

Creating Effective Visualisations Using Graph Builder

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Notes

Course Agenda

Introduction

Graph Builder Basics

Graph Builder Walk-throughs

Exercises

Graph Builder Walk-throughs

Exercises

Application Builder Instruction

Exercises

Graph Builder Galleries

| | |
|---------------------------|--|
| Continuous X and Y | With overlay, color and size variables |
| Categorical X | With 1 or 2 continuous variables and an overlay variable |
| Bars and Lines | Common styles for the Bar and Line elements |
| Multiples | Using grouping, paging or multiple frames |
| Special Purpose | Map, treemap, pie, mosaic and formula elements |

Composed Graphs 1

| | |
|----------------------|-----------------------------|
| Custom interval bars | Custom interval area |
| Marginal plots | Connected scatterplot curve |
| Stacked areas | Slope chart |

Composed Graphs 2

| | |
|-------------------|-----------------------|
| Bar and area | Stepped stacked areas |
| Likert scale bars | Waterfall chart |
| Broken time axis | Broken Y axis |

Composed Graphs 3

| | |
|-------------------------------|------------------------|
| Flow diagram | Custom reference lines |
| Smoother and reference ranges | Smoother and dots |
| Custom map | Multi-variable bullet |

Composed Graphs 4

| | |
|-------------------------|--------------------------|
| Periodic table squares | Bars with color |
| Labeled areas | One-dimensional heat map |
| Ordered bars with color | Custom reference lines |

Composed Graphs 5

| |
|------------------------|
| Funnel plot |
| Color square time line |
| Bullet and grouping |

Introduction to JMP® 12 Application Builder

Introduction

This tutorial will lead you through a series of exercises demonstrating some of the features of Application Builder in JMP 12. It is assumed that you have a beginner to intermediate level of experience building graphs using one or more JMP platforms. In this tutorial you will learn how to combine two or more platform reports into a window, save and deploy an application for use on the same or a different data table, add data filters, and parameterize an application.

The accompanying file AppBuilderTutorial.jmpapp will help to guide you through the exercises within JMP. Open this file with JMP 12 and use the arrows at the top of the page to navigate through the major steps. This document will provide additional detail on the steps to be performed.

Combine Windows

JMP contains a large number of statistical and graphing platforms specialized for a particular task. It is not uncommon for multiple platforms to be used in a coordinated way to answer a set of questions. Once you have created several reports that work well together, it may be helpful to be able to reproduce the same set of reports on the same table or on a new table. Combining the reports into a single window can reinforce the relationship between the reports.

In the accompanying live JMP tutorial, click the button *Launch Reports* to create two graphs.

To combine multiple reports into a window, start by positioning the reports on the screen in roughly the layout that you would like to see in the combined report. To combine the windows:

On Microsoft Windows (see Figure 1)

1. Select the reports using the toggle button at the lower-right corner
2. From the drop-down menu, select *Combine selected windows*

On Macintosh:

1. Select *Combine Windows...* from the main Windows menu
2. Select the windows and click Ok

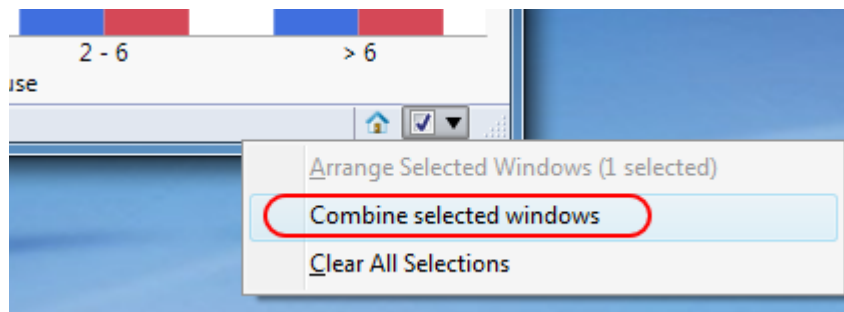


Figure 1: Combining multiple windows

A new window will be created as shown in Figure 2. Note that the windows will be arranged depending on how they appeared on the screen. They could be reversed, or even arranged vertically, depending on how you positioned the windows.

Note that the reports are still fully interactive – performing a selection in one graph will highlight the linked rows in the other. Each graph also has a red-triangle menu to continue working with the Graph Builder platform.

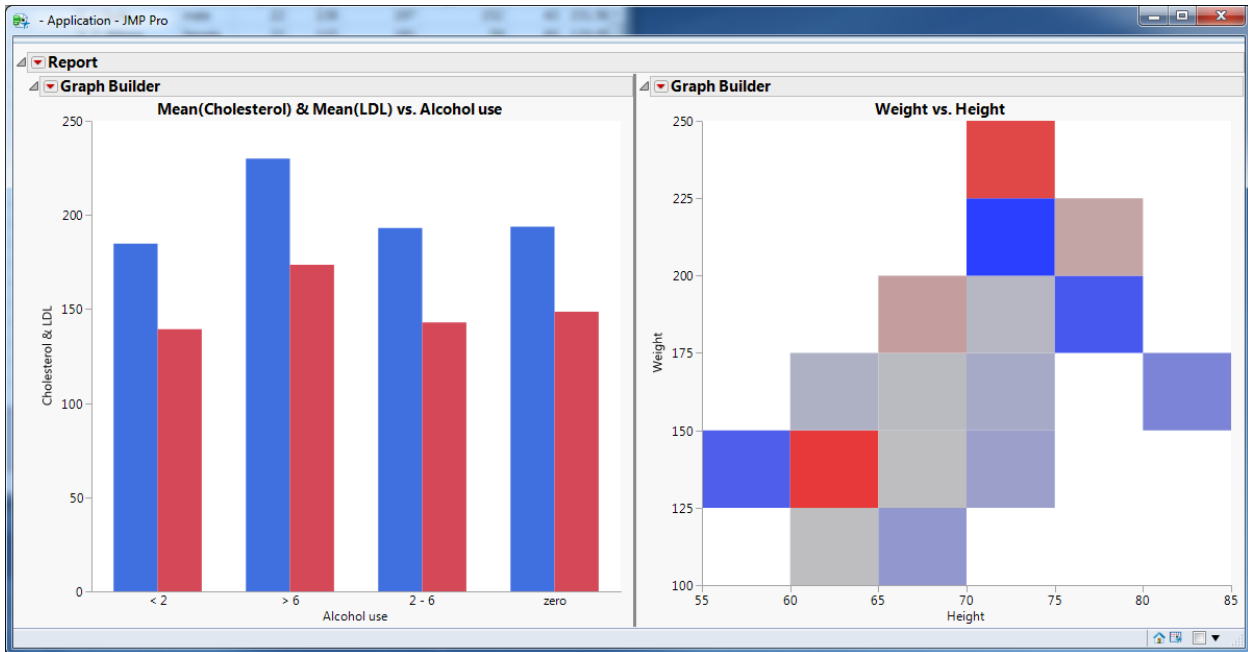


Figure 2: Combined Windows

Saving an application

When you have a combination of graphs that you would like to save to use again, there are several options. Note that in addition to the platform red-triangle menus, there is an additional red-triangle menu for the combined report. Much like an individual platform, this menu provides several options for saving the combined window for future use.

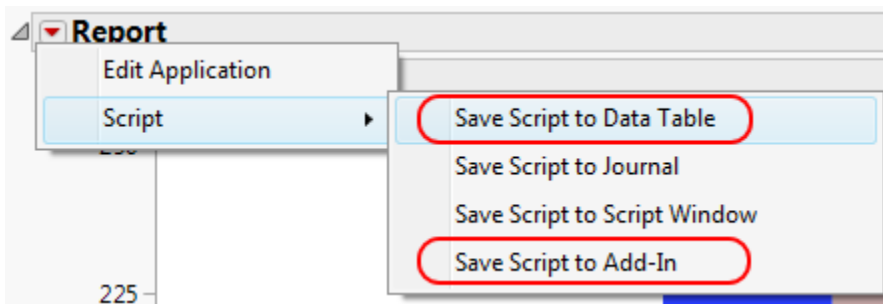


Figure 3: Saving an application

- Save Script to Data Table

Saving the script to the Data Table is analogous to the same command on an individual platform. The Application will appear in the list of scripts for the data table, and will reproduce the combined window for that specific Data Table.

- Save Script to Add-In

Add-Ins are a mechanism for adding menus to the JMP interface and associating scripts with these menus. This option is most useful if you want to produce the same combined report for a different data table with the same columns. Add-Ins can also be shared with others who have a need to perform the same analysis. When an application is run from the Add-In menu, the reports will be based on the current data table.

Application Builder

To this point, we have been using the Application Builder infrastructure, but not Application Builder itself. Combining windows is a quick way to produce a report. In Application Builder you can produce the same report from scratch, or make additional changes to a report created with *Combine Windows*.

In your combined report, select the Edit Application option from the red-triangle menu.

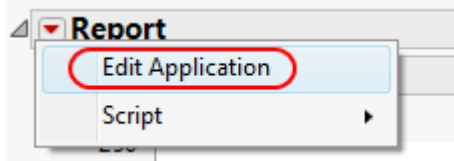


Figure 4: Editing a combined windows application

Application Builder is a tabbed, drag-and-drop environment for building applications. The builder interface, shown in Figure 5, has four main areas:

1. Source Panel

The source panel contains the display objects that can appear in an application window. This includes reports, data tables, data filters, and a variety of display boxes for layout as well as new content.

2. Workspace

The workspace in the center is where the window layout occurs. This is a tabbed workspace, with one tab for each window in the resulting application. There is also a tab for JSL scripts, which can optionally be used to enhance an application or create a fully custom application. In this introduction we will work with single-window applications that do not require scripting.

3. Object tree

The object tree at the upper-right contains a hierarchical view of the application, including any data tables, modules (windows), and display boxes. The main purpose of the object tree is to provide an alternate way to select object to operate on, rather than clicking in the workspace area.

4. Property Panel

The property panel displays editable properties for the current selected objects. Use this area to both view the current settings and also to make changes.

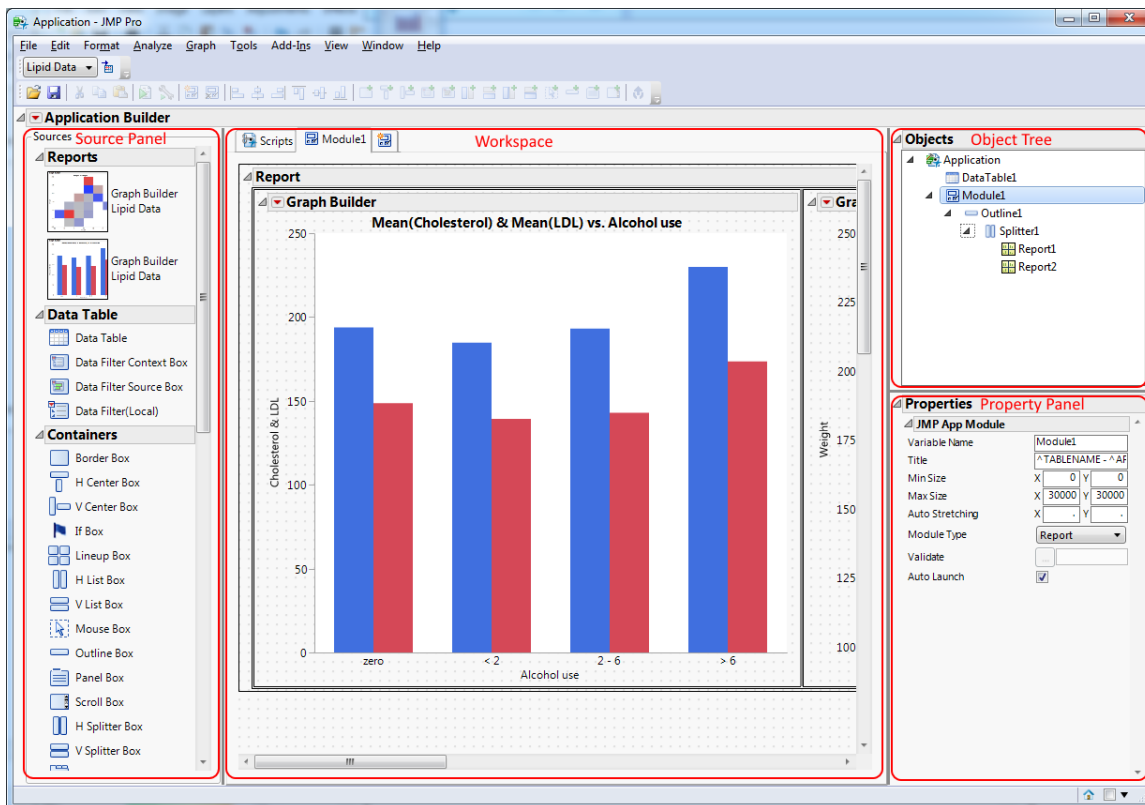


Figure 5: Application Builder layout

As an example, select the Application object from the Object tree as shown in Figure 6. Edit the Name in the Property Panel to choose a name for the Application. This name will help you to distinguish between multiple applications. The name is used when saving the application to the Data Table, to an Add-In, and also to a file, which we will see next.

From the red-triangle menu for Application Builder, choose Run Application to test the Application after making changes.

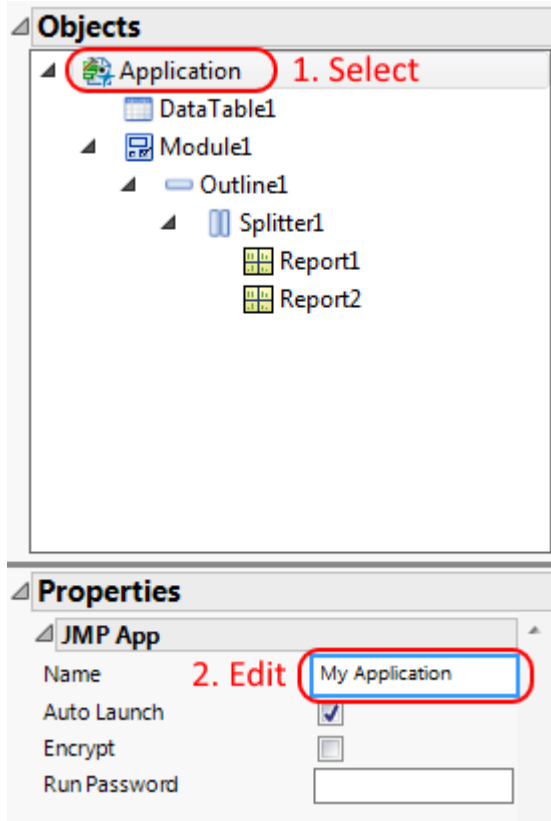


Figure 6: Editing the name of the Application

Saving Application Files

Saving a combined window to the Data Table and Add-In are examples of deploying the application for use. In some cases your application may have a life of its own, going through multiple revisions to add new features, rearrange the report, or make other changes. There are two document types in JMP to support applications:

1. .jmpappsource

A file with .jmpappsource extension is the native format produced by File > Save in the Application Builder. Opening a file with this extension will return you to the Application Builder interface where you can continue making changes to your application. If you are producing applications for others, this may be a file that you maintain but do not distribute.

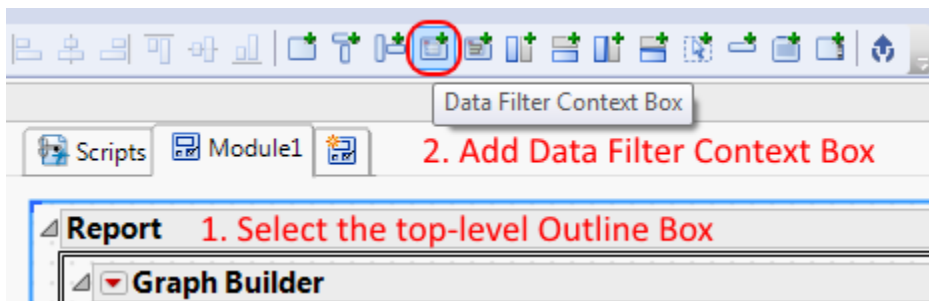
2. .jmpapp

A file with .jmpapp extensions is produced by File > Save As on Windows or File > Export on Mac. The content of this file is identical to the .jmpappsource, but in this case the application will run when the file is opened. This is an alternative to distributing an Add-In if you prefer not to add the application to the JMP menus.

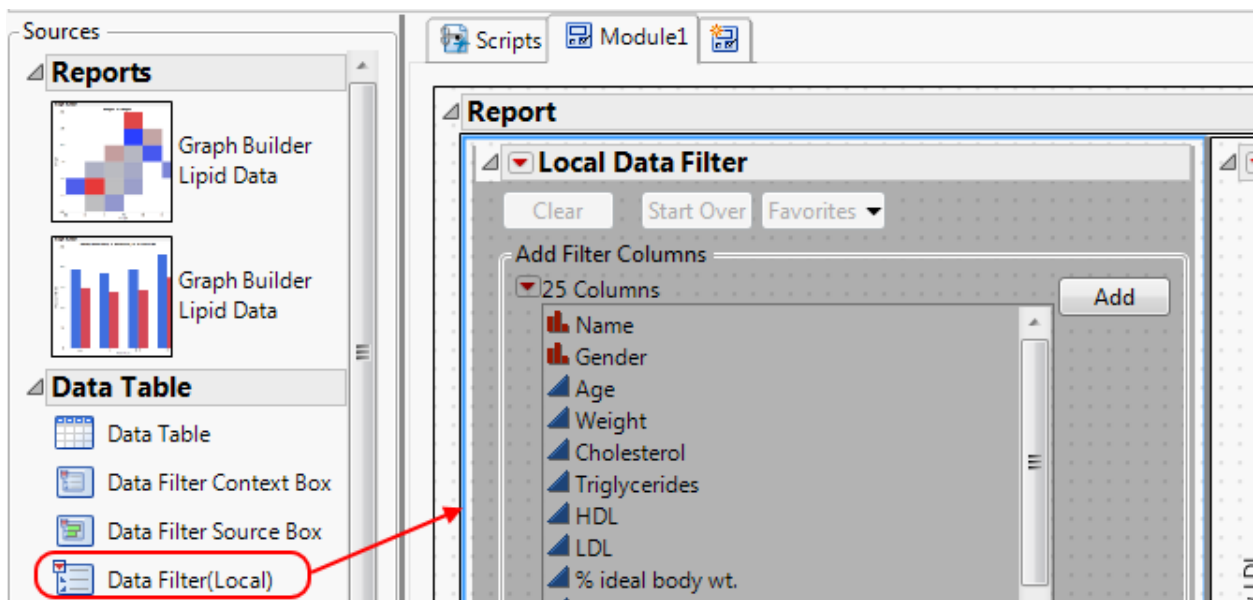
Shared Local Data Filter

Most platforms within JMP support a Local Data Filter feature for selectively filtering one report without affecting other reports. Within JMP Application Builder, you can add a Local Data Filter that will be shared between multiple reports in a windows:

1. Select the top-level Outline Box and click on the Data Filter Context Box in the toolbar. Everything within this box shares the same filter state



2. Drag the Local Data Filter from the Source Panel into the workspace. Highlights are shown as you are dragging so that you can see where it will be dropped. It does not matter where the filter is placed relative to the reports, as long as it is placed within the Data Filter Context Box.



After adding the Data Filter Context Box and the Local Data Filter, choose Run Application from the red-triangle menu to test the Application with the filter.

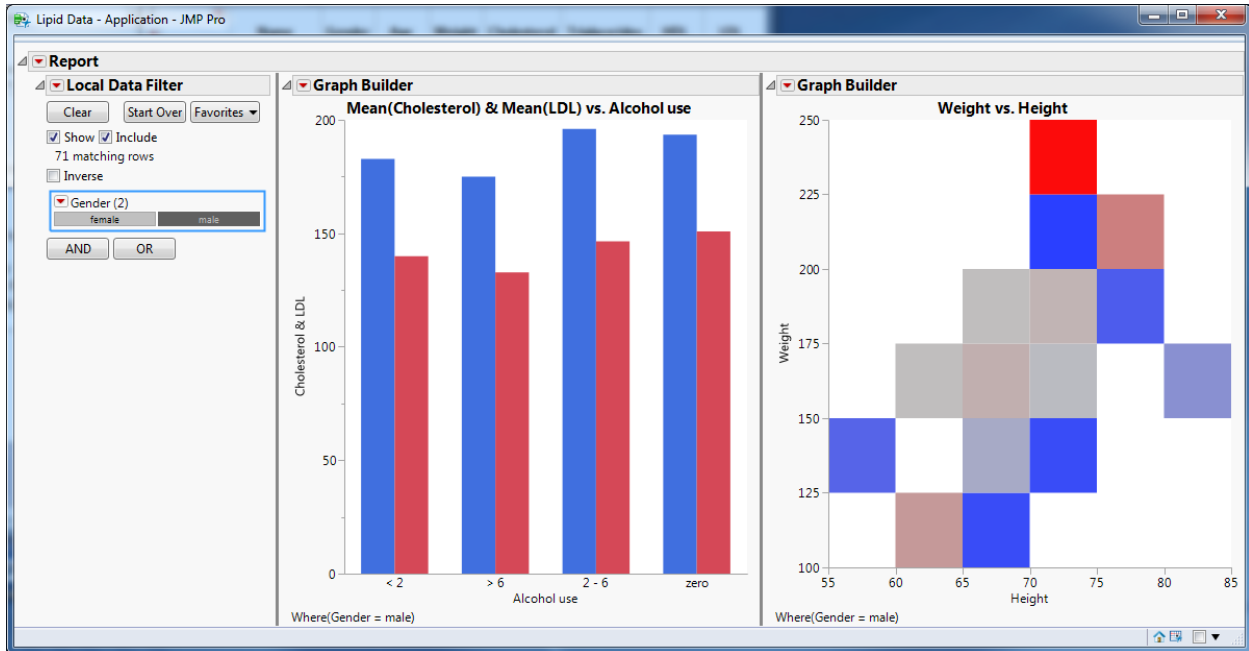


Figure 7: Combined window with Shared Local Data Filter

Selection Filters

The built-in Data Filter interface provides multiple ways of selecting the data of interest for categorical and continuous data. When exploring data in JMP, we often use graphs to inform decisions on what to look at next. In Application Builder, a Shared Local Data Filter can be replaced by a JMP graph to create a Selection Filter.

Continuing with our previous example, which already contains a Data Filter Context Box, remove the Local Data Filter. You can select the object and right-click to Delete, or press the Delete key, or simply drag the filter out of the workspace to delete it. In the accompanying slides, press the Launch Filter Report button to create another Graph Builder report. To use the graph as a Selection Filter, there are two steps:

1. Drag the new report into the Workspace. Just as with the Local Data Filter, the position does not matter, as long as the report is inside the Data Filter Context Box.
2. With the new report selected, click on Data Filter Source Box in the toolbar. This box identifies the new report as the box that we want to use as a Data Filter.

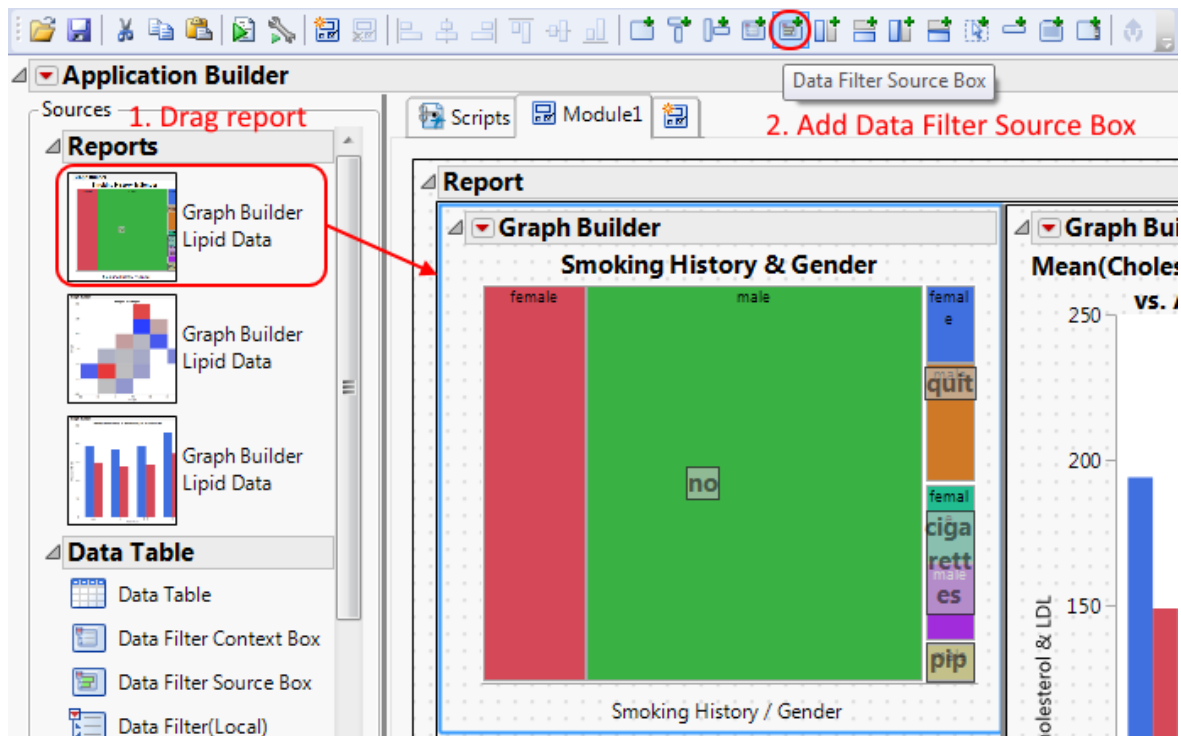


Figure 8: Adding a graph as a Selection Filter

When you run this Application, selections performed in the first report will filter the results in the other reports. Any JMP report that supports selection can be used as a selection filter, and the selection modes (Ctrl-selection, drag-selection, etc) are the same as in the stand-alone platform.

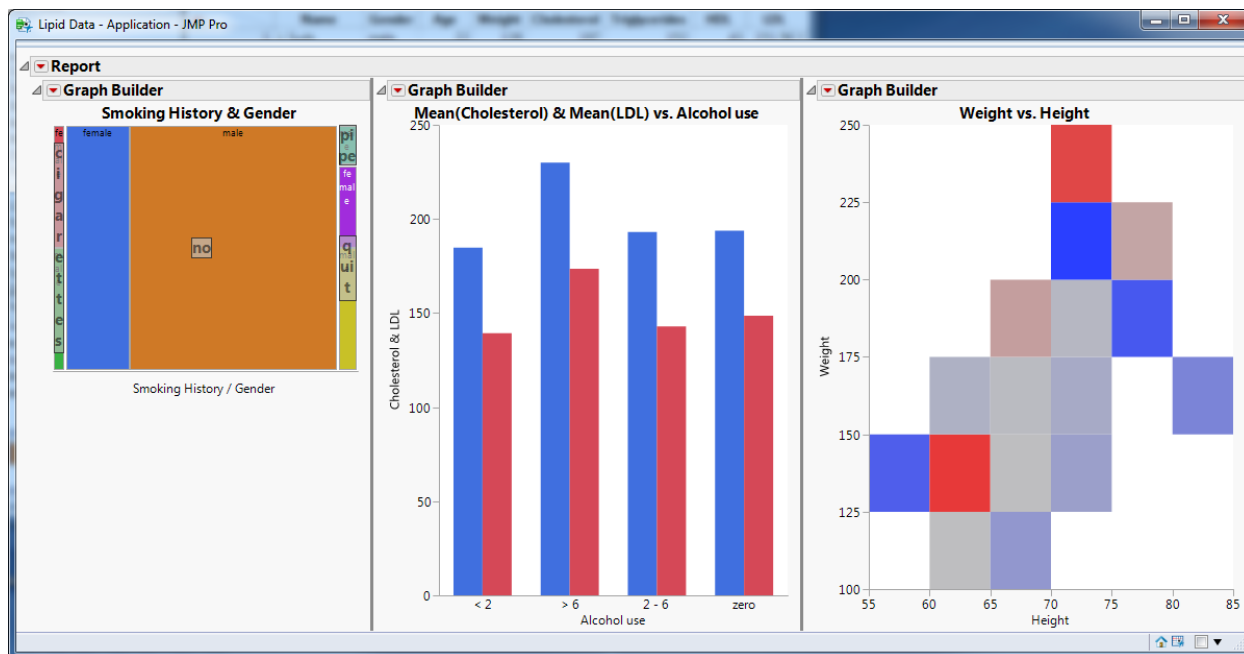


Figure 9: The Selection Filter in a running Application

Parameterizing Applications

Most JMP platforms begin by asking which columns you would like to analyze or graph. When you save a script to a table or script window, these choices are fixed unless you write some additional JSL. The same has been true with the JMP Applications that we have created so far, but Parameterization does allow you to create an Application that has more flexibility.

The first step in parameterization is to select which platforms, and which roles you want to parameterize. As shown in Figure 10, when a Report is selected (either in the Workspace or in the Object Tree), the roles are displayed in the Property Panel. If the role value is left blank, then App Builder will launch the platform with the original set of columns. You can choose to set a parameter value using a *JSL variable name* to indicate that you would like to vary this parameter when the application is run. There are more advanced uses for the JSL variable name, but for our purposes here, we will simply use three unique name for the roles in Report 2.

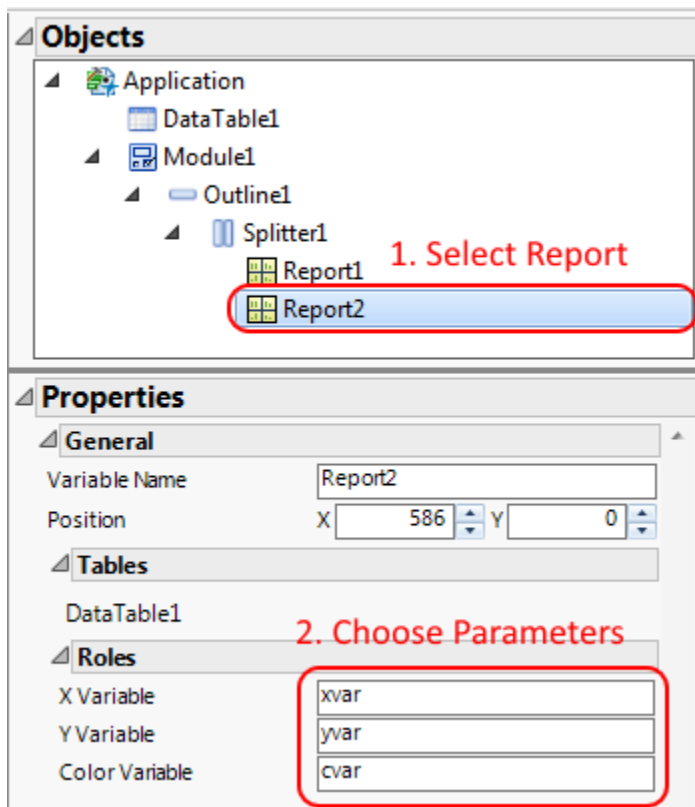


Figure 10: Parameterizing roles for a platform

Setting the parameter variables is sufficient to create a parameterized application. Having chosen one or more roles to parameterize, JMP will prompt to select the columns to be used when the application is run. Optionally, you can customize the labels that will be displayed in the launch dialog, as shown in Figure 11. Customizing labels will give you an opportunity to give a look and feel that is specific to the particular task of your application, rather than using general terms such as *X*, *Y*, and *Color*.

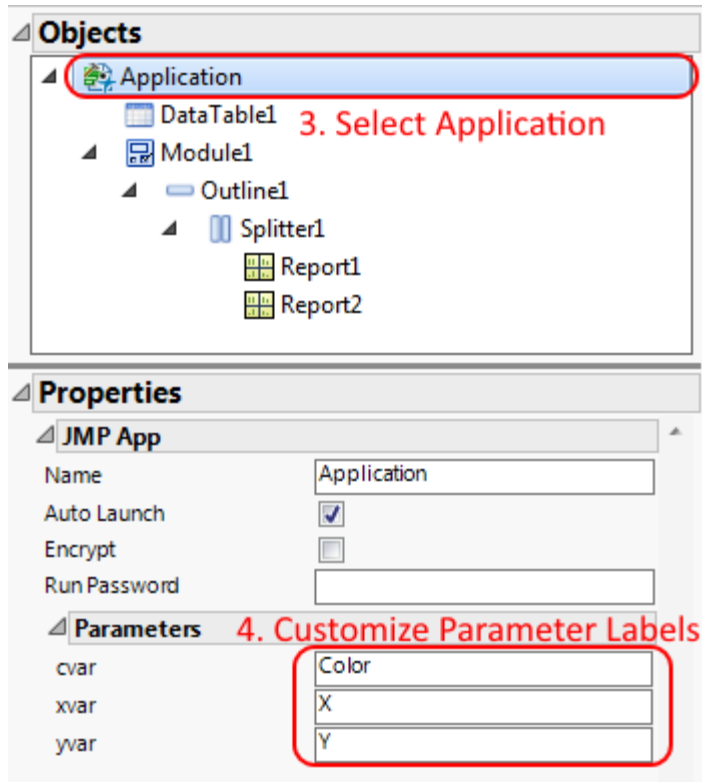


Figure 11: Customizing labels in a parameterized application

Other capabilities

This tutorial has provided an introduction to the JMP Application Builder and demonstrated several features that help you to create reusable JMP Applications for specialized tasks. There are more features that we have not had time to cover, including:

1. Multiple data tables

Application Builder supports multiple data tables and graphs/reports from multiple tables within a single application.

2. Multiple windows

All of our examples have organized reports into a single window. Using the tabbed interface in the App Builder workspace, it is possible to create Applications that organize reports into multiple windows.

3. Hierarchical filters

In our examples of the Local Data Filter and the Selection Filter, we always had a single filter. It is also possible to create layouts that support hierarchical filtering. For example, given worldwide

government budgets, you might filter by Country and then by Department.

4. JSL Scripting

All of the examples in this tutorial demonstrate features that can be used without writing JSL scripts. JMP Applications also supported embedded scripts that work along with the built-in functions to provide additional interactions.

Continuous X and Y

Element

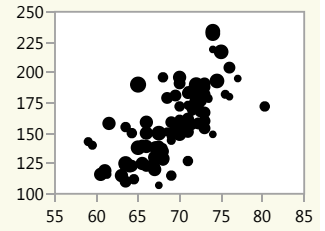
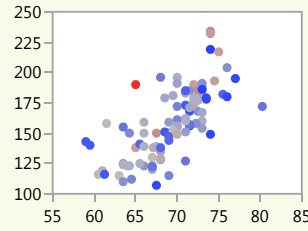
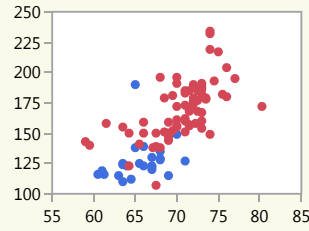
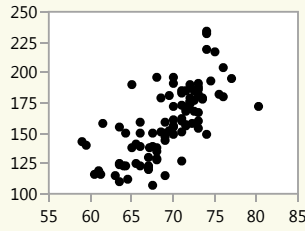
X and Y

With Overlay

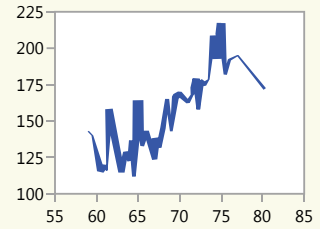
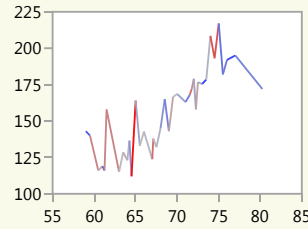
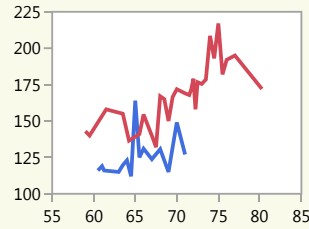
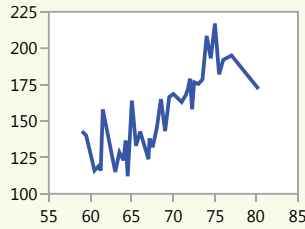
With Color

With Size

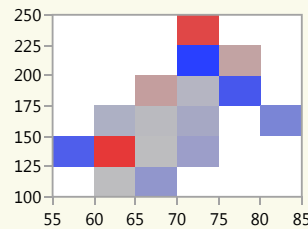
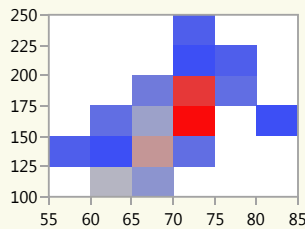

Points



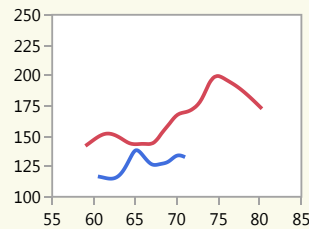
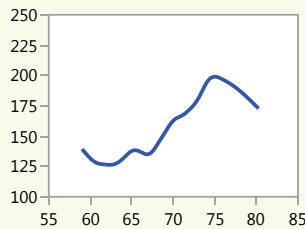

Line




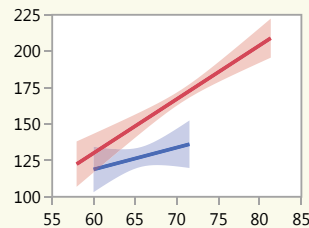
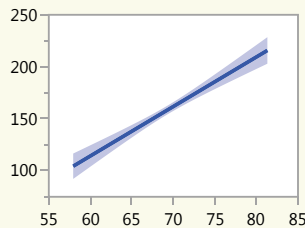

Heat map



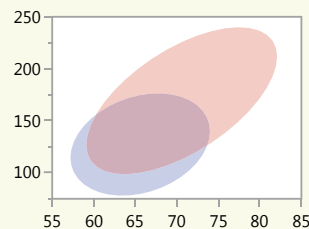
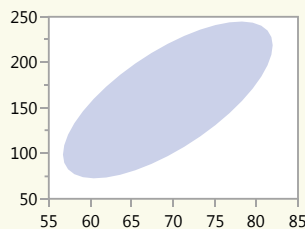

Smoother



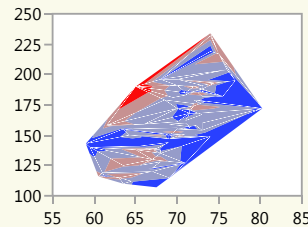
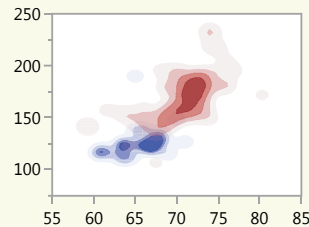
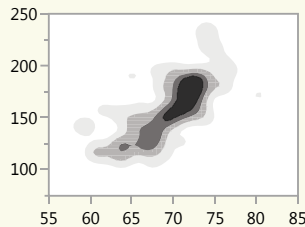

Line of Fit




Ellipse




Contour



Categorical X

Element

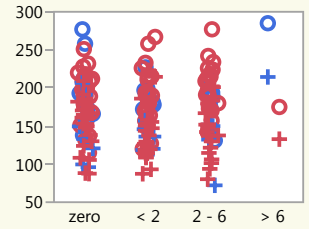
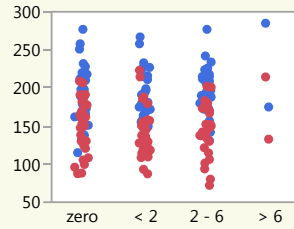
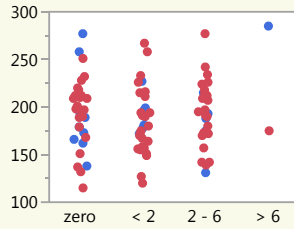
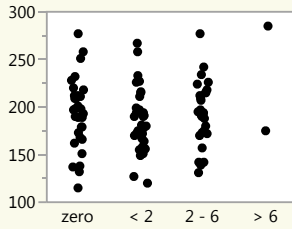
X and Y

With Overlay

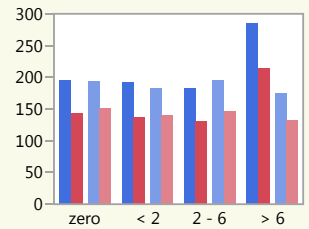
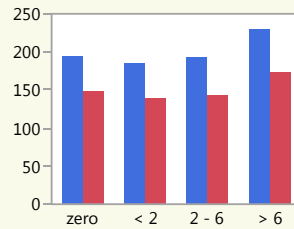
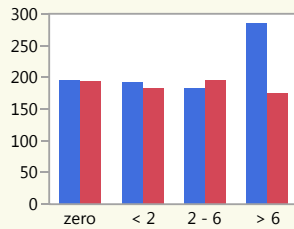
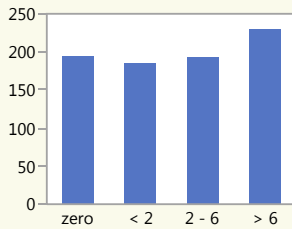
X and 2 Ys

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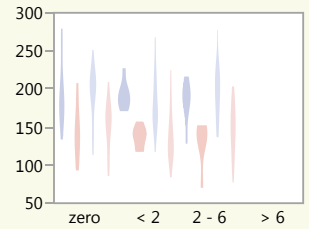
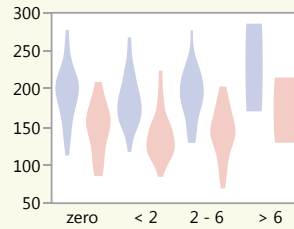
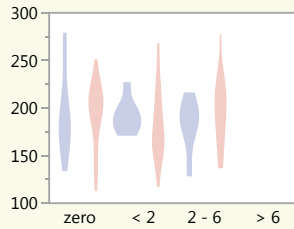
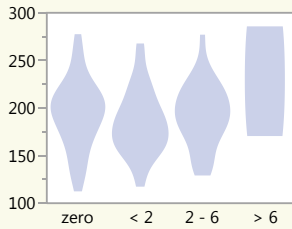
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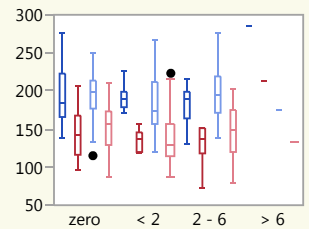
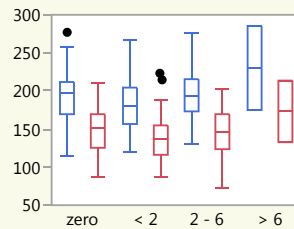
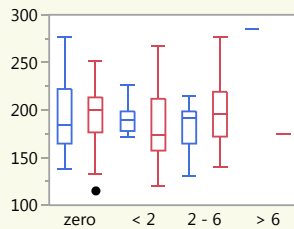
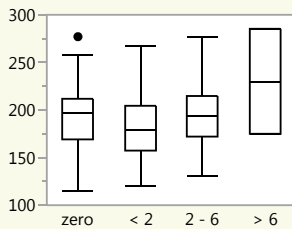
Bar



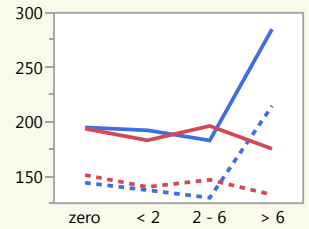
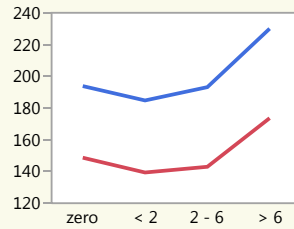
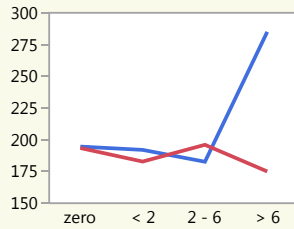
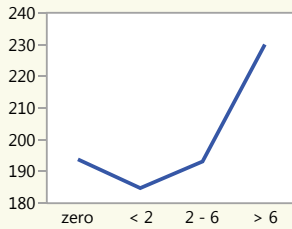
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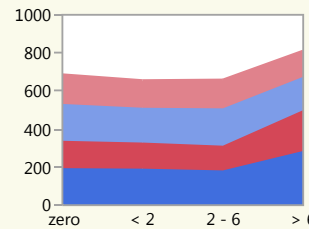
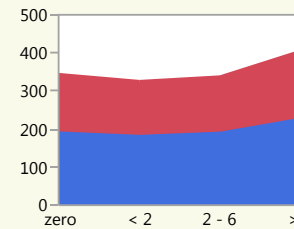
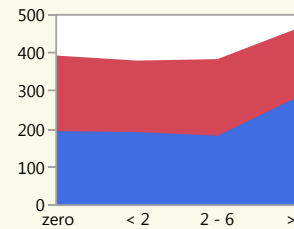
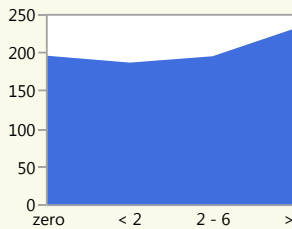
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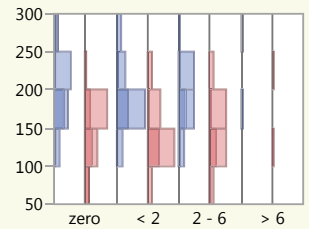
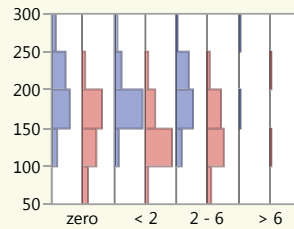
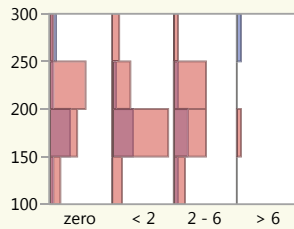
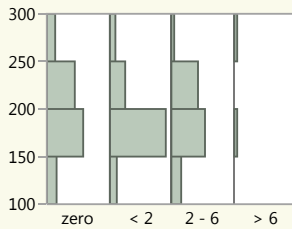
Line



Area

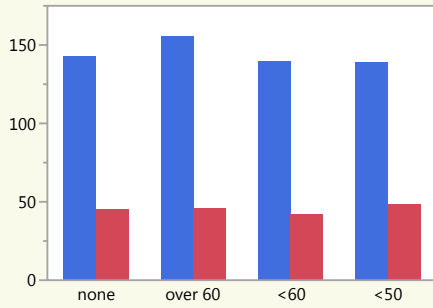


Histogram

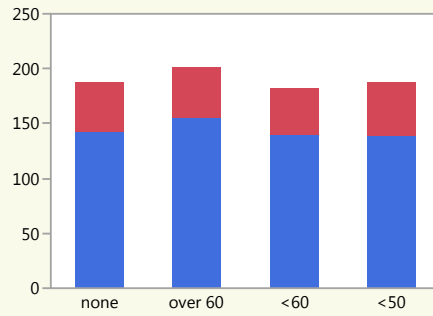


Bars and Lines

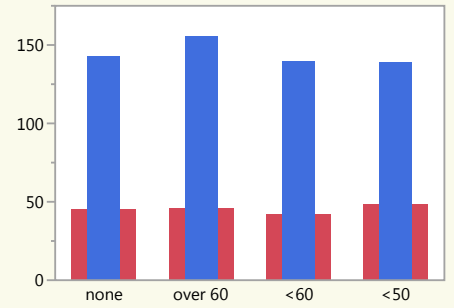
Bar Style: Side by Side



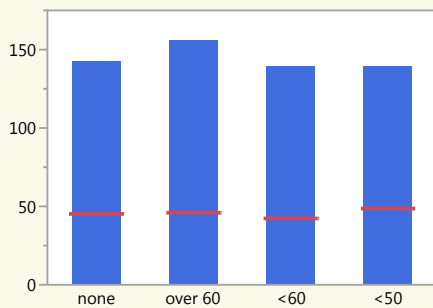
Bar Style: Stacked



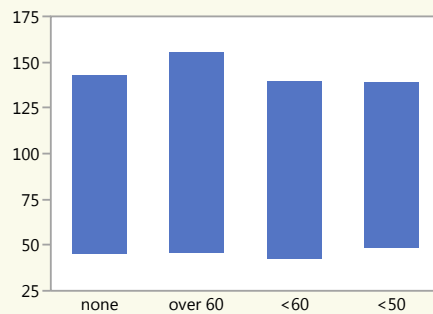
Bar Style: Bullet



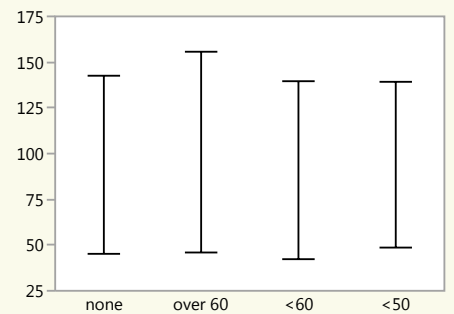
Bar Style: Single



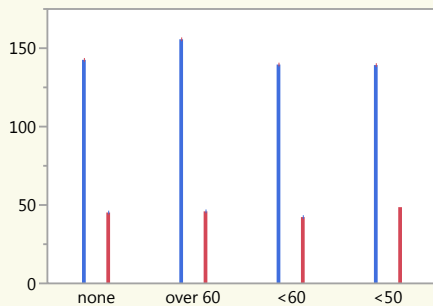
Bar Style: Range



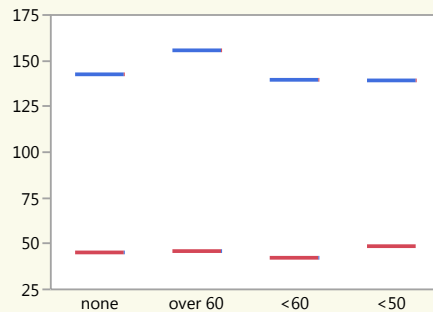
Bar Style: Interval



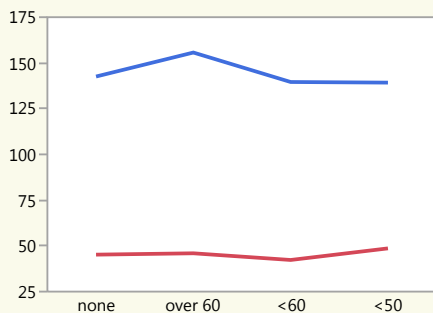
Bar Style: Needle



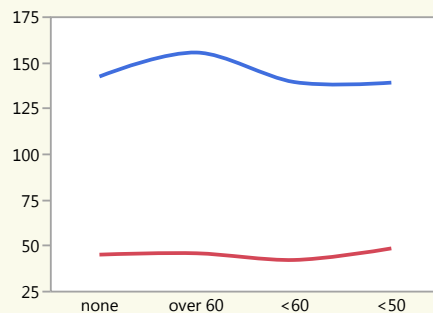
Bar Style: Float



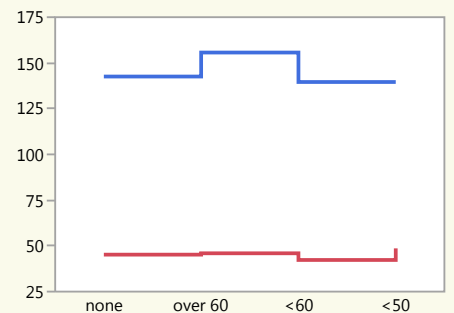
Line Connection: Line



Line Connection: Curve

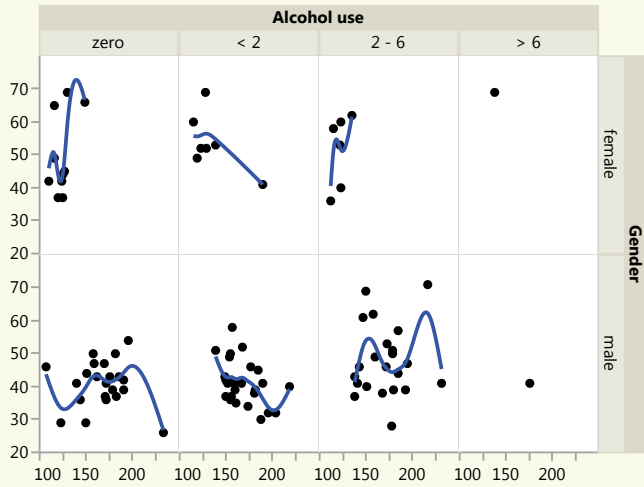


Line Connection: Step

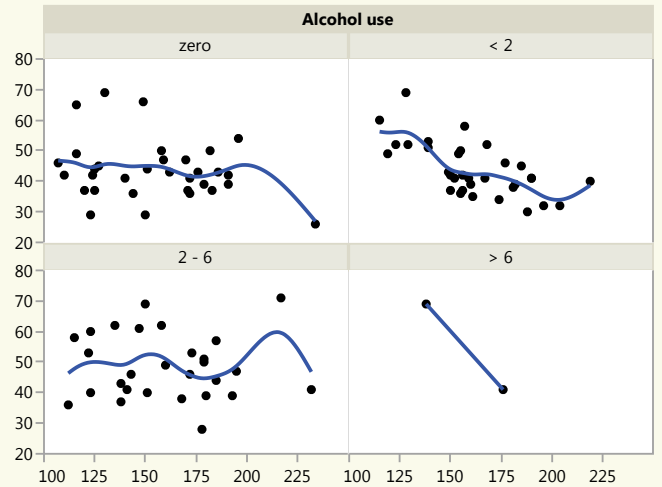


Multiples

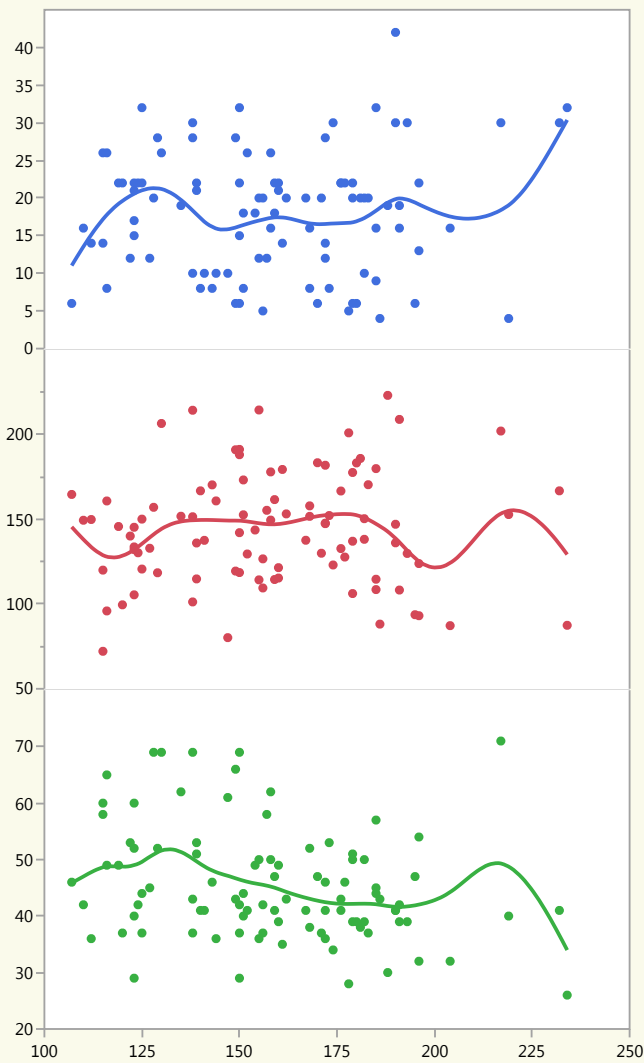
Group X and Group Y



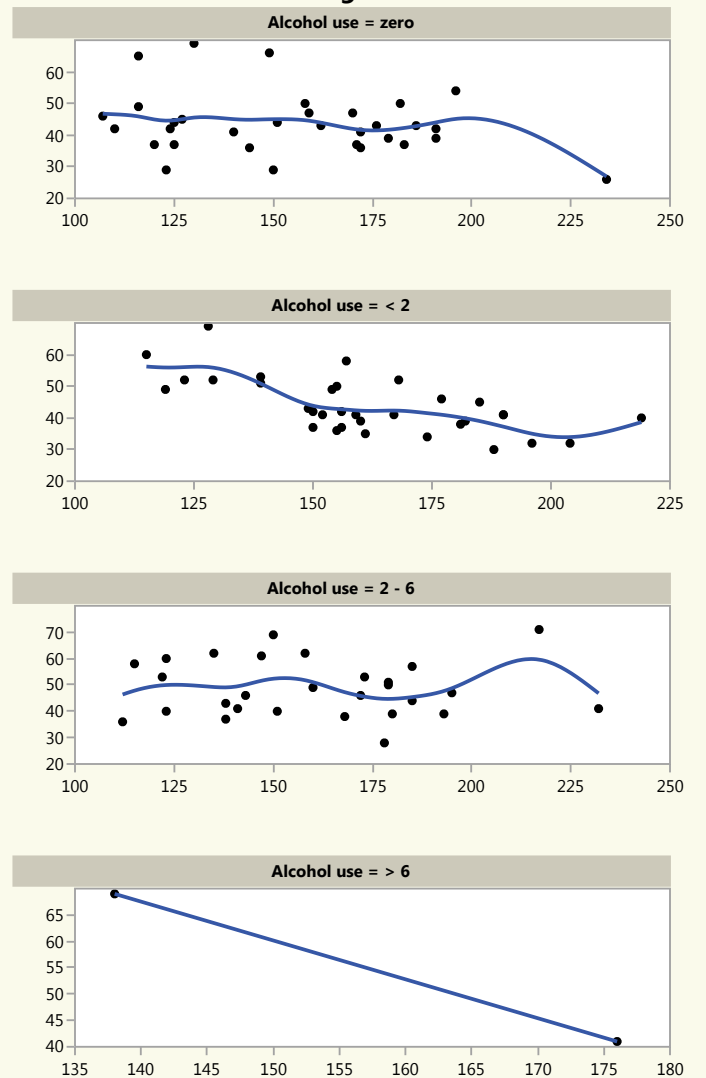
Group Wrap



Multiple Ys



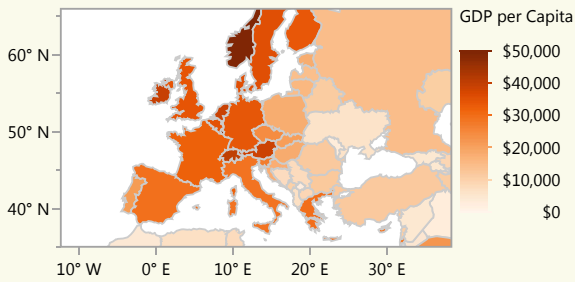
Page



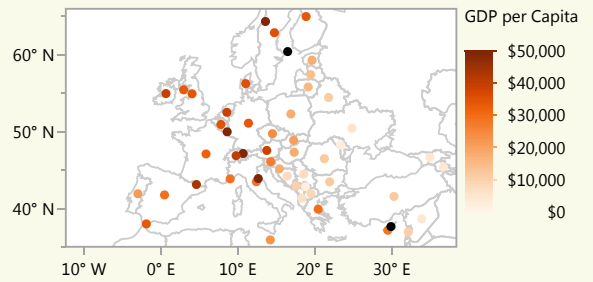
Special Purpose Graphs

Maps

Map Shapes with Shape and Color

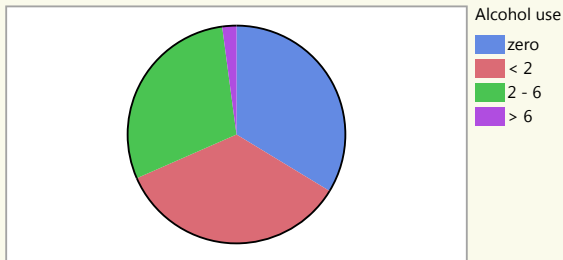


Points with Shape and Color

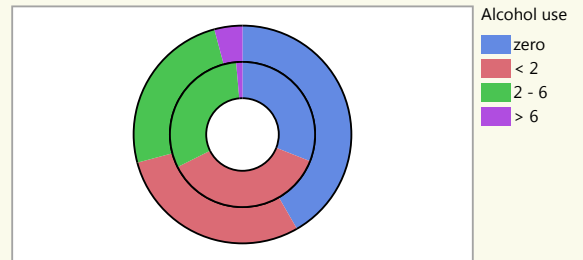


Pie

Pie

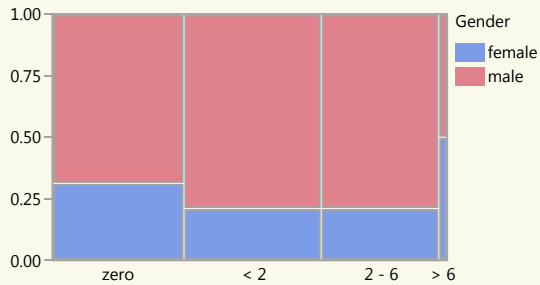


Donut with Overlay

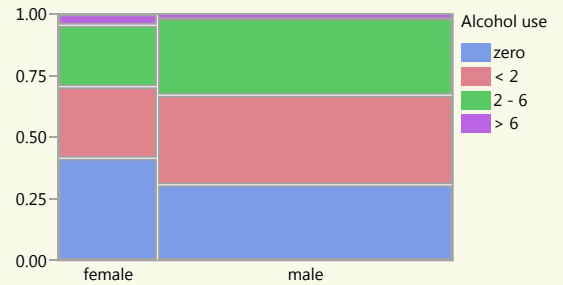


Mosaic

Mosaic

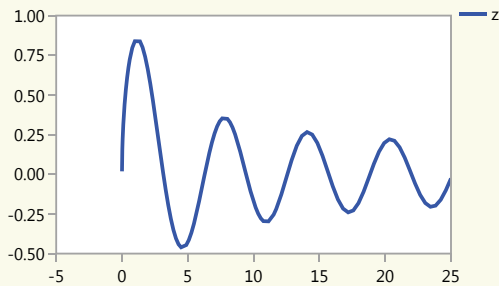


Mosaic

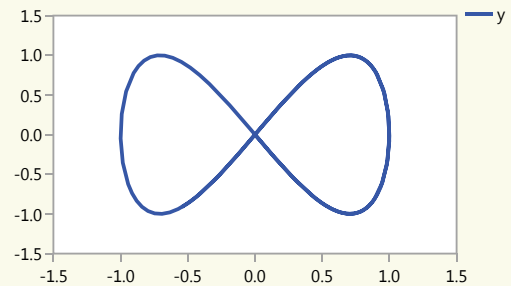


Formula

Formula: $y=f(x)$

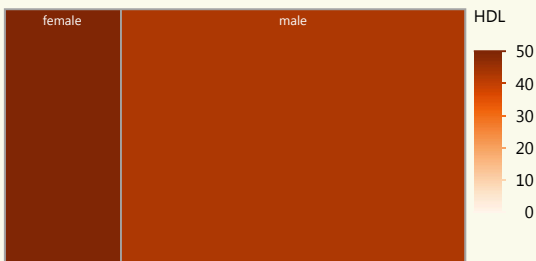


Formula: $x=f(t), y=g(t)$

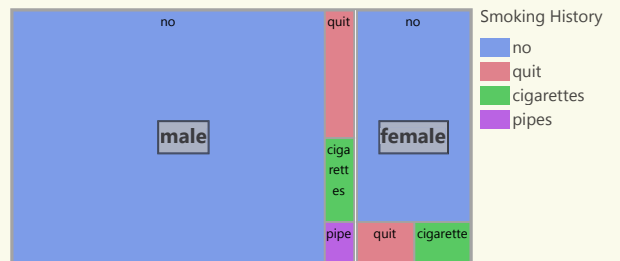


Treemap

Treemap with Continuous Color

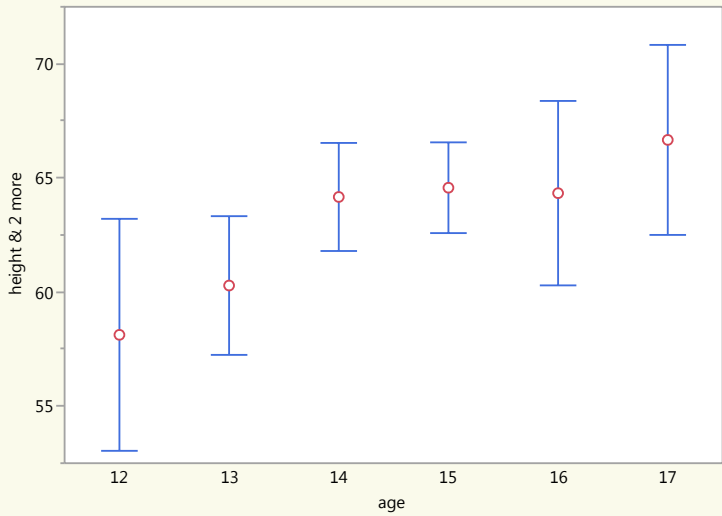


Nested Treemap (2 Xs) and Categorical Color

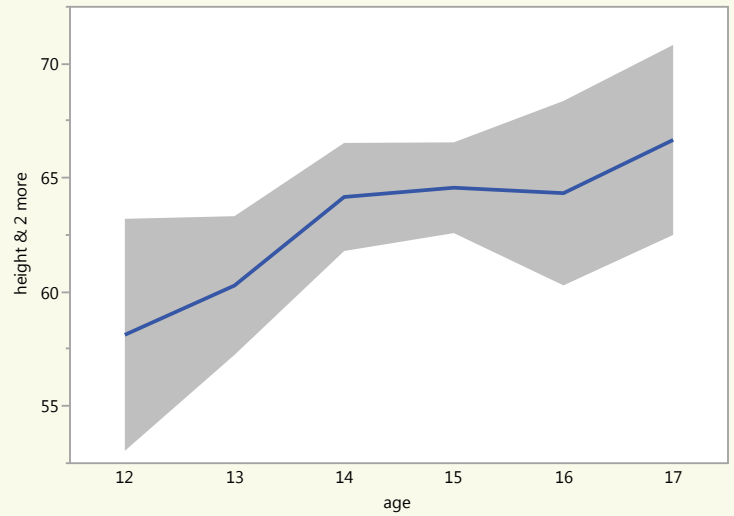


Composed Graphs 1

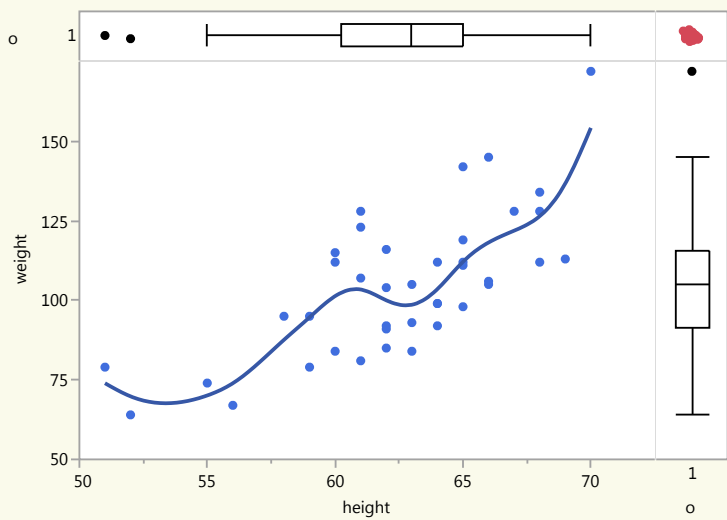
Custom interval bars: Big Class.jmp



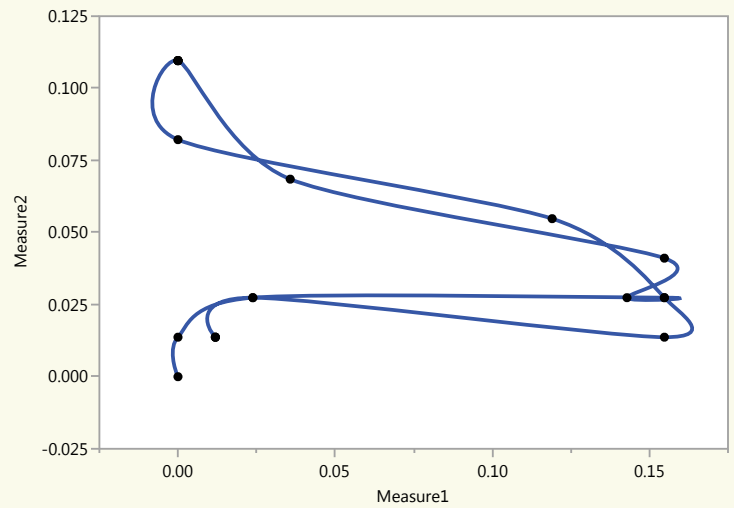
Custom interval area: Big Class.jmp



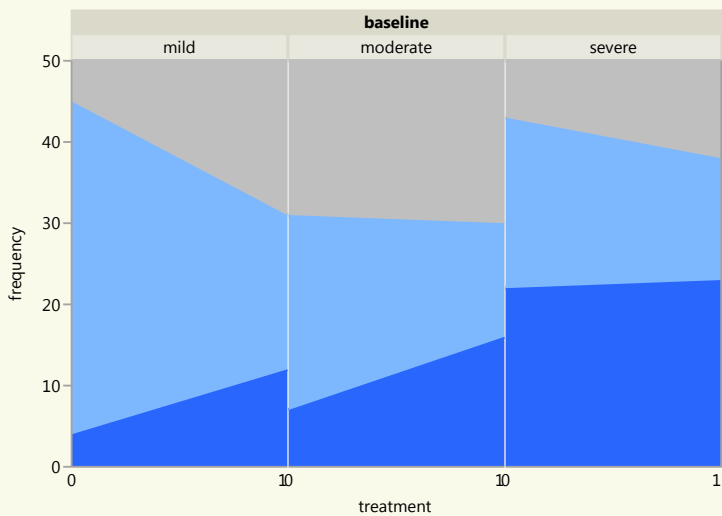
Marginal charts: Big Class.jmp



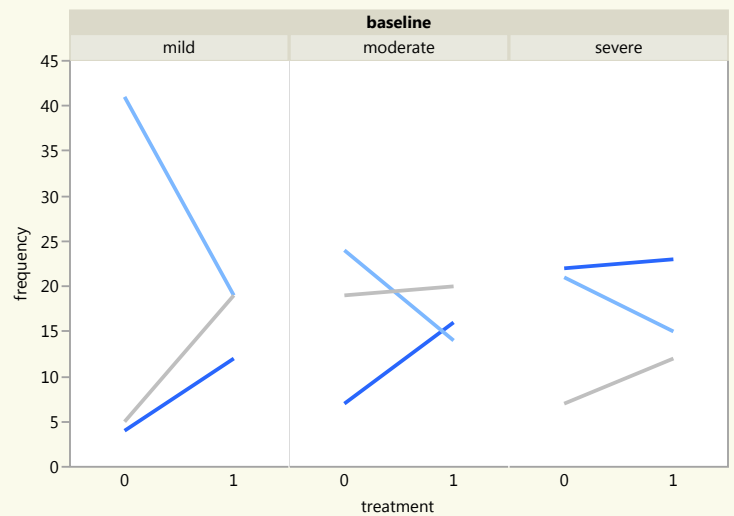
Connected scatterplot curve: XYCurve.jmp



Stacked areas: Treatments.jmp

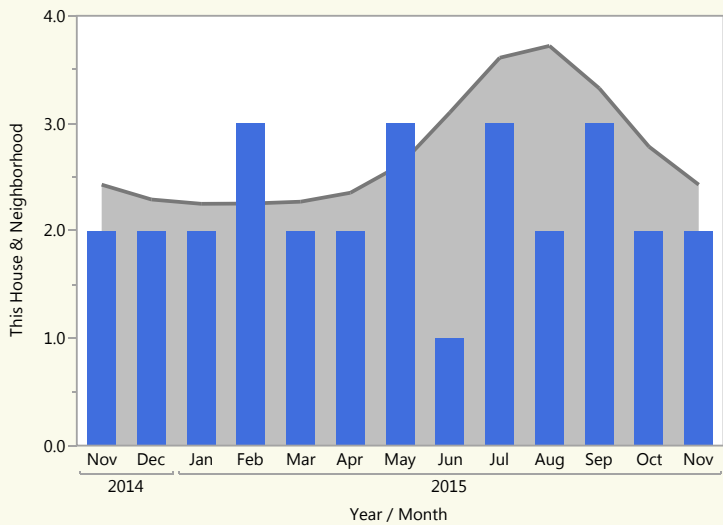


Slope charts: Treatments.jmp

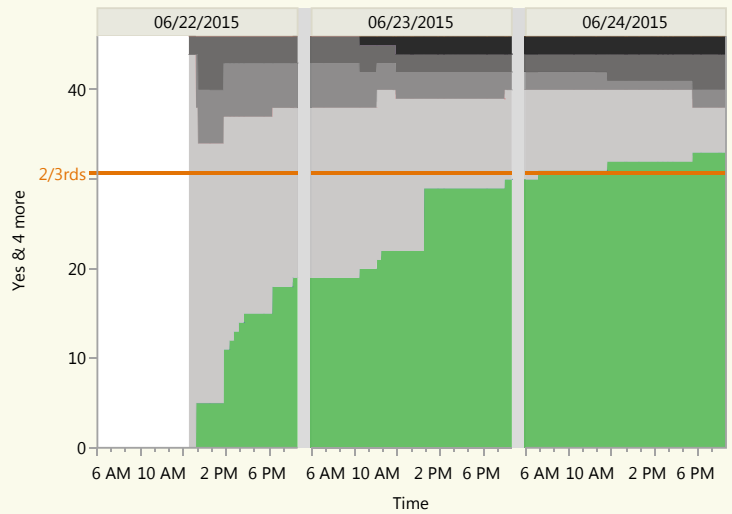


Composed Graphs 2

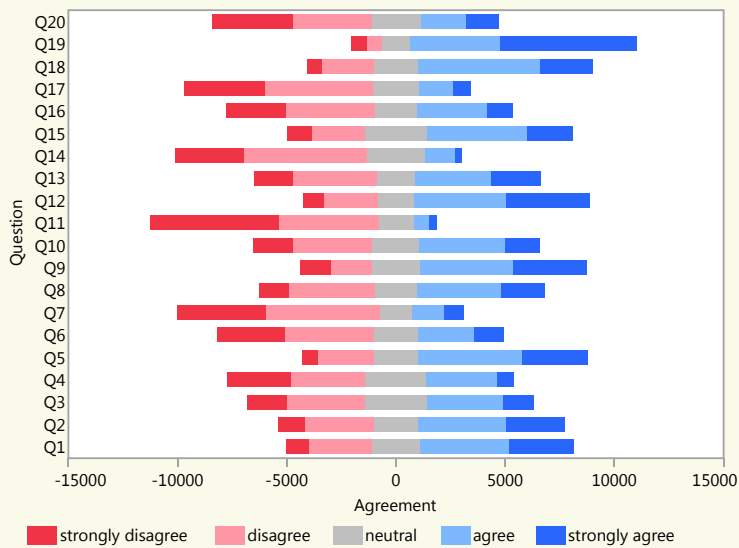
Bar and area: Water Bill.jmp



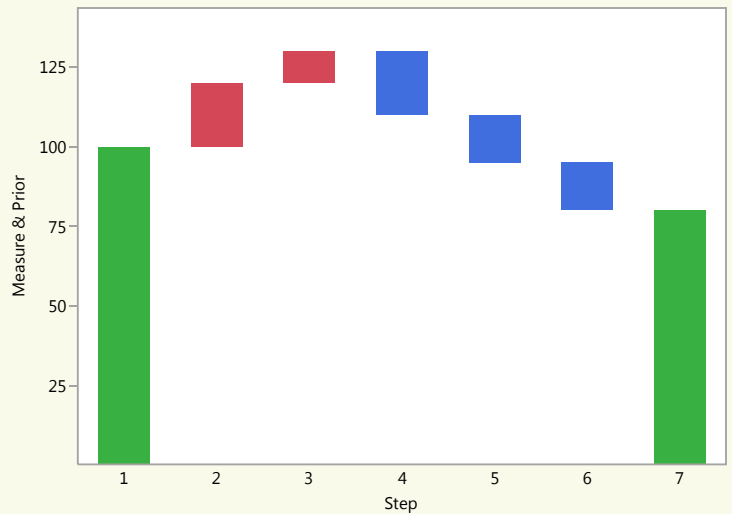
Stacked areas: Votes Over Time.jmp



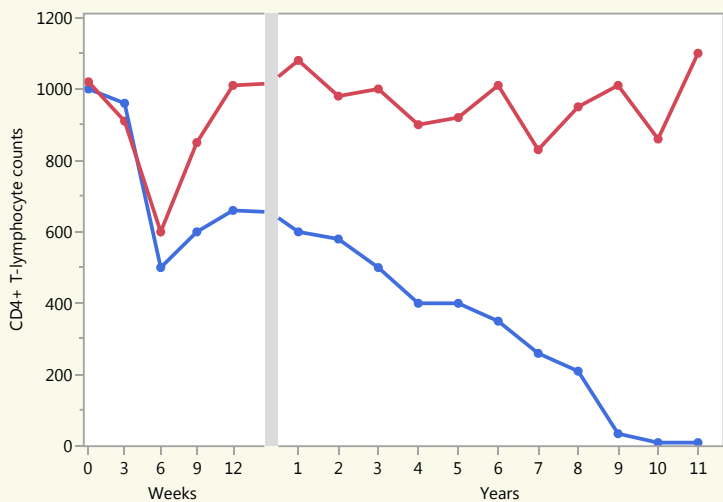
Likert scale bars: Likert Expanded.jmp



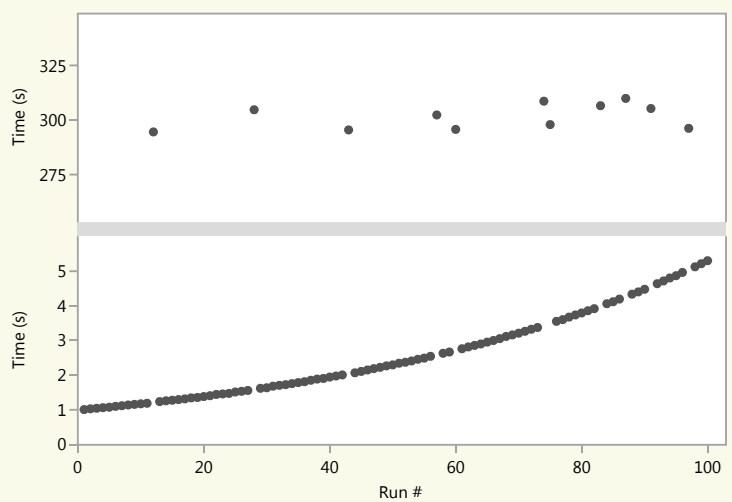
Range bars: Waterfall Chart.jmp



Broken time axis.jmp

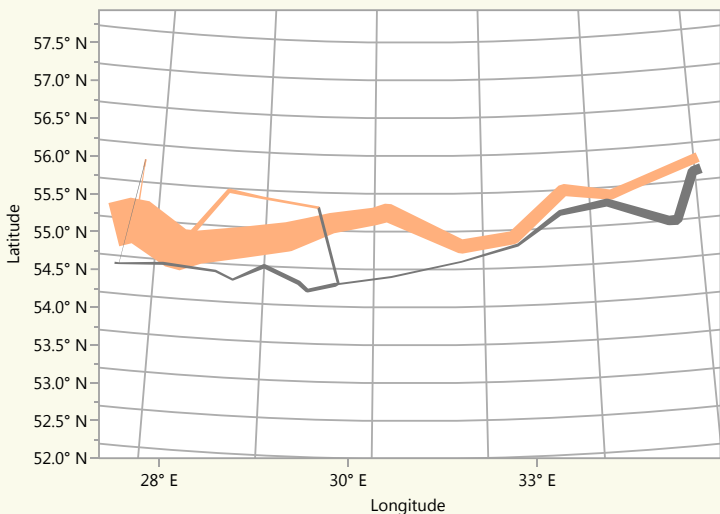


Broken Y axis.jmp

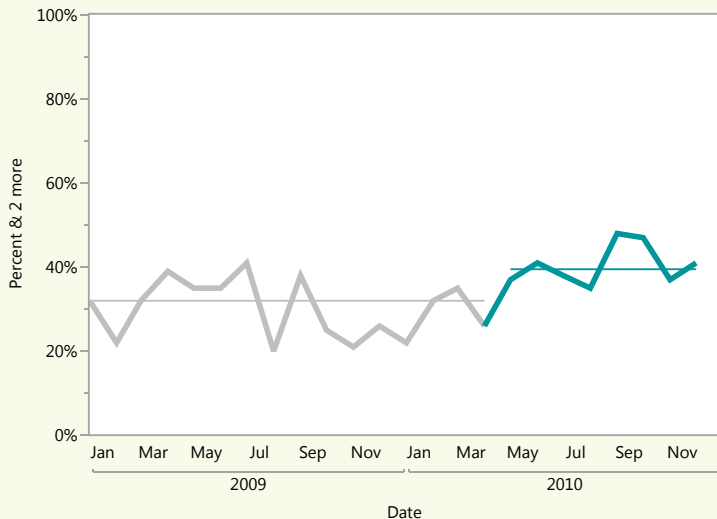


Composed Graphs 3

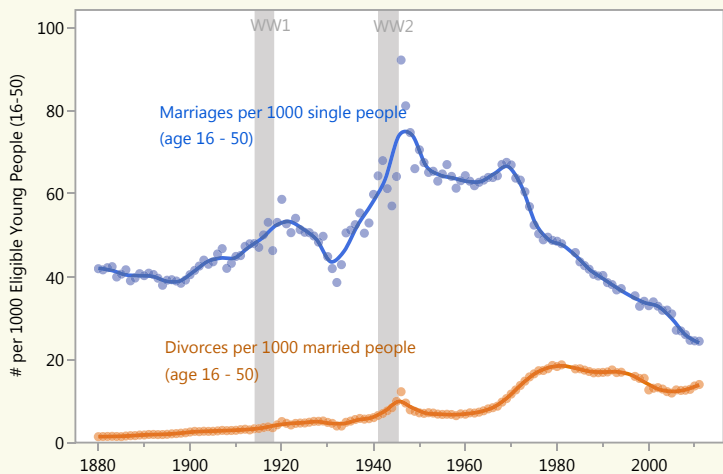
Flow diagram: Napoleons March.jmp



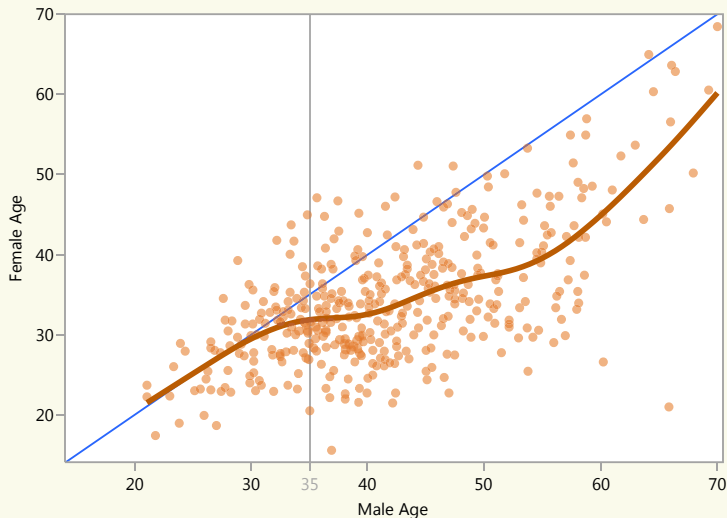
Custom reference lines: Phase Line.jmp



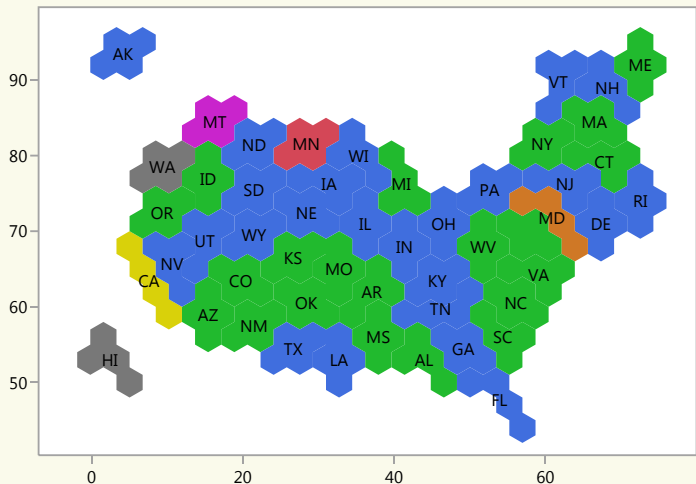
Annotations and ref ranges: Marriage Divorce Rates.jmp



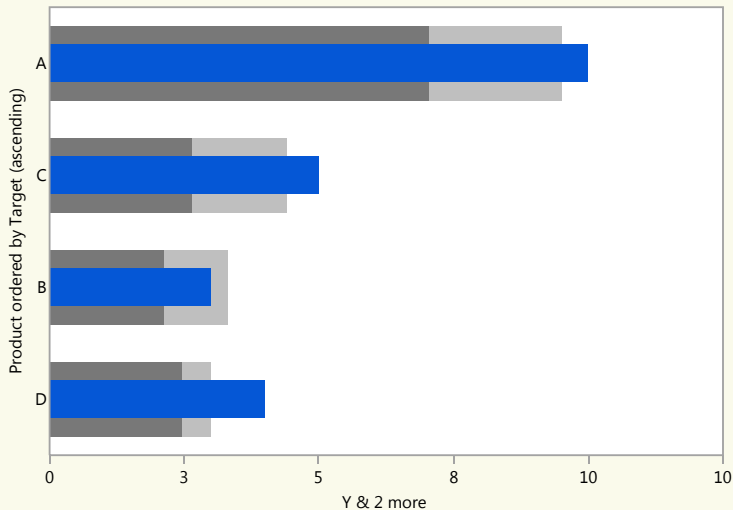
Smoother with faded dots: Hollywood Ages.jmp



Custom map shapes: US State Mottos.jmp

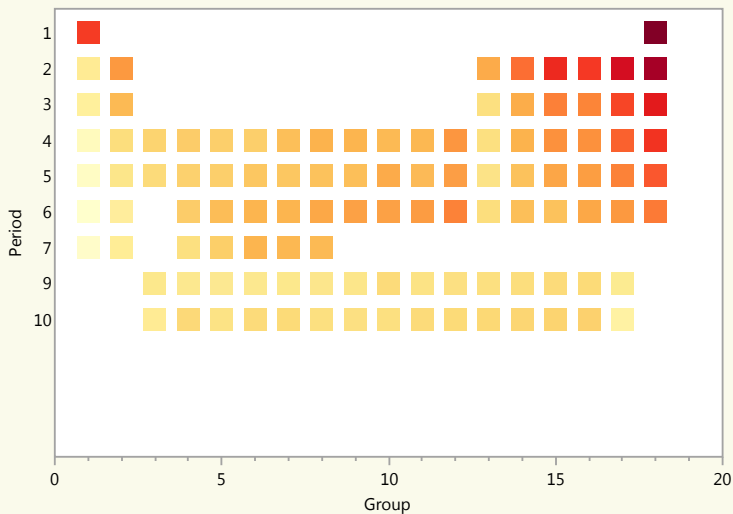


Muti-variable bullet: Bullet Measures.jmp

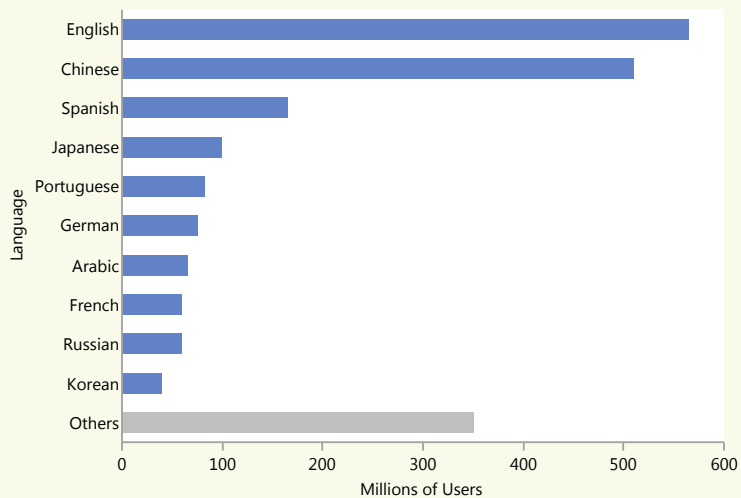


Composed Graphs 4

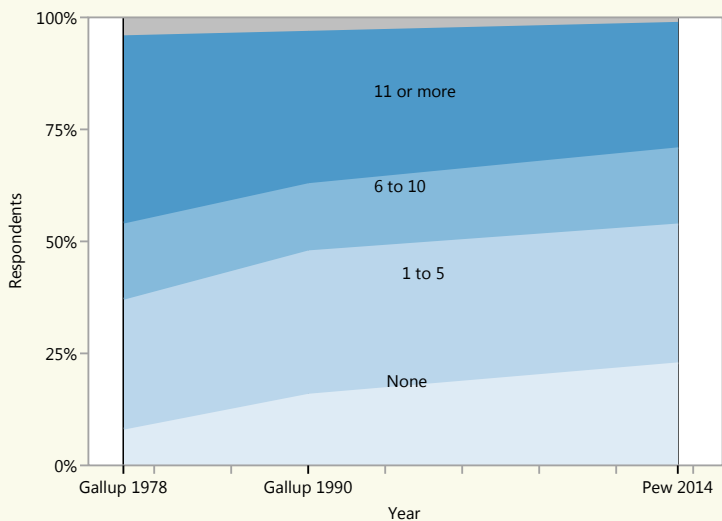
Period table squares: Ionization Energy.jmp



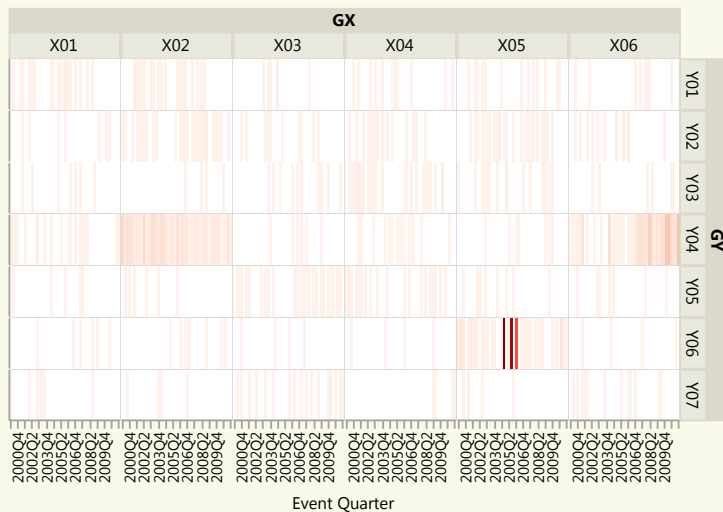
Bars with color: Languages.jmp



Labeled areas: Reading Polls.jmp

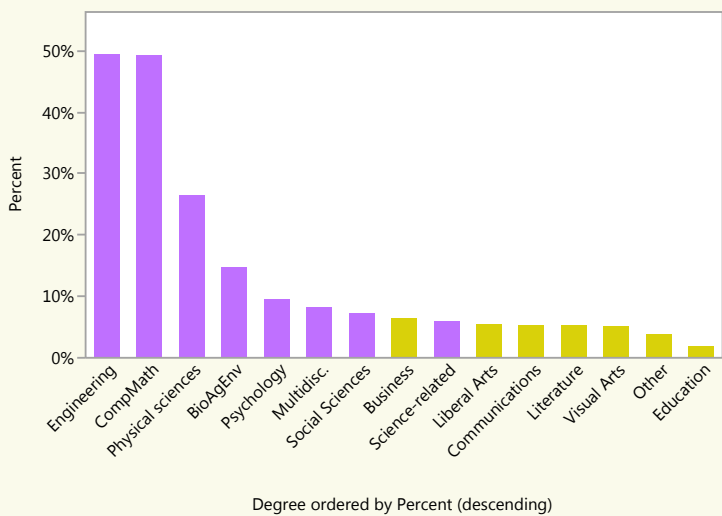


One-dimensional heat map: Patient Reporting 335.jmp



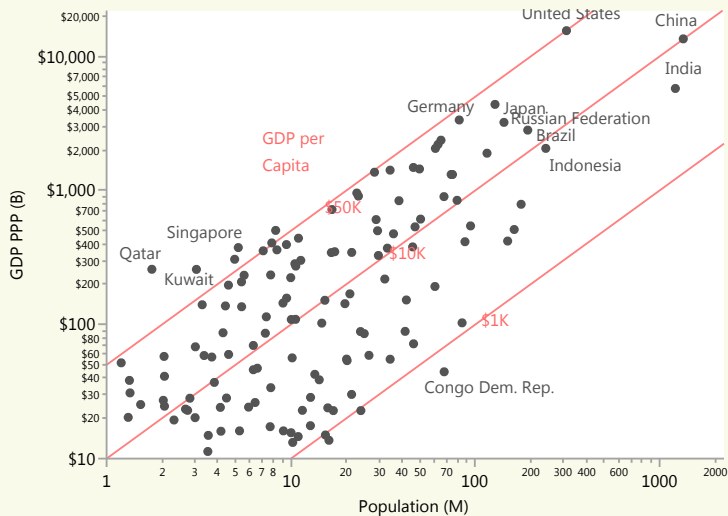
Where(3687 rows excluded)

Ordered bars with color: STEM jobs.jmp



Where(Job Type = STEM)

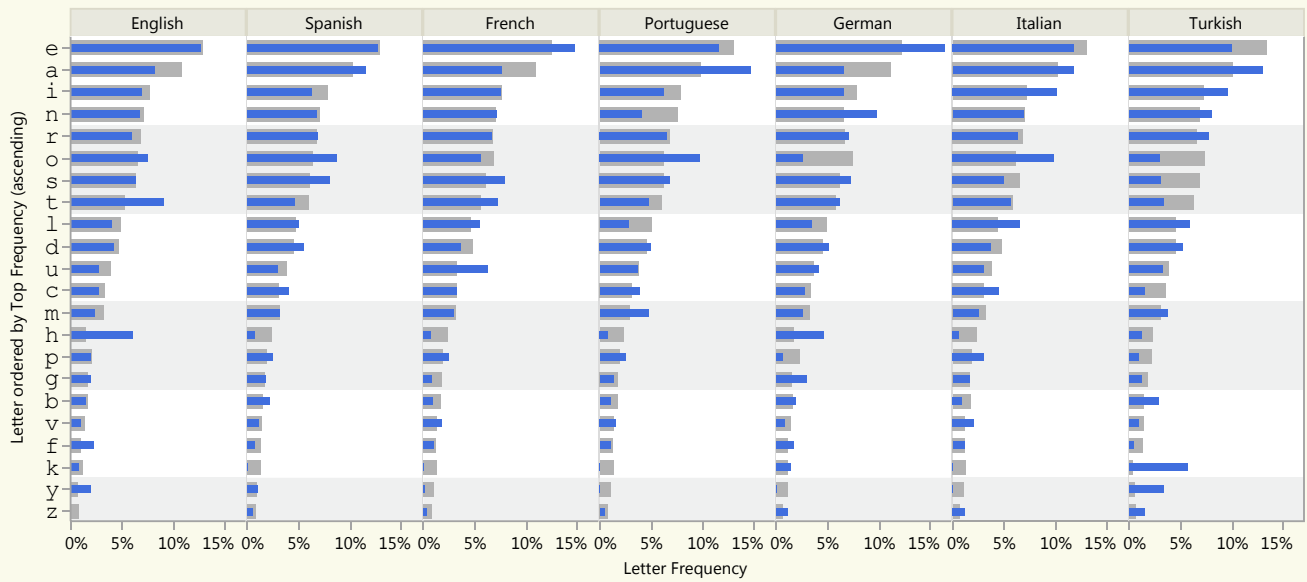
Custom reference lines: worldGDP2011.jmp.jmp



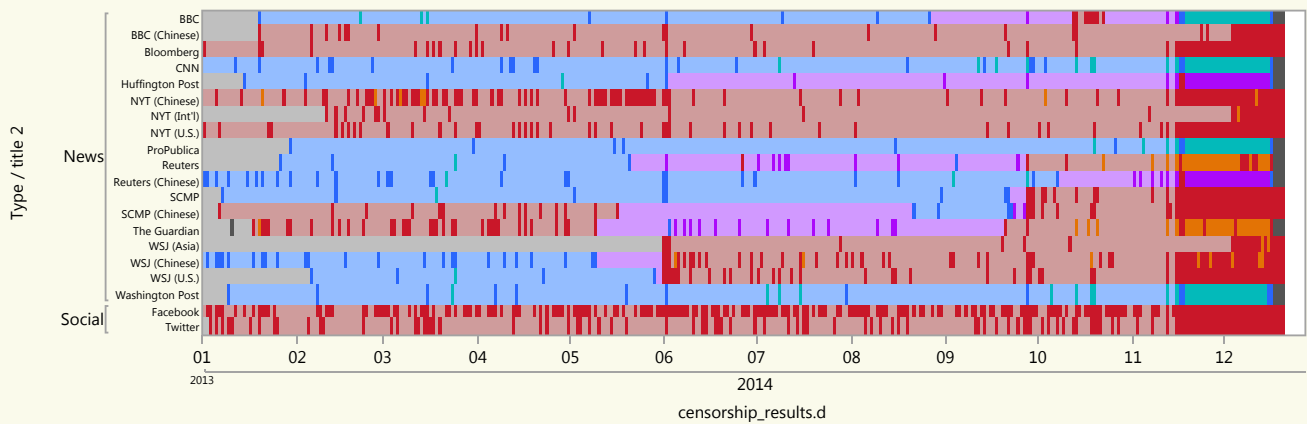
Where(10 rows excluded)

Composed Graphs 5

Bullet and Group X: Letter frequency stacked.jmp



Color Squares: Censorship.jmp



Funnel Plot: Same Sex Couples.jmp

