Chart Components and Working On

Your Graphics Piece-wise

step instructions are there for your learning enjoyment.

Hi, There's a new members-only tutorial that went up today, so if you'd like to make an interactive tiled bar chart using D3.js, the step-by-

Peter Cook, the author of D3 in Depth and the new-ish Frontend Charts, provides clear instructions and usable code in a remake of

JavaScript department.

September 20,

The Process /

components

2018

Topic

my R tutorial. Unlike with R, my work with JavaScript and other tools is more ad hoc, so I've always been hesitant to provide generalized instructions (and instead explain how I make specific things). I'm hoping Peter can provide stronger foundations for you in the

As I was working through Peter's tutorial, which is split up into digestible steps, I got to thinking about how visualization projects are so much less daunting when you go at it piece-wise. Hence, the topic of this issue: visualization components and approaching your data graphics in bits.

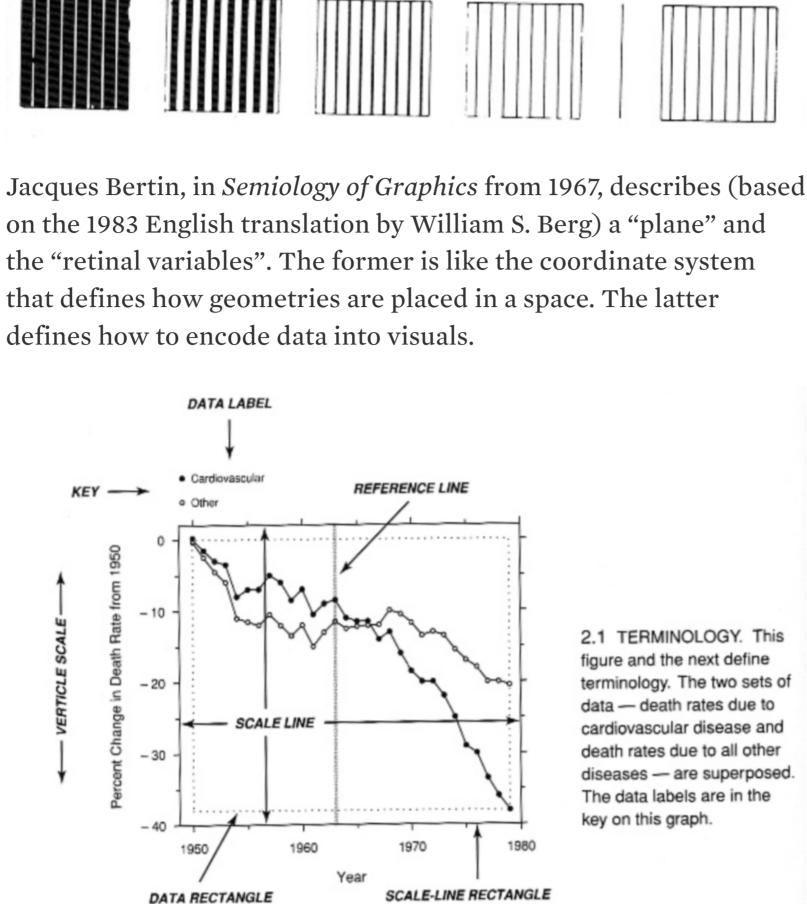
Let's go. Components of a Chart Before you can form a set of steps to visualize data, you need to know the components of a chart that you can separate. Like making an outline for an essay, you look for sections that make sense rather

than define how many periods and question marks you need to

There are a number of ways you can split a data graphic into

show.

components.



HORIZONTAL SCALE

Figure 19. AGE-ADJUSTED DEATH RATE. The data are the percent changes from 1950 in death rate in the United States due to cardivascular disease and other diseases.

William S. Cleveland, in his 1994 book The Elements of Graphing

Data, lists the "basic elements of graph construction" as "scales,

tick marks."

of graphics:

components of a graphic:

datasets,

captions, plotting symbols, reference lines, keys, labels, panels, and

In The Grammar of Graphics, published in 2005, Leland Wilkinson

Statistical graphic specifications are expressed in six statements:

1. DATA: a set of data operations that create variables from

built off the work by Bertin and more formally defined the

4. COORD: a coordinate system (e.g. polar), 5. ELEMENT: graphs (e.g. points) and their aesthetic attributes (e.g. color),

6. GUIDE: one or more guides (axes, legends, etc.)

Hadley Wickham, who implemented Wilkinson's grammar in R

with a package now known as ggplot2, defined a layered grammar

one statistical transformation, one position adjustment, and

As Wickham notes, this breakdown is similar to Wilkinson's, with

histogram, contourplot, and so on. In practice, many plots have (at

least) three layers: the data, context for the data, and a statistical

we might display the points themselves, a map giving some spatial

Anyways, as you can see, there are plenty of variations, and within

the time. While I keep them in the back of my mind, I tend to clump

Title of this Graph A description of the data or s

Title of this Graph

highlighting to set the stage.

VISUAL CUES

COORDINATE

SYSTEM

CONTEXT

context, and the contours of a two-dimensional density estimate.

summary of the data. For example, to visualize a spatial point process,

optionally, one dataset and set of aesthetic mappings,

2. TRANS: variable transformation (e.g. rank),

3. SCALE: scale transformations (e.g. log),

- To be precise, the layered grammar defines the components of a plot as: • a default dataset and set of mappings from variables to
  - aesthetics, • one or more layers, with each layer having one geometric object,
  - one scale for each aesthetic mapping used, • a coordinate system,

• the facet specification.

The layer component is particularly important as it determines the physical representation of the data, with the combination of stat and geom defining many familiar named graphics: the scatterplot,

the main difference coming from the layer component:

each component there are more variables to consider. In practice, you don't have to get into the nitty-gritty details all of

things together into four broad components:

Title of this Graph

100 units

80

60

40

20

0

highlighting to set the stage.

graphic;

reside;

the data.

highlighted;

from, and why it exists.

make better data graphics?

terms of a blobby.

settings.

chart into seven steps:

6. Add animations

7. Add a title and legend

annotation, and finally interaction.

A description of the data or something worth

**SCALE** Jan. Feb. Mar. Apr. May June July 2012 Source: Somewhere reputable Jan. Feb. Mar. Apr. May June July Title of this Graph

• The scale sets a stage for what parts of the data are

• The context communicates what the data is about, where it is

All of the components fit together tightly, and they all depend on

Working On Your Graphics Piece-wise

to figure out. Step 1: Load the data. Step 2: Define the coordinate system. Step 3: Draw the axes. Step 4: Draw the data based using visual things. So on and so forth.

So, instead of imagining a single chart full of data that somehow

makes sense and looks awesome, you split it up into smaller pieces

1. Figure out how to display a single tiled-bar 2. Display multiple tiled-bars 3. Add the life expectancy data 4. Add labels and an axis

5. Add dropdown menus and code to filter the data

single bar — and then visualizes multiple data points, adds

You also don't have to break things down into formal components

to implement your graphics (unless you use ggplot2, in which case

it helps a lot to know the formal grammar). In the context of our

most recent tutorial, Peter divides the task of making a tiled bar

1% Shopping

3%

Housework

12%

Non-Household Care <1%

This is a simulation of 1.000 people's

average day. It's based on 2014 data from

the American Time Use Survey, made way more accessible by the ATUS Extract Builder

There are moving parts and implementation choices on the way to the final graphic, but the main task (after analysis and simulation) was to figure out how to make a single bubble move from one place to another. (I wrote a tutorial for that.) Once I figured out how to make one bubble move, it was straightforward to make 1,000 move. After that, I worked on layout, annotation, and options. SELECT YEAR 1960 1980 2000 2014 Healthcare Practitioners Architecture & Engineering Business Operations Computer & Mathematical Protective Service Education & Library Community & Social Services

it easier to reuse code. Because I already knew how to make a bubble move, I was able to use the code to show distributions of shifting incomes. I also applied the same method to visualize changing place of work in a day. So split up your visualization into components. Think about its

Questions or suggestions? Reply to this email, find me on Twitter, or post to the forum. I can't reply to everything, but I appreciate all

Presidential Campaign, Five Graphics

About Contact

I'm particularly excited about this tutorial, because I didn't write it.

Places to Find Data

Google Dataset Search Impressions, the Challenges of Looking for Data, and Other Make It Mean Something or It Didn't Happen

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**RSS** 

Title of this Graph A description of the data or something worth highlighting to set the stage. • The visual cues dictate the geometry and/or colors of a • The coordinate system specifies the space that the visual cues

Okay, fine. Charts have components. Got it. How does that help you A common pitfall for beginners to visualization is to think of a chart as this single blobby thing. Plug in the data and get some visual output. This works for the standard chart types like bar chart, line chart, and scatterplot, because most software provides a quick way to spit them out. But for a data graphic that doesn't fall into a program's fixed categories, it's easy to get stuck when thinking in

So he starts with the most basic version of the chart method -a

Thanks for being a supporting member! See you next Thursday.

Twitter

This can come in handy even with point-and-click software like Excel. While you just highlight some columns and click on the graph button to make something, knowing the components gives you specific places to refine. You can always do better than default

I follow similar steps in my own projects. For example, in A Day in the Life of Americans, I used a force-directed graph to move circles from activity to activity: Religion 9:21am 1% Sports Volunteering <1% Leisure Phone Calls 12% Pro. Care Services Misc. 2%

Construction Maintenance & Repair Administrative Support Production Transportation Military Cleaning & Maintenance Healthcare Support Food Preparation Personal Care & Service Farming & Forestry Another nice side effect of the component approach is that it makes

most basic elements and work your way up. It makes the work less daunting and makes the work more straightforward later on. of the feedback.

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