rectangle on the left.*

   b. *Drag the Sale Value of House variable to the Y-Axis rectangle on the right, which is now named Count.*

   c. *Drag the Township variable to the X-Axis rectangle.*

6. **Click OK.**
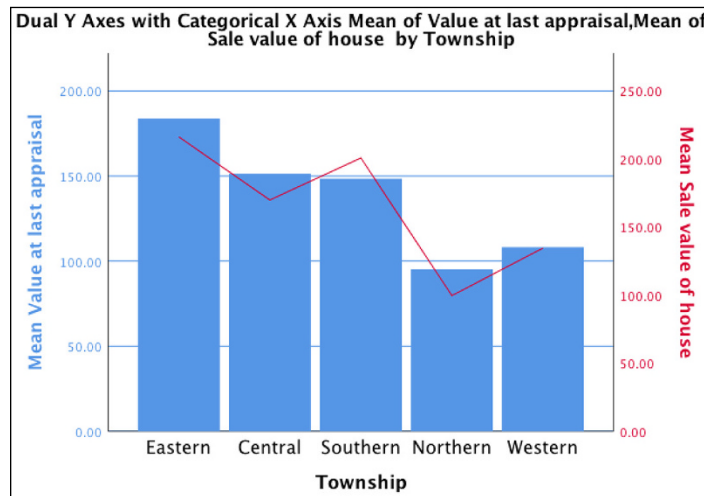
   The dual-axis graph shown in Figure 13-18 appears.

FIGURE 13-18:
A dual-axis graph displaying the curves inscribed by two variables with different ranges.

Fancy Maps Using Graphboard Template Chooser

In this section, we describe fancy maps that you can create only with Graphboard Template Chooser. When data has a geographical component, maps allow you to see patterns in the data that might not be evident in traditional charts, such as clusters or regions with a higher concentration of values.

The three types of maps we describe are the heat map, the choropleth of values map, and the coordinates on a reference map.

Heat map

A *heat map* calculates a summary statistic for a continuous field for the joint distribution of two categorical fields. A heat map is like a table that uses colors instead of numbers to represent cell values. Furthermore, color saturation is used to represent values that correspond to the variables depicted on the map (here, darker values represent higher values). Bright deep red indicates the highest value, and gray indicates a low value. The value of each cell, in this instance, will be the mean of Current Salary by Gender and Employment Category.

The following steps generate a heat map:

1. **Choose File ⇨ Open ⇨ Data and load the Bank.sav file.**

   Download the file from the book's companion website at `www.dummies.com/go/spss4e`.

2. **Choose Graphs ⇨ Graphboard Template Chooser.**

3. **Make sure the Basic tab is selected.**

4. **Using Ctrl-click, select Sex of Employee, Employment Category, and Current Salary.**

5. **Select Heat Map as the graph type.**

6. **Click OK.**

   The heat map shown in Figure 13-19 appears. Employee current salary is broken down by gender and employment category. You can see that males have a higher salary than females across all employment categories. Likewise, differences exist among employment categories. For example, males employees in the technical category have the highest current salary, while female employees in the technical and security categories have the lowest salary (because there are no people with this combination).

Choropleth of values

Maps can be used in a wide variety of settings to help answer many important questions. For example, organizations may want to know the location of certain client characteristics to determine where to send salespeople, where to hire additional employees, where to create new stores, or which marketing campaigns to use.

Investigators can also use maps to determine the spread of disease, fluctuations in temperature, population growth, distance traveled, where to send school buses, or how to create new districts. One of the nice features of maps is that they give meaningful context and can allow you to see patterns in data that might not be evident in traditional charts.
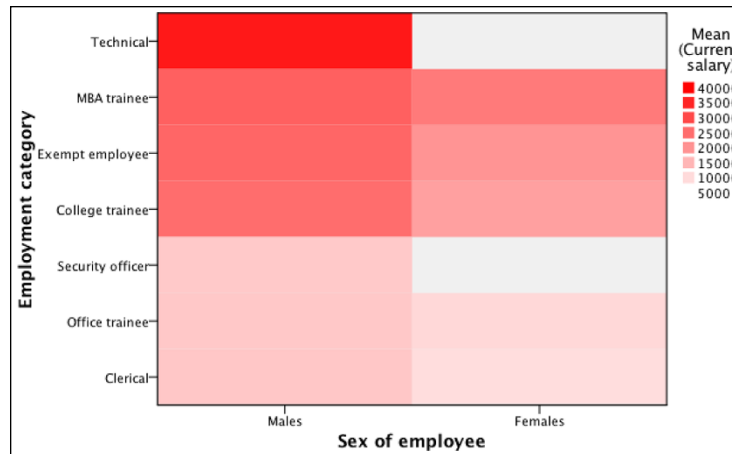
Maps can be created from a single variable or multiple variables. Maps can use categorical variables, continuous variables, and combinations of categorical and continuous variables.

The *choropleth of values map* shows relationships between two categorical variables and the mode for each location is depicted on the map in a different color.

Let's go through some examples on how to create maps:

1. **Choose File ⇨ Open ⇨ Data and load the Worldsales.sav file.**

   Download the file at www.dummies.com/go/spss4e.

2. **Choose Graphs ⇨ Graphboard Template Chooser.**

3. **Make sure the Basic tab is selected. Then select Continent, hold down the Ctrl key, and click Product Variable.**

   When you selected Continent, you could create only one type of map. When you then selected Product Variable, you selected a second categorical variable and can now create six types of maps.

4. **Select Choropleth of Values as the graph type.**

5. **Click the Detailed tab.**

   The Detailed tab is an alternative to the Basic tab where you can specify all required variables, summary statistics, and aesthetics. You select the graph type, specify the type of data, and then specify details that are not available on the Basic tab.

The Detailed tab is optional for most visualizations but is required when you're creating a map. You need to make sure that the right template and data key are selected. For example, if you have data for Africa, the map template must also be for Africa.

6. **Click the Select a Map File button.**

   The Select a Map dialog appears so you can select the appropriate map key and data key.

7. **Click the Map drop-down list and select Continents.**

   The *map key* consists of the values represented on the map template, which is basically the areas represented on the map.

8. **Click the Data Key drop-down list and select Continent.**

   A *data key* is a variable that contains the values in your dataset. It ties the data to the map, so that the data can be displayed on the map correctly. It's important to make sure that the map and data key values match.

9. **Click the Compare button.**

   The screen shown in Figure 13-20 appears. Now you can see which keys in the map key and data key match. Ideally, you want all the values to match. Make sure that all values for the data key match the values on the map. It's okay if your data does not have some of the values on the map key.
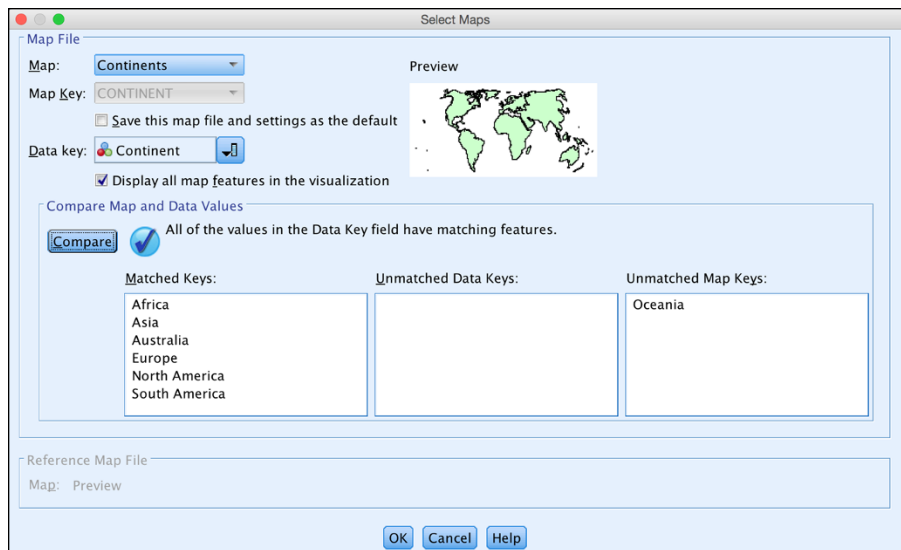
10. **Click OK, and then click OK again.**

FIGURE 13-20: The Select Maps dialog.

REMEMBER

Graphboard Template Chooser comes with several map files, which you can see by clicking the Manage button. The Manage button allows you to import or export map files. However, if you want to create your own map files, you need to use the map conversion utility, which is in the Utility menu.

The choropleth of values map shows relationships between two categorical variables. Note that the mode, or most common value, is depicted on the map in a different color. Figure 13-21 illustrates the relationship between the Continent and Product variables. The map shows that the continents of North America, Europe, and Australia prefer Product B, the biggest seller in South America and Africa is Product A, and Asia prefers Product C.
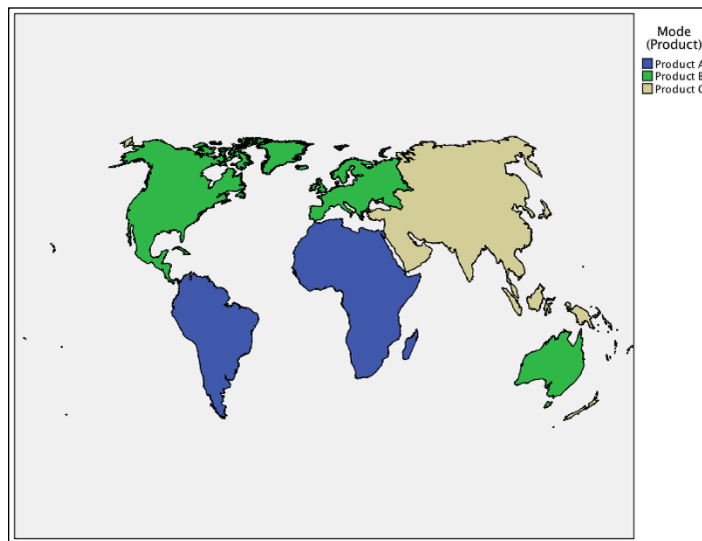

FIGURE 13-21:
A choropleth of values.

Coordinates on a reference map

The *coordinates on a reference map* uses two continuous variables, one representing longitude and one representing latitude. A map is drawn that displays points using longitude and latitude coordinates. This type of map can be used, for example, to show the location of different crimes, customers, or the spread of disease.

Follow these steps to create a coordinates on a reference map:

1. **Choose File ▷ Open ▷ Data and load the Coordinates.sav file.**

Download the file at www.dummies.com/go/spss4e.

2. **Choose Graphs ▷ Graphboard Template Chooser.**

3. **Make sure the Basic tab is selected, and then select Longitude.**

4. **Hold the Ctrl key down and click the Latitude variable.**

5. **Select Coordinates on a Reference Map as the graph type.**

6. **Click the Detailed tab, and then click the Select a Map File button.**

7. **Click the Map drop-down list and select Continents.**

8. **Click OK, and then click OK again.**

   On the reference map that appears, as shown in Figure 13-22, you can see that most customers are located in the eastern United States and western Europe.
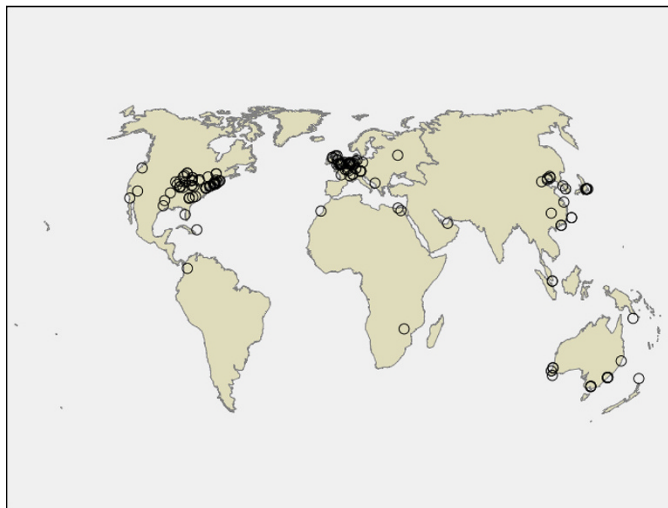

FIGURE 13-22:
Coordinates on a reference map.

REMEMBER We have presented just a few of the many graphs that you can create in SPSS. Play around with different options to see what you can come up with. After all, a good graph can easily help you convey a great deal of important information to your audience.