Getting Graphs a Good Look: Schemes and the Graph Editor

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Like Stata graphs

Would like to make them look different

- Needed for a particular journal
- Needed for in-house graphics
- Just because
The Default Look

- We have a default graph from Stata

![Default Graph from Stata](image)
We would like it to look like this, instead.
Three Solutions

- The brute force solution
  - Have a series of options we give to every Stata graph
  - This is not a good way to work!
- Use the Graph Recorder to change one graph, then apply the changes to other graphs
  - Simple via point and click, but needs many versions
- Write a *scheme* to control the look of all Stata graphs
  - A little more complex, but works more generally
- We’ll now go through each of these
Our Original Graph

- We’ll use the `lbw` dataset from Stata’s manuals
  - `.webuse lbw`
- Start with the simple birthweight vs. age
  - `.scatter bwt age`

- We’ll change the background, the plot symbols, the grid lines, and the y-axis labels
Recordings can be used to make common changes, especially if there is a single type of graph you make often.

Be forewarned, however, that a recording for a twoway graph will most likely not work for, say, a histogram.

- This means one recording would be needed for each type of graph...
The Record Button

- Start up the Graph Editor
- Click the red **Start Recording** button to record everything done
- We’ll change just overall characteristics here
  - We could record added text, lines or points
  - These would be positioned by the units in the graph, though
Change the background to white

- Double click outside the graph
- In the *Graph properties* dialog box, change the color to *white*
- Click **OK**
Changing Plot Points to X’s

- Right-click on one of the points
- From the contextual menu choose *Scatter properties*
- Change the symbol to *Large X*
- Click the **OK** button
Darkening the Gridlines

- Double-click just to the left of the vertical axis
- Click the **Grid lines** button
- Choose the *Gray 12* color
- Click the **OK** button
Making the $Y$-axis Ticks Horizontal

- Click the **Label properties** button
- Select the *Horizontal* item from the *Angle* field
- Click the **OK** button
- Click the **OK** button in the *Axis properties* dialog box
Click the Graph Record button again, to save the recording
Give it some nice name, like x grid
Close the graph editor but do not save the recording
Playing the Recording in the Graph Editor

- Reissue the `twoway` command from earlier
- Start the Graph Editor
- Click the **Play** button
- Select the \textit{x grid} item
  - The graph recording gets played
- Close the Graph Editor
Playing the Recording from the Command Window

- Get your `twoway` command
- Add an `play(x grid)` option
- Issue the command
  - The graph recording is applied to the graph
This can be applied to other scatterplots well enough
- `scatter bwt lwt, play(x grid)`

So...we have a way of changing simple scatterplots
Comments on Graph Recordings

- Your graph recordings are saved in your PERSONAL folder.
- They can be quite useful for such schemelets.
- If you look at them, you will see that they work directly with the graphics class system—edit at your own risk.
If we have overlaid graphs, the changes apply to just the first plot.

- `twoway (scatter bwt age if smoke==0) ///`
- `(scatter bwt age if smoke==1), ///`
- `legend(order(1 "non-smoker" 2 "smoker")) ///`
- `play(x grid)`
So, if we would like something which applies to deeper graphs we have two choices

- Make another recording for the more complex graph
- Try to make more general changes using a scheme

We’ll now look at schemes
What is a Scheme?

- A scheme is a series of settings which tell Stata how to draw graphs
- To see what schemes you have, try this
  - What is listed depends on what you might have installed
  - I have some extras here for showing off
- We should try a few
Why Use a Scheme?

- There is a standard appearance needed
  - For in-house graphics
  - For favorite journals
  - For your field

- You would like a different look

- You would like to implement this look without having to specify a long series of options to every graph command you use
We’ll keep working with our simple graph from before, as a start.

```
.scatter bwt age
```
By default, the `s2color` scheme is used in Stata
- This could be changed in the graph preferences

Here is the black-and-white version:
- `. scatter bwt age, scheme(s2mono)`

Or...reverse video
- `. scatter bwt age, scheme(s1rcolor)`

Or a very plain yet practical scheme, which is user-written
- `. scatter bwt age, scheme(lean2)`

Here is something ugly, stolen from a colleague at work
- `. scatter bwt age, scheme(ugly)`
Schemes are simple text files which list attributes of graphs, and then list how they should appear.

We’ll base our scheme on `s2color` and just change what we like.

- This is the best way to work.

We’ll then save the scheme with a very special name:

```
scheme-scheme-name.scheme
```

Stata will find the scheme if it is anywhere in the ado-path.
Redraw the scatterplot from above using the default s2color scheme

. scatter bwt age
What would we like to change?

- We’ll start by changing what we changed in the editor
  - A white background
  - X’s for the plot symbols
  - Darker grid lines
  - Horizontal labels on the vertical axis
We’ll work with on-line help, because

- Schemes are ...
  - simple: each line has an attribute, a context and its value
  - complex: the values can be raw or part of a style

We’ll pick out our changes as we need them from the online help:
- help scheme entries
  - This is a rare example of help which is on-line but *not* in the manuals

We’ll use the Command window only
- Reloading new versions of a scheme clears out the dialog boxes
Starting the Changes

- Open a new Do-file Editor window
- We’d like to alter the s2color scheme, so start by including this in the scheme:
  
  ```
  #include s2color
  ```
  
  Be sure there is no space after the hash (#) mark!

- This will base our scheme on Stata’s s2color scheme

- Save the scheme as `scheme-xgrid.scheme` in your scheme folder
Finding What to Change

- If you didn’t do it earlier, type `help scheme entries` to get to the place which says how to change scheme entries.
- We’d like to change the look of our scatterplots, so click the Scatter plots link.
  - This looks understandable, except for `p#` entries.
What Do $p$ and $p#$ Mean?

- Because Stata allows overlays of graphs, it needs methods for rendering each of the graphs.
  - There are 15 sets of settings—after the fifteenth overlay, the settings recycle.
- Use $p$ if the change pertains to all overlays of this type.
- Use the $p#$ if the change pertains to a particular overlay.
We’d like all the plot symbols to be large X’s
  - It looks like `symbol` is what we’re after
  - We can use `p` to universally change to X’s

Clicking the `symbolstyle` link gives lists of things to try
  - We can try `x` for large X

Add this line to your scheme file:

```
symbol p x
```
Changing the Symbol Color

- There is (apparently) no entry for changing the color of the plot symbols.
- When this happens, take a look at `help scheme shared plots`.
- It looks like we need to add:
  ```
  color p1 red
  ```
  to make the plot symbol red for the first plot.
- Save your scheme file.
Trying Out Our Creation

- Try from command line:
  . scatter bwt age, scheme(xgrid)
- The symbols are now red X’s
Changing the Gridlines

- We’d like the gridlines to be more visible
- Bring the Viewer window to the front
- Click the **Back** button to get back to the help scheme entries page
- Click the gridlines link
  - It looks like color `major_grid` is what we’d like to change
  - Click the `colorstyle` link to see how colors work
There are several alternatives

- Named colors
- 8-bit RGB colors
  - Colors are specified as \textit{Red# Green# Blue#}; each is a number from 0 to 255
- 8-bit CMYK colors
  - Colors are specified as \textit{Cyan# Magenta# Yellow# Black#}, with each number from 0 to 255
Changing the Grid Color

- Let’s try changing the color of the grid line to a named color
- Add this line to your scheme
  ```plaintext
color major_grid gs12
  ```
- Save the scheme file
Trying Out Our Second Creation

- Try reissuing the our command from earlier...you’ll find nothing has changed
  - `scatter bwt age, scheme(xgrid)`
    - This is because the scheme has been cached by Stata
- Flush the scheme from Stata’s cache
  - `. discard`
- Reissue the graph command, again
  - `. scatter bwt age, scheme(xgrid)`
- Stata will re-read the scheme file, so the new changes will be incorporated
Help for Changing the Y-axis Labels

- We’d now like to make the axis labels horizontal
- Bring the Viewer window to the front
- Click the **Back** button to get back to the help scheme entries page
- Click the **Axes** link
- Scroll to the “Axis tick labels” section
- It looks like we need to change the text angle for the y axis
- Click the link to **anglestyle** link
- We need to change the angle style to horizontal
Changing the Y-axis Labels

- Add the following line to your scheme
  `anglestyle vertical_tick horizontal`
- Save the scheme file
- discard the cache
- Reissue our favorite command
  `. scatter bwt age, scheme(xgrid)`
- The y-axis labels are now horizontal
Changing the Background

- To find this, go back to help scheme entries and scroll until you find the Background style definitions.
- We just need to add
  
  ```
  color background white
  ```

  to the scheme file.
- Discard and try the graph again.
We Have Our Scheme

- This is now a `xgrid` scheme we could use when needed
- We could add to it as we see fit to make a full set of changes
- The strategy we used is pretty much what everyone needs
- If we wanted to make this our default scheme, we could use the `set scheme` command:
  
  ```
  set scheme xgrid [, permanently]
  ```
Extending the Scheme to Histograms

- Now suppose that we would like to play with histograms
  - Specifically, it would be nice to change the default color of the bars
- Hit the **Back** button in the Viewer and click the Histogram plot link
- We’d like to change the color of the bars to a nice blue:
  - `color histogram "40 40 255"
- If you try this graph, you’ll see the outlines of the bars are now ugly
- Add one more line
  - `color histogram_line black`
- Now the histograms look nice, also
To find a full scheme, use Stata’s `viewsource` command:
```
viewsource scheme-s2color.scheme
```

There is a lot here!
A Carefully Built Scheme

To find how a nice scheme can be made without starting from scratch, look at one of the *lean2* schemes from Svend Juul

```
findit lean2 scheme
```

- Click the first link
- Install the files

- Use `viewsource` to look at the file
Where to Save?

- We saved this scheme in the folder we’re using
- This makes it usable only when working in this folder
- To use it other places, it needs to go in a location in Stata’s ado-path
There are two ways to uniformly alter the look of Stata graphs:

- **Graph recordings**
  - Are quick to make
  - Change specific graph types, so many would be needed

- **Schemes**
  - Take more time to make
  - Change all graph types