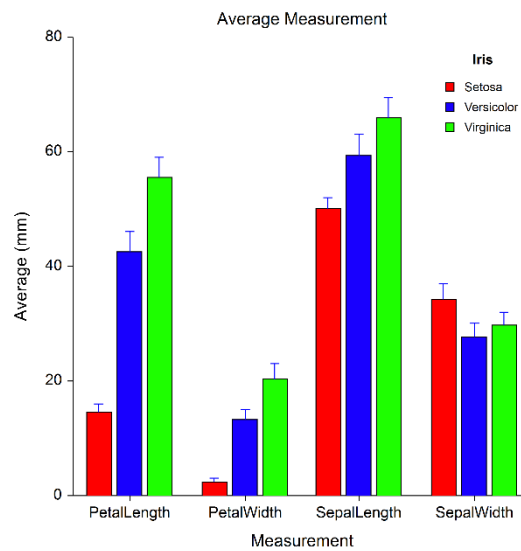
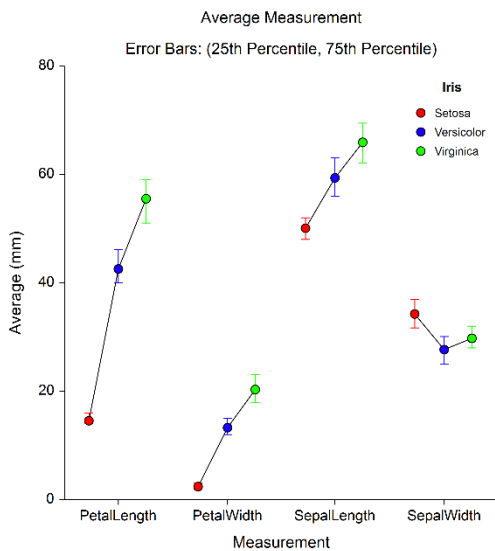
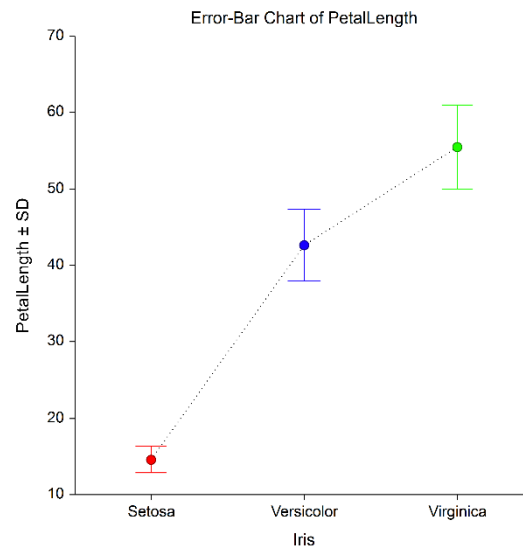
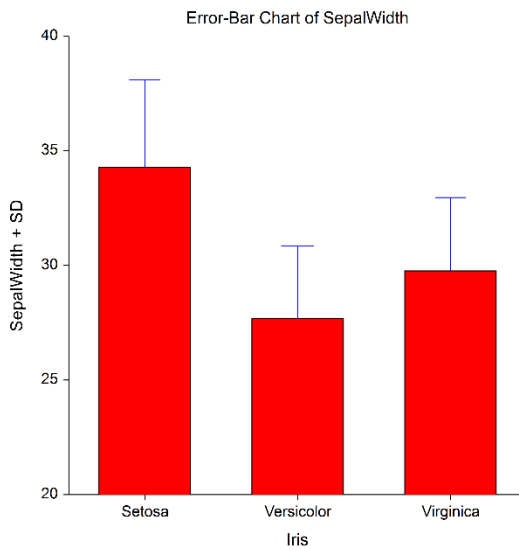


Chapter 156

Error-Bar Charts from Summary Data

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 bars (or symbols) and error-bar lines may represent any user-entered center and variability values. Both symmetric and asymmetric error bars may be entered.



Data Structure

This procedure accepts data in two different input formats. Both data formats involve a single column of numeric data values. The difference is due the way that the error is entered. You may enter either a single column containing error values, called *delta*, (e.g. standard deviation, standard error, etc.), which results in symmetric error bars, or you may enter the upper and lower error bounds for each point directly, which allows for asymmetric error bars. Rows with missing data values are ignored. Rows with missing error values are plotted, but error bars for the corresponding points are not drawn.

A second variable may be used to divide the data 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 – One-Factor and Two-Factor Error-Bar Charts

Data Variable

Specify a column with numeric data values to be plotted on the vertical axis.

Error Input Type

Specify how the error for the data variable will be entered. The choices are

- **None**
No error bars will displayed for the data variable.
- **Enter Error as Δ (Error Bounds = Center \pm Δ)**
Enter a single column containing the error values for the data variable (Δ 's). The error bar bounds for each point are computed as

$$\text{Upper Error Bound} = \text{Center} + \Delta$$

$$\text{Lower Error Bound} = \text{Center} - \Delta$$

These bounds result in vertical error bars that are symmetric about the center point.

- **Enter Upper and Lower Error Bounds Separately**
Enter the upper and lower error bounds directly using two input columns. With this input type, it is possible to enter asymmetric error bounds.

Error-Bar Charts from Summary Data

Error (Δ) Variable (Shown if Error Input Type = Enter Error as Δ)

Specify a column that contains error values to be plotted. These values are used to draw symmetric error bars about the center.

The error bounds are calculated using these error values as

$$\text{Upper Error Bound} = \text{Center} + \Delta$$

$$\text{Lower Error Bound} = \text{Center} - \Delta$$

If this variable is left blank, no error-bar lines will be plotted.

Lower Error Bound Variable (Shown if Error Input Type = Enter Upper and Lower Error Bounds Separately)

Specify a column that contains lower error values to be plotted with the corresponding data values. The values in this variable should be less than the corresponding values in the Upper Error Bound Variable. If this variable is left blank, no lower error-bar lines will be plotted.

Upper Error Bound Variable (Shown if Error Input Type = Enter Upper and Lower Error Bounds Separately)

Specify a column that contains upper error values to be plotted with the corresponding data values. The values in this variable should be greater than the corresponding values in the Lower Error Bound Variable. If this variable is left blank, no upper error-bar lines will be plotted.

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.

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 Only

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.

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

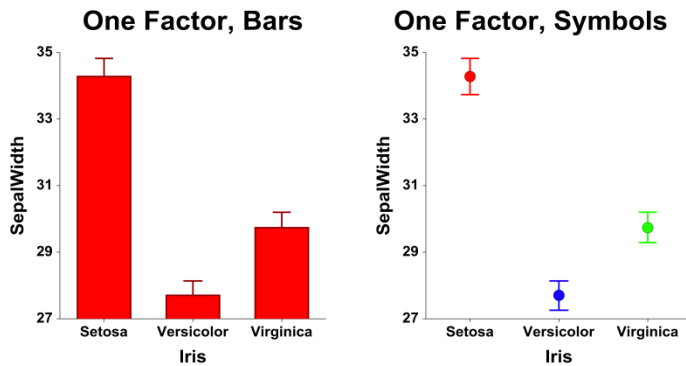
This section describes the specific options available on the Error-Bar Chart window, which is displayed when the Error-Bar Chart button is clicked. Common options, such as axes, labels, legends, and titles are documented in the Graphics Components chapter.

Error-Bar Chart Tab

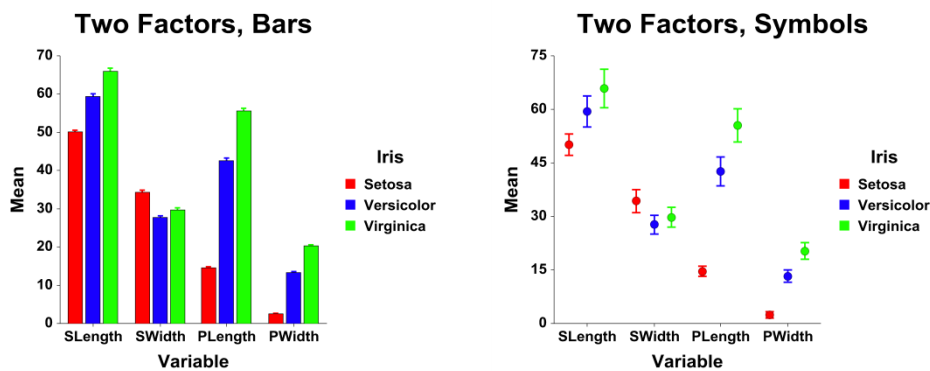
Bars and Symbols Section

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

One Factor



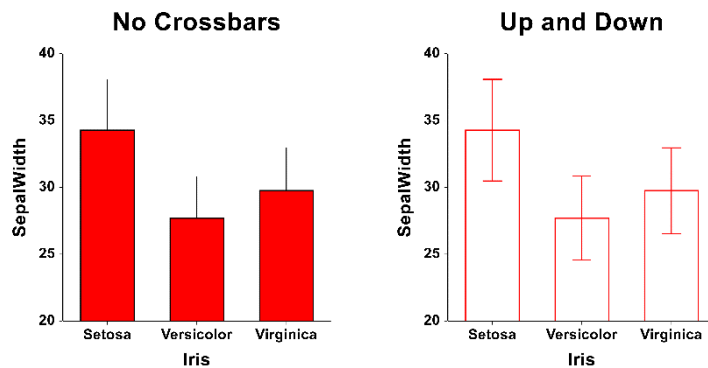
Two Factors



Error-Bar Charts from Summary Data

Variation (Error Bars) Section

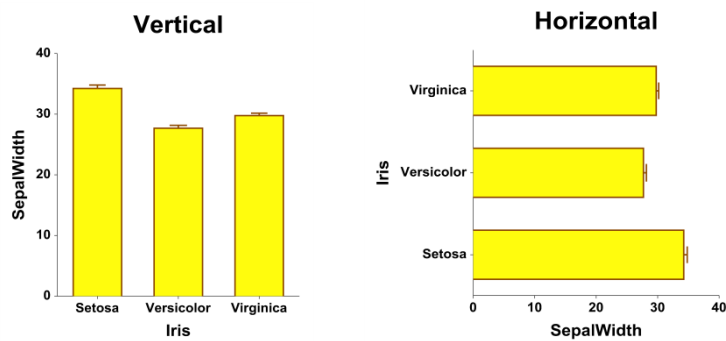
You modify the variation line that extends from the mean using the options in this section.



Layout Tab

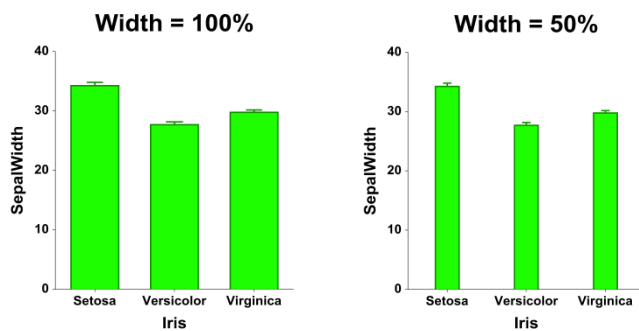
Orientation Section

You can orient the bars horizontally or vertically.



Object Spacing and Size Section

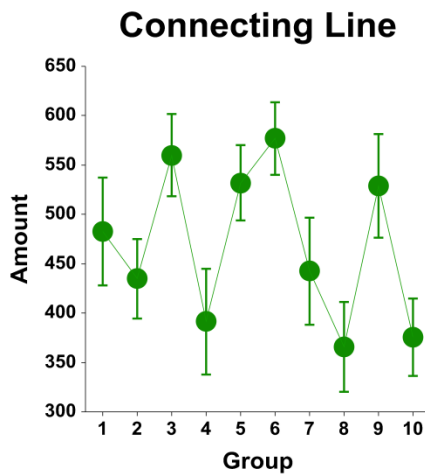
You can change the size of the gap between individual bars.



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 Error-Bar Charts from Summary Data by Entering Delta

This section presents an example of how to generate an error-bar chart from summary data. The data used are from the *FisherSummary* dataset. We will create separate error-bar charts for the variable called *Average* for each Measurement type, grouping each chart 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 from Summary Data window.

1 Open the Fisher dataset.

- From the File menu of the NCSS Data window, select **Open Example Data**.
- Click on the file **FisherSummary.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 from Summary Data** procedure.
- On the menus, select **File**, then **New Template**. This will fill the procedure with the default template.

3 Specify the variables.

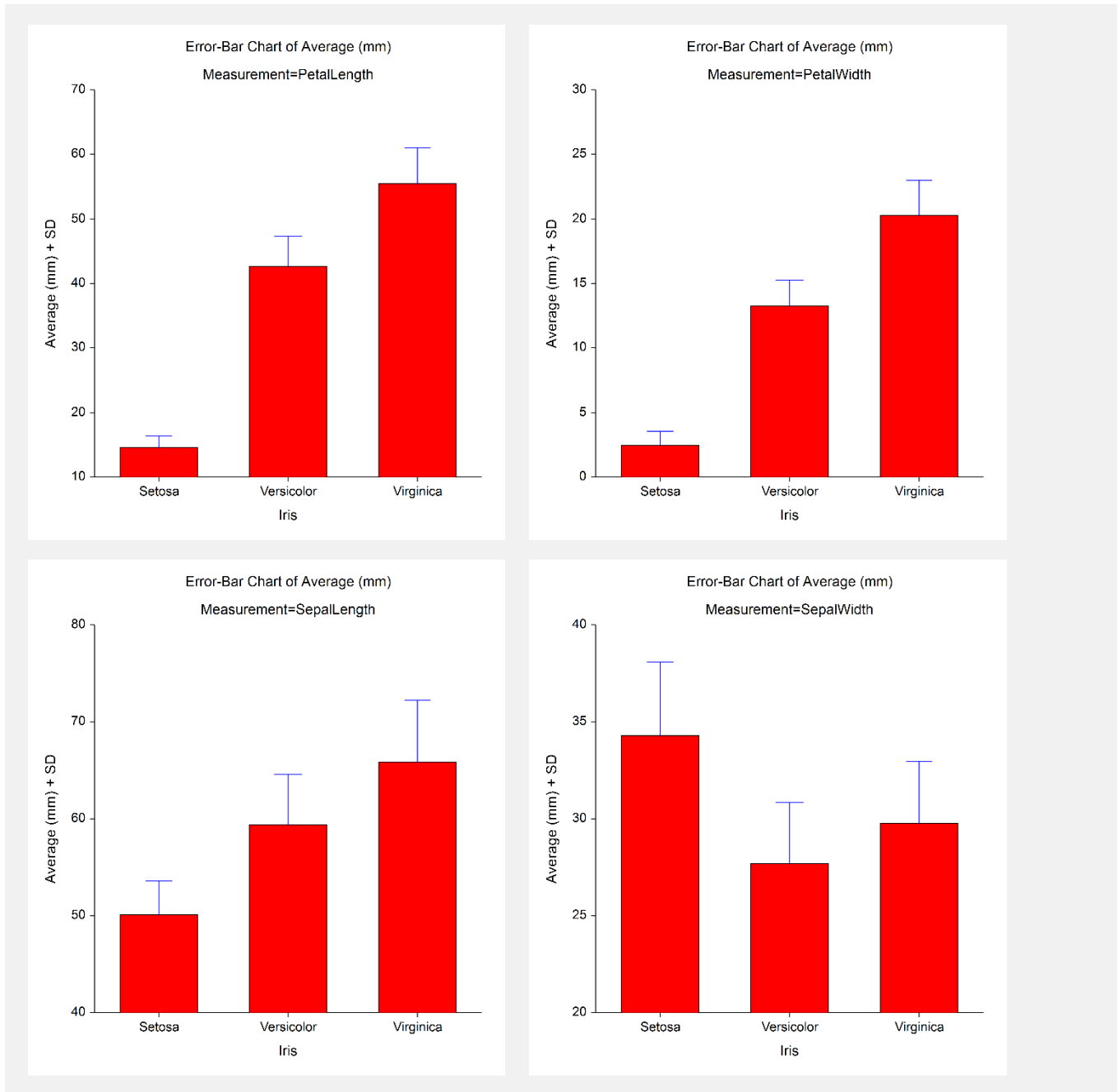
- On the Error-Bar Charts from Summary Data window, select the **Variables tab**.
- For **Data Variable** enter “**Average**”.
- For **Error Input Type** leave “**Enter Error as Δ (Error Bounds = Center \pm Δ)**” selected.
- For **Error (Δ) Variable** enter “**SD**”.
- For **Horizontal (Group) Variable** enter “**Iris**”.
- For **Break Variable 1** enter “**Measurement**”.
- Set **Variable Names to Labels**.
- 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 Charts from Summary Data

Error-Bar Chart Output with Bars

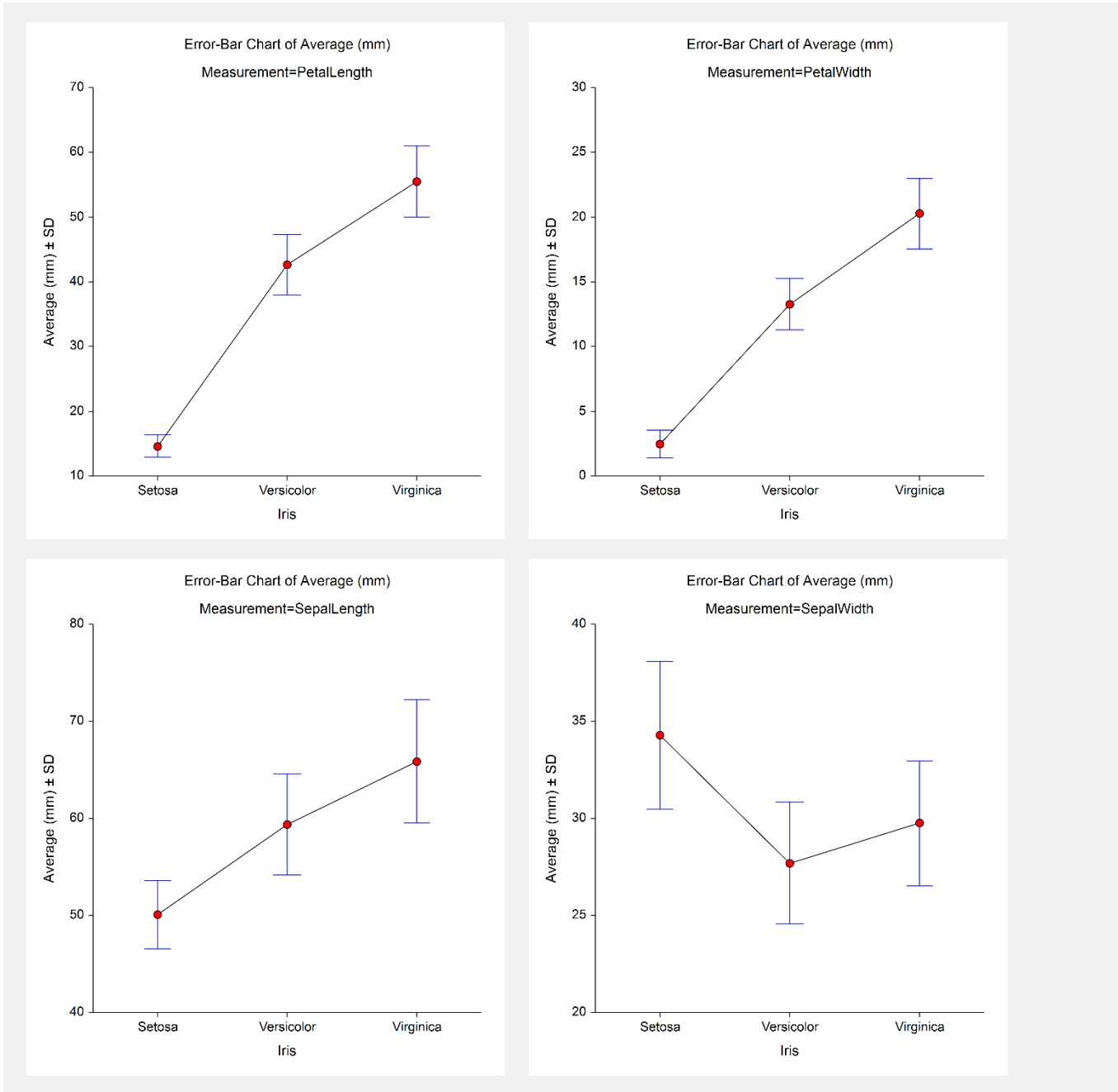


Four different plots are created corresponding to each measurement type.

Error-Bar Charts from Summary Data

Error-Bar Chart Output with Symbols

You can plot the same information with symbols and connecting lines by clicking on the plot format button, unchecking the bar fill and bar border, adding the symbols, and adding connecting lines (see **Example 1b** settings template).



Four different plots are created corresponding to each measurement type with symbols instead of bars.

Example 2 – Creating an Error-Bar Chart with Subgroups from Summary Data by Entering Upper and Lower Error Bounds

This example demonstrates how to generate an error-bar chart with subgroups from summary data. The data used are from the *FisherSummary* dataset. We will create one error-bar charts for the variable called *Average* with upper and lower error bounds entered separately. The error bounds correspond to the 75th and 25th percentiles, respectively.

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 from Summary Data (2 Factors) window.

1 Open the Fisher dataset.

- From the File menu of the NCSS Data window, select **Open Example Data**.
- Click on the file **FisherSummary.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 from Summary Data (2 Factors)** procedure.
- On the menus, select **File**, then **New Template**. This will fill the procedure with the default template.

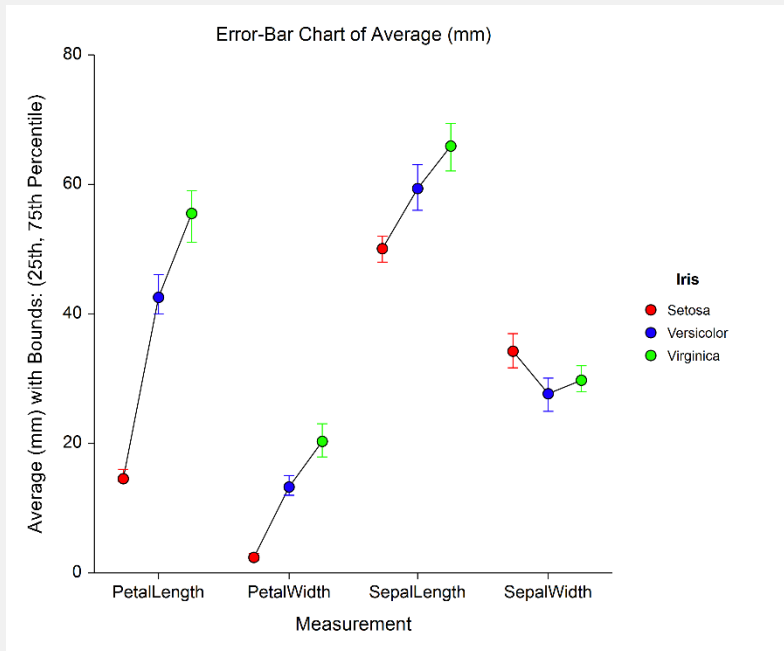
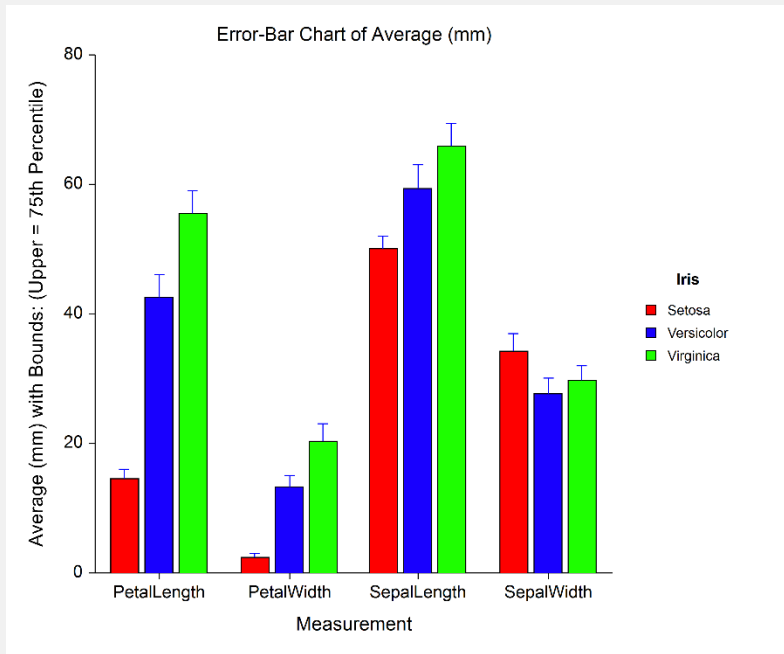
3 Specify the variables.

- On the Error-Bar Charts from Summary Data (2 Factors) window, select the **Variables tab**.
- For **Data Variable** enter “**Average**”.
- For **Error Input Type** select “**Enter Upper and Lower Error Bounds Separately**” selected.
- For **Lower Error Bound Variable** enter “**P25**”.
- For **Upper Error Bound Variable** enter “**P75**”.
- For **Horizontal (Group) Variable** enter “**Measurement**”.
- For **Legend (Subgroup) Variable** enter “**Iris**”.
- Set **Variable Names** to **Labels**.
- 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). In the second plot the error bar lines are also made to be the same color as the symbol.

Error-Bar Charts from Summary Data

You can also include connecting lines between groups as in the following plot (see **Example 2c** settings template).

