

SAS[®] Workshop: SAS[®] Visual Analytics

Course Notes

SAS® Workshop: SAS® Visual Analytics Course Notes was developed by Eric Rossland. Editing and production support was provided by the Curriculum Development and Support Department.

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SAS® Workshop: SAS® Visual Analytics Course

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To learn more...



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Chapter 1 SAS® Workshop: SAS® Visual Analytics

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1.1 SAS Workshop: SAS Visual Analytics

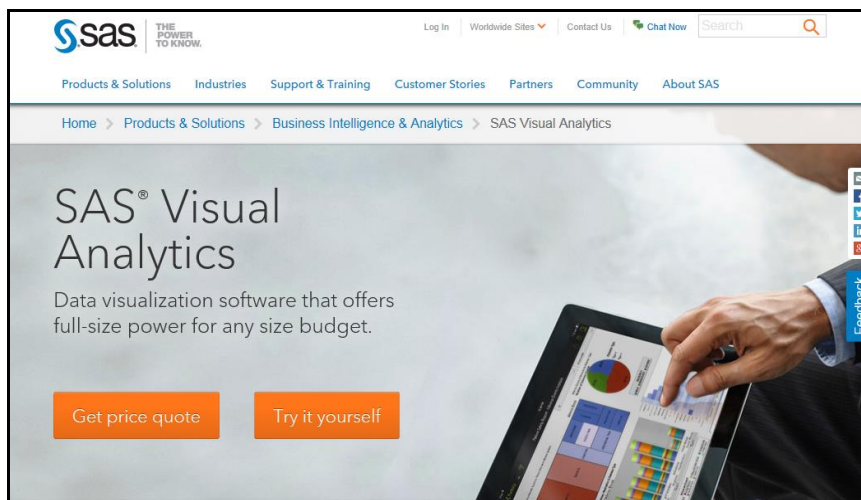
Use these demonstration steps to follow along with the instructor. Please do not move ahead of the instructor, and do not deviate from the instructions. Thank you.



Accessing the SAS Visual Analytics Demonstration Environment

In this demonstration, you connect to the SAS Visual Analytics demonstration environment.

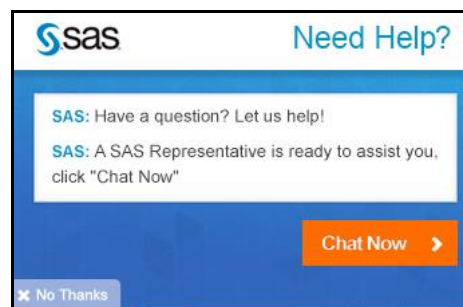
1. Access Internet Explorer.
 - a. Select **Internet Explorer** from the Windows taskbar or Start menu.
 - b. Navigate to the following URL: **http://www.sas.com/va**.



2. Access the SAS Visual Analytics demo environment.
 - a. Click **Try it yourself**.
 - b. Click **Get Full Access**.




If a chat window appears at any point, click **No Thanks** in the bottom left corner to close the window.



- c. If prompted, enter the requested information and click **Try It Now**.

Get Full Access



SAS Visual Analytics offers better data visualization, easy analytics, and a full range of on-premise and cloud-based deployment options.

Want to see the full capabilities of SAS Visual Analytics? Register now to:

- 1 Get unlimited access to explore data and build reports.*
- 2 View a series of video demos to help you get started.
- 3 Access additional resources to learn more about SAS Visual Analytics.

*This demo uses a predefined data set. Reports will not save between sessions.

Have a SAS profile? To complete this form automatically: [Login](#)

First Name *

Last Name *

Email Address *

Organization/Company *

Job Title

Country *
Select your country

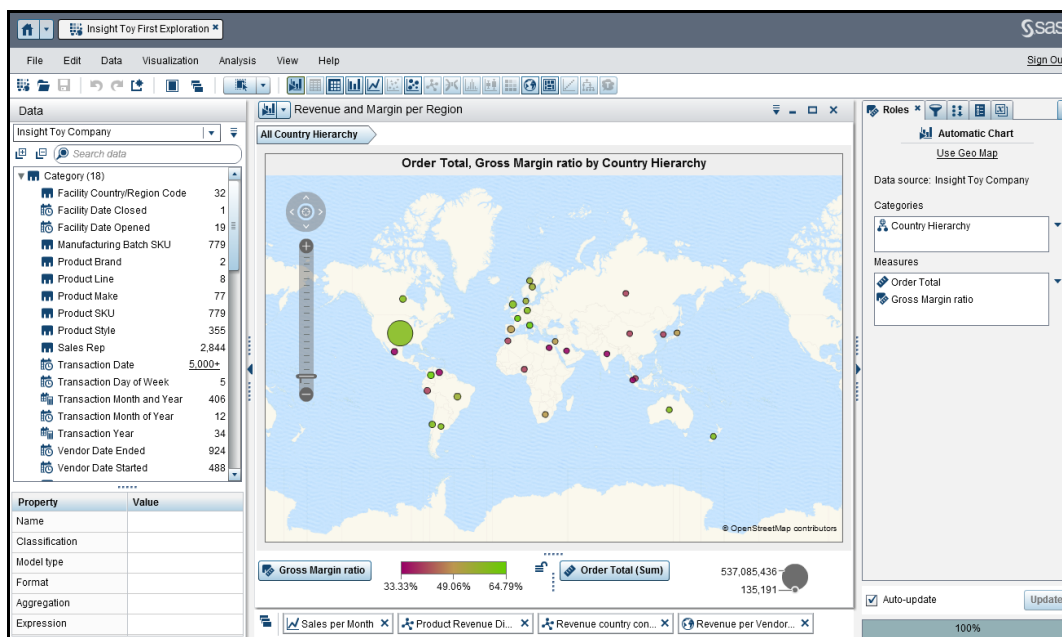
State/Province *
Please select

Business Phone *

Try It Now

3. Click **Launch SAS® Visual Analytics**.

The demonstration environment opens in SAS Visual Analytics Explorer. A data source is already loaded and one visualization is displayed.



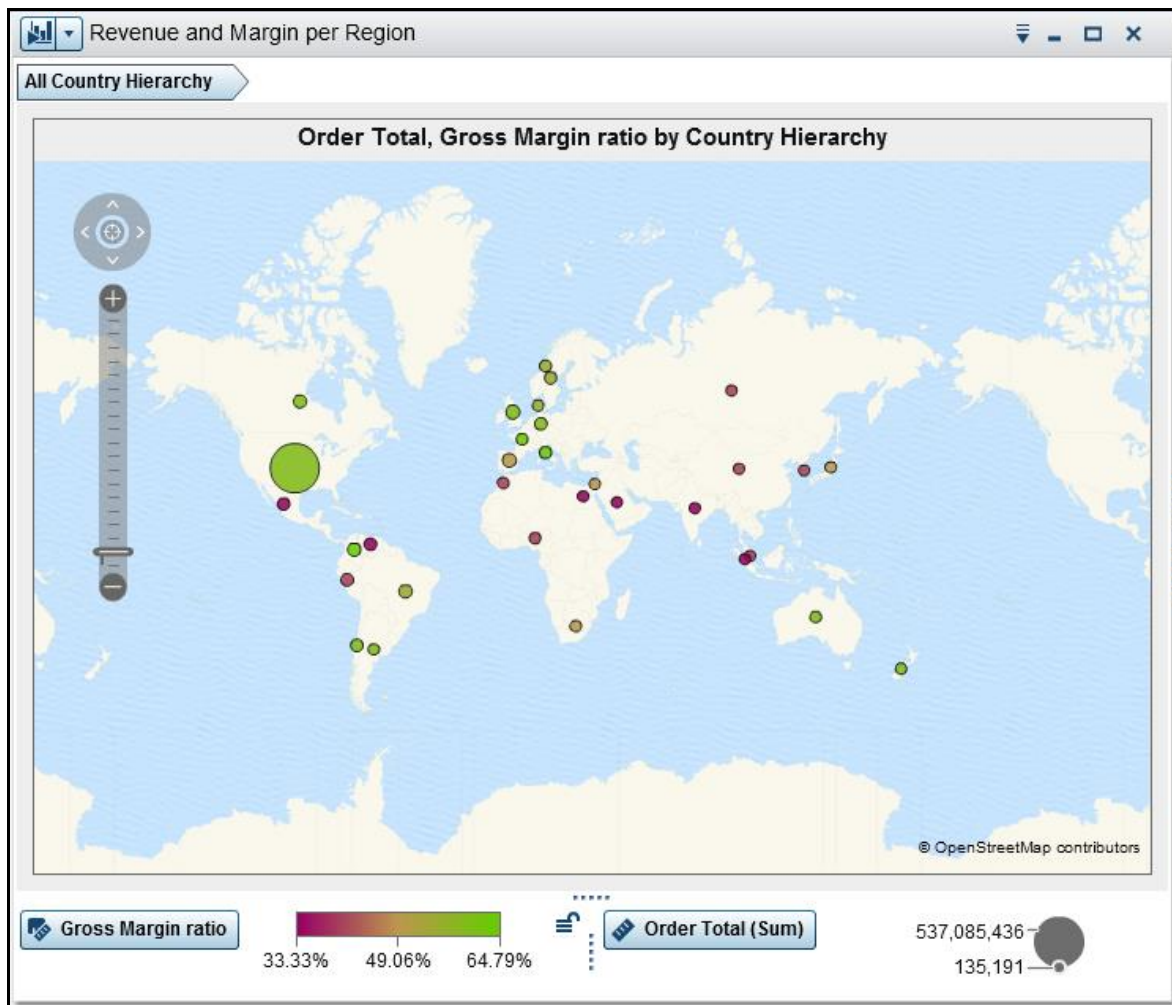


Using SAS Visual Analytics Explorer

In this demonstration, you use SAS Visual Analytics Explorer to explore a data source and create several visualizations.

1. Interact with the existing visualization.

The gross margin ratio and order total for each country is displayed using a geographical map.

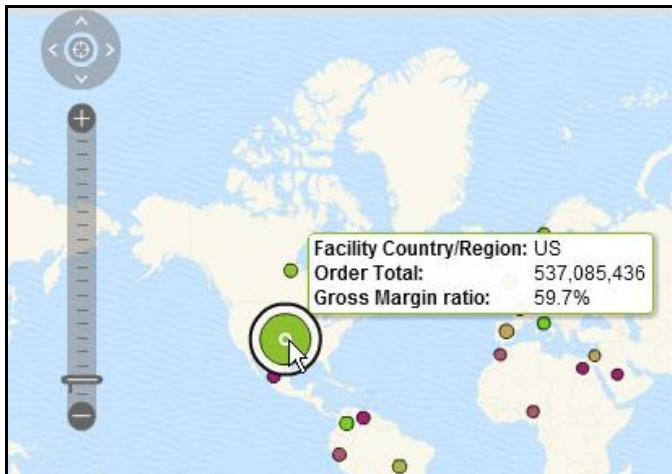


Each country value in the data source is displayed as a colored bubble on the map. The color is based on the gross margin ratio: colors close to magenta have a lower gross margin ratio, whereas colors closer to green have a higher gross margin ratio. The bubble size is based on the order total: the larger the bubble, the greater the sum of the order total.



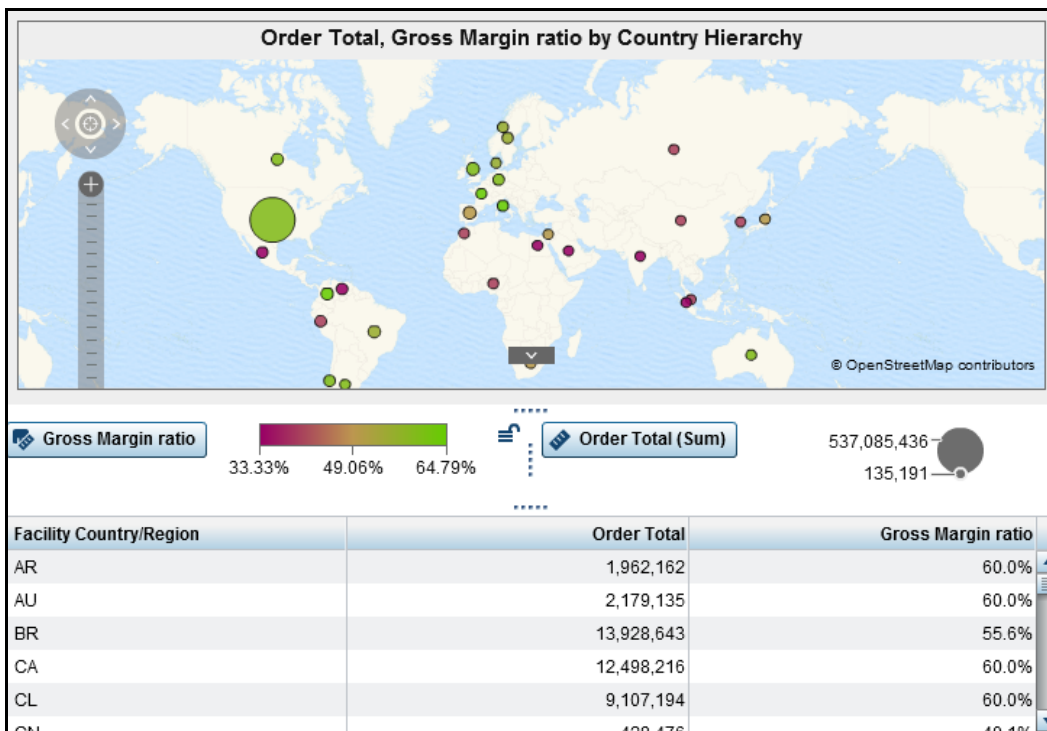
How information is displayed for each visualization depends on your resolution, window size, and panel state (collapsed or expanded). What you see on your workshop machine might not be exactly the same as what you see in this handout.

- a. Position the mouse pointer on the US bubble to display a data tip with additional information.

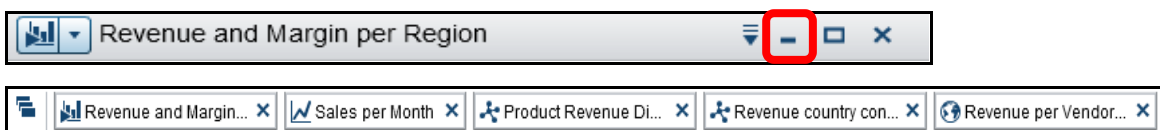


- b. Right-click in the map background and select **Show Details**.

The visualization displays a table of values at the bottom so that you can easily view the order total and gross margin ratio for each country.



- c. Click **Minimize** on the visualization header to minimize the visualization to the Dock pane at the bottom of the workspace.



2. Create a new visualization to analyze product sale by the product hierarchy.

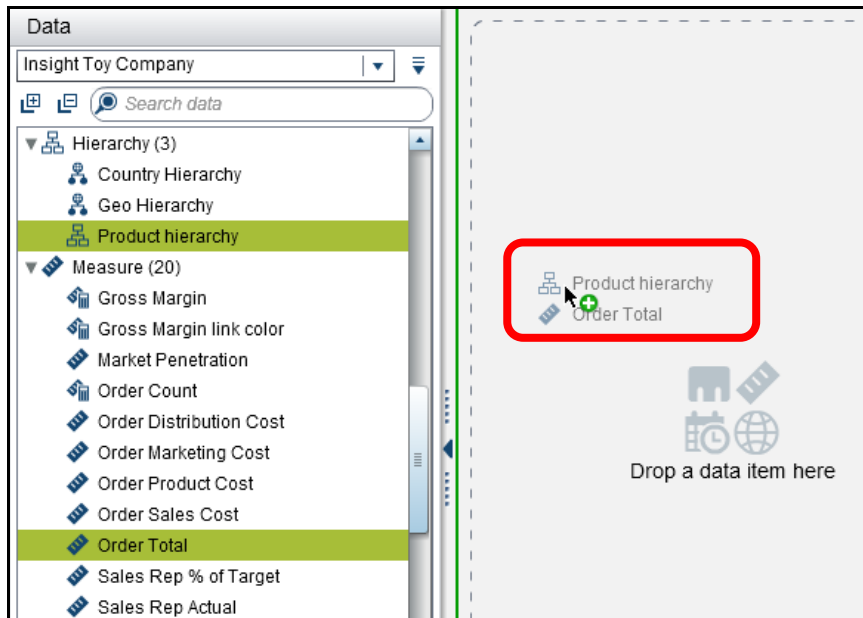
- a. Hold down the Ctrl key and click to select the following data items (in the order specified) from the Data pane on the left:

- **Product hierarchy**
- **Order Total**

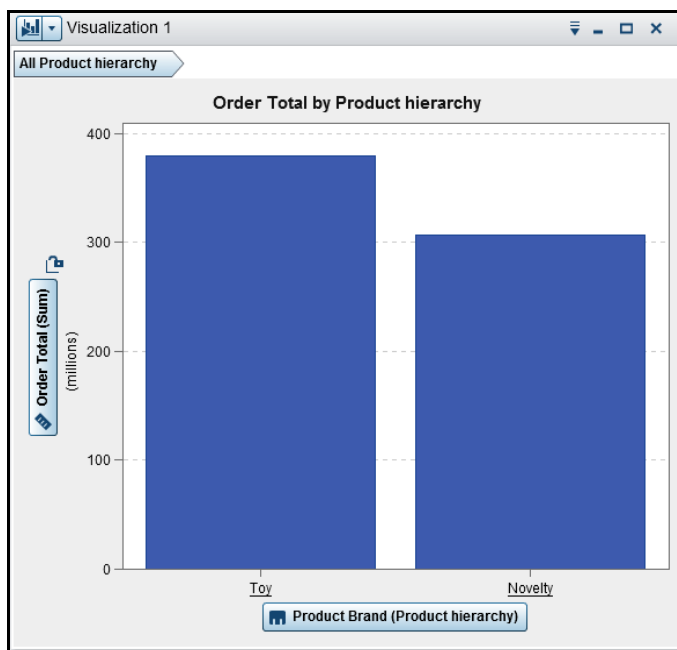


You need to scroll down to find the data items in the Hierarchy and Measure groups.

- b. Drag the selected items onto the workspace.

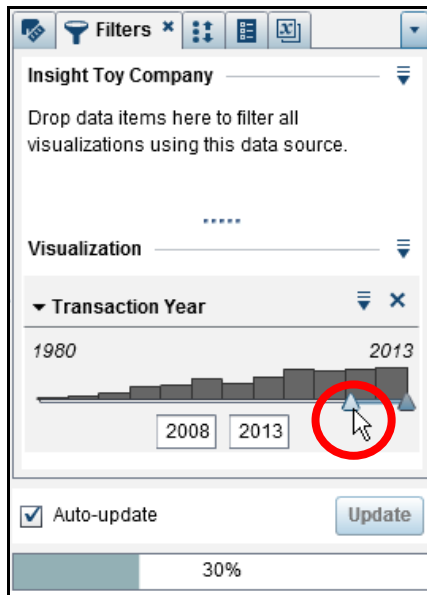


The automatic chart functionality determines the best way to display the selected items.




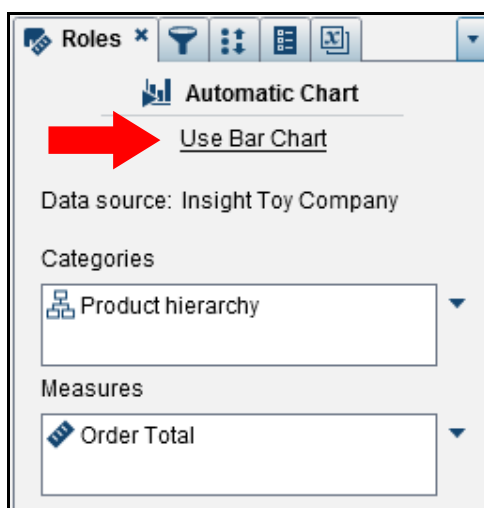
3. Add a visualization filter to display only the transaction years between 2008 and 2013.

- a. Right-click **Transaction Year** in the Data pane and select **Add as Filter on Visualization**.
- b. Using the Filters tab in the right pane, move the left slider until the year 2008 is displayed.

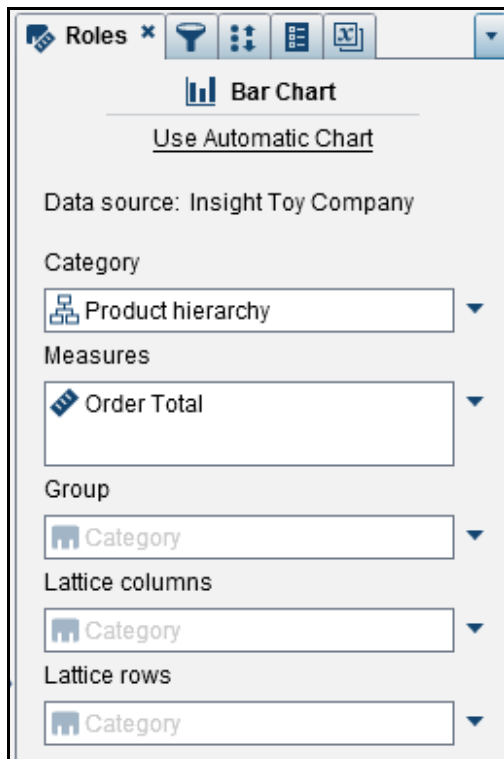


The gauge at the bottom of the window indicates that 30% of the data is returned based on the filter.

4. Change the visualization type and modify the role assignments.
 - a. Click  (the **Roles** tab) in the right pane to select it.
 - b. Click **Use Bar Chart** at the top of the Roles pane to change the visualization type.

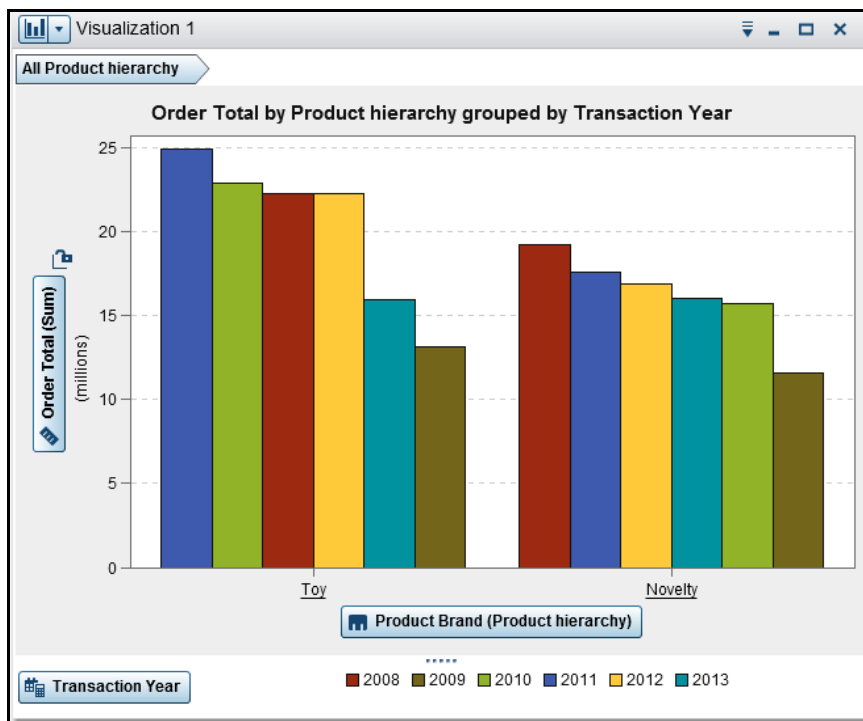


In most cases, additional roles are available when you change from the automatic chart visualization to another type of visualization.



- c. Click  (**Edit selection**) next to the **Group** role and select **Transaction Year**.

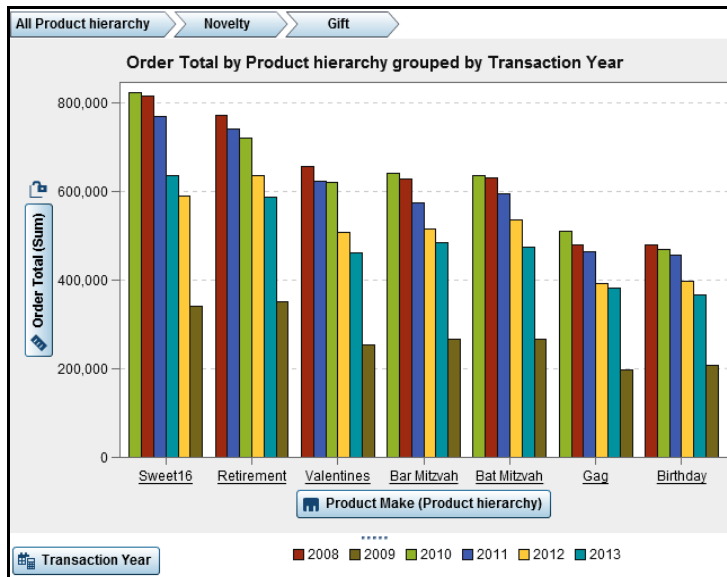
The bar chart is updated to reflect the change:



5. Navigate through the hierarchy.
- Double-click one of the bars in the Novelty group.

- b. Double-click one of the bars in the Gift group.

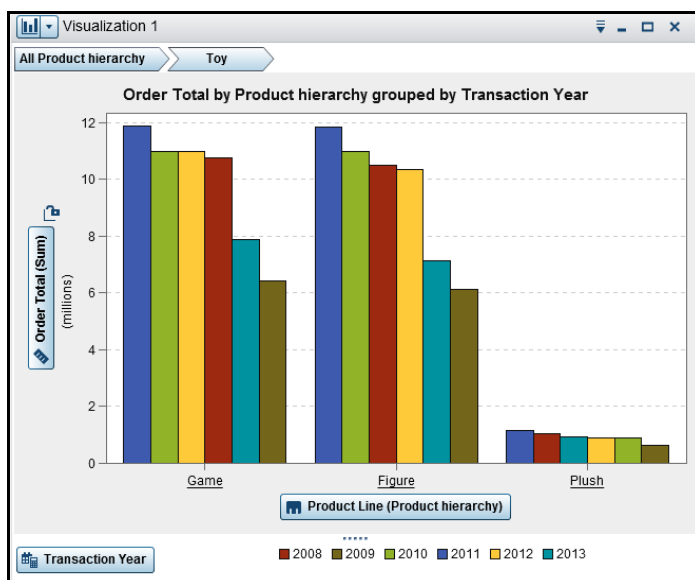
The bar chart is updated to display the different levels of the hierarchy.




- c. Move your mouse pointer to the **Novelty** icon in the navigation area above the bar chart.
- d. Click the arrow and select **Toy**.

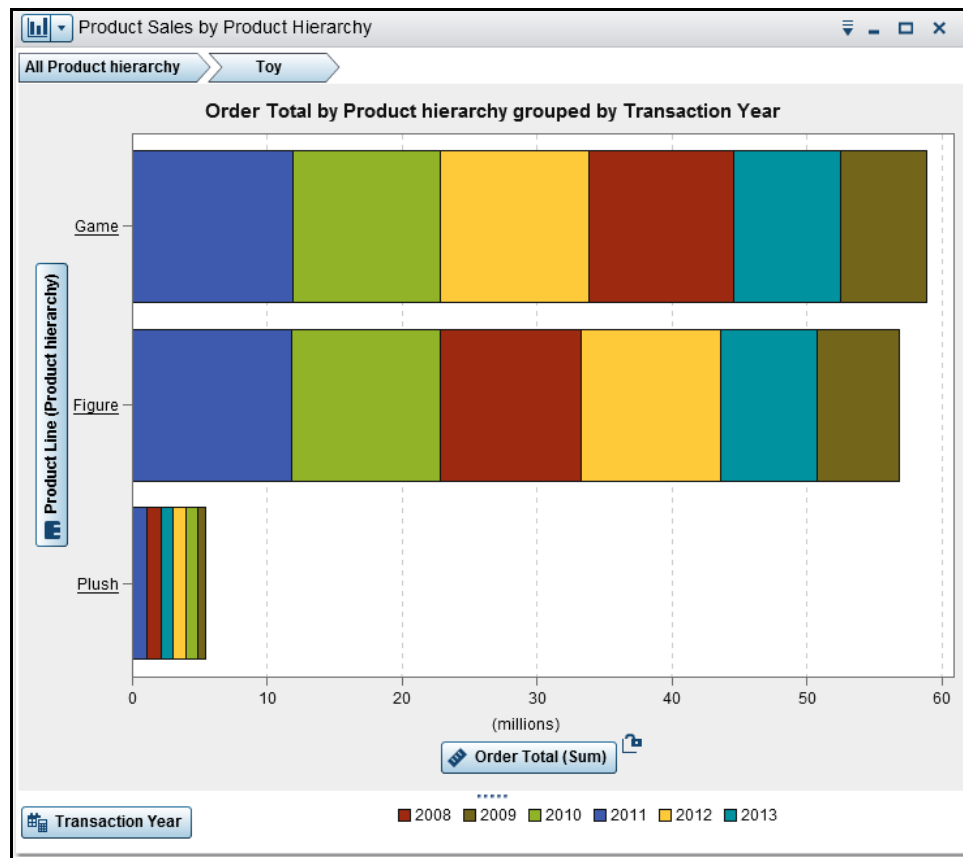



The bar chart is updated.



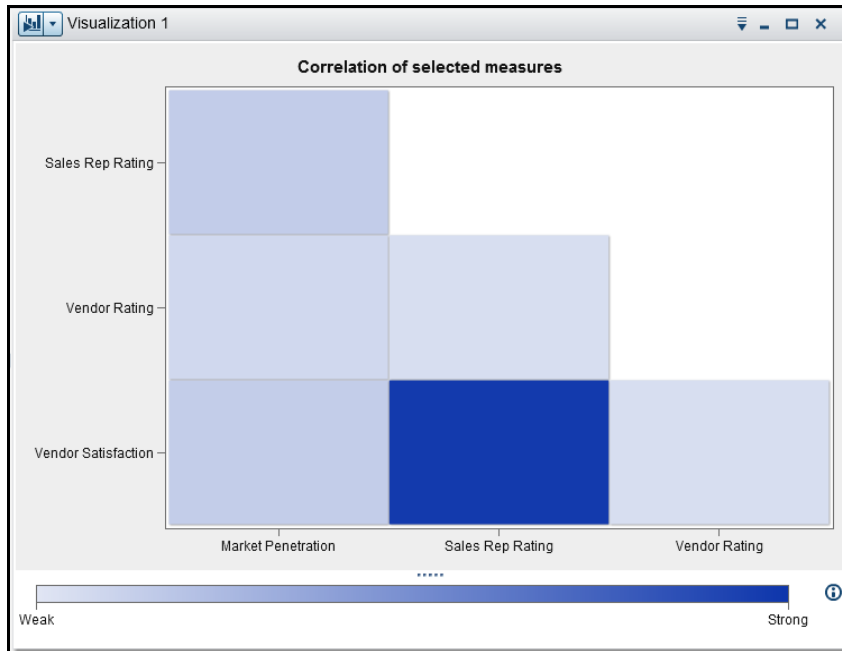
6. Change the visualization properties.
 - a. Click  (the **Properties** tab) in the right pane to select it.
 - b. Type **Product Sales by Product Hierarchy** in the **Name** field and press Enter.
 - c. Select **Horizontal** for the **Bar direction** field.
 - d. Select **Stack** for the **Grouping style** field.

The bar chart is updated:



7. Click  (**Minimize**) on the visualization header to minimize the visualization to the Dock pane at the bottom of the workspace.
8. Create a new visualization based on four measures.
 - a. Hold down the Ctrl key and click to select the following data items (in the order specified):
 - **Market Penetration**
 - **Sales Rep Rating**
 - **Vendor Rating**
 - **Vendor Satisfaction**
 - b. Drag the selected data items to the workspace.

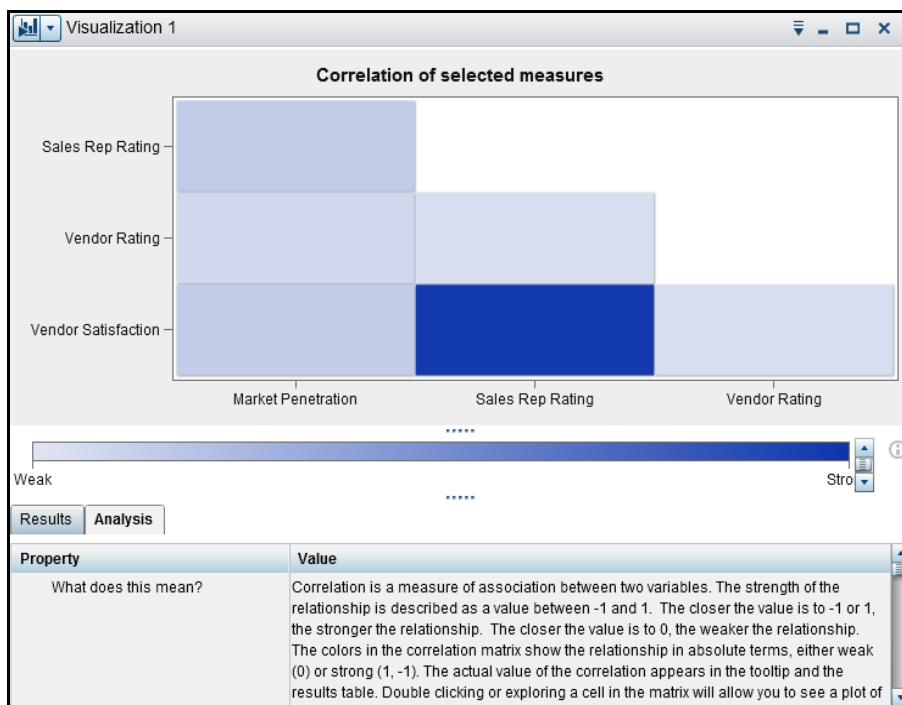
The automatic chart functionality determines the best way to display the selected data items. In this case, a visualization that shows the correlation of the measures is created.



The color of the boxes indicates whether there is a weak correlation (lighter color) or a strong correlation (darker color) between the specified measures.

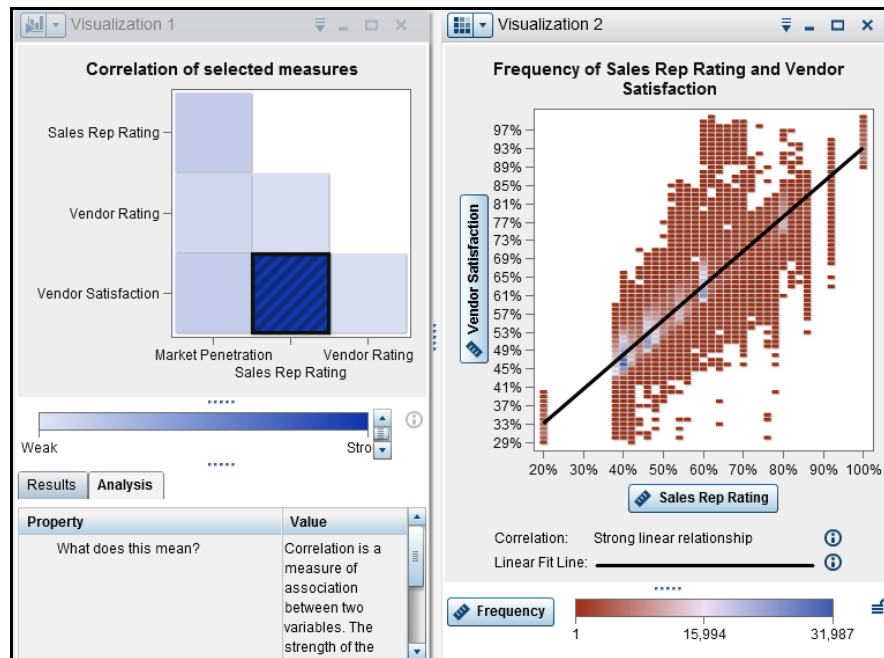
- c. Click (**About these correlation results**) in the bottom right corner of the visualization to display additional information.


Details are displayed beneath the visualization, including information about the analysis.



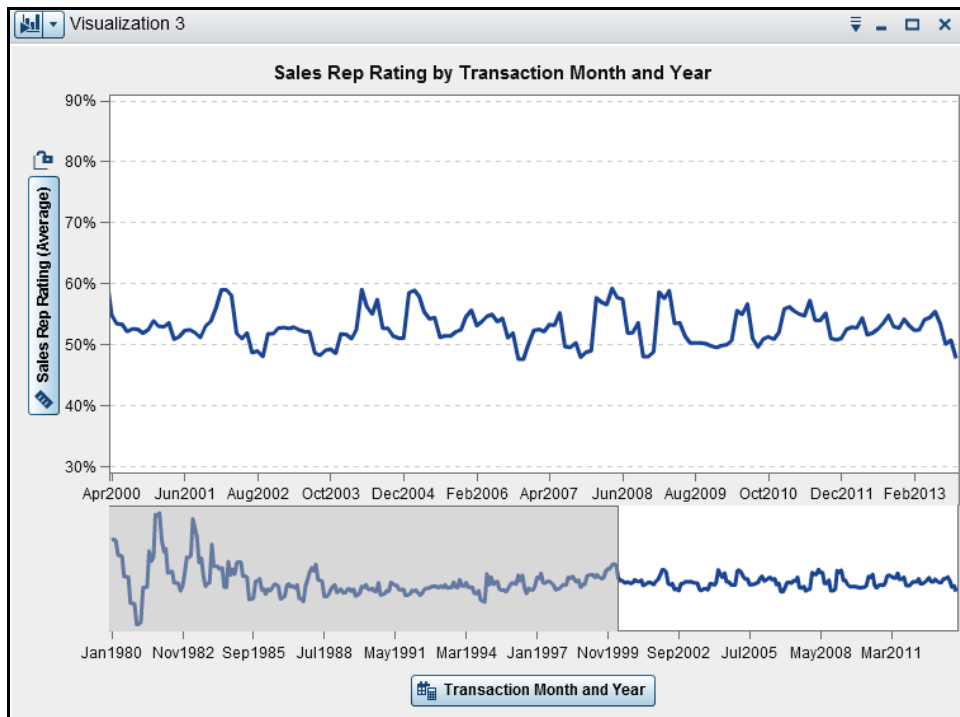
- d. Double-click the box that displays the correlation of **Vendor Satisfaction** and **Sales Rep Rating**.

An additional visualization is created to show the frequency of **Unit Reliability** and **Product Quality**.






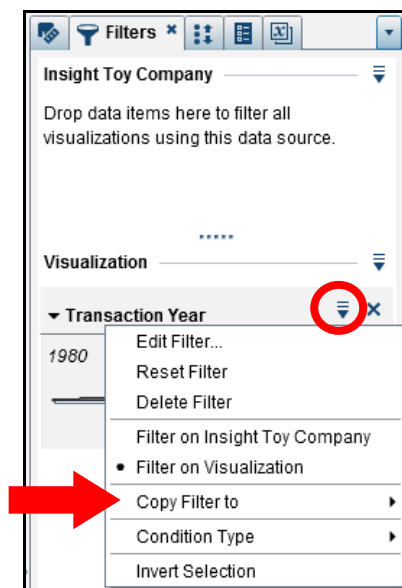
- e. Click  (**Minimize**) on the visualization header to minimize both visualizations to the Dock pane.
9. Create another visualization to analyze product material cost by month.
- Hold down the Ctrl key and click to select the following data items (in the order specified):
 - **Transaction Month and Year**
 - **Sales Rep Rating**
 - Drag the selected items to the workspace.


The automatic chart displays the information using a line chart and includes an overview axis.

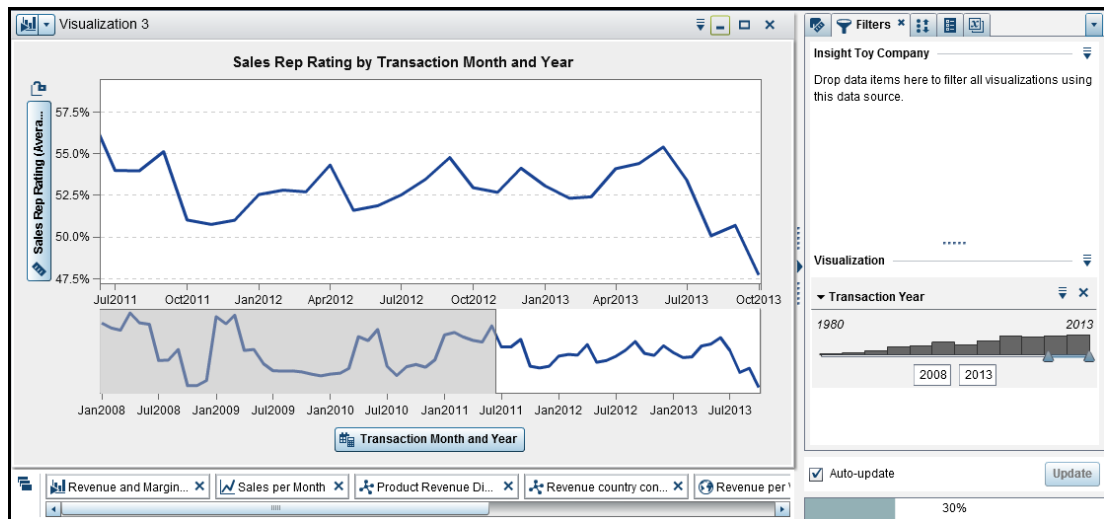


c. Copy the previously created visualization filter.

- 1) In the Dock pane, click  (**Manage visualizations**) and select **Product Sales by Product Hierarchy** to display that visualization.
- 2) Click  (the **Filters** tab) in the right pane to select it.
- 3) In the Visualization area, click  (**Options**) next to **Transaction Year** and select **Copy Filter to Visualization 3**.

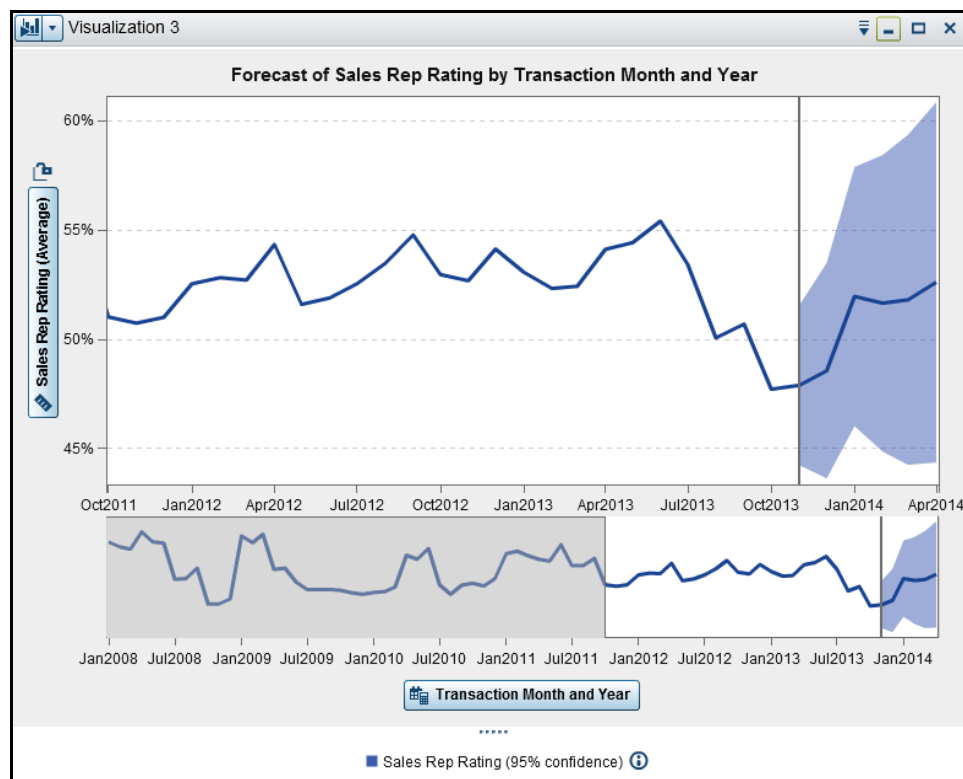



- 4) Click  (**Minimize**) on the Product Sales by Product Hierarchy visualization heading to minimize the visualization to the Dock pane.
- 5) Notice that the filter was copied to Visualization 3 and has been applied.



- d. Right-click in the background of the line chart and select **Show Forecast**.

The line chart now displays predicted values based on the historical information:





- e. Click  (**About these forecast results**) at the bottom of the visualization to display additional information.

- f. Click  next to **Sales Rep Rating** to expand the analysis information.

Results Analysis	
Property	Value
What does this mean?	The forecast shows the predicted values of the measure based on the historical values. The bands around the forecast represent the 95% confidence interval for the forecast.
▼ Sales Rep Rating	
Forecast algorithm	"Sales Rep Rating" is forecast using the "Winters Method (Additive)" algorithm.

10. Add a new visualization and set the type to crosstab.

- Click  (**Minimize**) on the visualization heading to minimize the visualization to the Dock pane.
- Click  (**Crosstab**) in the toolbar to create a new crosstab visualization.
- Hold down the Ctrl key and click to select the following data items (in the order listed):

- **Product hierarchy**
- **Order Product Cost**
- **Order Total**
- **Gross Margin ratio**



You have to scroll to the bottom of the Data pane to find **Gross Margin ratio**, which is in the Aggregated Measures group.

- Drag the selected data items to the visualization.

The crosstab visualization should resemble the following:

Visualization 4				
All Product hierarchy				
Product Brand ▲	Order Product Cost	Order Total	Gross Margin ratio	
Novelty	126,506,192	306,136,496	58.7%	
Toy	158,551,308	379,719,372	58.2%	

- Click  (**Expand**) next to **Novelty**.


The crosstab is updated:

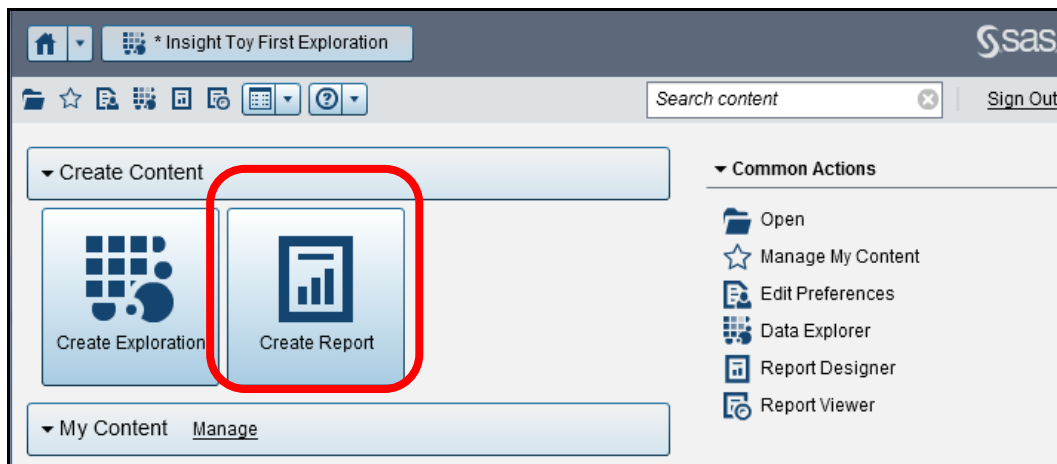
All Product hierarchy				
Product Brand ▲	Product Line ▲	Order Product Cost	Order Total	Gross Margin ratio
Novelty	Beach	27,335,593	65,791,245	58.5%
	Bead	52,336,003	126,269,000	58.6%
	Gift	28,901,923	70,474,951	59.0%
	Promo	14,971,842	36,290,437	58.7%
	Thrifty	2,960,831	7,310,863	59.5%
Toy		158,551,308	379,719,372	58.2%



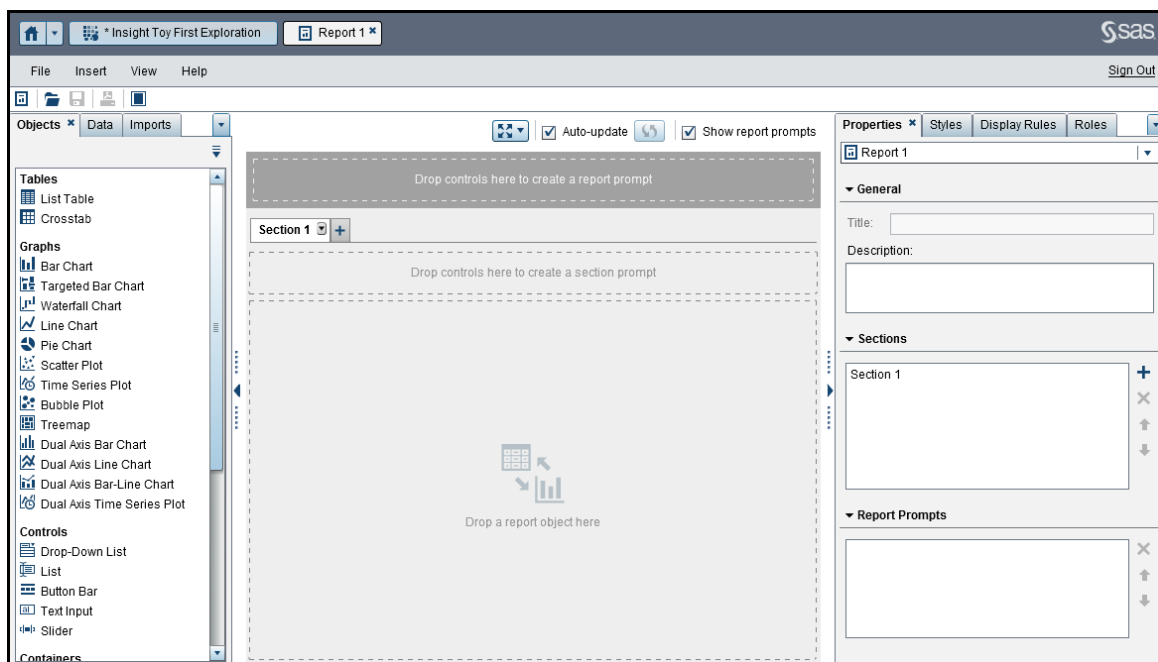
Using SAS Visual Analytics Designer

In this demonstration, you use SAS Visual Analytics Designer to create an interactive report with two sections and several report objects.

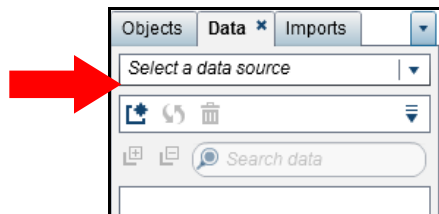
1. Click  (**Home Page**) in the upper left corner to view the SAS Visual Analytics Home Page.
2. From the Home Page, click **Create Report** in the Create Content area.



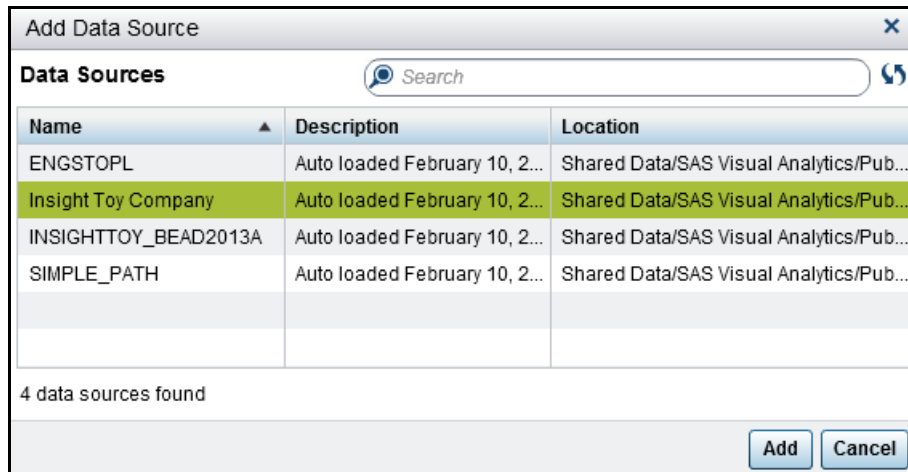
SAS Visual Analytics Designer appears.



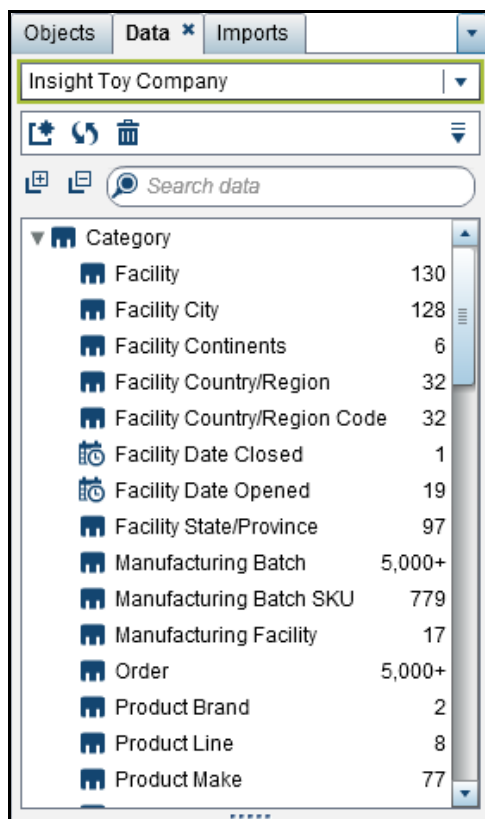
3. Open a data source.
 - a. Click the **Data** tab in the left pane to make it active.
 - b. Click **Select a data source** at the top of the Data tab.



- c. Double-click **Insight Toy Company** in the Add Data Source window.

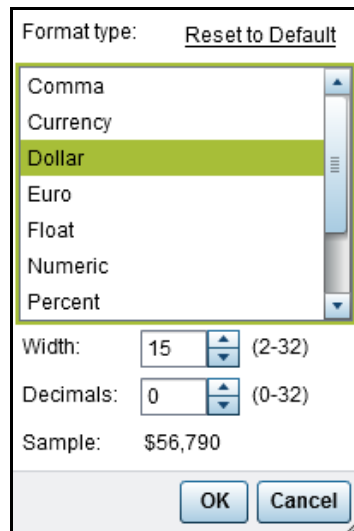


The data source is loaded and the data items are displayed on the Data tab in the left pane.



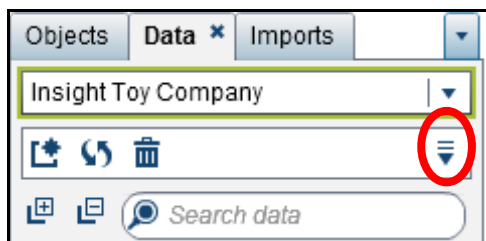
4. Change data item properties.

- a. Select **Order Product Cost** on the Data tab in the left pane.
 - 1) At the bottom of the Data pane, click **Comma** in the right column of the **Format** property to display the format selector.
 - 2) Select **Dollar** as the format type. Accept the default values for the **Width** and **Decimals** fields.

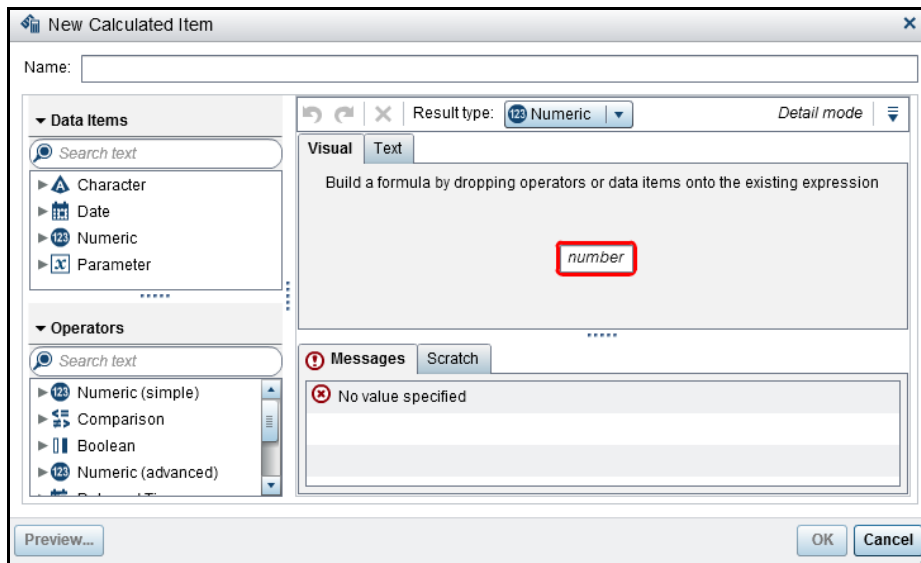


- 3) Click **OK**.
- b. Select **Order Total** on the Data tab.
 - 1) Click **Comma** in the right column of the **Format** property to display the format selector.
 - 2) Select **Dollar** as the format type. Accept the default values for the **Width** and **Decimals** fields.
 - 3) Click **OK**.
5. Create a new data item.

- a. Click  (**Options**) at the top of the Data tab in the left pane.

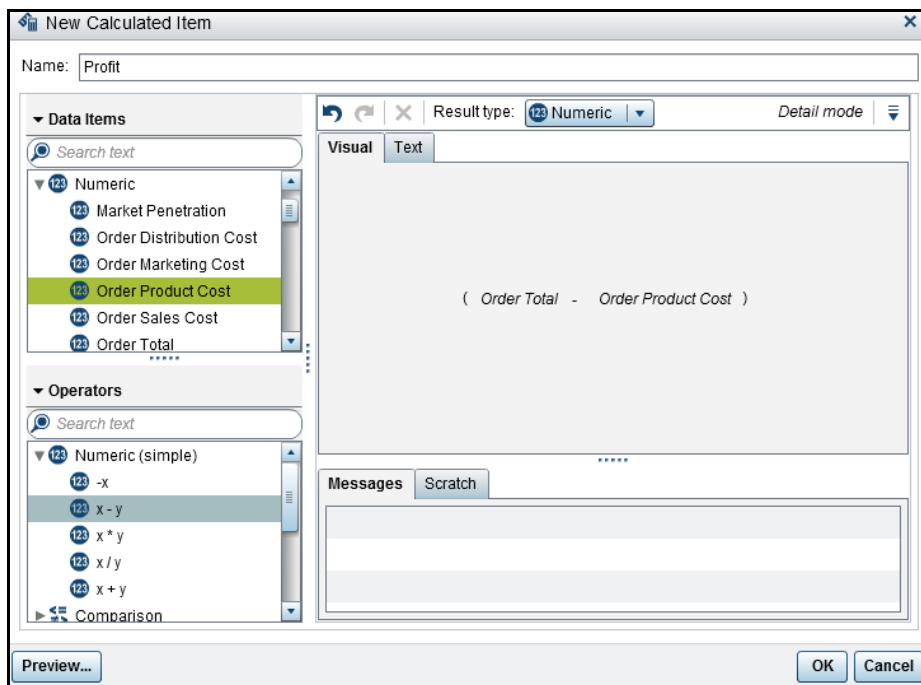


- b. Select **New Calculated Item**. The New Calculated Item window appears.




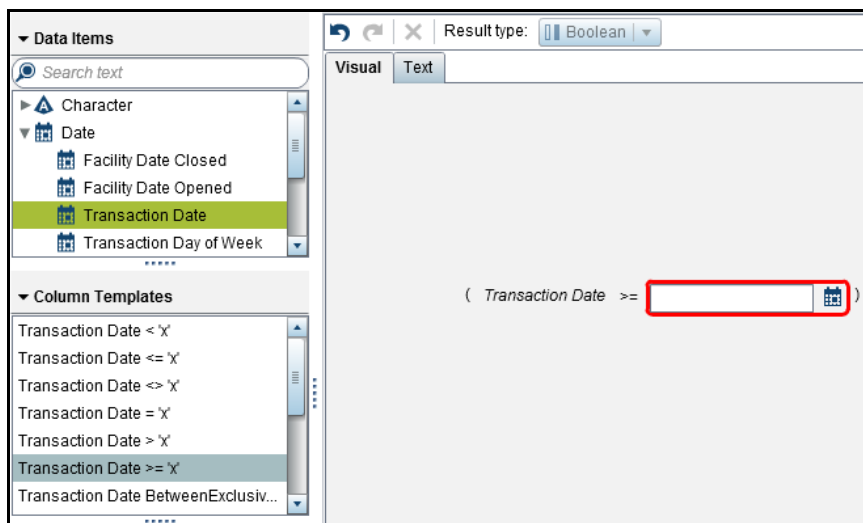
- c. Enter **Profit** in the **Name** field.
- d. Double-click **Numeric (simple)** in the Operators section to expand it.
- e. Double-click **x-y**.
- f. Double-click **Numeric** in the Data Items section to expand it.
- g. Double-click **Order Total**.
- h. Double-click **Order Product Cost**.




The New Calculated Item window should resemble the following:

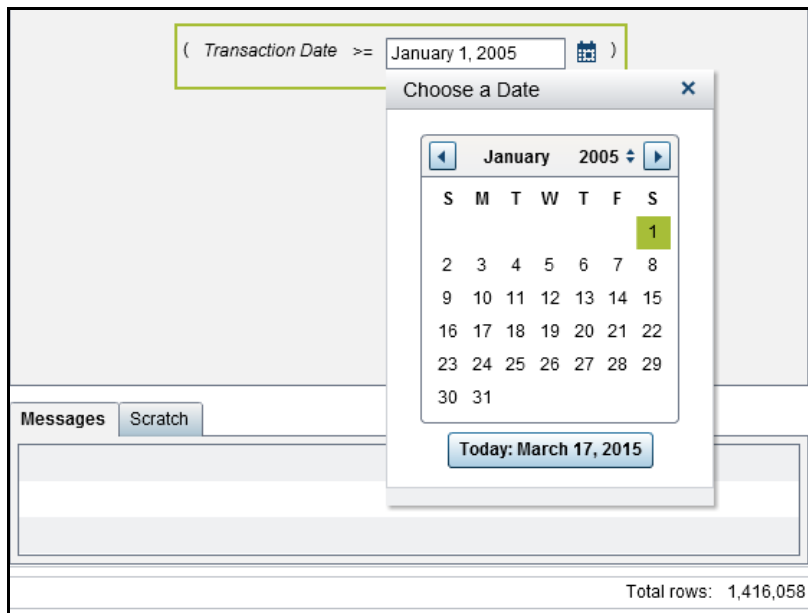



- i. Click **OK**.

- j. If necessary, select **Profit** on the Data tab in the left pane.
 - 1) At the bottom of the Data pane, click **Comma** in the right column of the **Format** property to display the format selector.
 - 2) Select **Dollar** as the format type.
 - 3) Accept the default values for the **Width** field.
 - 4) Select **0** for the **Decimals** field.
 - 5) Click **OK**.
6. Add a data source filter to limit the data used in the report.
 - a. Click  (**Options**) at the top of the Data tab in the left pane.
 - b. Select **New Data Source Filter**.
 - c. Double-click **Date** in the Data Items section to expand it.
 - d. Select **Transaction Date**.
 - e. In the Column Templates list, double-click **Transaction Date >= 'x'**; to add the condition to the expression.



- f. Click  to specify the date for the condition.
- g. In the Choose a Date window, select **January 1, 2005**.
 - 1) Click  to select **January**.
 - 2) Click the bottom portion of the  button to select **2005**.
 - 3) Click **1** to select the date.



 The number of rows returned based on the filter is indicated at the bottom of the window.

Returned rows: 630,458	Total rows: 1,416,058
------------------------	-----------------------

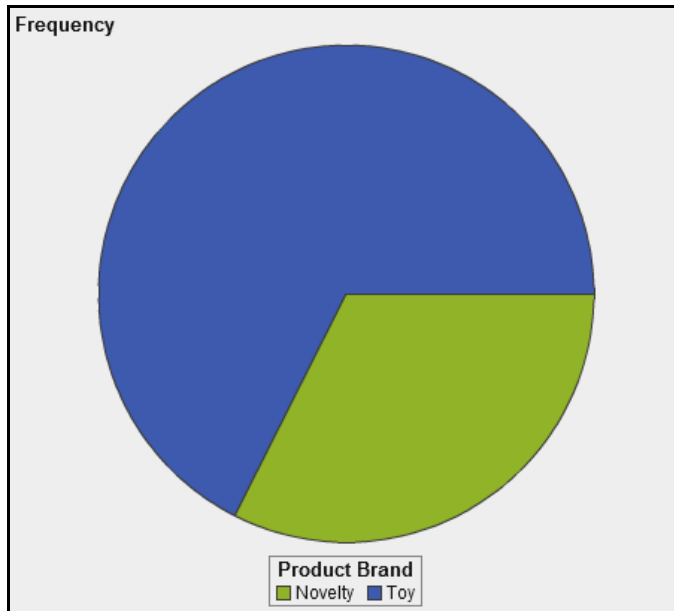
- h. Click **OK** to close the window and apply the data source filter.
7. Add a pie chart to the report canvas.
 - a. Click the **Objects** tab in the left pane to make it active.
 - b. Drag the **Pie Chart** object from the Objects tab in the left pane to the report canvas.

A representation of the pie chart is displayed. The icon in the bottom right corner indicates that the required roles have not been assigned a data item.



- c. Click the **Data** tab in the left pane to make it active.
- d. Drag **Product Brand** from the Data tab onto the pie chart.

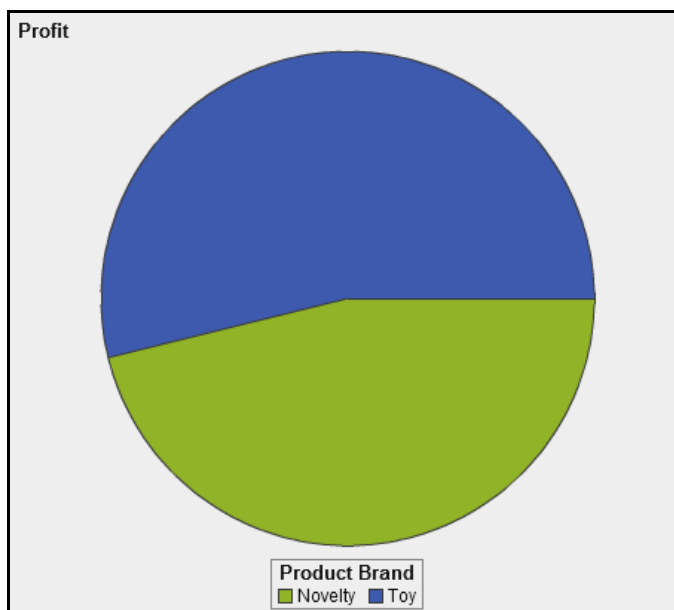
The pie chart is updated to show a slice for each value of **Product Brand**. The size of the slice is based on the frequency count.



When no measure is selected, the sizes of the pie slices are based on frequency.

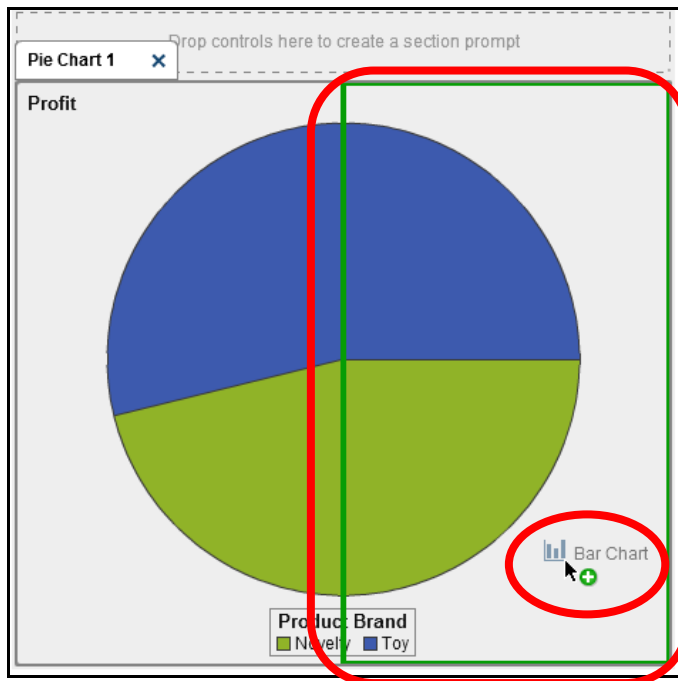
- e. Drag **Profit** from the Data tab onto the pie chart.

The pie chart is updated:



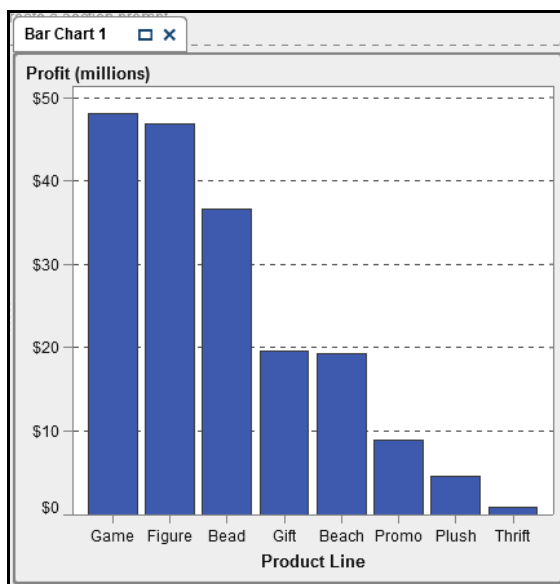
- 8. Add a bar chart to the report canvas to the right of the pie chart.

- a. Click the **Objects** tab in the left pane to make it active.
- b. Drag the **Bar Chart** object from the Objects tab in the left pane to the right of the pie chart on the report canvas.



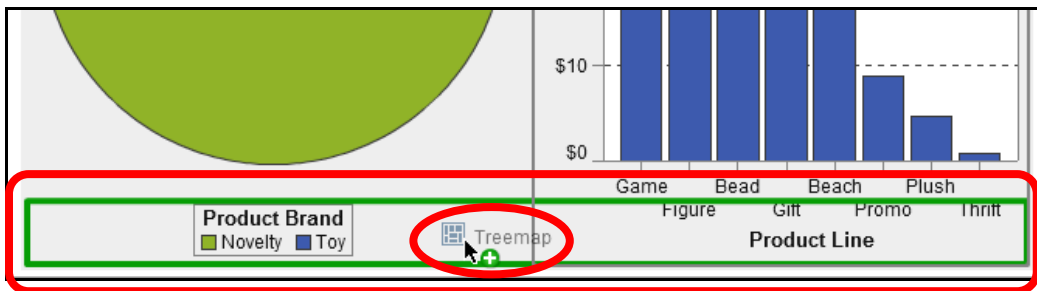
- c. Click the **Data** tab in the left pane to make it active.
- d. Hold down the Ctrl key and select **Product Line** and **Profit** from the Data tab and drag them onto the bar chart.

The bar chart is updated:



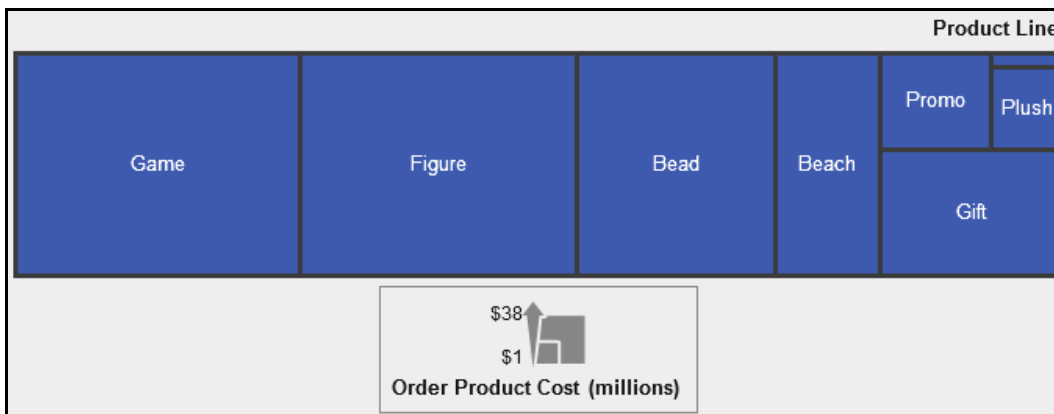
9. Add a treemap to the bottom of the report.

- a. Click the **Objects** tab to make it active.
- b. Drag the **Treemap** object from the Objects tab to the report canvas and drop it in the drop zone at the bottom of the report.

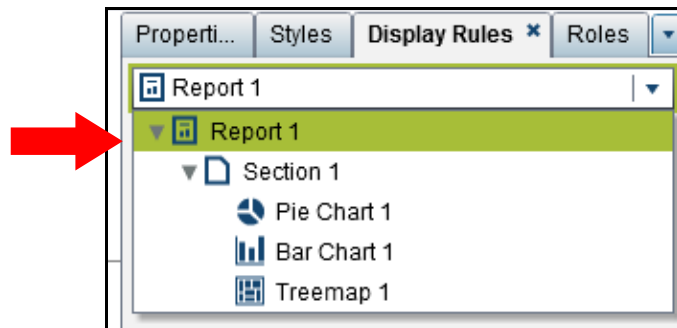


- c. Click the **Data** tab to make it active.
- d. Hold down the Ctrl key and select **Product Line** and **Order Product Cost** from the Data tab and drag them onto the treemap.

The treemap should resemble the following:

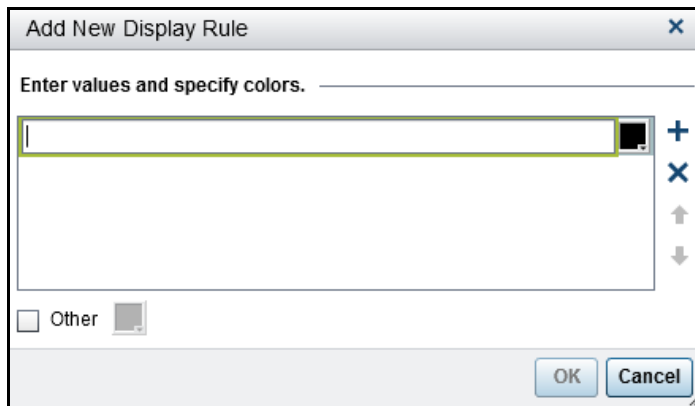


10. Create a report-level display rule.
 - a. Click the **Display Rules** tab in the right pane.
 - b. Select **Report 1** from the list at the top of the Display Rules tab.



- c. Click **New**.


The Add New Display Rule window appears.




- d. Enter **Toy** as the value.



As you type, you see values from the data that begin with the characters that you have entered.

- e. Click the color selector .

- f. Select a green color.

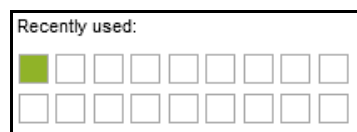
- g. Click  to add another value.


- h. Enter **Game** as the value.

- i. Select the same green color.




Recently used colors appear at the bottom of the window.



- j. Click  to add another value.

- k. Enter **Figure** as the value.

- l. Select the same green color.

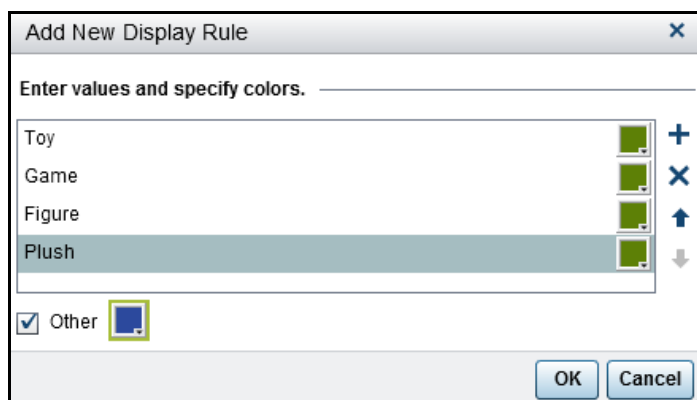
- m. Click  to add another value.

- n. Enter **Plush** as the value.

- o. Select the same green color.

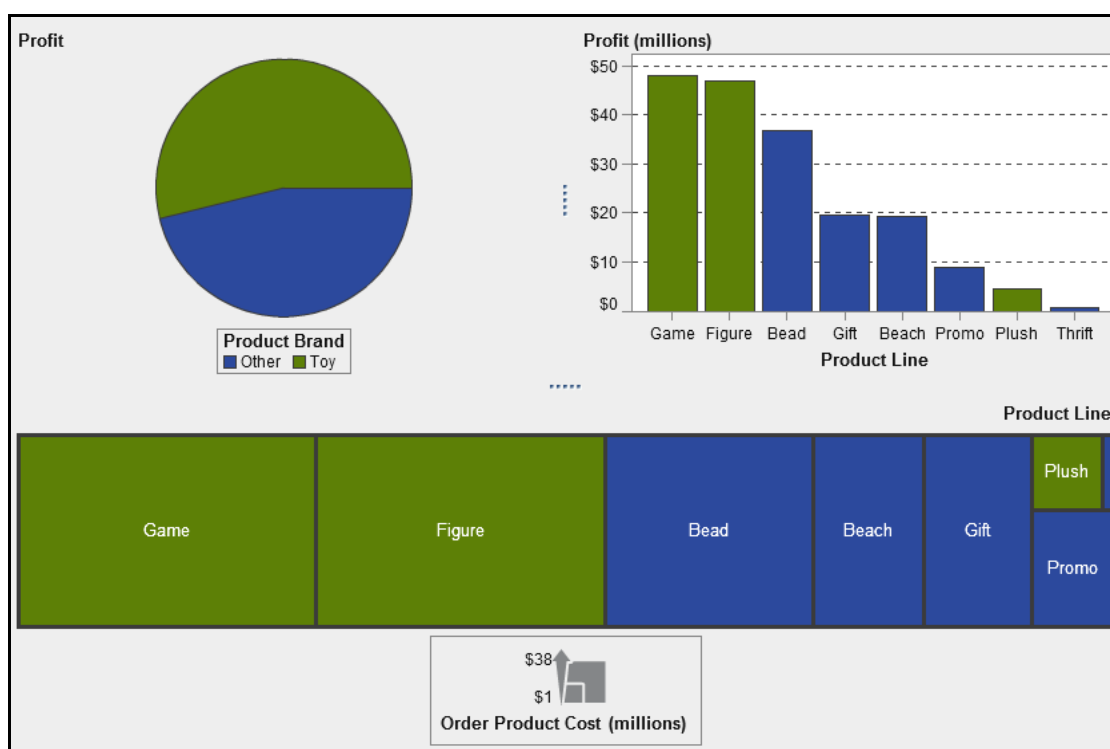
- p. Click the **Other** check box.

- q. Select a blue color.



- r. Click **OK** to close the window and apply the display rule.

The report objects are updated.

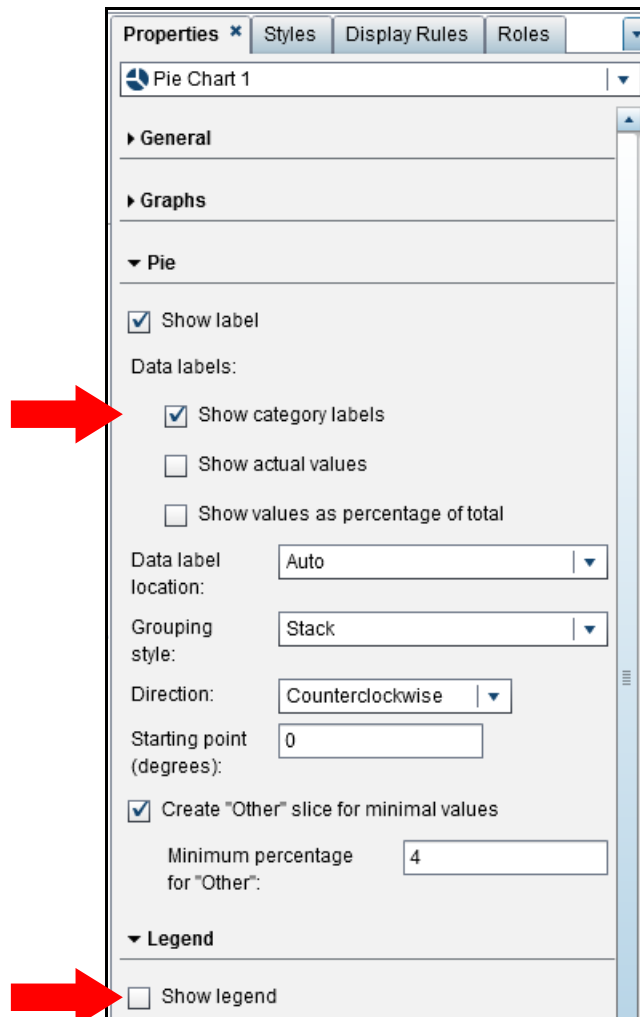


11. Modify report object properties.

- Click the **Properties** tab in the right pane.
- Select **Treemap 1** in the list at the top of the window.




- c. Type **Order Product Cost** in the **Title** field and press Enter.
- d. Select **Pie Chart 1** in the selection list at the top of the right pane.
- e. Click **Show category labels**.
- f. Clear the **Show legend** check box.



- g. Click the **Styles** tab.

h. Click **Text Styling** to expand it.

1) For the **Value** field, click **B (Bold)**.

2) For the **Value** field, click  (**Select a font color**) and select white.

12. Create a data item for transaction year.

a. If necessary, click the **Data** tab to make it active.

b. Right-click **Transaction Date** and select **Duplicate Data Item**.

c. Verify that **Transaction Date (1)** is selected in the list of data items.

d. At the bottom of the Data pane, click in the right column of the **Name** property.

e. Type **Transaction Year** and press Enter.

f. Click in the right column of the **Format** property to display the format selector.

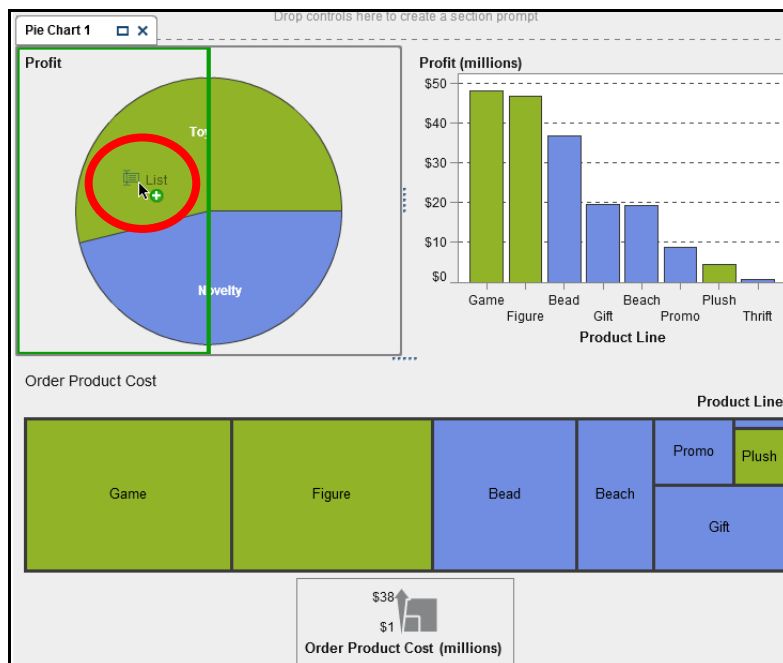
g. Select **Year** as the format type.

h. Click **OK** to apply the format.

13. Add a control to enable the selection of one or more years to filter the report.

a. Click the **Objects** tab to make it active.

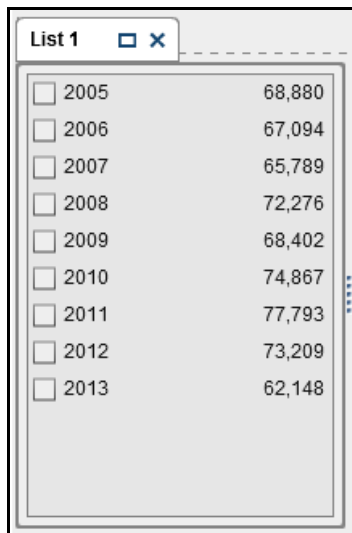
b. Drag a **List** control from the Objects tab to the left of the pie chart on the report canvas.



c. Click the **Data** tab to make it active.

d. Drag **Transaction Year** from the Data tab to the list control.

The list control should resemble the following:




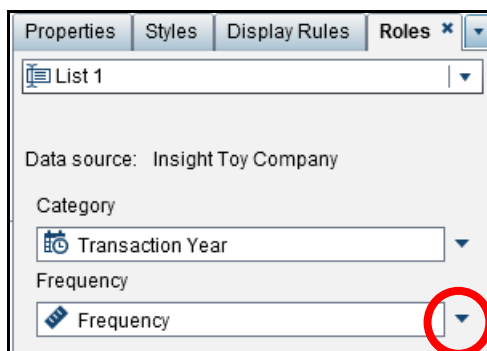
Year	Count
2005	68,880
2006	67,094
2007	65,789
2008	72,276
2009	68,402
2010	74,867
2011	77,793
2012	73,209
2013	62,148

- e. Click the check boxes for **2011**, **2012**, and **2012**.



At this point you are selecting item only in the list control. No interactions have been established, so the other report objects remain unchanged.

- f. Select **Roles** in the right pane.
- g. Verify that **List 1** is the selected item.
- h. Select  (**Edit selection**) next to the **Frequency** field.



Properties Styles Display Rules Roles

List 1

Data source: Insight Toy Company

Category


Transaction Year

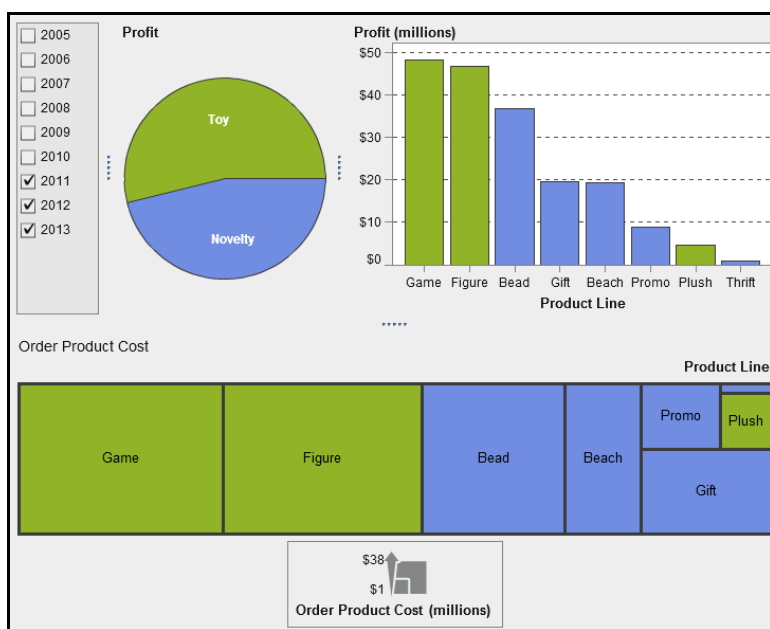
Frequency

Frequency

- i. Select **Remove Frequency**.
- j. Click **Yes** when prompted to remove the data assignment.

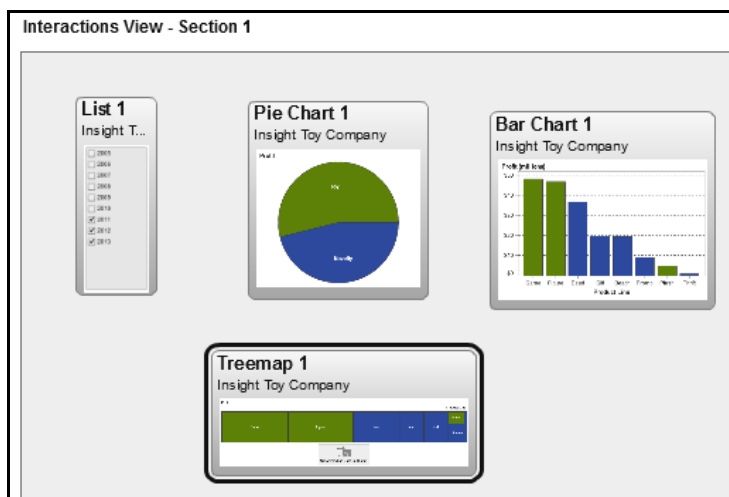
<input type="checkbox"/>	2005
<input type="checkbox"/>	2006
<input type="checkbox"/>	2007
<input type="checkbox"/>	2008
<input type="checkbox"/>	2009
<input type="checkbox"/>	2010
<input checked="" type="checkbox"/>	2011
<input checked="" type="checkbox"/>	2012
<input checked="" type="checkbox"/>	2013

k. Use the handle icons () to resize the report objects to resemble the following:

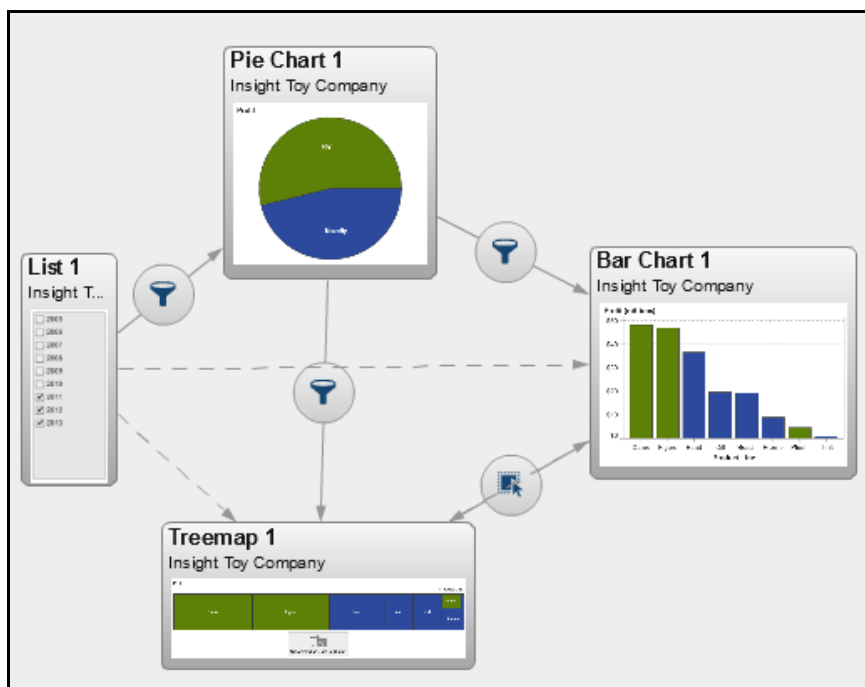



14. Establish interactions between the objects in the report.

a. Select **View** ⇒ **Show Interactions**.

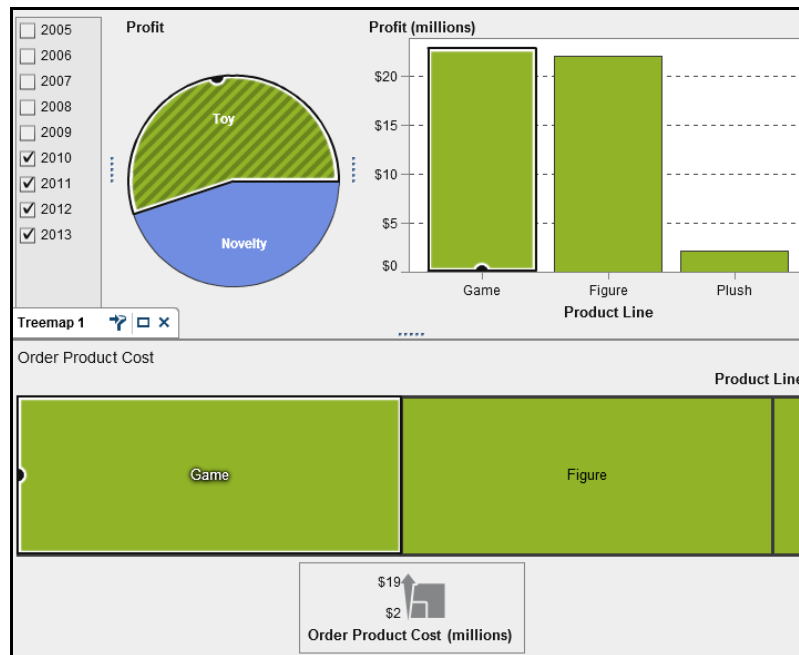


- b. Move the mouse pointer over **List 1** and drag the pencil icon to **Pie Chart 1** to establish a filter interaction.
- c. Move the mouse pointer over **Pie Chart 1** and drag the pencil icon to **Bar Chart 1** to establish a filter interaction.
- d. Move the mouse pointer over **Pie Chart 1** and drag the pencil icon to **Treemap 1** to establish a filter interaction.
- e. Move the mouse pointer over **Treemap 1** and drag the pencil icon to **Bar Chart 1** to establish a filter interaction.
- f. Right-click the new filter icon between Treemap1 and Bar Chart 1 and select **Interaction Type** ⇒ **Brush**.



 The dashed lines indicate derived interactions and are added automatically.

- g. Select **View** ⇒ **Show Layout**.
- h. Test the interactions.
 - 1) Click the check box for **2010**. The other report objects should update to reflect additional values.
 - 2) Click the pie slice for **Toy** in the pie chart. The bar chart and treemap should update to display only the product lines for the Toy product brand.
 - 3) Click the bar for **Figure** in the bar chart. The corresponding tile in the treemap should be selected.
 - 4) Click the tile for **Game** in the treemap. The corresponding bar in the bar chart should be selected.



15. Add another section to the report.

Select **Insert** ⇒ **New Section**.



16. Add a crosstab to Section 2.

- Click the **Objects** tab to make it active.
- Drag the **Crosstab** object from the Objects tab to the report canvas.
- Click the **Data** tab to make it active
- Hold down the Ctrl key and select the following data items (in the order specified):
 - **Product Brand**
 - **Product Line**
 - **Profit**
 - **Order Distribution Cost**
 - **Order Marketing Cost**
- Drag the selected items onto the crosstab.

Section 1

Section 2

+

Drop controls here to create a section prompt

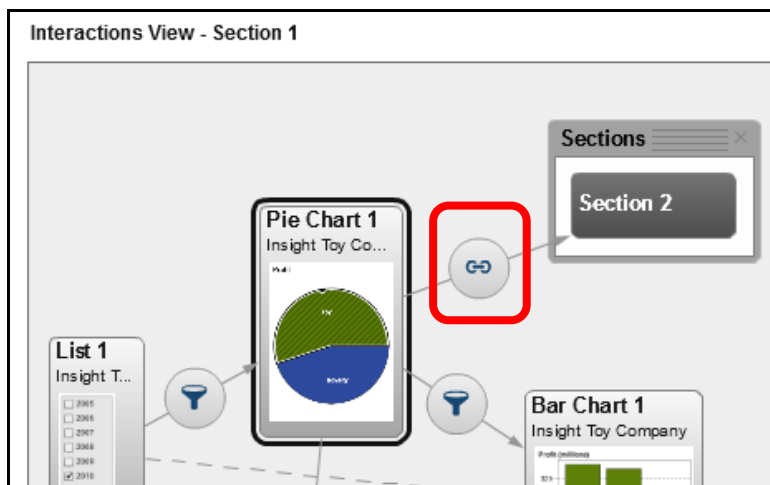
Crosstab 1

Product Brand ▲	Product Line ▲	Profit	Order Distribution Cost	Order Marketing Cost	
Novelty	Beach	\$19,330,770	222,591.25	1,505,564.27	
	Bead	\$36,673,973	415,358.08	2,846,722.40	
	Gift	\$19,590,284	268,698.16	1,468,327.99	
	Promo	\$8,854,947	156,484.50	671,889.66	
	Thrift	\$801,817	79,079.30	32,821.76	
Toy	Figure	\$46,781,867	769,320.95	3,881,212.38	
	Game	\$48,075,466	743,510.19	3,998,450.80	
	Plush	\$4,589,495	231,054.42	308,942.96	

17. Link Section 1 to Section 2.

- Click the **Section 1** tab to make it the active section.
- Select **View** ⇒ **Show Interactions**.
- Click **Pie Chart 1** and drag the pencil icon to the **Section 2** section.


A filter interaction is established between the two report objects.



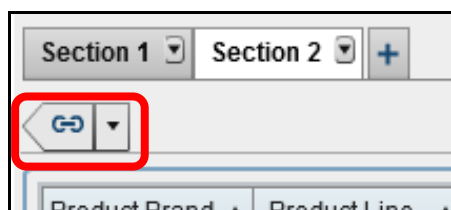
- Select **View** ⇒ **Show Layout**.
- Test the interactions.
 - Double-click the slice for **Novelty** in the pie chart.

Section 2 is displayed.

Section 1		Section 2			
Product Brand ▲		Product Line ▲	Profit	Order Distribution Cost	Order Marketing Cost
Novelty	Beach		\$8,853,433	100,212.08	692,154.81
	Bead		\$16,614,241	184,067.27	1,298,752.40
	Gift		\$9,121,457	119,266.37	694,583.28
	Promo		\$3,483,999	62,383.94	269,051.10
	Thrift		\$352,539	35,755.95	13,922.20


 The crosstab objects is filtered by the value selected in the pie chart (**Novelty**) as well as the values selected in the list control (**2010, 2011, 2012, and 2013**).

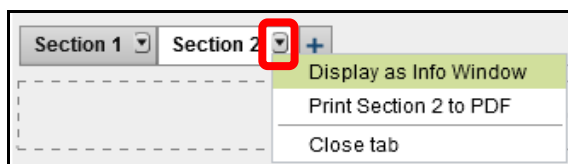
- 2) Click  (**Back to Section 1**).



Section 1 is displayed.

18. Change Section 2 to an info window.

- Click the **Section 2** tab to make it the active section.
- Click  on the Section 2 tab and select **Display as Info Window**.



Notice the tab name changes to **Info Window 1**.

Section 1

Info Window 1

+

This tab is available only to report authors. To make the Info window available in the viewers, create a link to the Info window from a report object.

Product Brand ▲	Product Line ▲	Profit	Order Distribution Cost	Order Marketing Cost	
	Beach	\$19,330,770	222,591.25	1,505,564.27	

19. Test the interactions.

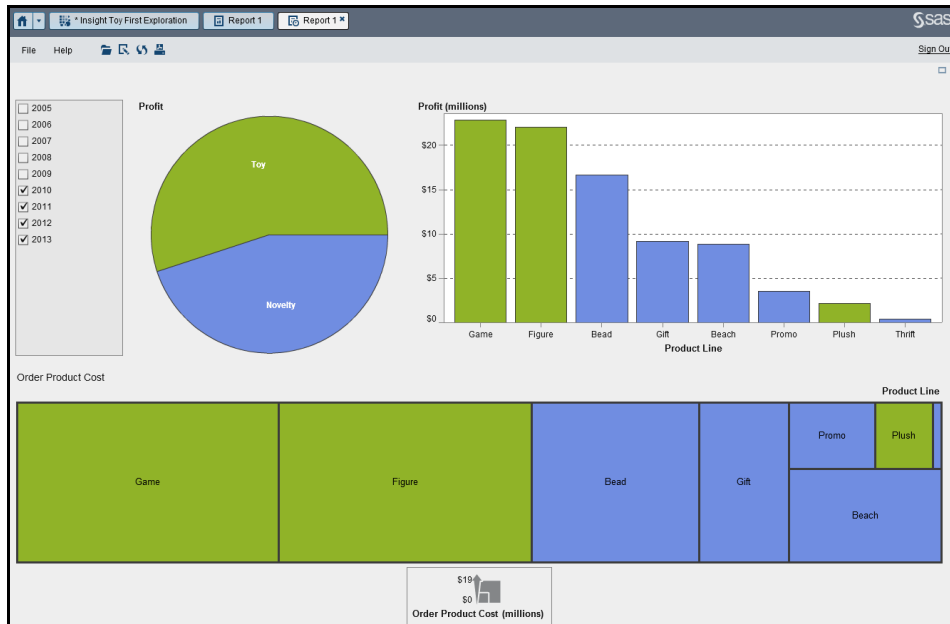


You cannot test the Info Window functionality when editing the report.

- Select **File** ⇒ **Save As** to save the report.

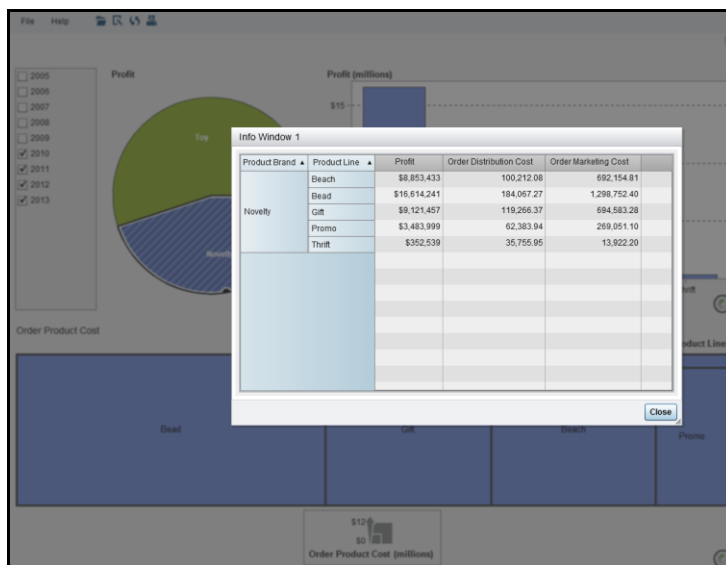
- b. Verify that **My Folder** is selected as the folder.
- c. Accept the default name of **Report 1** and click **Save**.
- d. Select **File** ⇒ **View Report**.

The report appears in SAS Visual Analytics Viewer:



- e. Click the pie slice for **Toy** in the pie chart. The bar chart and treemap should update to display only the product lines for the Toy product brand.
- f. Click the bar for **Game** in the bar chart. The corresponding tile in the treemap should be selected.
- g. Double-click the slice for **Novelty** in the pie chart.

The info window is displayed, and it shows information for only the Novelty product brand.





You can move and resize the info window.

- h. Click **Close** to close the info window.
- i. Double-click the slice for **Toy** in the pie chart.


The info window is displayed, and it shows information for only the Toy product brand.

Info Window 1				
Product Brand ▲	Product Line ▲	Profit	Order Distribution Cost	Order Marketing Cost
Toy	Figure	\$22,063,387	363,162.49	1,920,155.08
	Game	\$22,888,075	353,766.86	1,995,275.44
	Plush	\$2,107,113	102,690.11	148,471.99






[Close](#)

- j. Click **Close** to close the info window.



- k. Click  on the far side of the window to expand the right pane.

The Properties tab of the right pane displays the selected object name as well as information about display rules and incoming filters.

Properties		Alerts
Name: Pie Chart 1		
▼ Display Rules		
Report Level		
Toy		
Game		
Figure		
Plush		
Other		
▼ Incoming Filters		
Pie Chart 1		
Transaction Year In (2010) OR		
Transaction Year In (2013) OR		
Transaction Year In (2012) OR		
Transaction Year In (2011)		

20. Click  (**Home Page**) in the upper left corner to view the SAS Visual Analytics Home Page

Please do not log off or shut down the workshop computer.