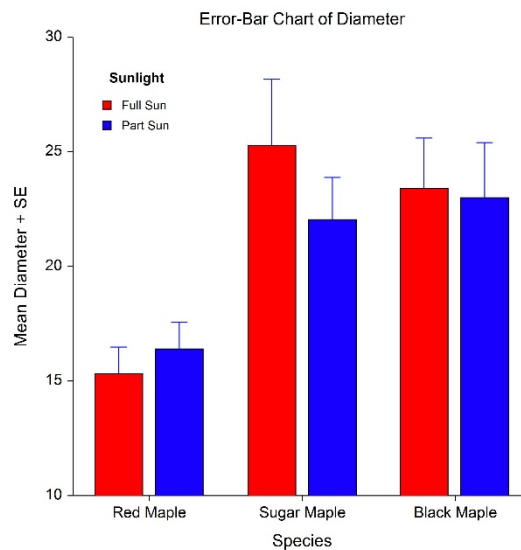
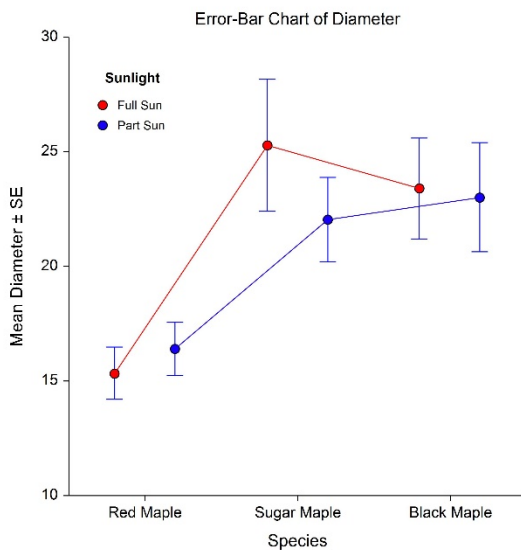
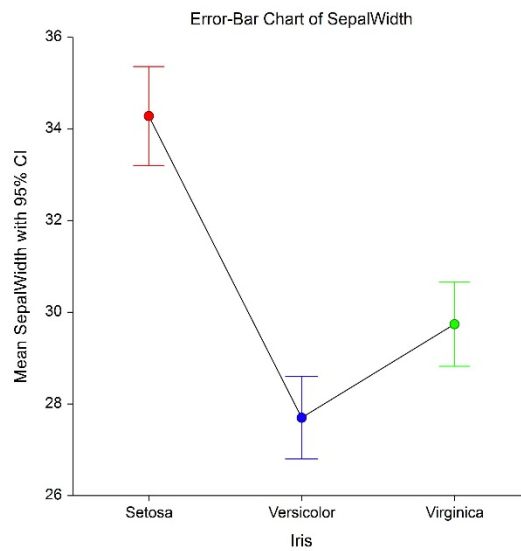
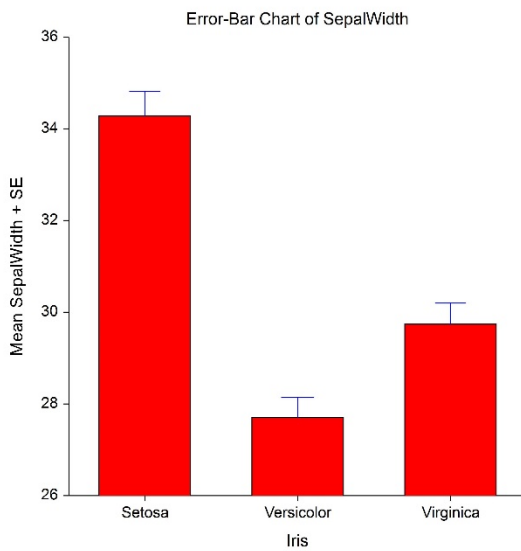


Chapter 155

Error-Bar Charts

Introduction

Error-Bar Charts graphically display tables of means (or medians) and variability. Following are examples of the types of charts produced by this procedure. The error bars may represent the standard deviation (SD) of the data, the standard error of the mean (SE), a confidence interval, the data range, or percentiles.



Data Structure

An error-bar chart is constructed from a numeric variable. A second variable may be used to divide the first variable into groups (e.g., age group or gender). In the two-factor procedure, a third variable may be used to divide the groups into subgroups.

Procedure Options

This section describes the options available in this procedure.

Variables Tab

This panel specifies which columns are used to create the error-bar chart.

Variables – Simple Error-Bar Charts

Data Variable(s)

This option lets you designate which variables are plotted. If more than one Data Variable is designated and no Horizontal (Group) Variable is selected, a set of error-bar charts will be displayed on a single chart, one error-bar plot for each variable. If more than one variable is designated and a Horizontal (Group) Variable is selected, a separate error-bar chart will be drawn for each variable.

Horizontal (Group) Variable

Designates an optional variable used to separate the observations into groups. The groups defined by this variable will all appear on the same plot.

Frequency Variable

Specify an optional frequency (count) variable. This variable contains integers that represent the number of observations (frequency) associated with each observation. If left blank, each observation has a frequency of one.

Break Variables

Select optional break (categorical) variables. A separate plot will be generated for each unique value of this variable. If you specify more than one break variable, a separate plot will be generated for each unique combination of the values of the variables specified.

Variables – Two-Factor Error-Bar Charts

Data Variable(s)

This option lets you designate which variables are plotted. If more than one Data Variable is designated and no Legend (Subgroup) Variable is selected, the variables will become the legend (subgroup) levels. If more than one variable is designated and a Legend (Subgroup) Variable is selected, a separate plot will be drawn for each variable.

Horizontal (Group) Variable

Designates an optional variable used to separate the observations into groups. An individual error-bar will be displayed for each unique combination of this variable with the Legend (Subgroup) Variable.

Legend (Subgroup) Variable

Designates an optional variable used to separate the observations into subgroups. An individual error-bar will be displayed for each combination of this variable with the Horizontal (Group) Variable. The levels of this variable will be shown in the legend.

Error-Bar Charts

Frequency Variable

Specify an optional frequency (count) variable. This variable contains integers that represent the number of observations (frequency) associated with each observation. If left blank, each observation has a frequency of one.

Break Variables

Select optional break (categorical) variables. A separate plot will be generated for each unique value of this variable. If you specify more than one break variable, a separate plot will be generated for each unique combination of the values of the variables specified.

Format Options

Variable Names

This option specifies whether the column names or column labels are used on the chart.

Value Labels

This option specifies whether the actual values or the value labels are used to label the group level labels of the plot.

Error-Bar Chart Format

Format

Click the format button to change the plot settings (see Error-Bar Chart Window Options below).

Edit During Run

Checking this option will cause the plot format window to appear when the procedure is run. This allows you to modify the format of the graph with the actual data.

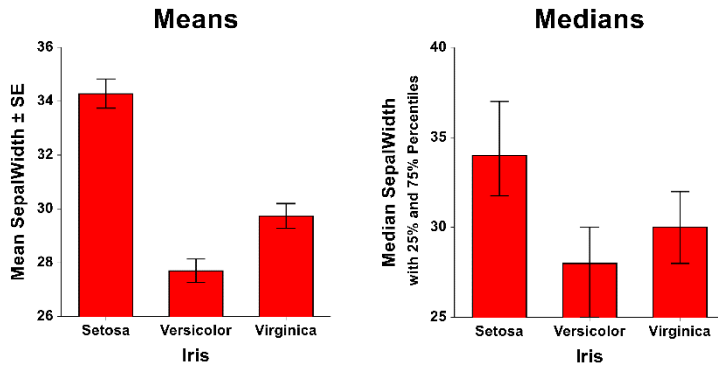
Error-Bar Chart Window Options

This section describes the specific options available on the Error-Bar Chart window, which is displayed when the Error-Bar Chart button is clicked. Common options, such as axes, labels, legends, and titles are documented in the Graphics Components chapter.

Error-Bar Chart Tab

Estimation of Center Section

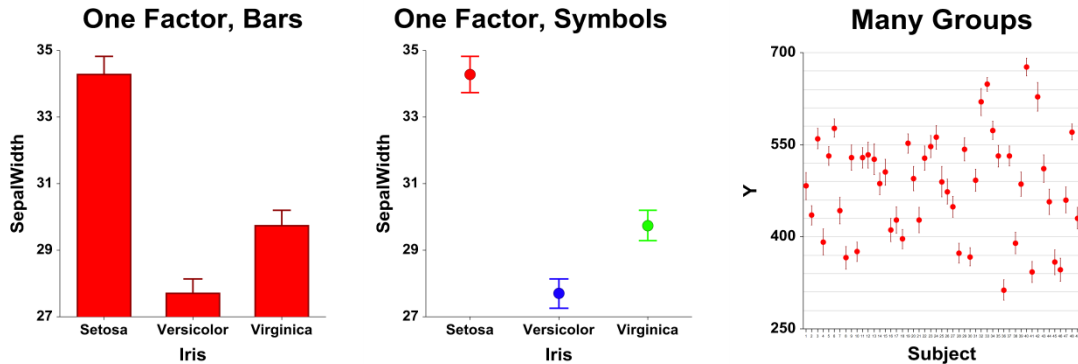
You can choose whether to plot means or medians.



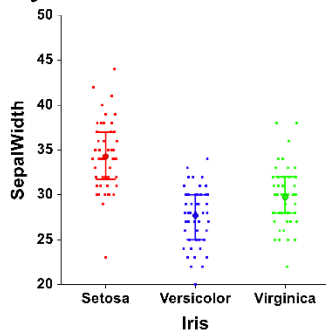
Bars and Symbols Section

You can modify the color of bars, border, and/or symbols using the options in this section.

One Factor



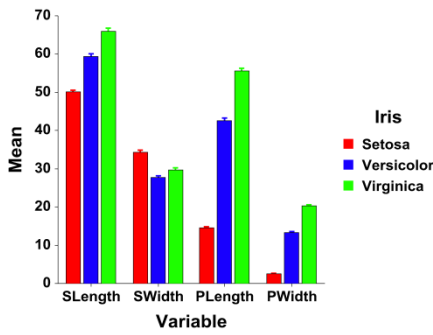
Symbols with Raw Data



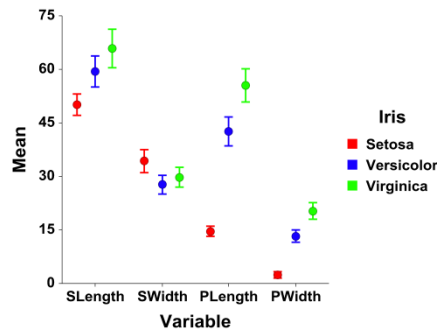
Error-Bar Charts

Two Factors

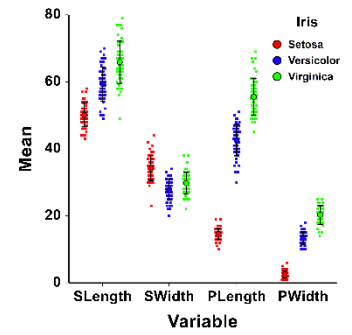
Two Factors, Bars



Two Factors, Symbols



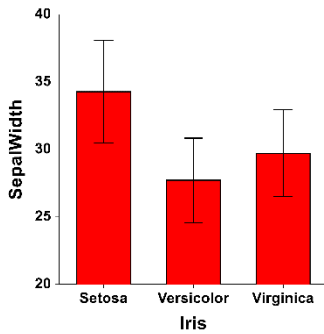
Symbols with Raw Data



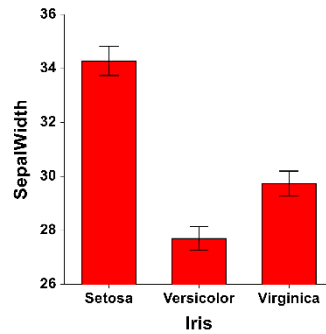
Variation (Error Bars) Section

You modify the variation line that extends from the mean using the options in this section.

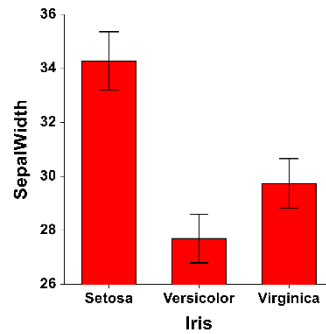
Standard Deviation



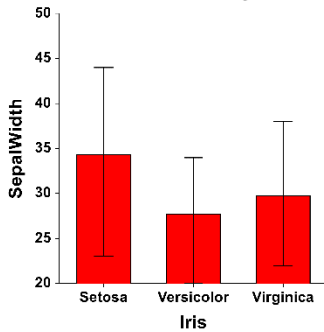
Standard Error



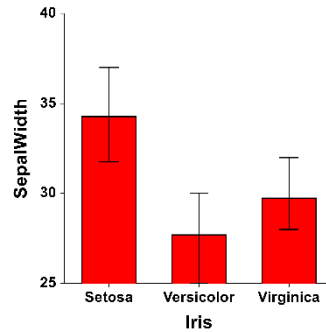
Confidence Interval



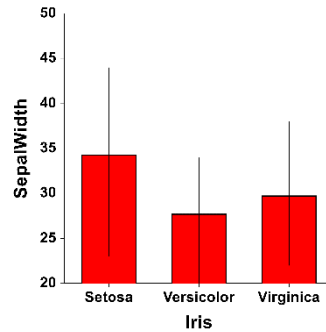
Data Range



Percentiles



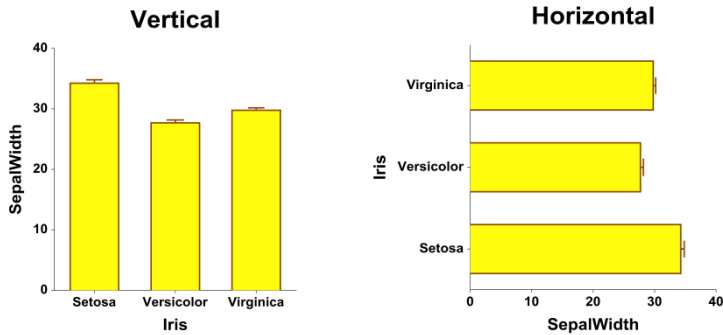
No Crossbars



Layout Tab

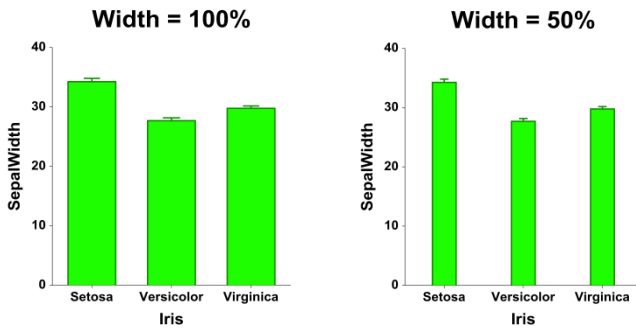
Orientation Section

You can orient the bars horizontally or vertically.



Object Spacing and Size Section

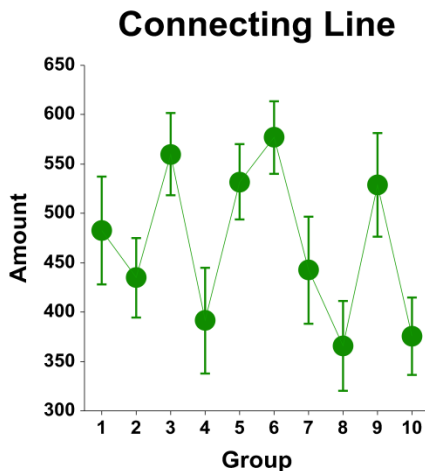
You can change the size of the gap between individual bars.



Connecting Lines Tab

Connect Between Groups Section

You can add reference lines at group means and percentiles.



Titles, Legend, Numeric Axis, Group Axis, Grid Lines, and Background Tabs

Details on setting the options in these tabs are given in the Graphics Components chapter.

Example 1 – Creating an Error-Bar Chart

This section presents an example of how to generate an error-bar chart. The data used are from the Fisher dataset. We will create error-bar charts of the *SepalLength* variable, grouping on the type of iris.

You may follow along here by making the appropriate entries or load the completed template **Example 1** by clicking on Open Example Template from the File menu of the Error-Bar Charts window.

1 Open the Fisher dataset.

- From the File menu of the NCSS Data window, select **Open Example Data**.
- Click on the file **Fisher.NCSS**.
- Click **Open**.

2 Open the Error-Bar Charts window.

- Using the Graphics menu or the Procedure Navigator, find and select the **Error-Bar Charts** procedure.
- On the menus, select **File**, then **New Template**. This will fill the procedure with the default template.

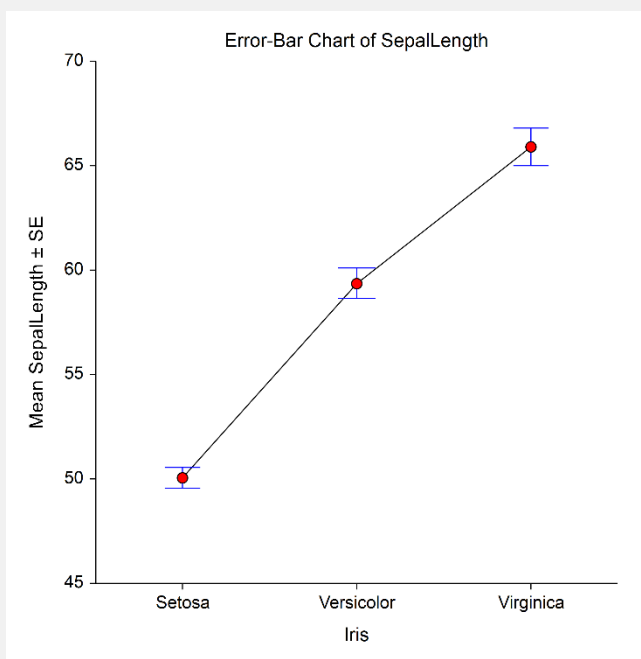
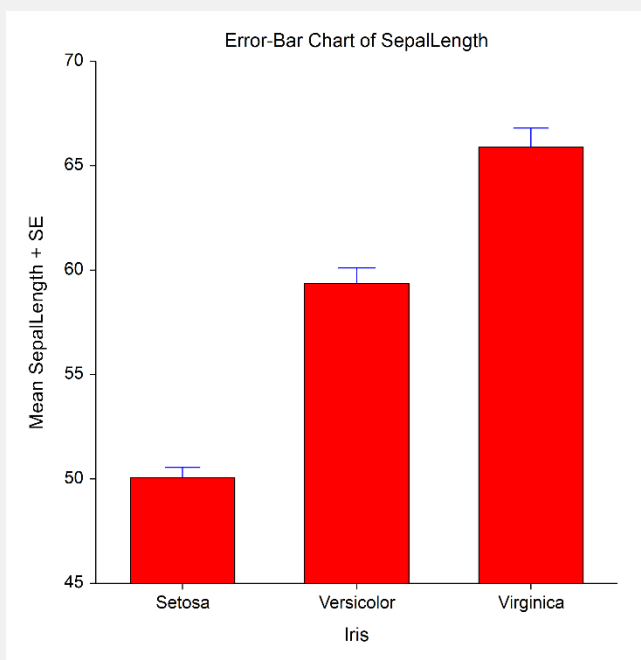
3 Specify the variables.

- On the Error-Bar Charts window, select the **Variables tab**.
- Double-click in the **Data Variable(s)** text box. This will bring up the variable selection window.
- Select **SepalLength** from the list of variables and then click **Ok**. “SepalLength” will appear in the Variable(s) box.
- Double-click in the **Horizontal (Group) Variable** text box. This will bring up the variable selection window.
- Select **Iris** from the list of variables and then click **Ok**. “Iris” will appear in the Horizontal (Group) Variable box.
- Set **Value Labels** to **Value Labels**.

4 Run the procedure.

- From the Run menu, select **Run Procedure**. Alternatively, just click the green Run button.

Error-Bar Chart Output



The second plot is the same data with the bar fill and bar border removed and symbols and connecting lines added (see **Example 1b** settings template).

Example 2 – Creating an Error-Bar Chart with Subgroups

This section presents an example of how to generate an error-bar chart with subgroups. The data used are from the fictitious Tree dataset. We will create error-bar charts of the *Diameter* variable, grouping on *Species*, with subgroups according to *Sunlight*.

You may follow along here by making the appropriate entries or load the completed template **Example 2** by clicking on Open Example Template from the File menu of the Error-Bar Charts (2 Factors) window.

1 Open the Tree dataset.

- From the File menu of the NCSS Data window, select **Open Example Data**.
- Click on the file **Tree.NCSS**.
- Click **Open**.

2 Open the Error-Bar Charts (2 Factors) window.

- Using the Graphics menu or the Procedure Navigator, find and select the **Error-Bar Charts (2 Factors)** procedure.
- On the menus, select **File**, then **New Template**. This will fill the procedure with the default template.

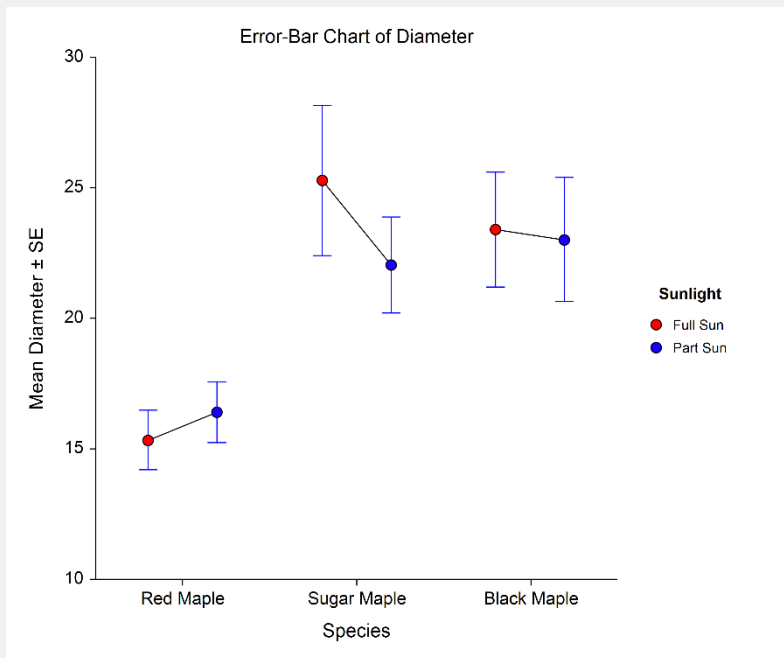
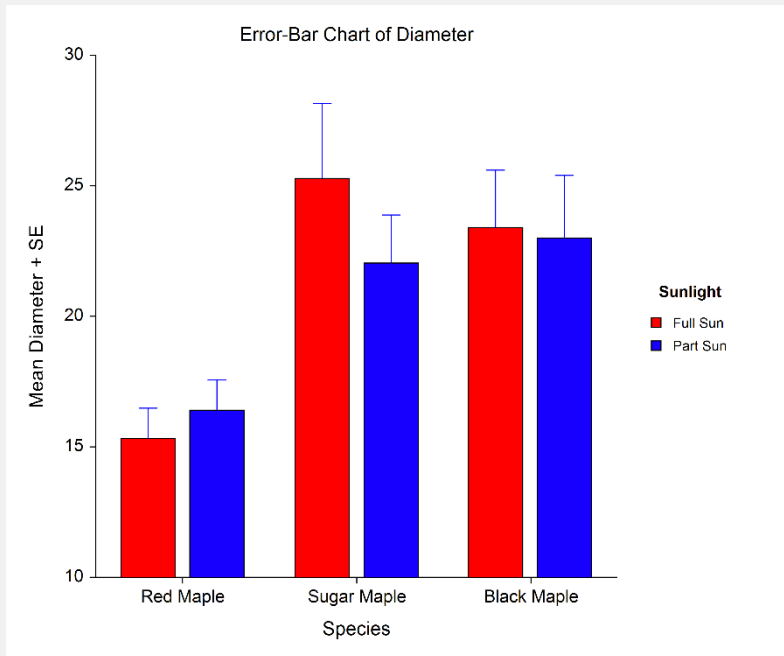
3 Specify the variables.

- On the Error-Bar Charts (2 Factors) window, select the **Variables tab**.
- Double-click in the **Data Variable(s)** text box. This will bring up the variable selection window.
- Select **Diameter** from the list of variables and then click **Ok**. “Diameter” will appear in the Variable(s) box.
- Double-click in the **Horizontal (Group) Variable** text box. This will bring up the variable selection window.
- Select **Species** from the list of variables and then click **Ok**. “Species” will appear in the Horizontal (Group) Variable box.
- Double-click in the **Legend (Subgroup) Variable** text box. This will bring up the variable selection window.
- Select **Sunlight** from the list of variables and then click **Ok**. “Sunlight” will appear in the Legend (Subgroup) Variable box.
- Set **Value Labels** to **Value Labels**.

4 Run the procedure.

- From the Run menu, select **Run Procedure**. Alternatively, just click the green Run button.

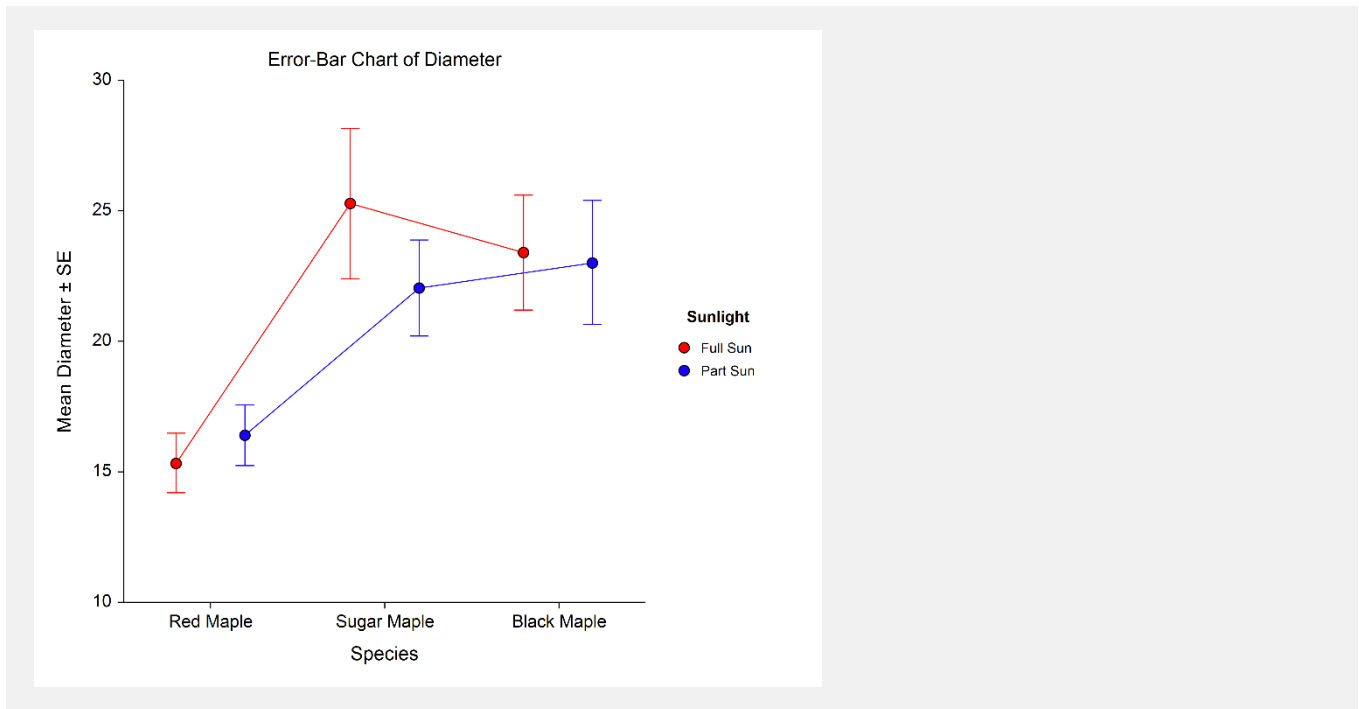
Error-Bar Chart Output



The second plot is the same data with the bar fill and bar border removed and symbols and connecting lines added (see **Example 2b** settings template).

Error-Bar Charts

You can also make the error-bar lines be the same color as the symbol color and include connecting lines between groups as in the following plot (see **Example 2c** settings template).



Example 3 – Creating an Error-Bar Chart with 95% Confidence Interval Limits and Raw Data

This section presents an example of how to generate an error-bar chart with 95% confidence interval limits. The data used are from the Fisher dataset. We will create error-bar charts of the *SepalLength* variable, grouping on the type of iris.

You may follow along here by making the appropriate entries or load the completed template **Example 3** by clicking on Open Example Template from the File menu of the Error-Bar Charts window.

1 Open the Fisher dataset.

- From the File menu of the NCSS Data window, select **Open Example Data**.
- Click on the file **Fisher.NCSS**.
- Click **Open**.

2 Open the Error-Bar Charts window.

- Using the Graphics menu or the Procedure Navigator, find and select the **Error-Bar Charts** procedure.
- On the menus, select **File**, then **New Template**. This will fill the procedure with the default template.

3 Specify the variables.

- On the Error-Bar Charts window, select the **Variables tab**.
- Double-click in the **Data Variable(s)** text box. This will bring up the variable selection window.
- Select **SepalLength** from the list of variables and then click **Ok**. “SepalLength” will appear in the Variable(s) box.
- Double-click in the **Horizontal (Group) Variable** text box. This will bring up the variable selection window.
- Select **Iris** from the list of variables and then click **Ok**. “Iris” will appear in the Horizontal (Group) Variable box.
- Set **Value Labels** to **Value Labels**.

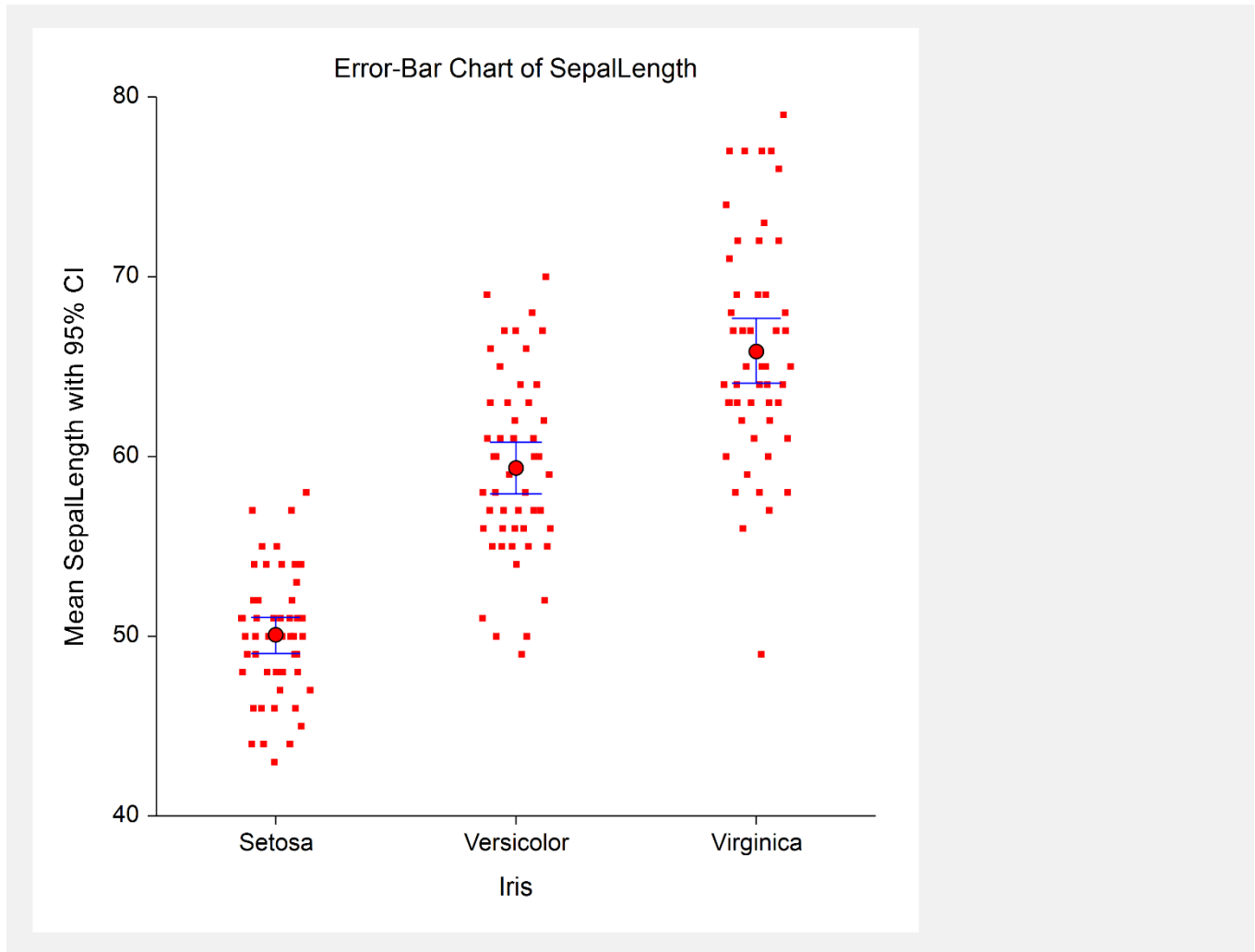
4 Edit the Plot.

- Click on the **Plot Format** button.
- On the **Error-Bar Chart** tab, uncheck **Bar Fill** and **Bar Border** under **Bars & Symbols**.
- On the **Error-Bar Chart** tab, put a checkmark next to **Symbols** under **Bars & Symbols**.
- On the **Error-Bar Chart** tab, put a checkmark next to **Raw Data** under **Bars & Symbols**.
- On the **Error-Bar Chart** tab, change the **Error Bar Variation Line Type** to **Confidence Interval**.
- Click **OK** to save the plot settings.

5 Run the procedure.

- From the Run menu, select **Run Procedure**. Alternatively, just click the green Run button.

Error-Bar Chart Output



Example 4 – Creating an Error-Bar Chart with Medians

This section presents an example of how to generate an error-bar chart with medians instead of means. The data used are from the Fisher dataset. We will create error-bar charts of the *SepalLength* variable, grouping on the type of iris.

You may follow along here by making the appropriate entries or load the completed template **Example 4** by clicking on Open Example Template from the File menu of the Error-Bar Charts window.

1 Open the Fisher dataset.

- From the File menu of the NCSS Data window, select **Open Example Data**.
- Click on the file **Fisher.NCSS**.
- Click **Open**.

2 Open the Error-Bar Charts window.

- Using the Graphics menu or the Procedure Navigator, find and select the **Error-Bar Charts** procedure.
- On the menus, select **File**, then **New Template**. This will fill the procedure with the default template.

3 Specify the variables.

- On the Error-Bar Charts window, select the **Variables tab**.
- Double-click in the **Data Variable(s)** text box. This will bring up the variable selection window.
- Select **SepalLength** from the list of variables and then click **Ok**. “SepalLength” will appear in the Variable(s) box.
- Double-click in the **Horizontal (Group) Variable** text box. This will bring up the variable selection window.
- Select **Iris** from the list of variables and then click **Ok**. “Iris” will appear in the Horizontal (Group) Variable box.
- Set **Value Labels** to **Value Labels**.

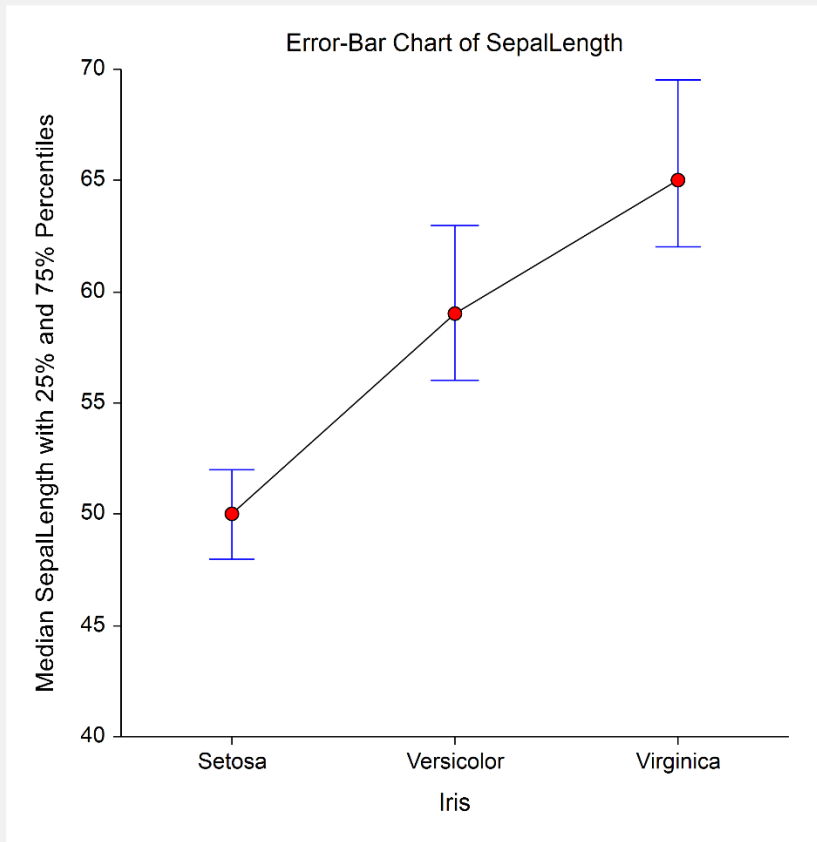
4 Edit the Plot.

- Click on the **Plot Format** button.
- On the **Error-Bar Chart** tab, change **Center Estimation Type** to “**Median**”.
- On the **Error-Bar Chart** tab, uncheck **Bar Fill** and **Bar Border** under **Bars & Symbols**.
- On the **Error-Bar Chart** tab, put a checkmark next to **Symbols** under **Bars & Symbols**.
- On the **Connecting Lines** tab, put a checkmark next to **Medians** under **Connect Between Groups**.
- On the **Painting Order** tab, move **Connecting Lines** before **Error-Bar Chart**.
- Click **OK** to save the plot settings.

5 Run the procedure.

- From the Run menu, select **Run Procedure**. Alternatively, just click the green Run button.

Error-Bar Chart Output



When medians are plotted, the error-bars are not necessary symmetric about the median. In this example, the 25th and 75th percentiles are represented by the lower and upper error bars, respectively. The other option when plotting medians is to draw error bars that cover the entire range of the data as displayed in the following plot (see **Example 4b** settings template).

