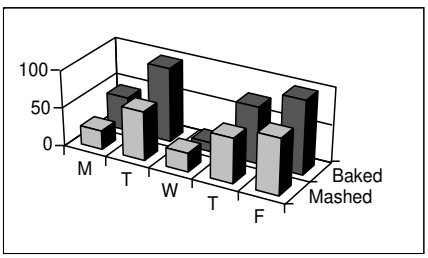
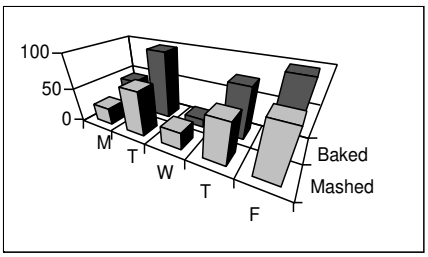
from which the floor of the chart appears to be viewed). The figure below compares the same chart with two different perspective settings.



Perspective set to 10



Perspective set to 80

The bars shown in 80-degree perspective appear to be seen through a wide-angle lens — the tops of the bars appear close and the bases of the bars further away. With the 10-degree (default) perspective, the bars seem three-dimensional but don't have the dramatic height of the other example.

To change the perspective, select the chart and choose *View Options* from the Chart Inspector's pop-up list. Enter a value from 0 to 90 into the *Perspective* text field, and click *Set* to see the resulting chart.

Add/Remove Chart Text

Choose *Add Chart Text* to place a chart text box into your chart. To enter text, begin typing directly into the box. Text can be edited normally. Chart text can be moved anywhere within a chart, and can be resized. To remove the text, select the chart text box and choose *Remove Chart Text*.

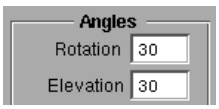
For more information on working with chart text, refer to the "Adding Chart Text" section on page 159 in Chapter 11.

To limit rotation to one direction, hold down the Shift key as you drag. The movement is limited to whichever direction you move first (either left/right or up/down).

You can also rotate using the arrow keys. With the rotator handles showing, press an arrow key to rotate the chart one degree in any direction.

Finally, you can control the rotation of the chart by entering a numeric setting for either the rotation or the elevation. The initial settings are for 30 degrees rotation and 30 degrees elevation.

To change the setting, select the chart and choose *View Options* from the Chart Inspector's pop-up list. Enter a value into the *Rotation* or *Elevation* text fields, and click *Set* to see the results.



Rotation settings can range from 0 to 359 degrees, to correspond to the ability to turn the chart all the way around with the handles. Settings at 90-degree angles (0, 90, 180, 270) place the bars, areas, wireframe, or lines directly behind each other. (A different side of the floor appears in front with each 90-degree change.) This can make bars difficult to distinguish. For the most readable charts, use settings from 30 to 70 (or from 120 to 160, 210 to 250, or 300 to 340).

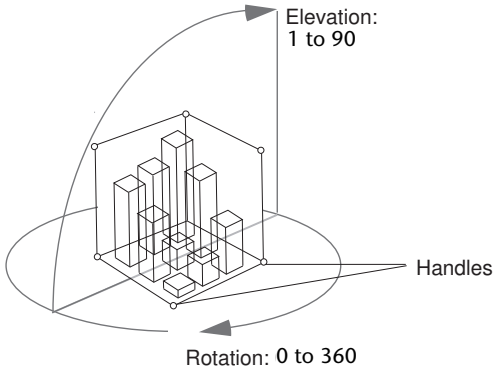
Elevation settings can range from 0 (viewing from ground level) to 90 degrees (viewing from directly above). Settings between 20 and 50 make charts easiest to read.

Use the numeric settings instead of the rotator handles when you want to show more than one chart from the same angle.

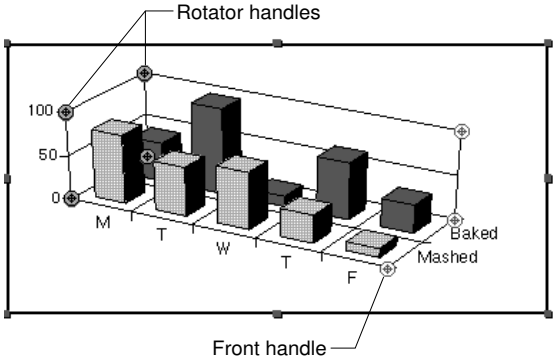
Giving the Illusion of Distance

To make the bars, areas, wireframe, or lines in a 3D chart look more like three-dimensional objects, you can increase the *perspective* (the distance

level or from directly above. This is also known as changing the chart's *elevation*.

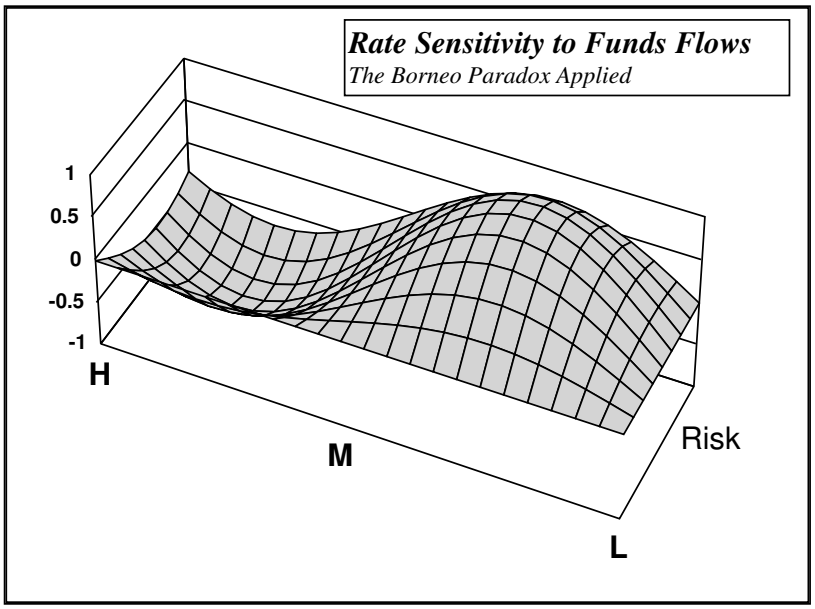


To rotate a chart, first click anywhere in the chart to select it. Then click within one of the three walls that extend from the axes, and drag one of the rotator handles that appear.



Drag left to rotate the chart clockwise, or right to rotate counterclockwise. To rotate the chart up around the vertical axis (to increase its elevation), drag up; to rotate down (or decrease elevation), drag down.

When you release the mouse button, the chart is redrawn in the new position. If you rotate the chart far enough, the axis labels will switch to the opposite side so that they always appear in the front of the chart. All handles work the same except the front handle, which rotates in the opposite direction.



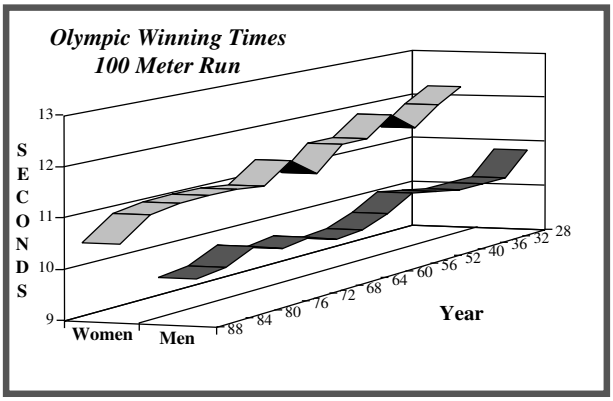
3D surface chart

You can display a 3D surface chart from different angles. See the "Rotating 3D Charts" section below for more information. You can also increase the chart's perspective, as described in the "Giving the Illusion of Distance" section on page 242.

Rotating 3D Charts

You can turn any 3D chart to view it from a different angle. You can also rotate a chart up and down so that you appear to view it from ground

Like two-dimensional line charts, 3D line charts emphasize general trends in data and compare trends between data sets.



3D line chart

In 3D line charts, the minimum size for a selection is 1 cell by 2 cells. To make effective use of the third dimension, however, your selection should be at least 2 cells by 2 cells.

You can turn a 3D line chart to see it from different angles. For more information, refer to the "Rotating 3D Charts" section on page 240. You can also increase its perspective as described in the "Giving the Illusion of Distance" section on page 242. Finally, to vary the thickness of the lines, see the "Setting 3D Bar, Area, and Line Thickness" section on page 165.

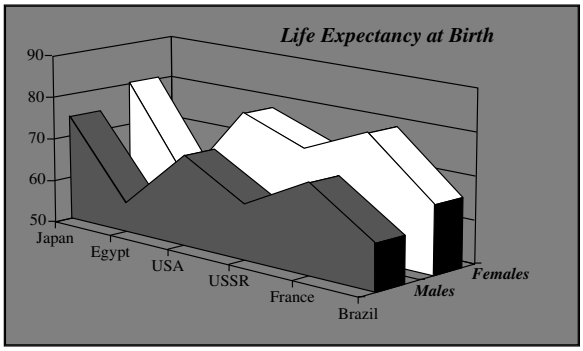
3D Surface Charts

To create a 3D surface chart, select the data you want to chart and choose *3D Surface* or click the button on the icon bar.

3D surface charts are similar to 3D wireframe charts. They show data as a surface of interconnected lines and datapoints. Like 3D wireframe charts, 3D surface charts float in the chart space, and emphasize the minimum and maximum limits of the data.

In 3D surface charts, the minimum size for a selection is 2 cells by 2 cells.

Like line charts, 3D area charts emphasize general trends in the data plotted against the x-axis. But like 3D bar charts, they invite comparisons between the areas displayed along the z-axis.



3D area chart

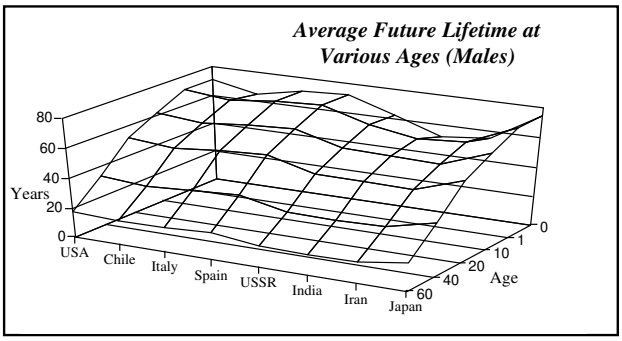
In 3D area charts, the minimum size for a selection is 1 cell by 2 cells. To make effective use of the third dimension, however, your selection should be at least 2 cells by 2 cells.

You can display a 3D area chart from different angles. See the "Rotating 3D Charts" section on page 240 for more information. You can also increase the chart's perspective, as described in the "Giving the Illusion of Distance" section on page 242. Finally, to find out how to vary the thickness of the areas, see the "Setting 3D Bar, Area, and Line Thickness" section on page 165.

3D Line Charts

To create a 3D line chart, select the data you want to chart and choose *3D Line* or click the button on the icon bar.

A 3D line chart is similar to a two-dimensional line chart. Lines corresponding to second and subsequent data sets are displayed behind the first line.



3D wireframe chart

In 3D wireframe charts, the minimum size for a selection is 2 cells by 2 cells.

Note *Because the 3D wireframe is a single object in the chart frame, no legend is necessary to distinguish its parts.*

You can display a 3D wireframe chart from different angles. See the "Rotating 3D Charts" section on page 240 for more information. You can also increase the chart's perspective, as described in the "Giving the Illusion of Distance" section on page 242.

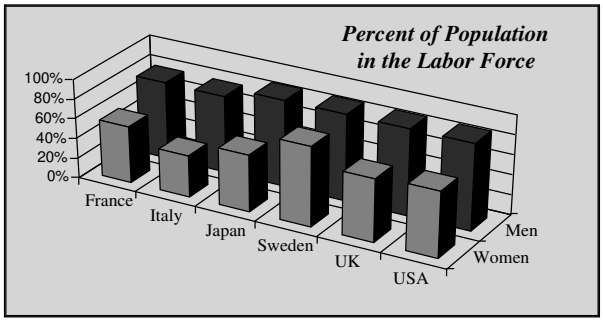
Note *Applying a shade to the wireframe helps distinguish it from the walls and floor of the chart frame.*

3D Area Charts

To create a 3D area chart, select the data you want to chart and choose *3D Area* or click the button on the icon bar.

3D area charts are similar to two-dimensional area charts except that the areas are not stacked. Instead, the z-axis distinguishes the areas corresponding to the second and subsequent data sets.

A 3D bar chart compares individual values in the same way as a standard bar chart. However, the addition of a third axis (the *z-axis*) means second and subsequent sets of bars appear to be behind the first set of bars.



3D Bar Chart

Like standard bar charts, 3D bar charts emphasize differences in data because the bars appear next to each other.

For a 3D bar chart, the minimum size for a selection is 1 cell. To make effective use of the third dimension, however, your selection should be at least 2 cells by 2 cells.

Note *If you plot several sets of data, your 3D bar chart can be confusing because the values appear very close together. When this happens, increase the size of the chart, or try plotting the same data in a stacked bar chart instead.*

3D Wireframe Charts

To create a 3D wireframe chart, select the data you want to chart and choose *3D Wireframe* or click the button on the icon bar.

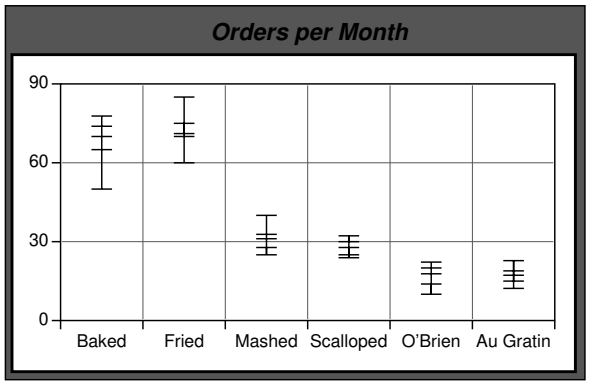
3D wireframe charts show data as a framework of lines connecting the datapoints inside the chart frame. Because 3D wireframe charts seem to float in the chart space, they emphasize the minimum and maximum limits of the data.

You can also use the *Labels Are* settings in the *Common* subpanel of the Chart Inspector to control whether high, low, open, and close values should be placed in rows or columns. For more information, refer to the "Labeling the X-Axis" section on page 150 in Chapter 11.

Note *If your data isn't placed according to the layout described above (for example, if you reverse the high and low values), flags may appear where you don't expect them.*

Your selection for a high-low chart must be at least 2 cells by 2 cells. For a high-low-close chart, it must be at least 2 cells by 3 cells, and for a high-low-open-close chart, it must be at least 2 cells by 4 cells.

The hash mark form uses uniform symbols for high, low, open, and close points. Use this form when you want ParaSheet to figure the high and low points and you don't need separate symbols to distinguish the remaining points from each other.



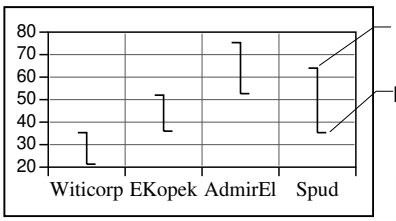
You can change the shade and width of the hash marks or stock market symbols. For more information, refer to the "Controlling Shading and Width" section on page 161 in Chapter 11.

Note *In a high-low chart, no values are plotted for empty cells or text cells included in your data selection.*

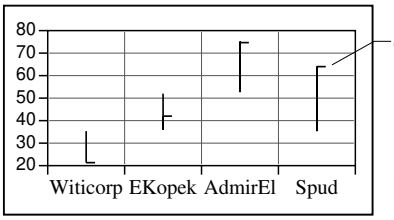
3D Bar Charts

To create a 3D bar chart, select the data you want to chart and choose *3D Bar* or click the button on the icon bar.

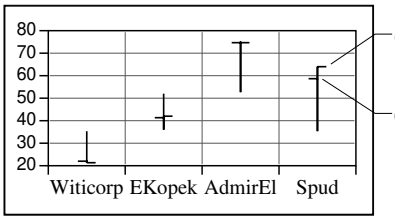
high-low-open-close chart. If you select more than four sets of data, the chart is plotted in hash mark form, described later in this section.



High-low chart



High-low-close chart



High-low-open-close chart

In stock market form, you assign values to each category in the order in which the data appears in your selection. The first row or column becomes the high values, the second row or column becomes the low values, the third becomes the close values. If you select four or more sets of data, the third row or column switches to become the open values, and the close values are reassigned to the fourth.

For example, if you're plotting more rows than columns, the high, low, open, and close values should be placed in columns as shown below:

	A	B	C	D
1	21.125	17.75	17.75	20.5
2	5.625	4	5	5.25
3	7.5	5.25	5.5	7.5
4	52	48.875	49.5	50.25
5	12.75	10	10.625	11.125

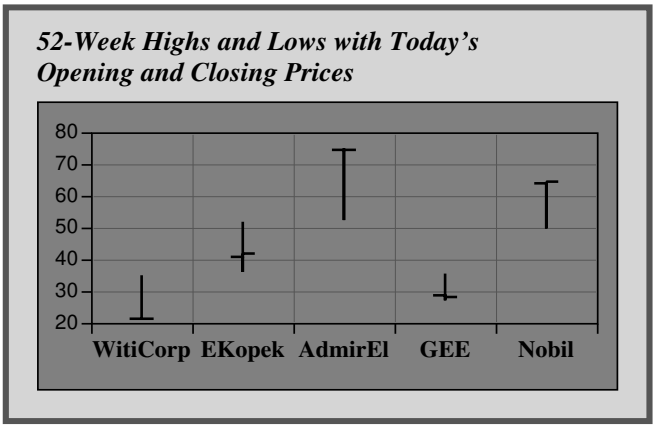
High Low Open Close

High-Low Charts

To create a high-low chart, select the data you want to chart and choose *High-Low* or click the button on the icon bar.

Like line and area charts, high-low charts also track changes in data over specific time periods. High-low charts show the high and low points connected by a vertical line. Intermediate values appear as small bars along this line.

You may be familiar with a high-low chart in its stock market form. The standard stock market high-low-open-close chart displays four pieces of information for a stock: its high and low prices for a day and its opening and closing prices.



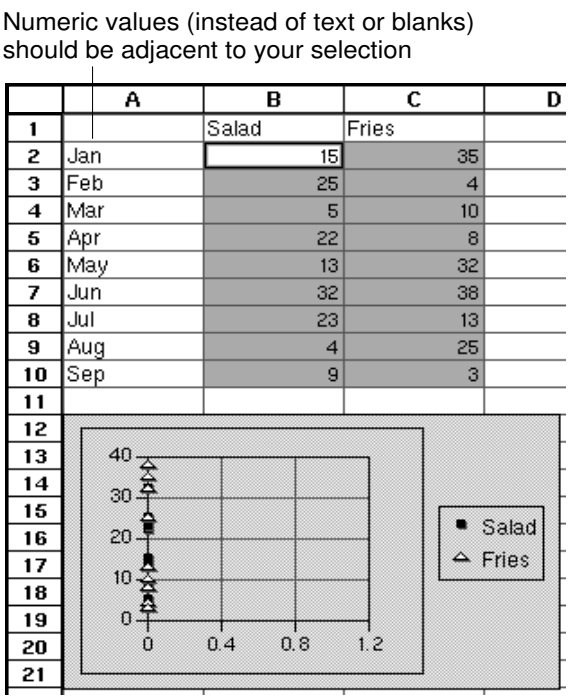
High-low-open-close chart

You can also use a high-low chart to plot events during a specific time frame, such as the number of telephone calls received during each hour of the working day.

High-low charts display values in either a stock market or hash mark form. You choose the form you want by choosing *View Options* from the Chart Inspector's pop-up list. Click either *Stock Market* or *Hash Marks*.

The stock market form is the way ParaSheet initially draws the chart. In this form, selecting two sets of data results in a high-low chart. Selecting three sets of data results in a high-low-close chart. Four selections create a

If there are no values in the adjacent cells, ParaSheet assumes they are zero, so your graph will look something like this:

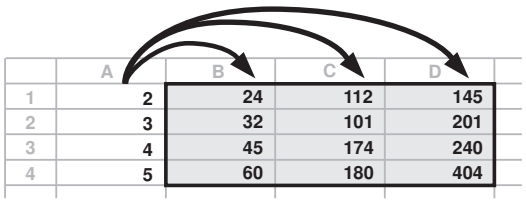


In a standard scatter chart, ParaSheet calculates tick marks for both the x-axis and y-axis. However, you can override the automatic tick calculation for one or *both* axes. For more information on automatic tick calculation, refer to the "Modifying a Chart's Axes" section on page 150 in Chapter 11.

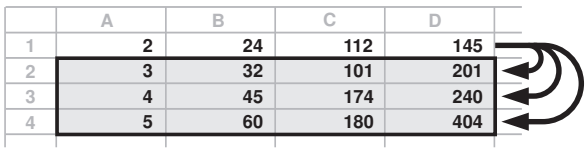
As in line charts, you can choose to show both the points and the lines connecting them, the points alone, or simply the lines in a scatter chart. To change the display, select the chart and choose *View Option*s from the Chart Inspector's pop-up list. When the chart is first drawn, only *Points* is checked. Deselect any option you do not want to show.

If you use two or more sets of data, each set has a unique symbol on the chart.

columns than rows, the first set of variables is immediately *above* your selection.



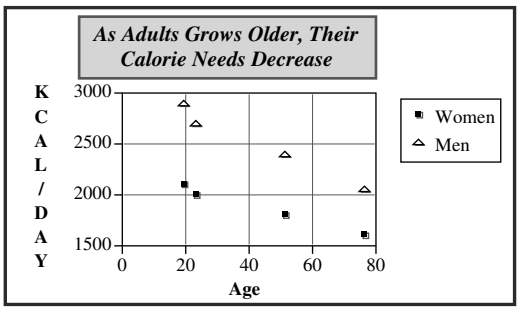
More rows than columns in selection. Points plotted are: (2,24), (2,112), and so on.



More columns than rows in selection. Points plotted are: (145,201), (145,240), and so on.

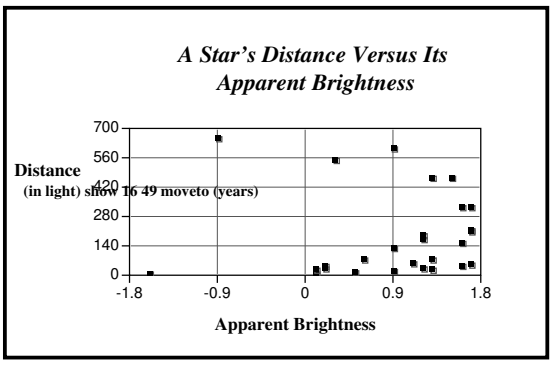
You can also use the *Labels Are* settings in the *Common* subpanel of the Chart Inspector to control whether variables are taken from the left of or above the selection. For more information, refer to the “Labeling the X-Axis” section on page 150 in Chapter 11.

The figure below shows a scatter chart of related data. As one value rises in this example, the other decreases.



Scatter chart of related data

If the data were not related, the points would be plotted in the graph in a seemingly random pattern, as in the figure below.



Scatter chart of unrelated data

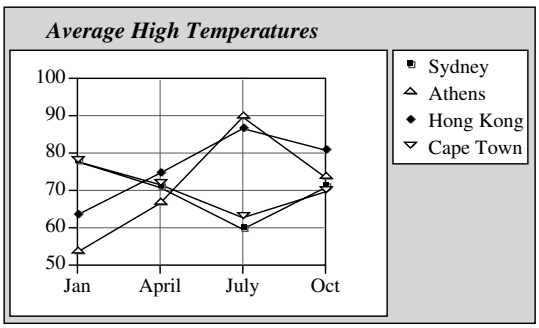
In scatter charts, the minimum size for a selection is 1 cell by 2 cells. Each point in a scatter chart represents the intersection of two variables. The first set of variables is in the column or row *adjacent* to your selection.

If your selection has more rows than columns, the first set of variables is immediately to the *left* of your selection. If your selection has more

In line charts, the minimum size for a selection is 1 cell by 2 cells.

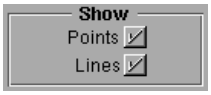
Each value in a line chart appears as a point. These points are connected by a line. When you're plotting multiple sets of data, ParaSheet represents the points in each line with a unique symbol.

The line chart below tracks four sets of data.



Line chart

You can choose to show the points only or the lines only. To change the display, select the chart and choose *View Options* from the Chart Inspector's pop-up list. Both *Points* and *Lines* are checked initially.

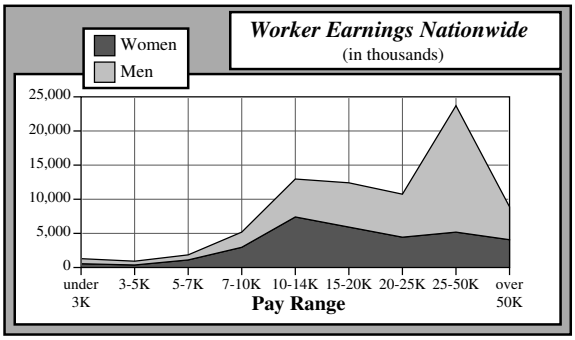


Deselect the option you don't want to show.

Scatter Charts

To create a scatter chart, select the data you want to chart and choose *Scatter*, or click the button on the icon bar.

Scatter charts are useful for looking at the relationship between two sets of numbers. Just as in a spreadsheet, where a cell's location is the cross section of its column letter and row number, each point on a scatter chart is plotted where the two numeric values intersect from the x-axis and y-axis scales.



Area chart

In area charts, the minimum size for a selection is 1 cell by 2 cells.

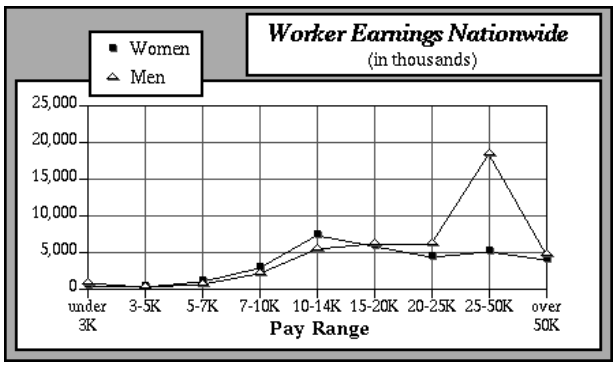
Note *ParaSheet treats negative values as zero in area charts.*

Line Charts

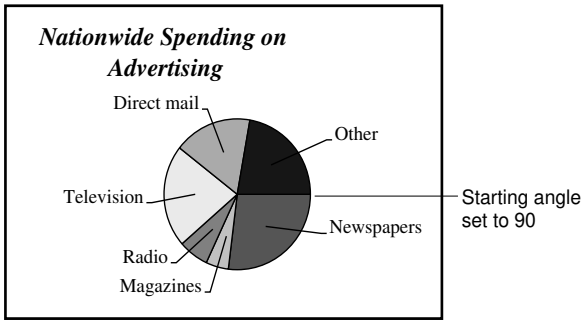
To create a line chart, select the data you want to chart, and choose *Line* or click the button on the icon bar.

Line charts of a single data set show values connected by lines, so they emphasize a general trend in data. A bar chart of similar data would invite comparisons of individual data values.

When you include more than one data set in a line chart, you compare each trend with the others. A line chart is not just an unfilled area chart; the data sets are not stacked. The line chart below shows the same data as the area chart on page 227.



Line chart



Pie chart with adjusted starting angle.

Area Charts

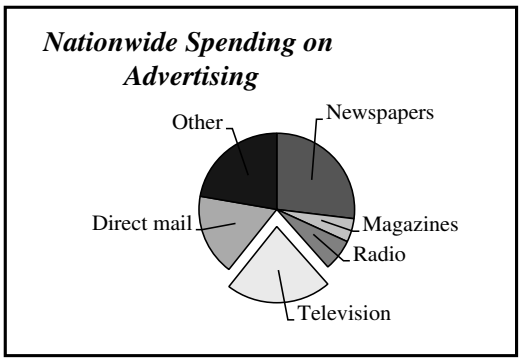
To create an area chart, select the data you want to chart and choose *Area*, or click the button on the icon bar.

In an area chart, each set of data is represented by a line tracking the data points in the set. The values from each set of data are stacked upon the previous set. The area between the lines is filled with a shade.

Like line charts, area charts emphasize general trends in data (rather than emphasizing differences, like a bar chart). But unlike line charts, the stacking of values emphasizes totals rather than individual values. Compare the area chart below with the line chart on page 228, which plots the same data. The area chart shows men's and women's earnings stacked, while the line chart shows them overlapping against the same scale.

An area chart has an added feature similar to that of pie charts: the viewer can sense at a glance the proportion of each shaded area as a part of the whole.

piece moves out from the pie center and ParaSheet automatically resizes the chart.



Pie chart with wedge *exploded*.

Putting the pieces together again is simple. Just drag the exploded piece toward the center of the pie.

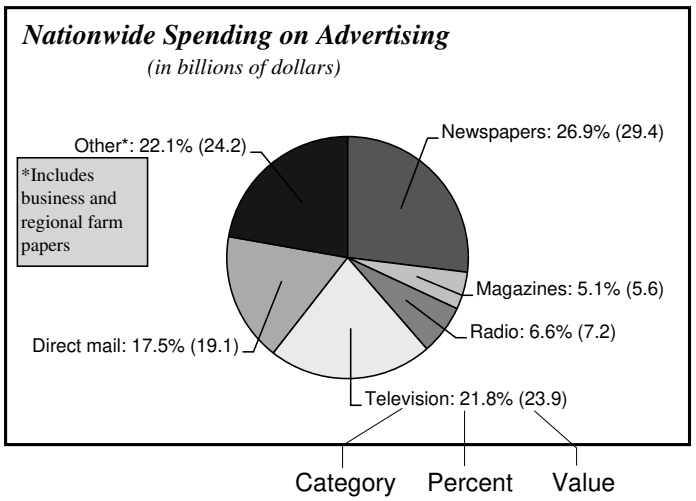
Setting the Starting Angle

When ParaSheet draws a pie chart, the first value in the plotted selection range is represented by the wedge that begins at 0 degrees (the twelve o'clock position). Succeeding values are plotted in wedges moving clockwise.

You can place this first value in any position in the pie by changing the starting angle. To reposition the first wedge, select the chart and choose *View Options* from the Chart Inspector's pop-up list. Enter as the new *Starting Angle* an integer from 0 to 360.

ParaSheet redraws the pie chart using this value to position the wedge that represents the first plotted value.

show any combination of these and the percentages together. You can also display the pie chart with no labels at all.



Pie chart with labels.

To change the pie chart labels, select the chart and choose *Marking* from the Chart Inspector's pop-up list. Check *Percentages*, *Values*, *Categories* (the spreadsheet labels), or a combination of these to display new labels.

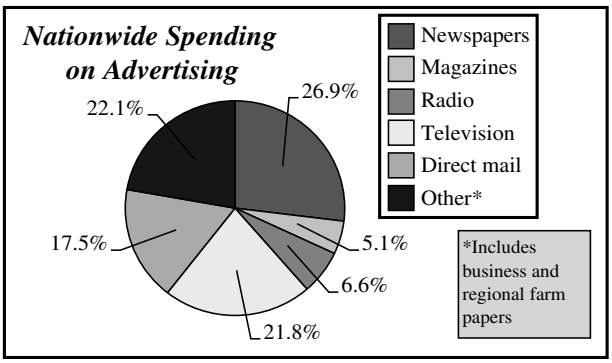
For more information on working with the Inspector, refer to the "Using the Chart Inspector" section on page 146 in Chapter 11.

Note *If chart space is at a premium, you can eliminate the legend and place its text next to each pie wedge instead. Check Categories in the Marking subpanel of the Inspector and deselect "Show Chart Legend" in the Common subpanel.*

Exploding a Pie Chart

When you want to emphasize important elements of data in a pie chart, you can *explode*, or isolate, specific pieces of the pie. To explode a pie chart wedge, click to select it and then drag it away from the chart. The

In contrast to other types of charts, pie charts don't have axes. They only plot a single set of data, while most charts compare sets of data. Pie charts are effective in showing single values as a percentage of a whole.



Pie chart

Note *Negative values are treated as zero in a pie chart, and therefore aren't plotted.*

Only the first selected row or column appears in a pie chart, even if your selection contains more than one row or column. If your selection contains more rows than columns, one column is plotted. If it contains more columns than rows, one row is plotted.

You can control whether a row or column is plotted, through the *Labels Are* settings in the *Common* subpanel of the Chart Inspector. For more information, refer to the "Labeling the X-Axis" section on page 150 in Chapter 11.

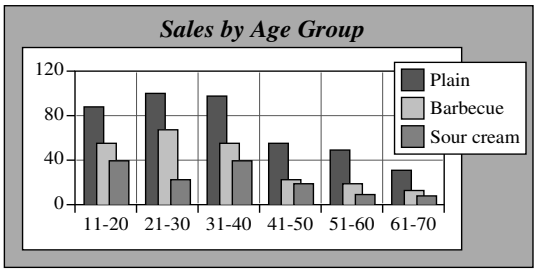
Shortcut *If the pie chart has many divisions, the percentage labels may overlap slightly, making them difficult to read. To correct this, make the chart larger, drag the labels to new locations, or combine some of the data into broader categories.*

Labeling Pie Chart Wedges

You don't have to display pie chart totals as percentages. Instead, you can show the numeric values of each piece, display the spreadsheet labels, or

Overlapping Bars

You can make bars overlap, which provides more space to display multiple sets of data.



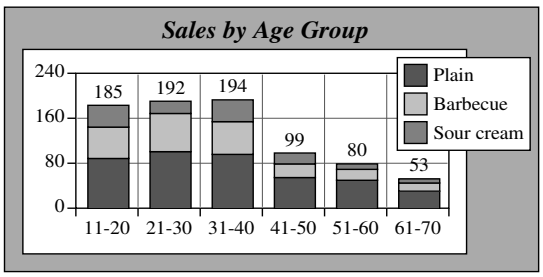
Bar chart with overlapping bars.

Select the chart and choose *View Options* from the Chart Inspector's pop-up list. Check *Overlapping Bars*.

For more information on working with the Chart Inspector, refer to the "Using the Chart Inspector" section on page 146 in Chapter 11.

Displaying Bar Values

To display totals for each set of data, select the chart and choose *View Options* from the Chart Inspector's pop-up list. Check *Show Bar Values*.

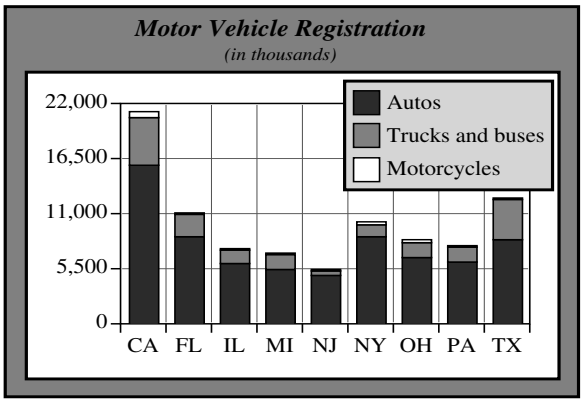


Stacked Bar chart displaying bar values.

Pie Charts

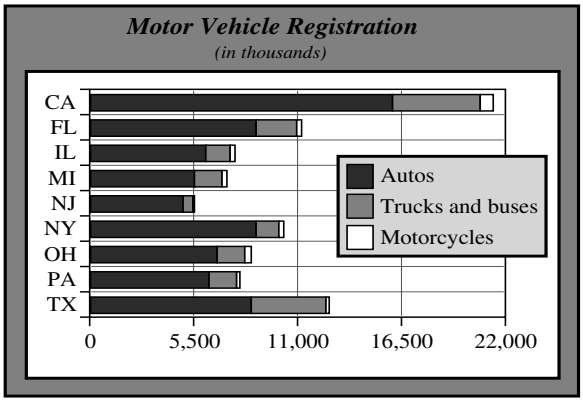
To create a pie chart, select the data you want to chart, and choose *Pie* or click the button on the icon bar.

When ParaSheet draws a vertical bar chart, the bars extend vertically from the x-axis.



Stacked Bar chart

Horizontal bar charts display your data so that the x-axis is vertical and the bars extend horizontally.



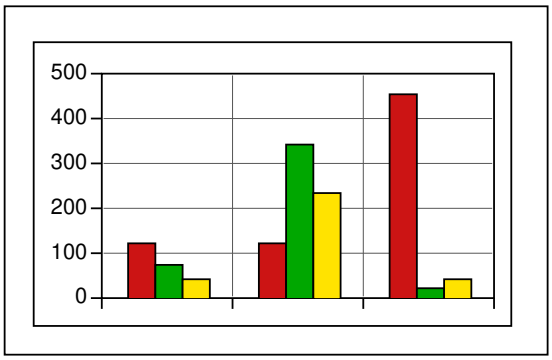
Horizontal Stacked Bar chart

Note *If your x-axis labels are too long to fit, use a horizontal bar chart instead.*

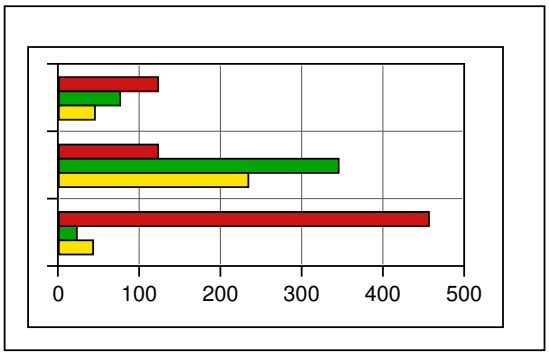
For an effective bar chart, the minimum size for a selection is 1 cell by 2 cells. For an effective stacked bar chart, the minimum size for a selection is 2 cells by 2 cells.

Note *ParaSheet treats negative values as zero in vertical or horizontal stacked bar charts. In non-stacking bar charts, negative values are plotted as bars extending below the zero point on the y-axis.*

Bar charts are useful for comparing individual values. They emphasize differences in data because the bars appear side-by-side.



Bar chart

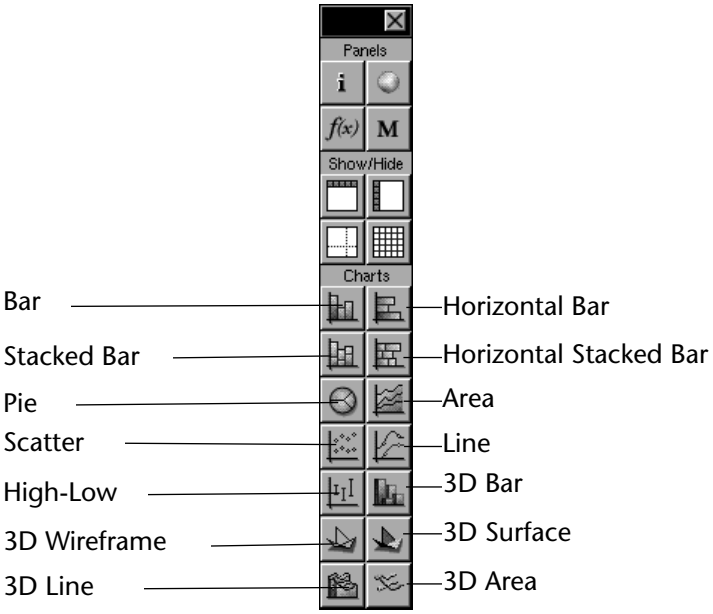


Horizontal Bar chart

Stacked bar charts compare cumulative totals while still keeping track of individual elements. Because the values are added into the stacks, the emphasis is on comparing the totals, not the individual values.

Shortcut

You can also chart selected data by clicking a chart icon on the icon bar.



Bar Charts

To create a bar chart, select the data you want to chart and choose one of the bar chart commands. ParaSheet offers four types of bar charts:

- Bar (each value has an individual bar)
- Horizontal bar
- Stacked bar (the values for each group are stacked into one bar)
- Horizontal stacked bar

Chapter 19

Charts

The Charts menu contains commands to create 14 different chart types, as well as commands for adding and removing chart text. This chapter describes each chart type in detail.

About Charts

A *chart* is a graph plotted with data you have selected in your spreadsheet. ParaSheet draws 14 types of charts: bar, horizontal bar, stacked bar, horizontal stacked bar, pie, area, scatter, line, high-low, 3D bar, 3D wireframe, 3D area, 3D line and 3D surface.

Use charts to illustrate your data to maximum clarity and impact. Every ParaSheet chart is customizable, from resizing and positioning to adding color and labels.

Once selecting your data, a chart is created by clicking a chart command from the Charts menu.

The following sections describe the way each type of chart looks when you create it, and suggest uses for each one.

For more information about how to choose the data you want to chart, as well as how to select and modify a chart through the Chart Inspector, read through Chapter 11, “Charting Your Data.”