

# Creating Presentation-Quality ODS Graphics Output

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# What is ODS Graphics?

- New framework for defining graphs
- Used by SAS products to generate automatic graphs
- Accessed by templates, procedures, and interactive applications

# Three Main Presentation Considerations

- Effective graphics content
- Correct graphics style
- Resolution

# Effective Graphics

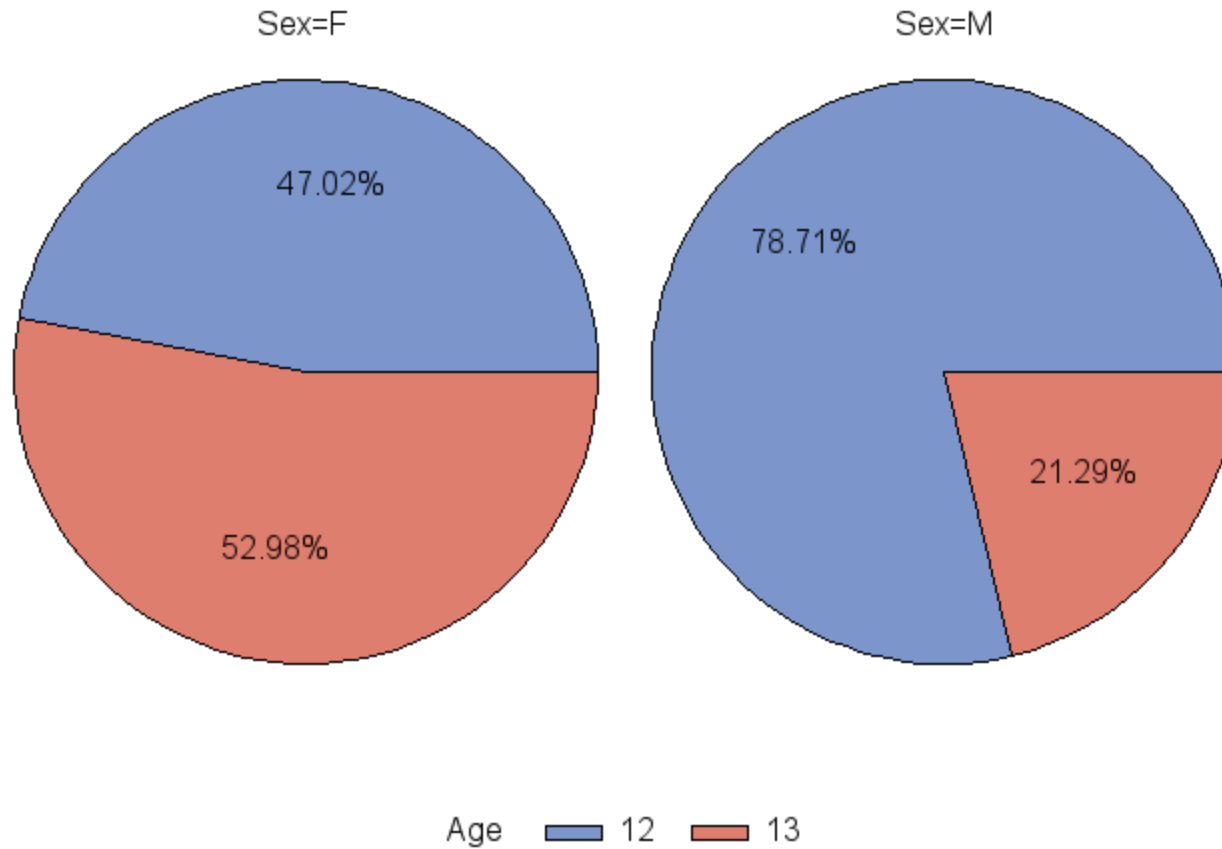
“One graph is more effective than another if its quantitative information can be decoded more quickly and more easily by most observers.”

-- Naomi Robbins

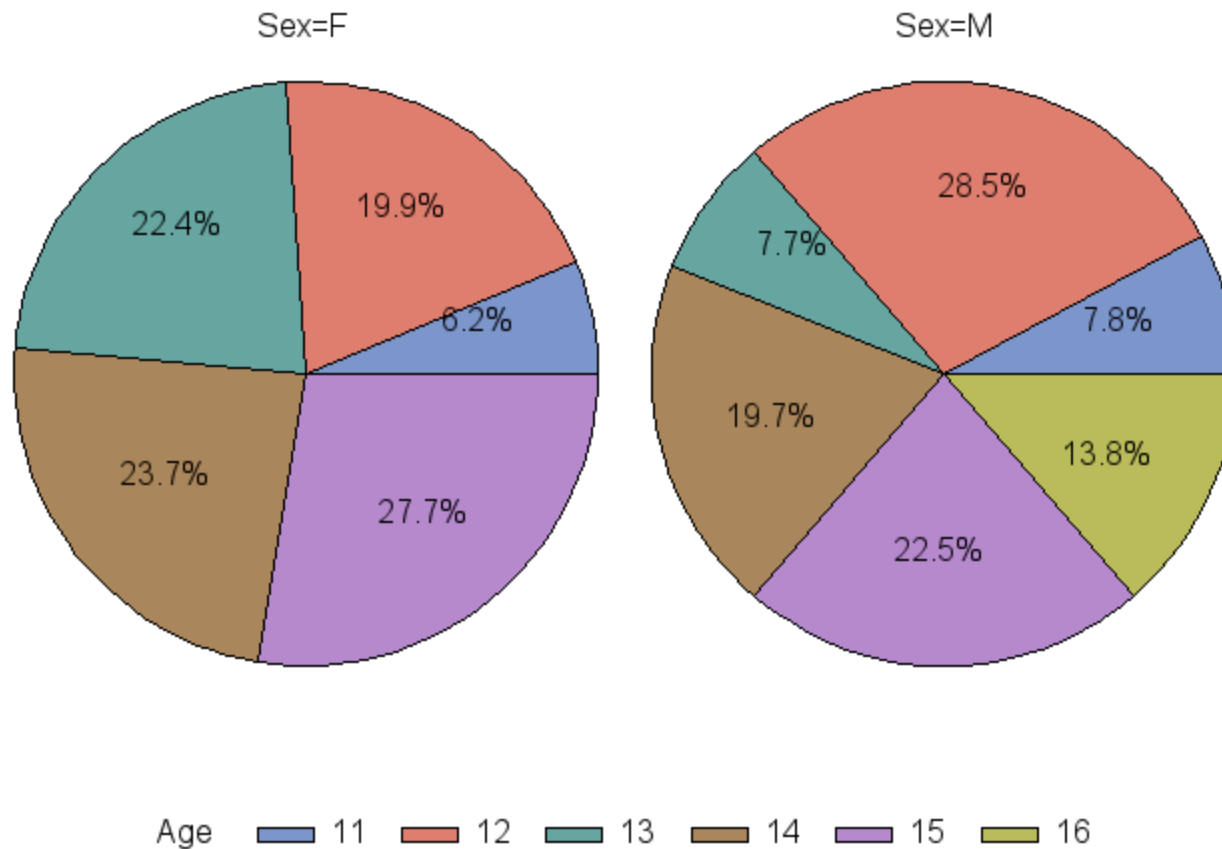
# Effective Content Considerations

- Effective chart type
- Visual attributes that emphasize data
- Effective data labeling
- Uncluttered axes
- Graph layouts to eliminate clutter

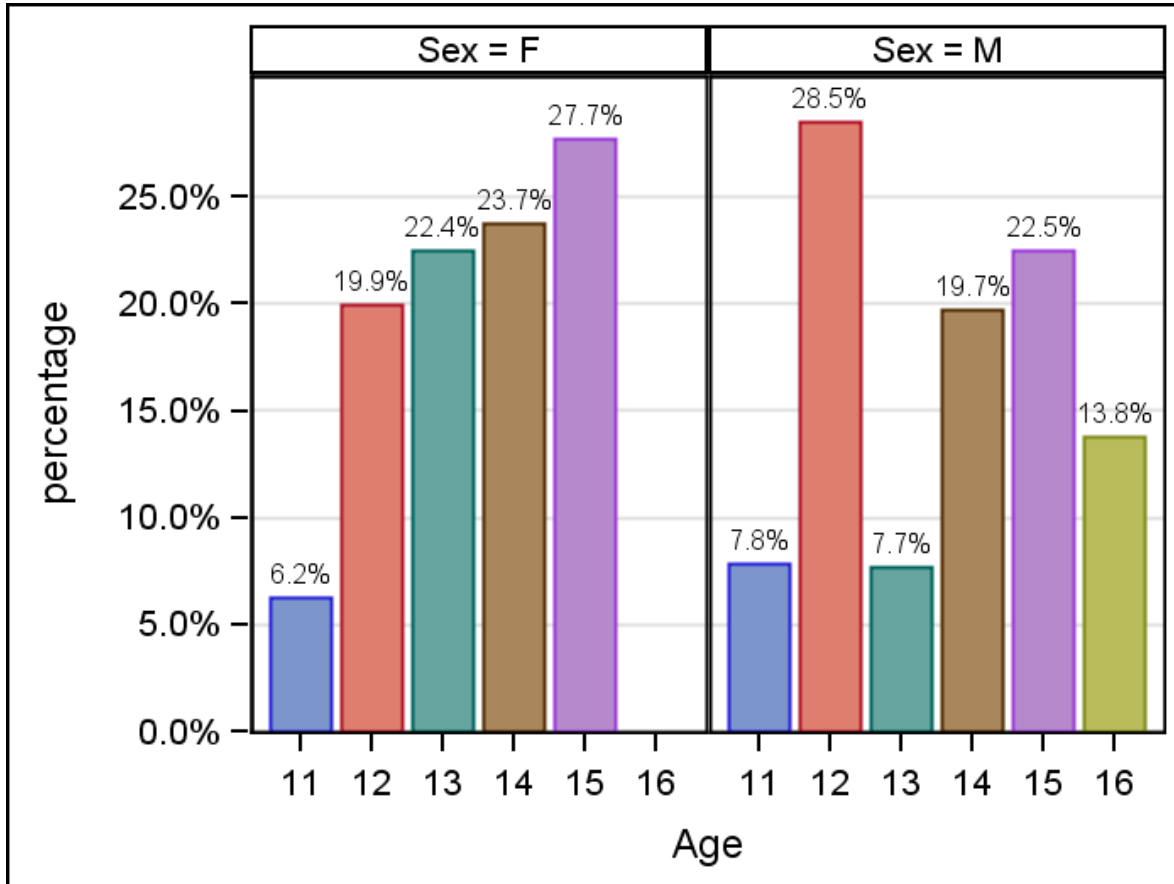
# Effective Chart Type



# Effective Chart Type

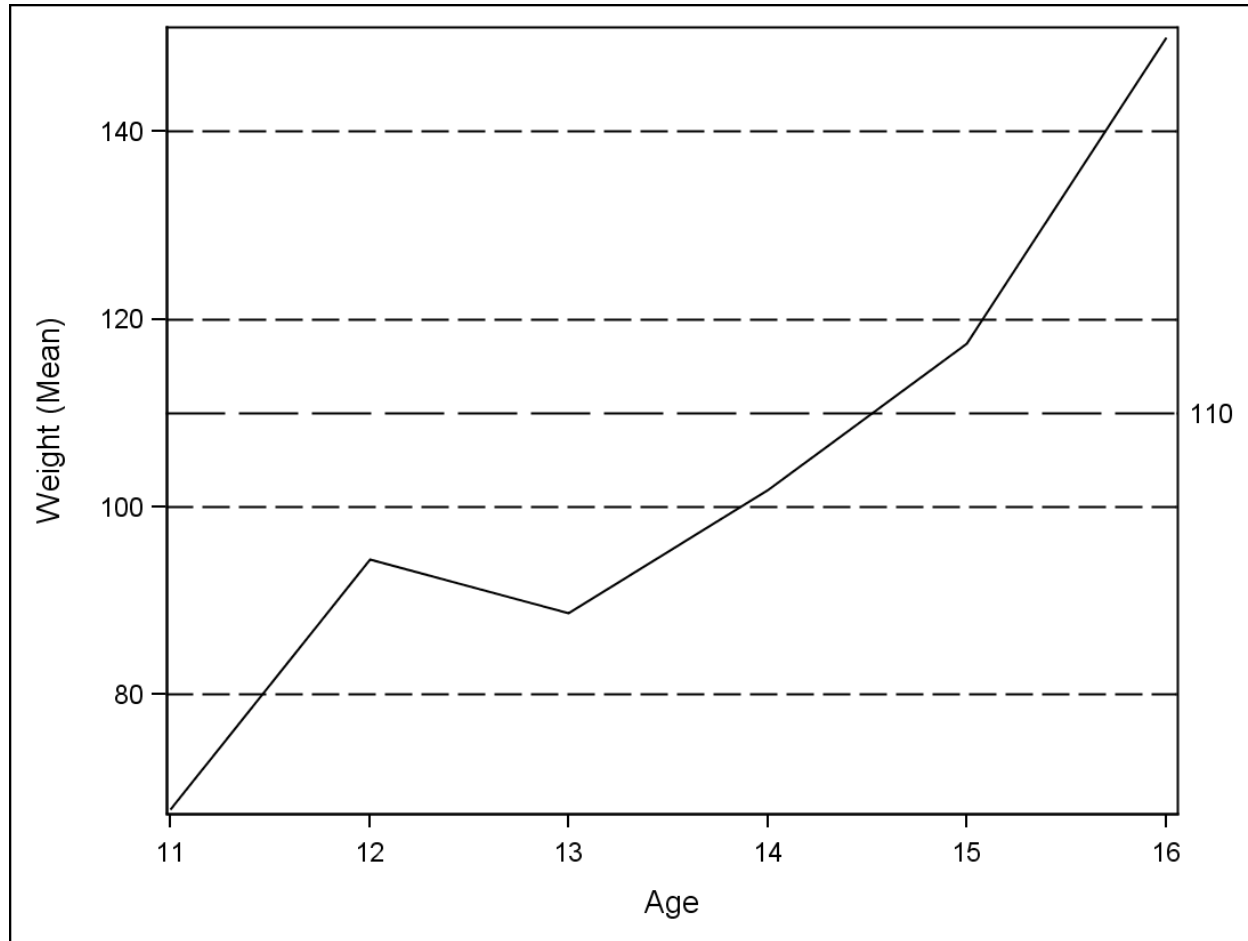


# Effective Chart Type

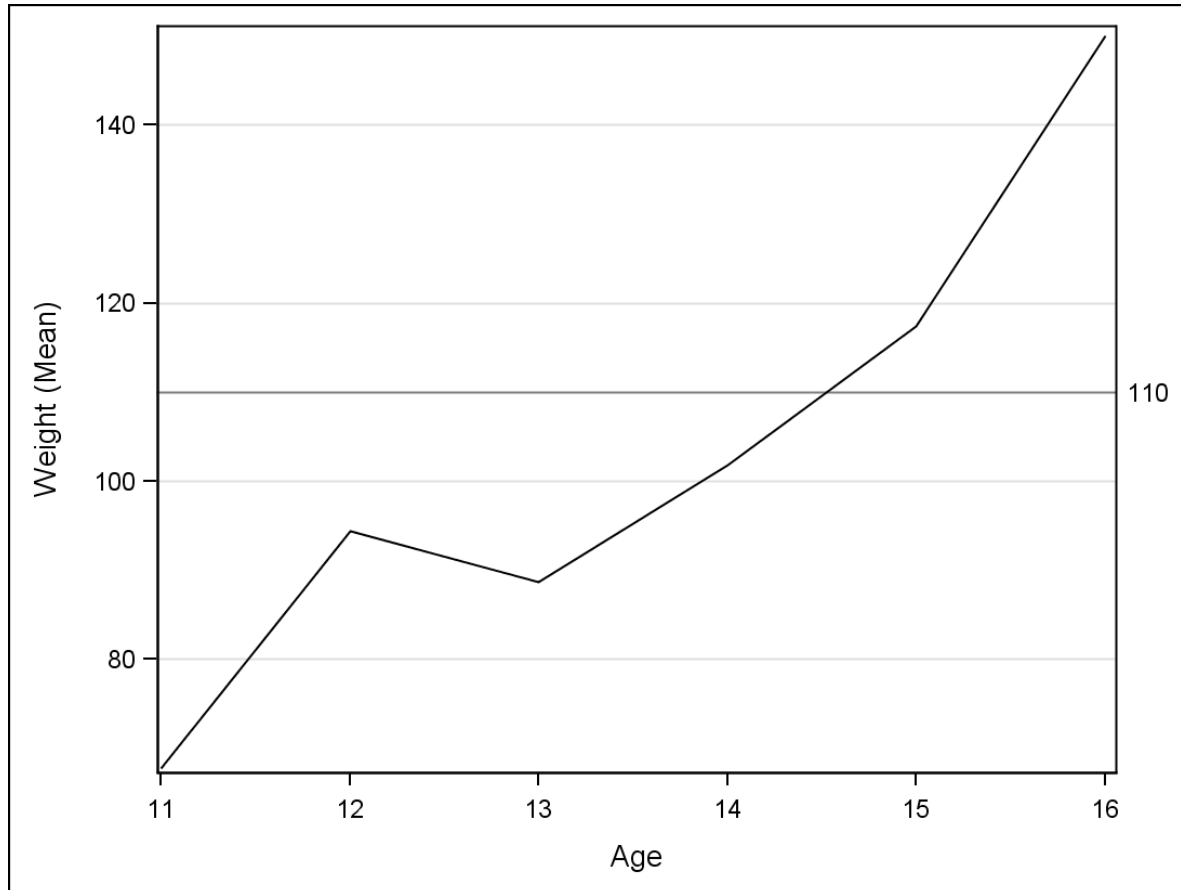


```
proc sgpanel data=percent_data  
    noautolegend;  
    where percentage ne .;  
    panelby sex;  
    rowaxis grid;  
    vbar age / group=age datalabel  
        response=percentage  
        nostatlabel;  
run;
```

# Visual Attributes That Emphasize Data



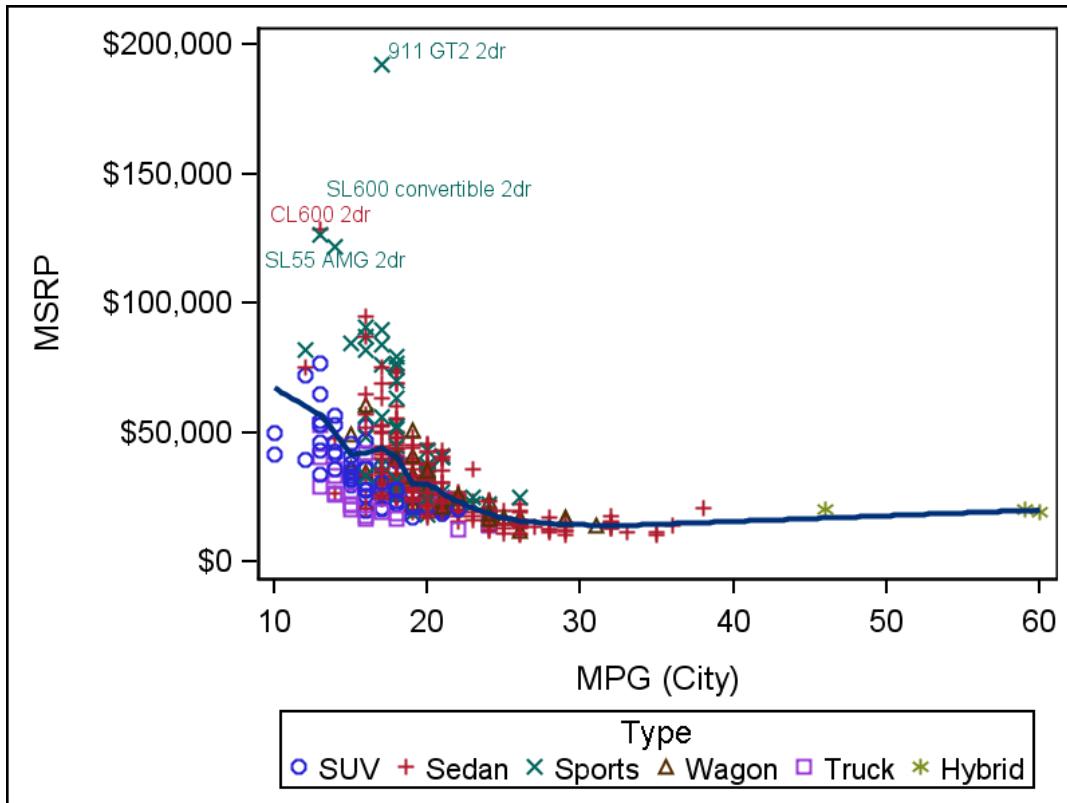
# Visual Attributes That Emphasize Data



```
proc sgplot data=sashelp.class;  
yaxis grid;  
refline 110 / label;  
vline age / response=weight  
stat=mean;  
run;
```



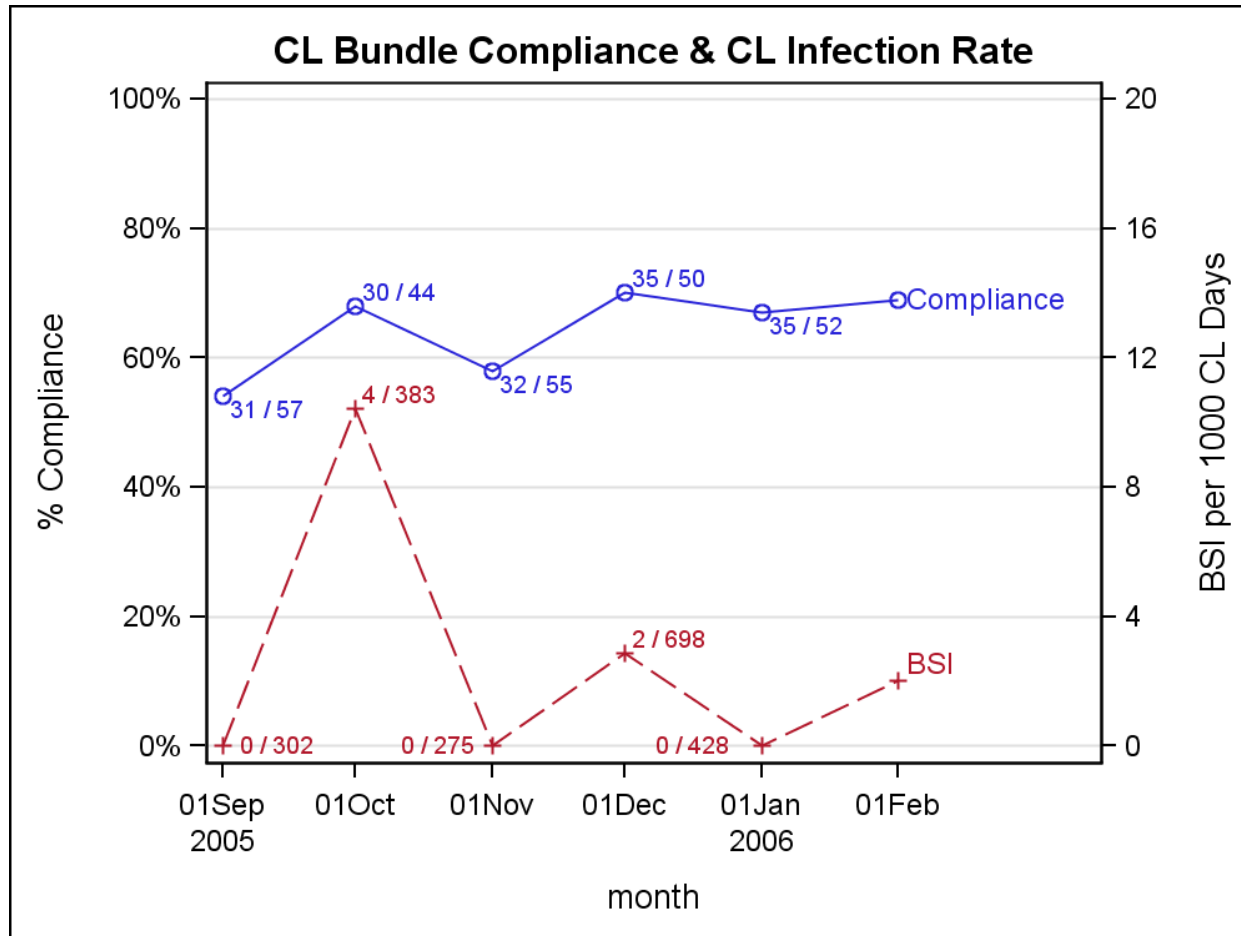
# Effective Data Labeling



```
data cars;
  set sashelp.cars;
  if (msrp >= 100000) then
    expensive=model;
run;
```

```
proc sgplot data=sashelp.cars;
  scatter x=mpg_city y=msrp /
    group=type datalabel=expensive;
  loess x=mpg_city y=msrp / nomarkers;
run;
```

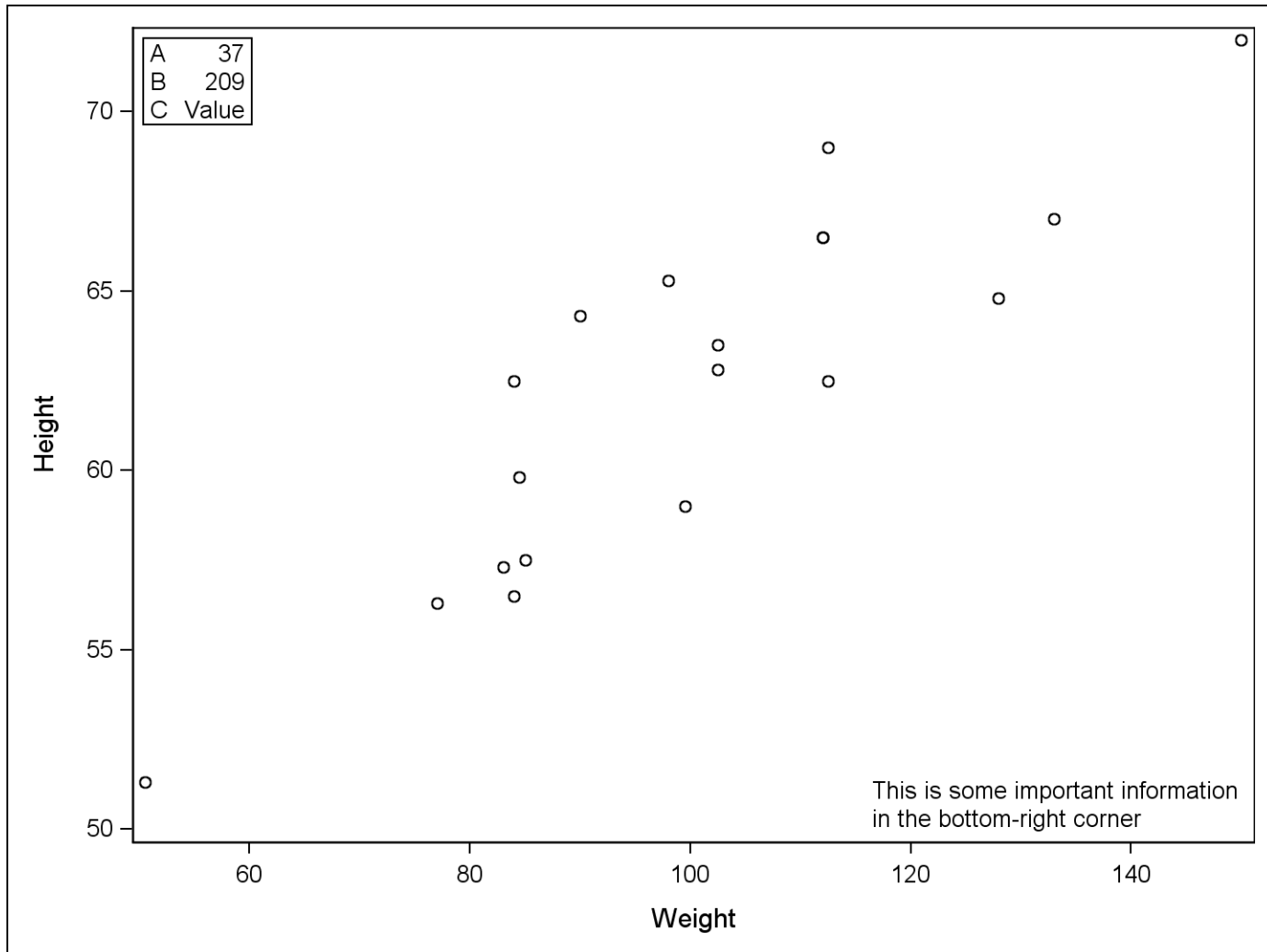
# Effective Data Labeling



# Effective Data Labeling

```
title1 "CL Bundle Compliance & CL Infection Rate";  
proc sgplot data=compliance;  
  series y=Compliance x=month / markers datalabel=Comp_label  
        curvelabel=" Compliance" curvelabelloc=inside;  
  series y=BSI x=month / y2axis markers datalabel=BSI_label  
        curvelabel=" BSI" curvelabelloc=inside;  
  yaxis label="% Compliance" values=(0 to 1 by 0.2) grid;  
  y2axis label="BSI per 1000 CL Days" values=(0 to 20 by 4);  
run;
```

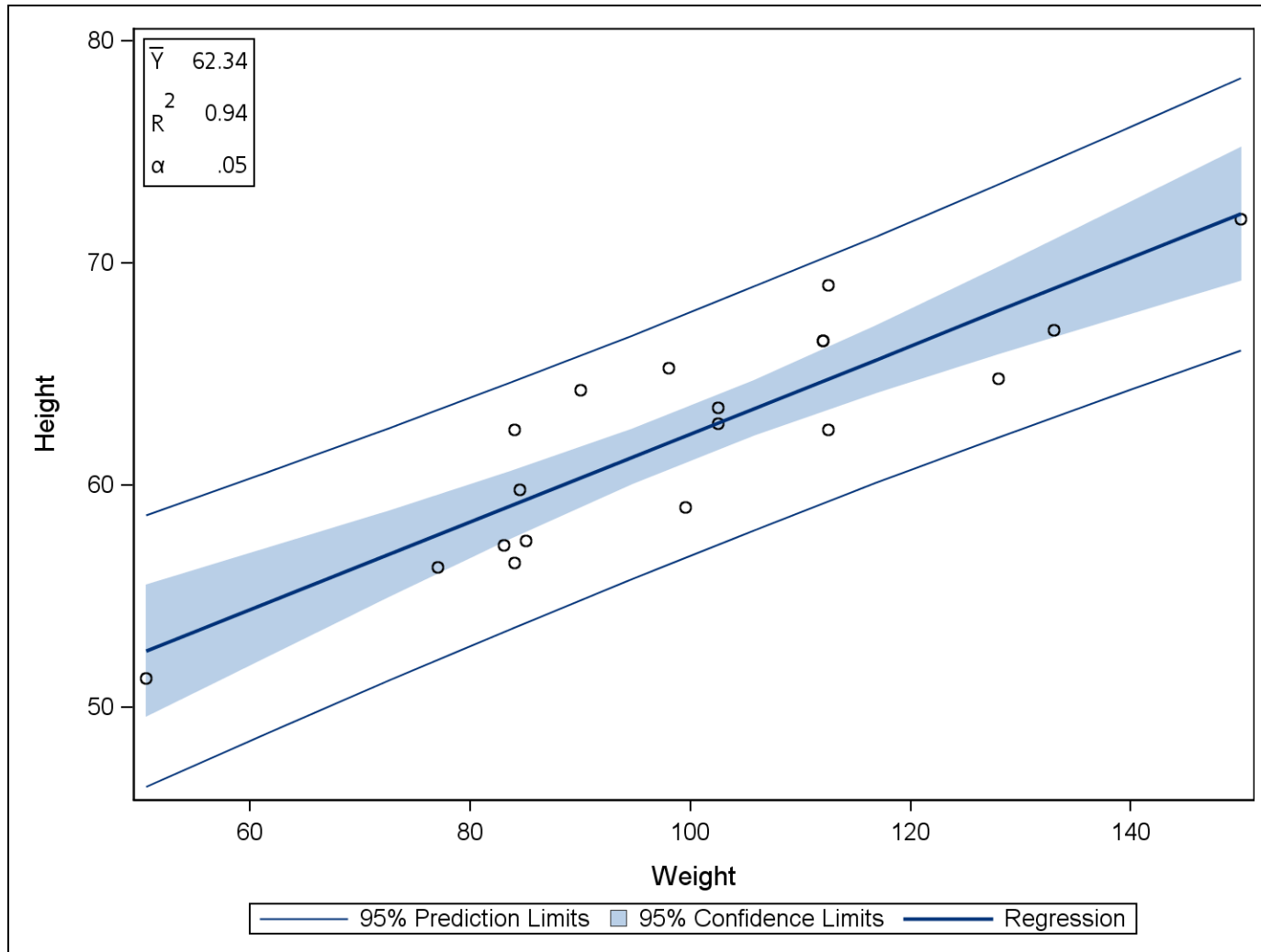
# Effective Labeling



# Effective Labeling

```
proc sgplot data=sashelp.class;  
  scatter x=weight y=height;  
  inset "This is some important information"  
        "in the bottom-right corner" /  
        position=BottomRight;  
  inset ("A"="37" "B"="209" "C"="Value") /  
        position=TopLeft border;  
run;
```

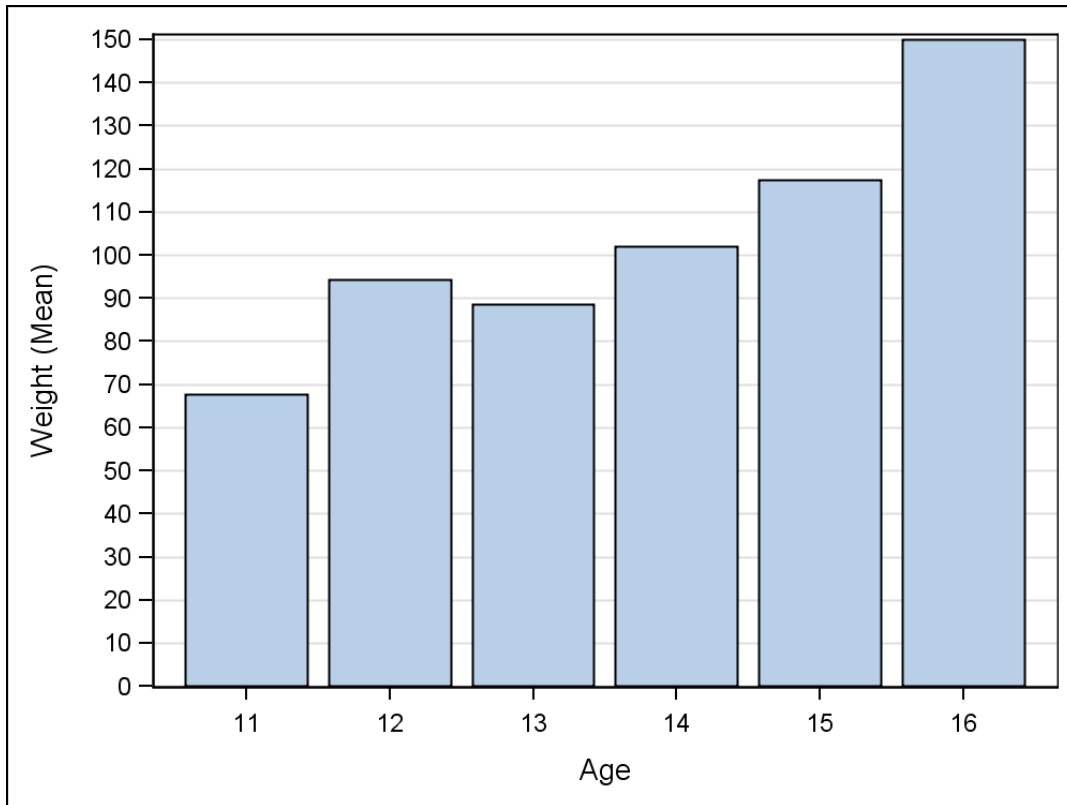
# Effective Labeling



# Effective Labeling

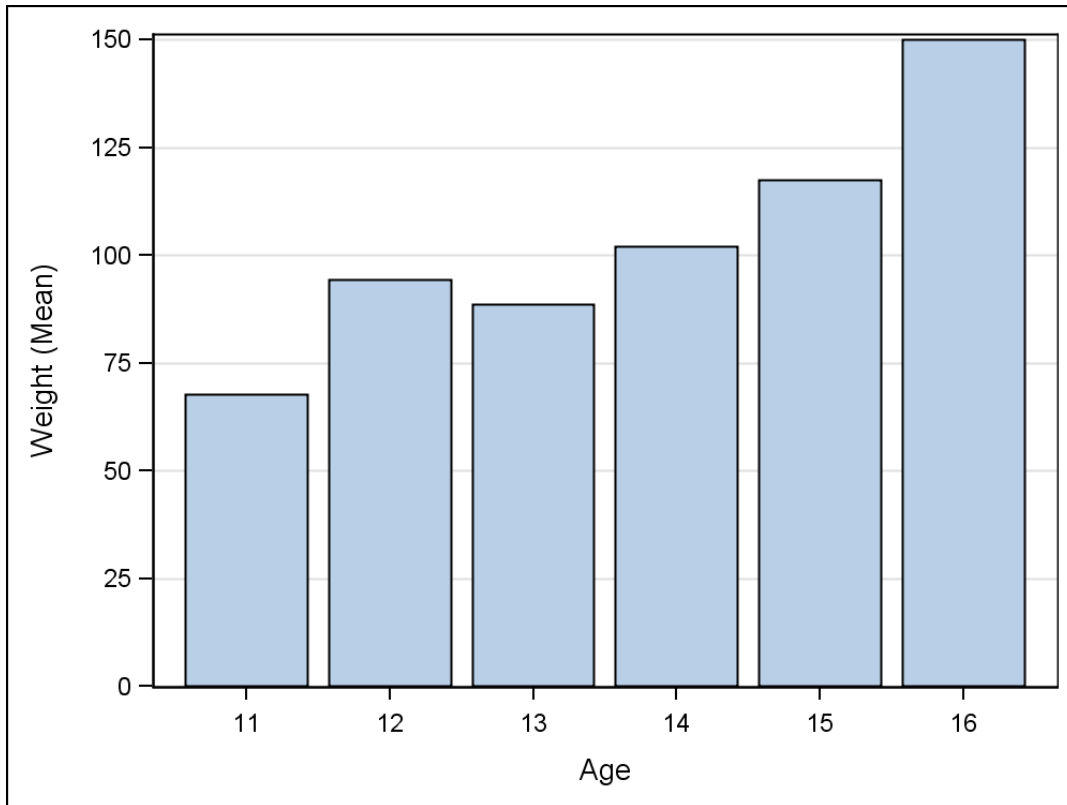
```
ods escapechar='~';  
proc sgplot data=sashelp.class;  
  reg x=weight y=height / clm cli;  
  inset ( "Y~{unicode bar}"="62.34" "R~{sup '2'}"="0.94"  
         "~{unicode alpha}"=".05" ) / position=TopLeft  
        border;  
run;
```

# Uncluttered Axes



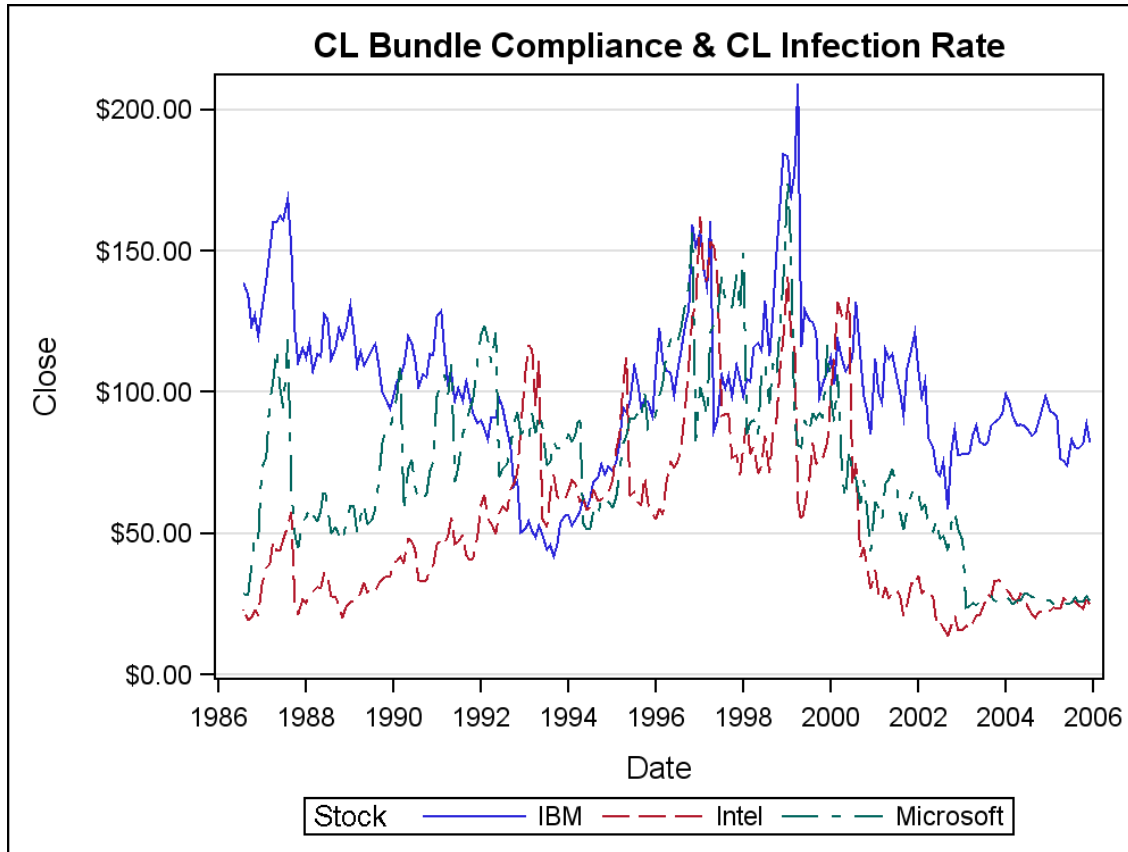
```
proc sgplot data=sashelp.class;  
yaxis values=(0 to 150 by 10) grid;  
vbar age / response=weight stat=mean;  
run;
```

# Uncluttered Axes



```
proc sgplot data=sashelp.class;  
yaxis grid;  
vbar age / response=weight stat=mean;  
run;
```

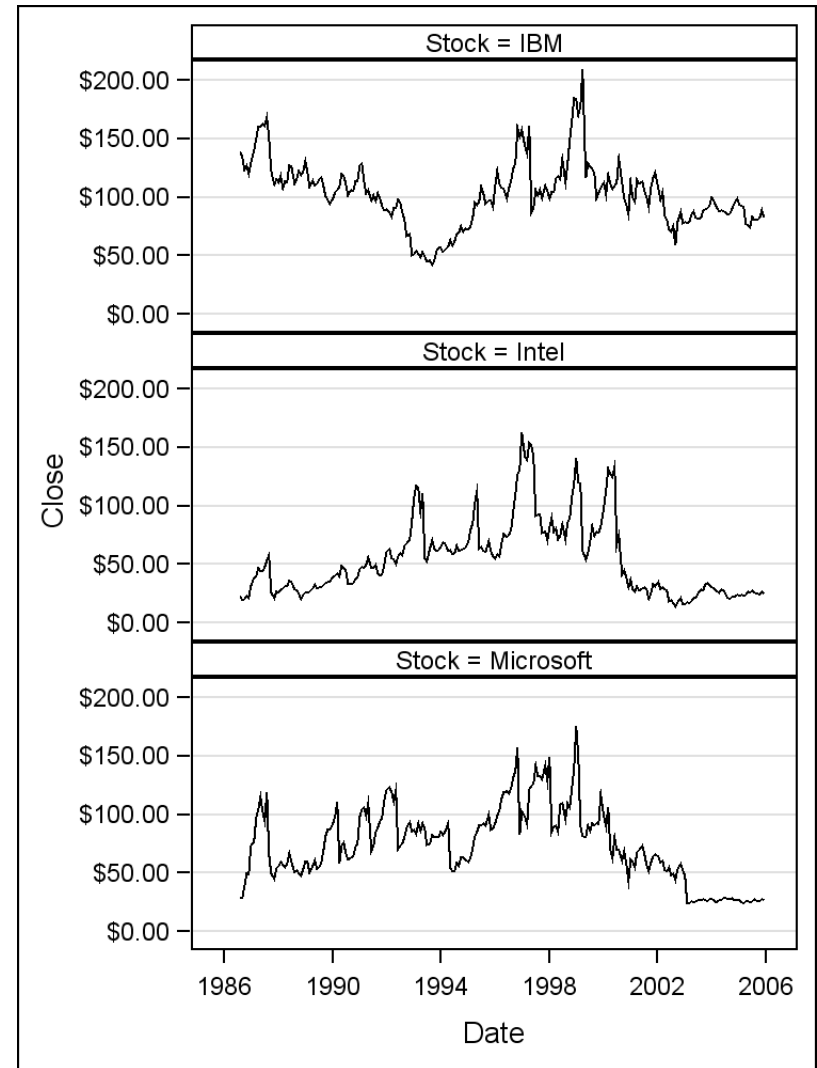
# Uncluttered Graphics



```
proc sgplot data=sashelp.stocks;  
yaxis grid;  
series x=date y=close / group=stock;  
run;
```

# Uncluttered Graphics

```
proc sgpanel data=sashelp.stocks;  
  panelby stock / columns=1;  
  rowaxis grid;  
  series x=date y=close;  
run;
```



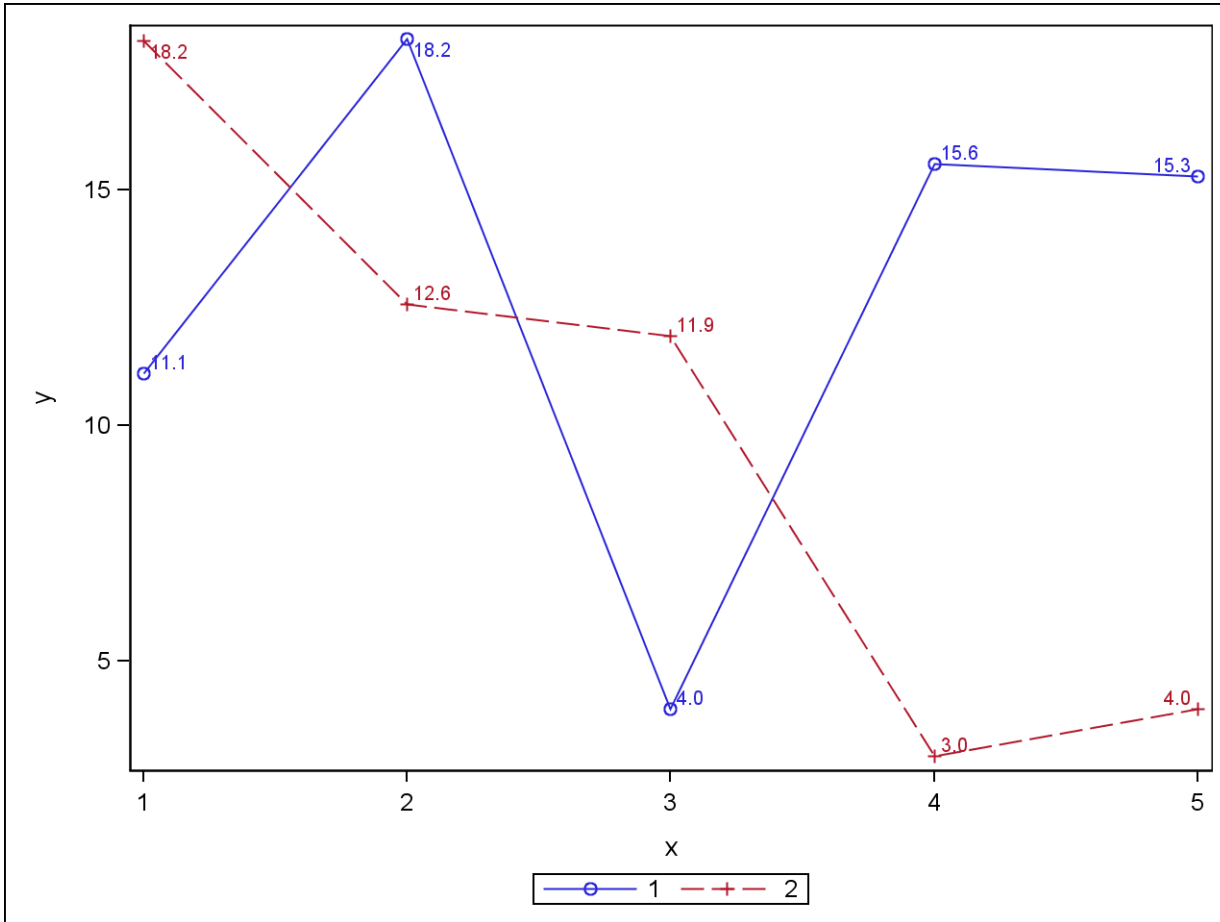
# Global Options

- Antialias / AntialiasMax
- Border
- LegendAreaMax
- Scale
- Width / Height

# Style Considerations

- Font Size
- Line Thickness
- Marker Size
- Color or Black-and-White
- Data Emphasis

# Style Considerations – Slides

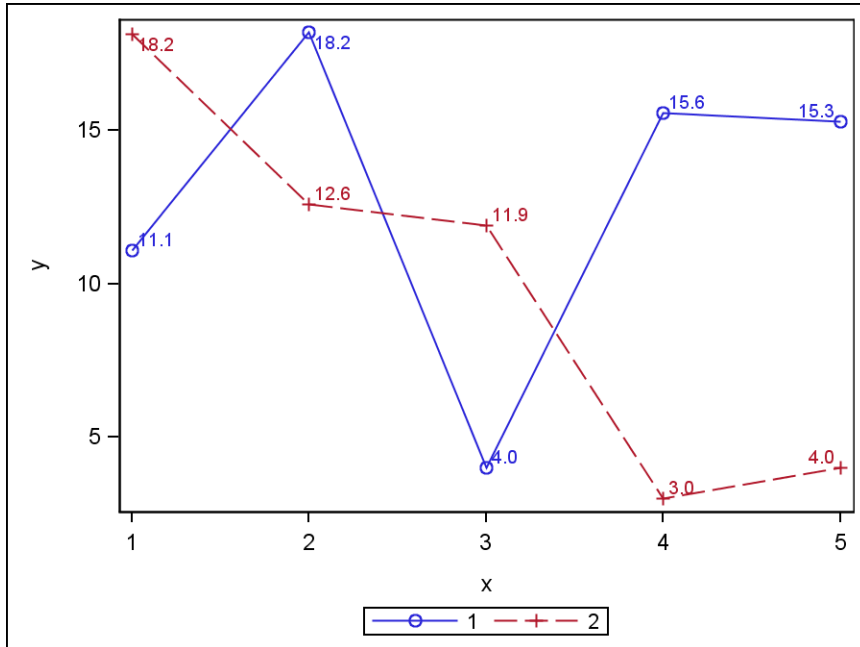


# Style Considerations – Slides

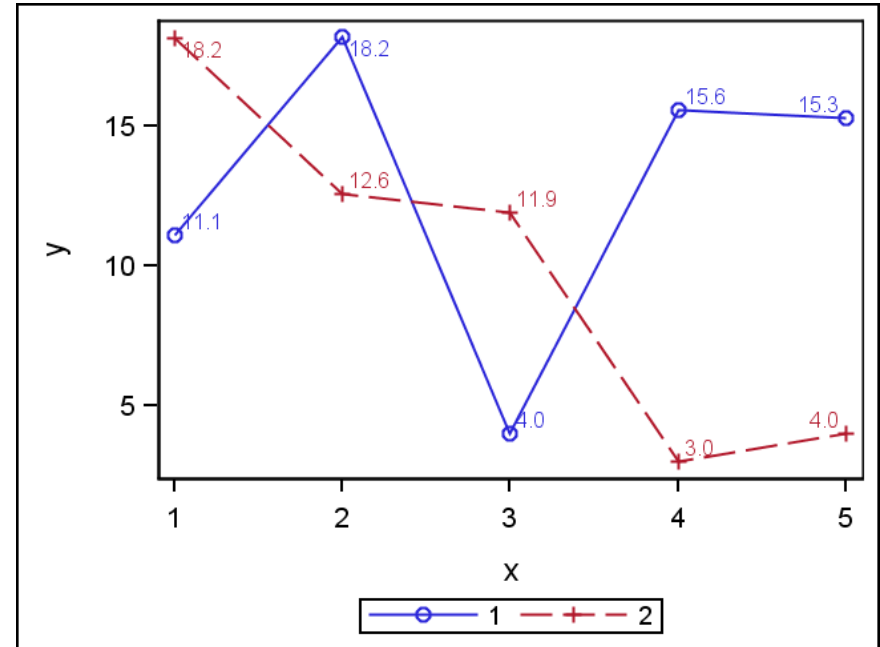
Two techniques for enlarging the graph contents

- Creating a graph smaller than you need and stretching it.
- Modifying the ODS style

# Stretching Technique



450px



325px

# Style Modification Technique

```
proc template;  
  define style  
  styles.presentation;  
    parent = styles.listing;  
  end;  
run;
```

# Style Modification Technique

1. Run the following code to write the style to the SAS log:  
proc template;  
    source styles.listing;  
run;
2. Perform the following steps to open the style in an editor in a Display Manager session:
  - a. Type **odst** in the command field.
  - b. Expand **SASHELP.TMPLMST**.
  - c. Click the **Styles** folder.
  - d. Double-click the **LISTING** style.

# Style Modification Technique

```
style GraphFonts "Fonts used in graph styles" /
  'GraphDataFont' = ("<sans-serif>, <MTsans-serif>", 7pt)
  'GraphUnicodeFont' = ("<MTsans-serif-unicode>", 9pt)
  'GraphValueFont' = ("<sans-serif>, <MTsans-serif>", 9pt)
  'GraphLabelFont' = ("<sans-serif>, <MTsans-serif>", 10pt)
  'GraphFootnoteFont' = ("<sans-serif>, <MTsans-serif>", 10pt)
  'GraphTitleFont' = ("<sans-serif>, <MTsans-serif>", 11pt, bold)
  'GraphAnnoFont' = ("<sans-serif>, <MTsans-serif>", 10pt);
```

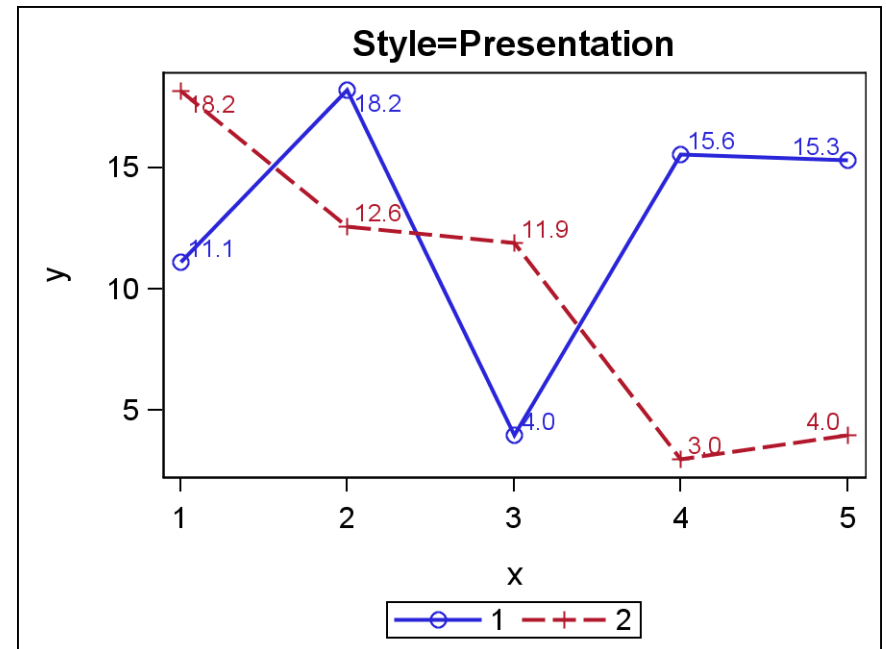
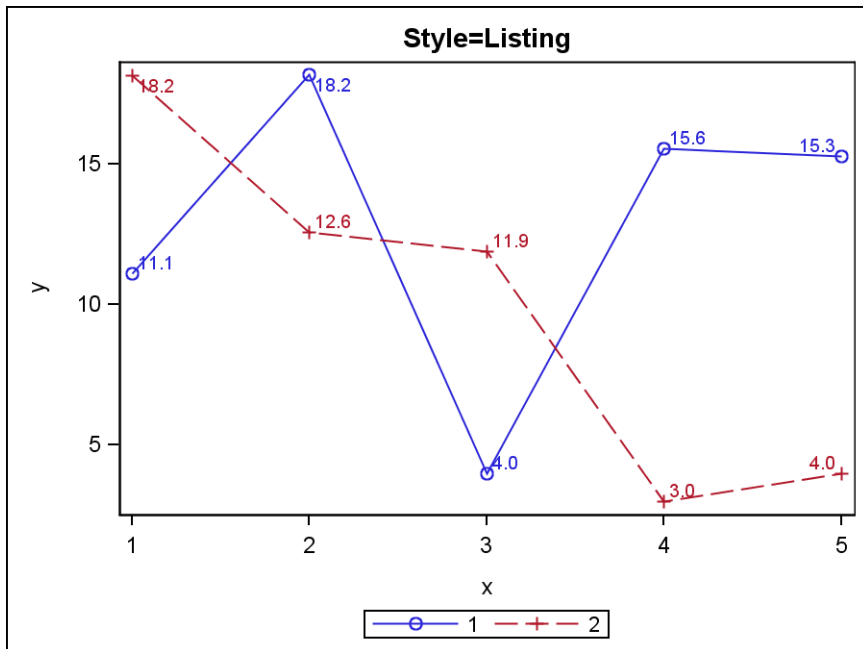
# Style Modification Technique

```
class GraphDataDefault /
  endcolor = GraphColors('gramp3cend')
  neutralcolor = GraphColors('gramp3cneutral')
  startcolor = GraphColors('gramp3cstart')
  markersize = 7px
  markersymbol = "circle"
  linethickness = 1px
  linestyle = 1
  contrastcolor = GraphColors('gcdata')
  color = GraphColors('gdata');
```

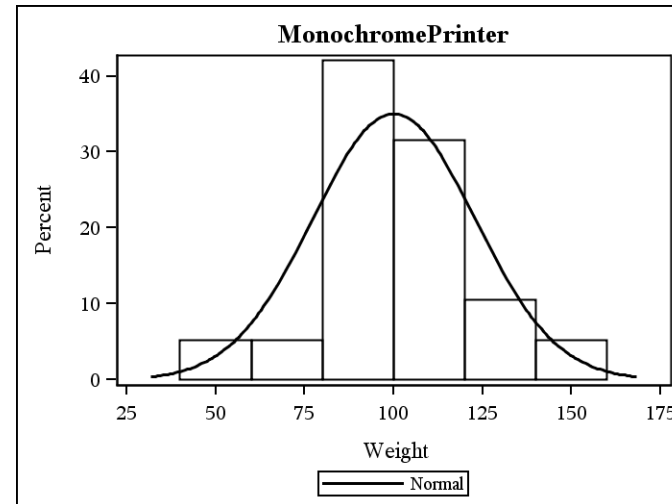
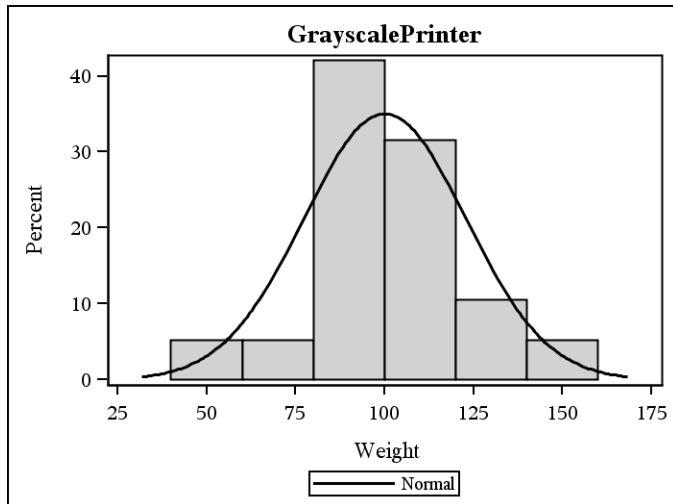
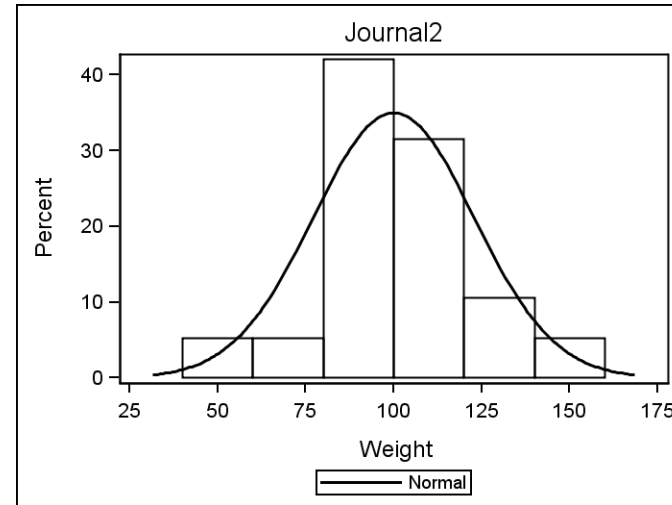
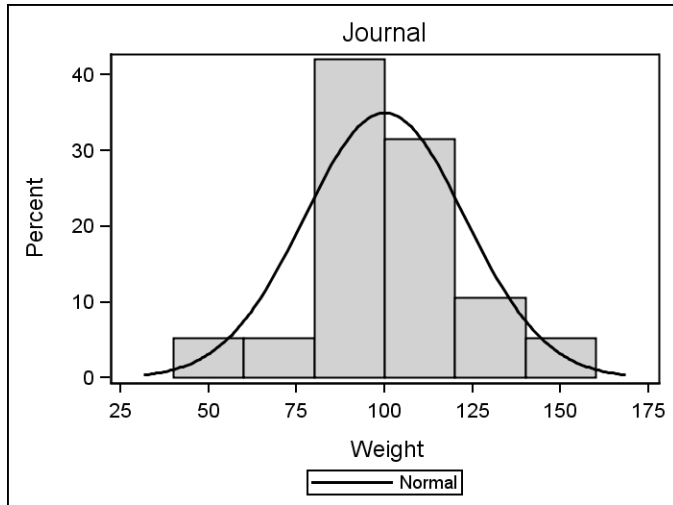
# Style Modification Technique

```
proc template;
define style styles.presentation;
parent = styles.listing;
  style GraphFonts "Fonts used in graph styles" /
    'GraphDataFont' = ("<sans-serif>, <MTsans-serif>",7pt)
    'GraphUnicodeFont' = ("<MTsans-serif-unicode>",9pt)
    'GraphValueFont' = ("<sans-serif>, <MTsans-serif>",9pt)
    'GraphLabelFont' = ("<sans-serif>, <MTsans-serif>",10pt)
    'GraphFootnoteFont' = ("<sans-serif>, <MTsans-serif>",10pt)
    'GraphTitleFont' = ("<sans-serif>, <MTsans-serif>",11pt,bold)
    'GraphAnnoFont' = ("<sans-serif>, <MTsans-serif>",10pt);
class GraphDataDefault /
  endcolor = GraphColors('gramp3cend')
  neutralcolor = GraphColors('gramp3cneutral')
  startcolor = GraphColors('gramp3cstart')
  markersize = 7px
  markersymbol = "circle"
  linethickness = 1px
  linestyle = 1
  contrastcolor = GraphColors('gcdata')
  color = GraphColors('gdata');
end;
run;
```

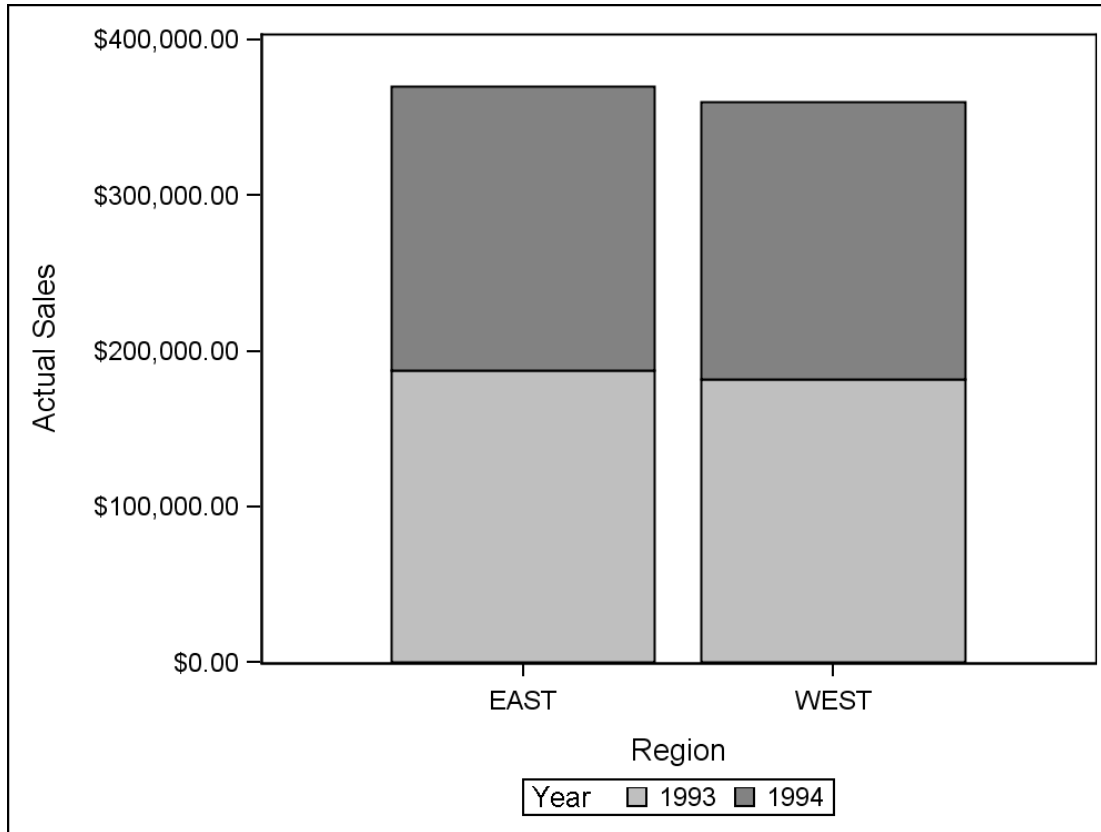
# Style Modification Technique



# Printed Reports

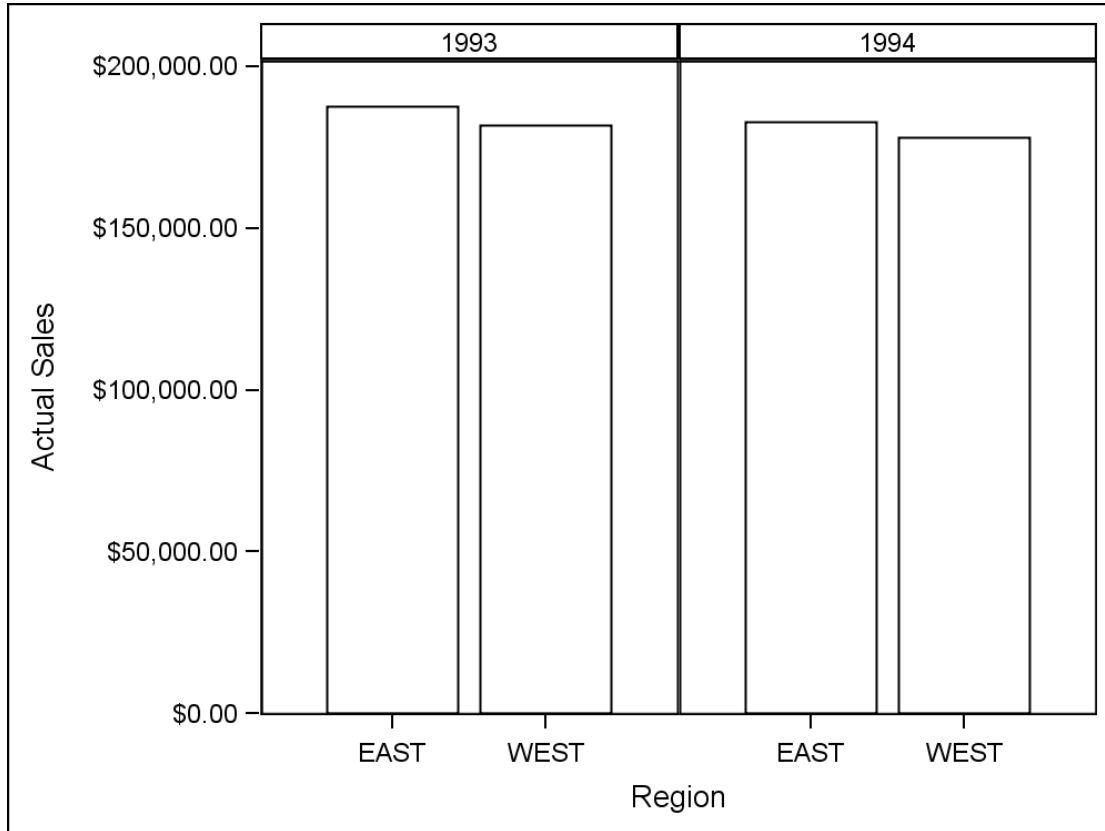


# Printed Reports



```
proc sgplot data=sashelp.prdsale;  
  vbar region / response=actual  
            group=year;  
run;
```

# Printed Reports

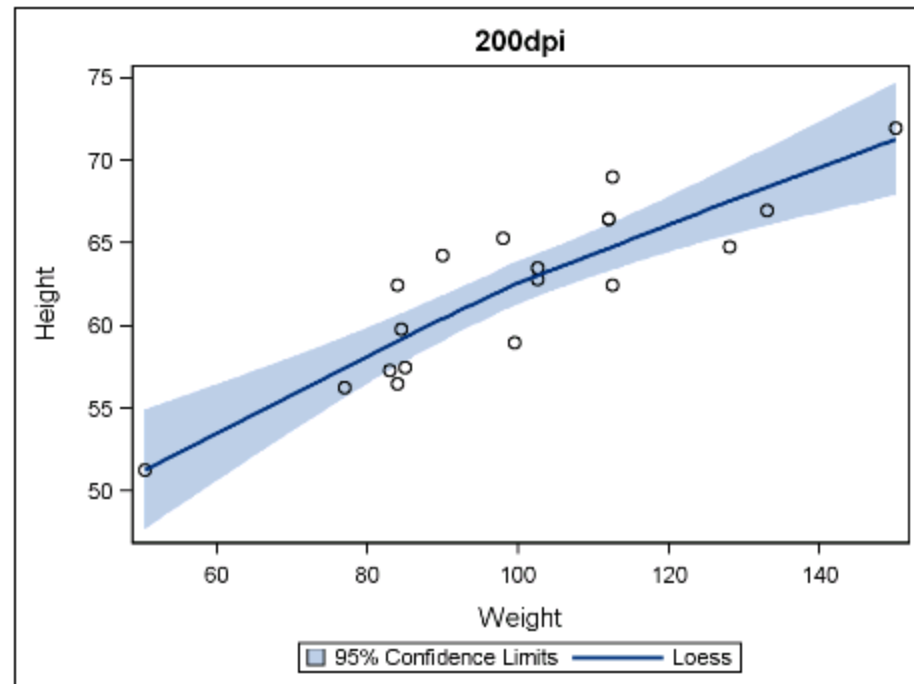
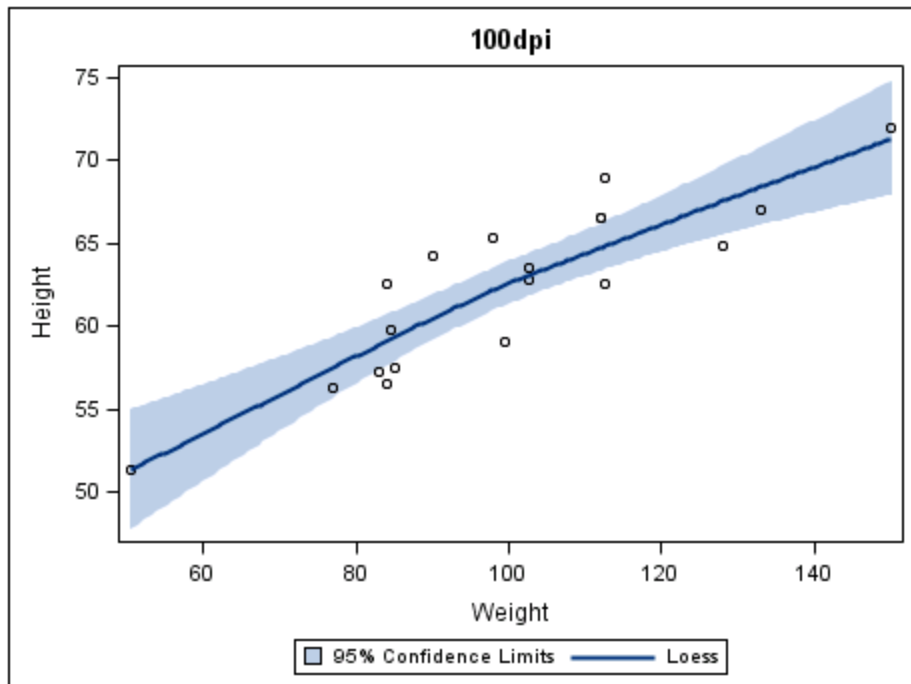


```
proc sgpanel data=sashelp.prdsale;  
  panelby year / novarname;  
  vbar region / response=actual nofill;  
run;
```

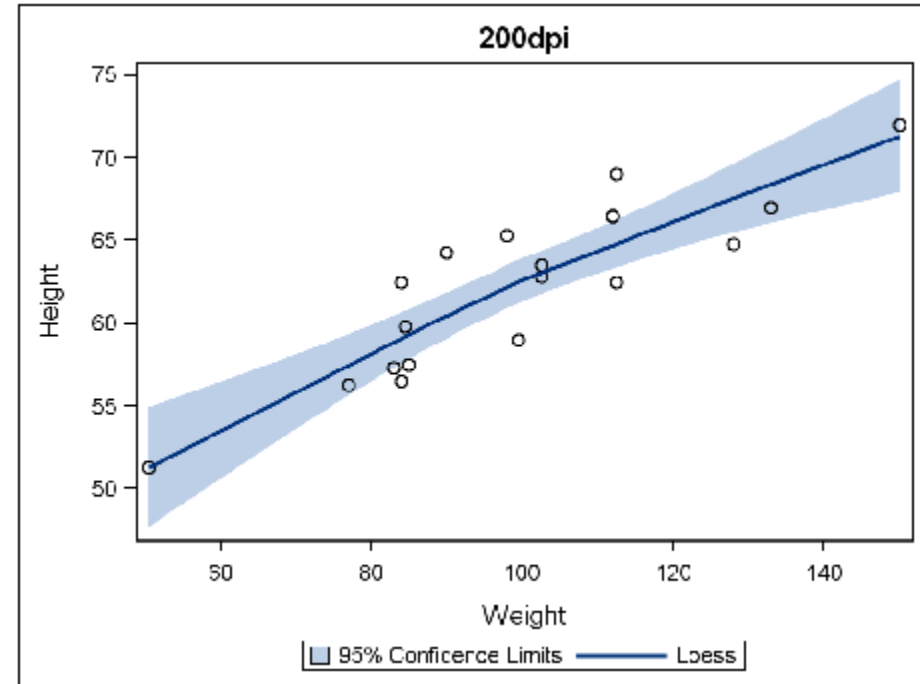
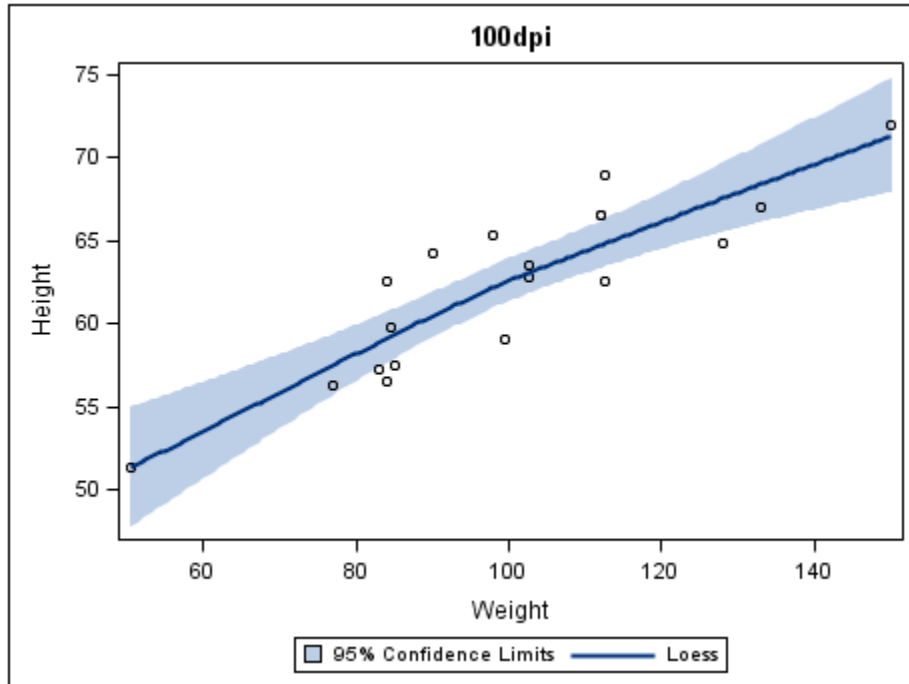
# Graph Resolution

- Web page resolution
- Slide presentation resolution
- Printed report resolution

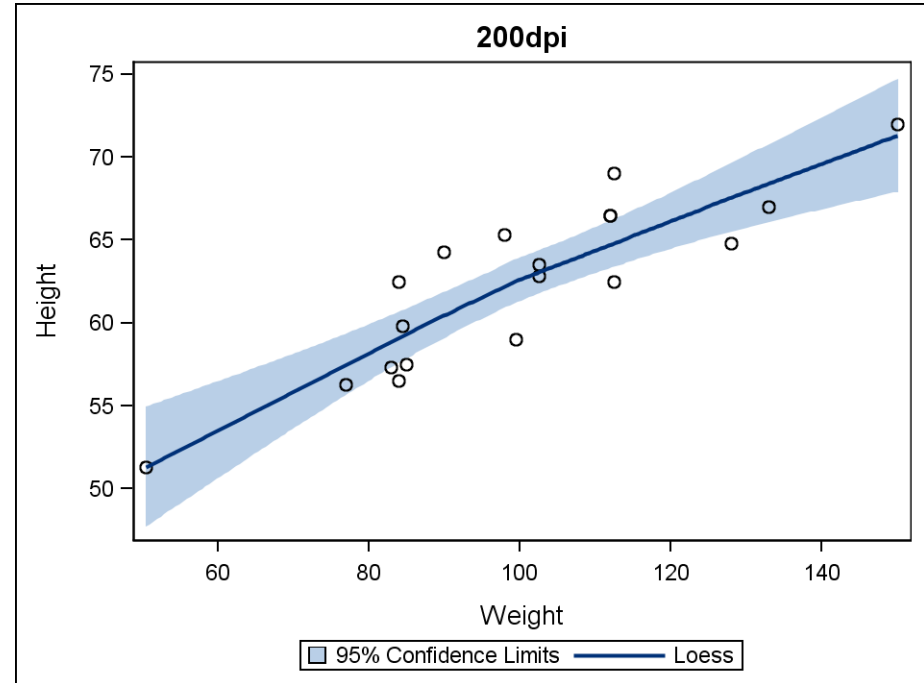
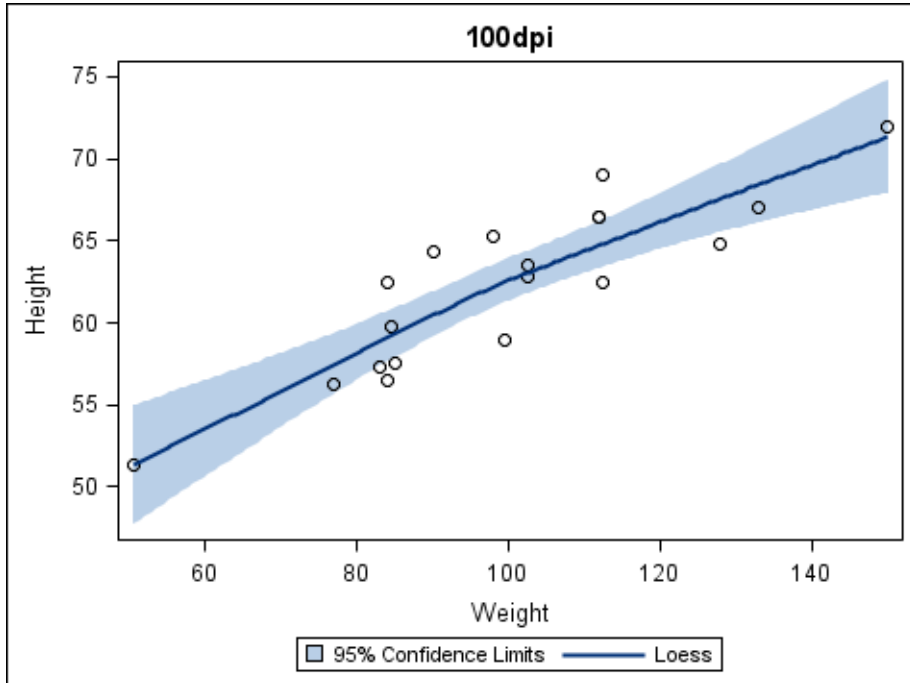
# Web Page Resolution - Firefox



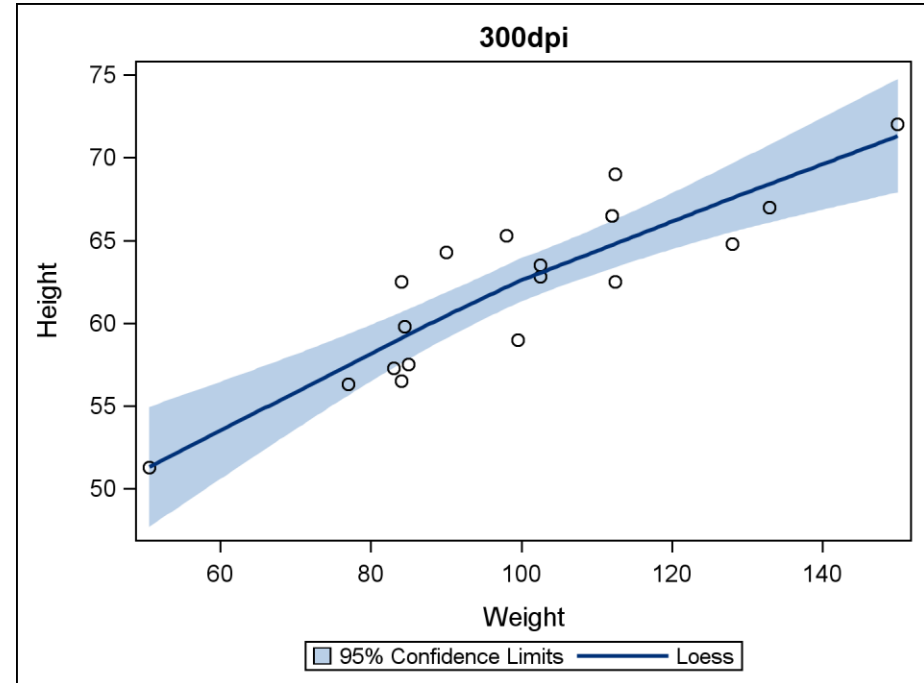
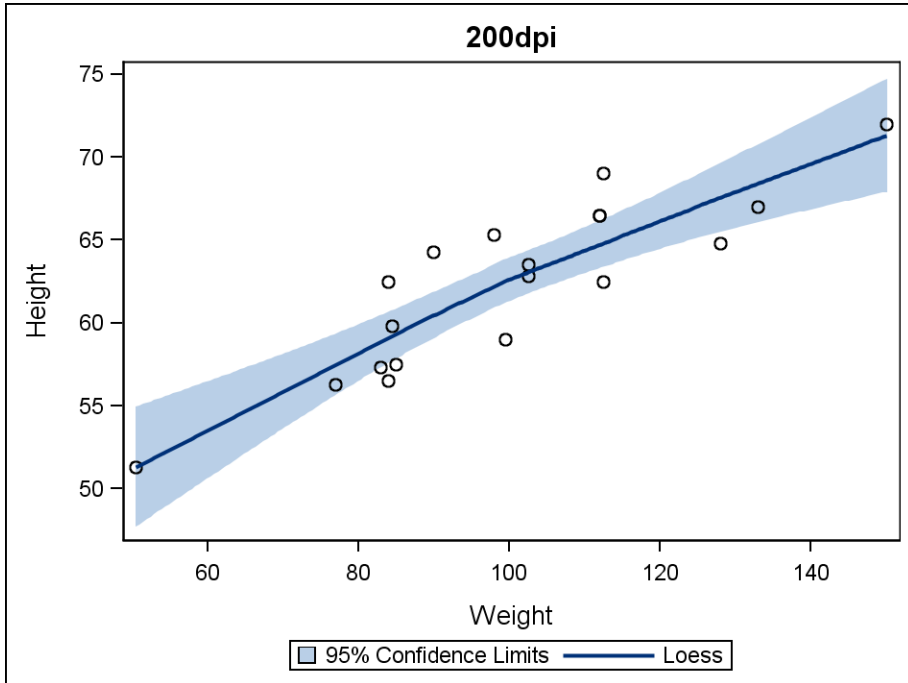
# Web Page Resolution – Internet Explorer



# Slide Presentation Resolution



# Slide Presentation Resolution



# Printed Report Resolution

- Requires high resolution for good quality
- Printer DPI should be used
- High resolution may require a memory adjustment

# Printed Report Resolution

```
/* Options used when SAS is accessing a JVM for JNI processing */  
-JREOPTIONS=(  
-Dsas.jre.libjvm=C:\PROGRA~1\Java\JRE15~1.0_1\bin\client\jvm.dll  
-Djava.security.policy=!SASROOT\core\sasmisc\sas.policy  
-Dsas.ext.config=!SASROOT\core\sasmisc\sas.java.ext.config  
-Dsas.app.class.path=C:\PROGRA~1\SAS\SASVER~1\9.2\eclipse\plugins\tkjava.jar  
-DPFS_TEMPLATE=!SASROOT\core\sasmisc\qrpfstpt.xml  
-Djava.class.path=C:\PROGRA~1\SAS\SASVER~1\9.2\eclipse\plugins\SASLAU~1.JAR  
-Djava.system.class.loader=com.sas.app.AppClassLoader  
-Xmx128m  
-Xms128m  
-Djava.security.auth.login.config=!SASROOT\core\sasmisc\sas.login.config  
-Dtkj.app.launch.config=!SASROOT\picklist  
)
```

# Conclusion

- Importance of content
- Consider different styles for different mediums
- The best resolution is not always high-resolution



## Creating Presentation-Quality ODS Graphics Output

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