

# lecture 15:

## interactivity, iteration, animation

November 29, 2017

Interactivity

# Types of interaction

- **Select**: mark something as interesting
- **Explore**: show me something else
- **Reconfigure**: show me a different arrangement
- **Encode**: show me a different representation
- **Abstract/Elaborate**: show me more or less detail
- **Filter**: show me something conditionally
- **Connect**: show me related items

# Select: mark something as interesting

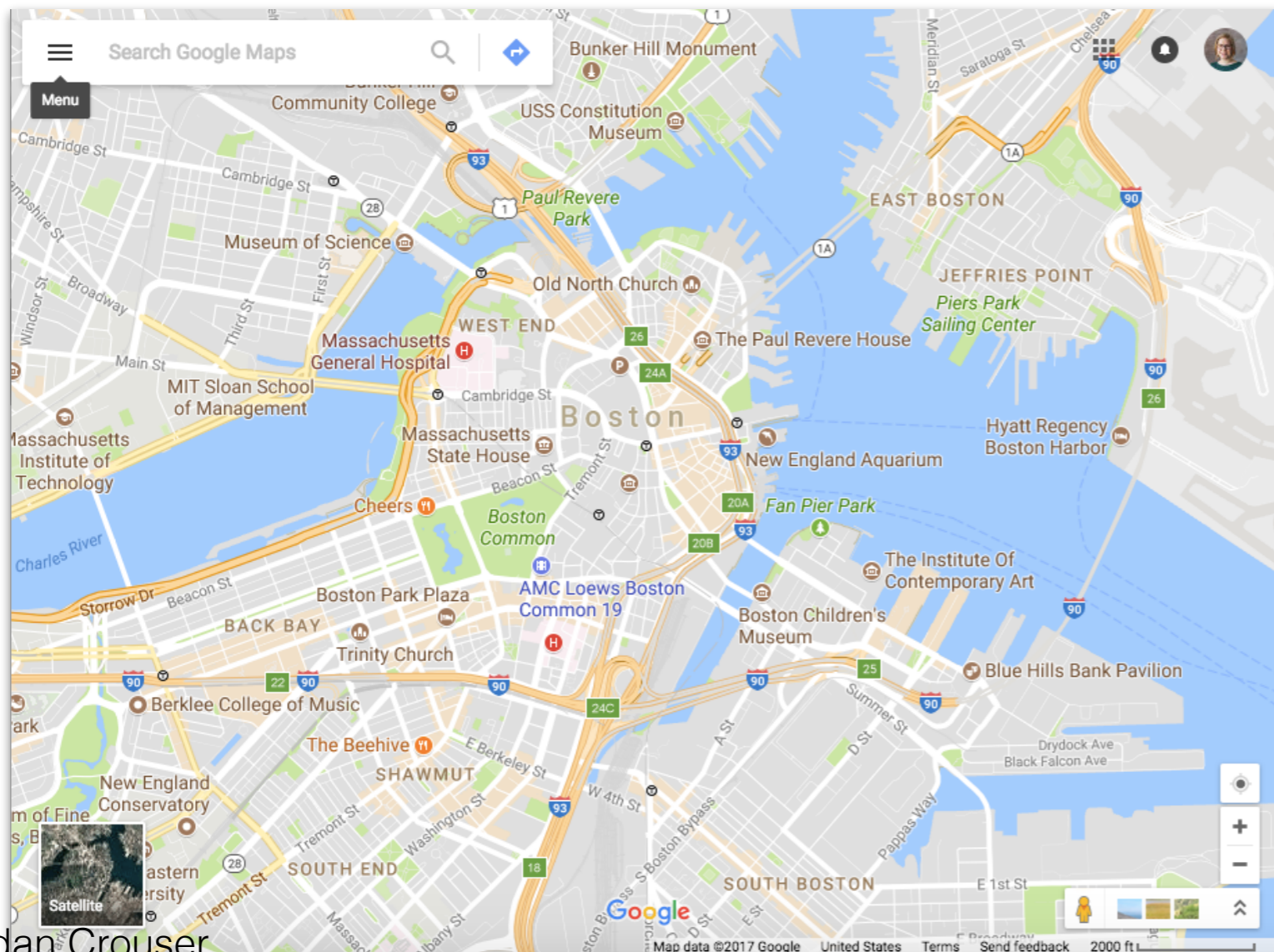


Stephen Few. (2010). Coordinated highlighting in context.

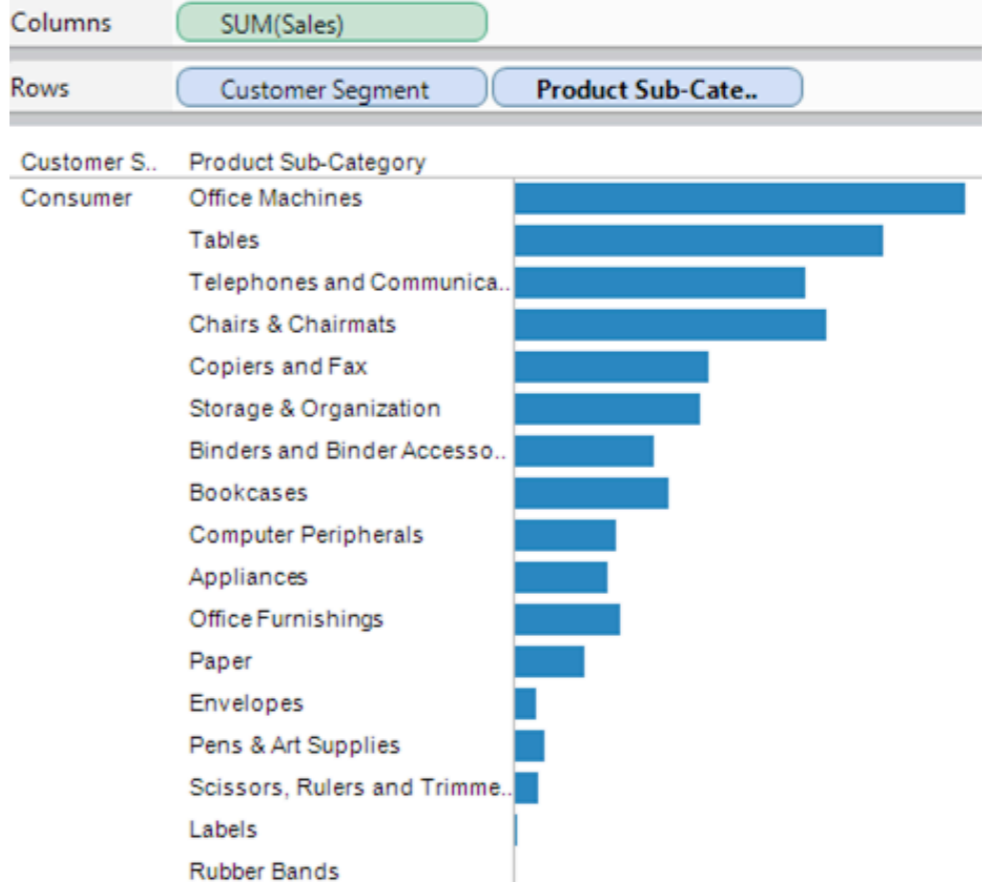
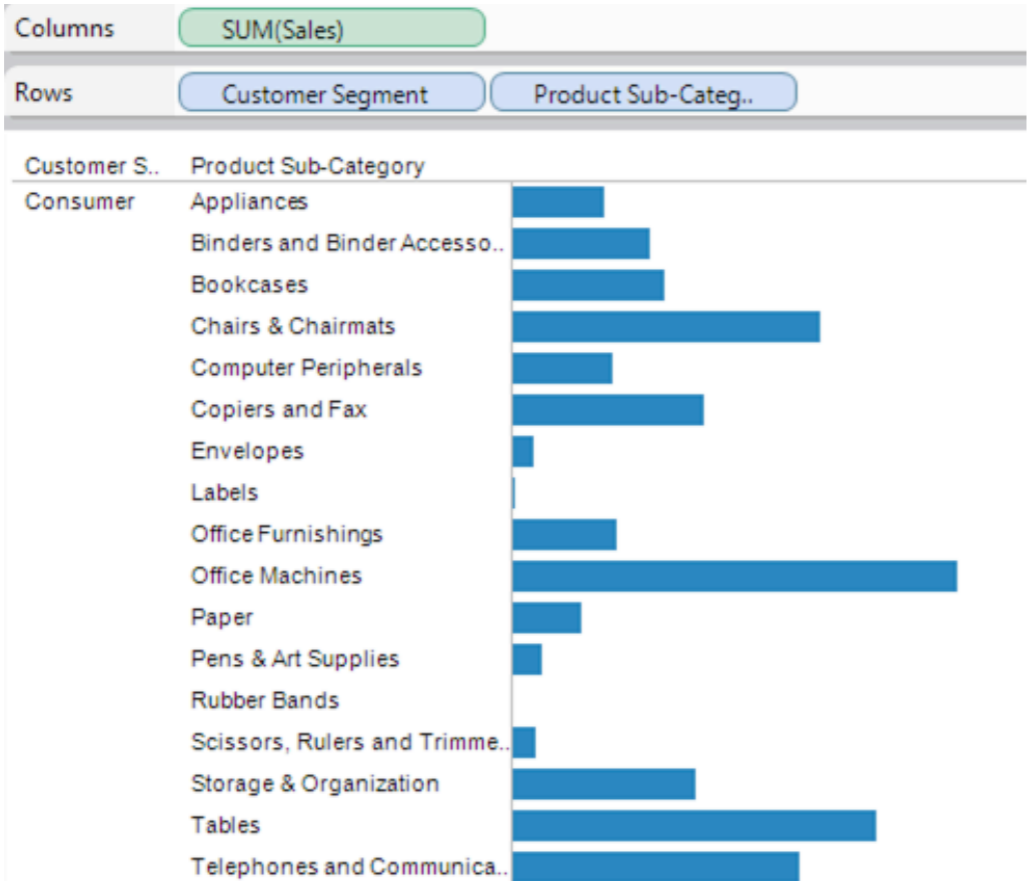
[https://www.perceptualedge.com/articles/visual\\_business\\_intelligence/coordinated\\_highlighting\\_in\\_context.pdf](https://www.perceptualedge.com/articles/visual_business_intelligence/coordinated_highlighting_in_context.pdf)

# Explore: show me something else

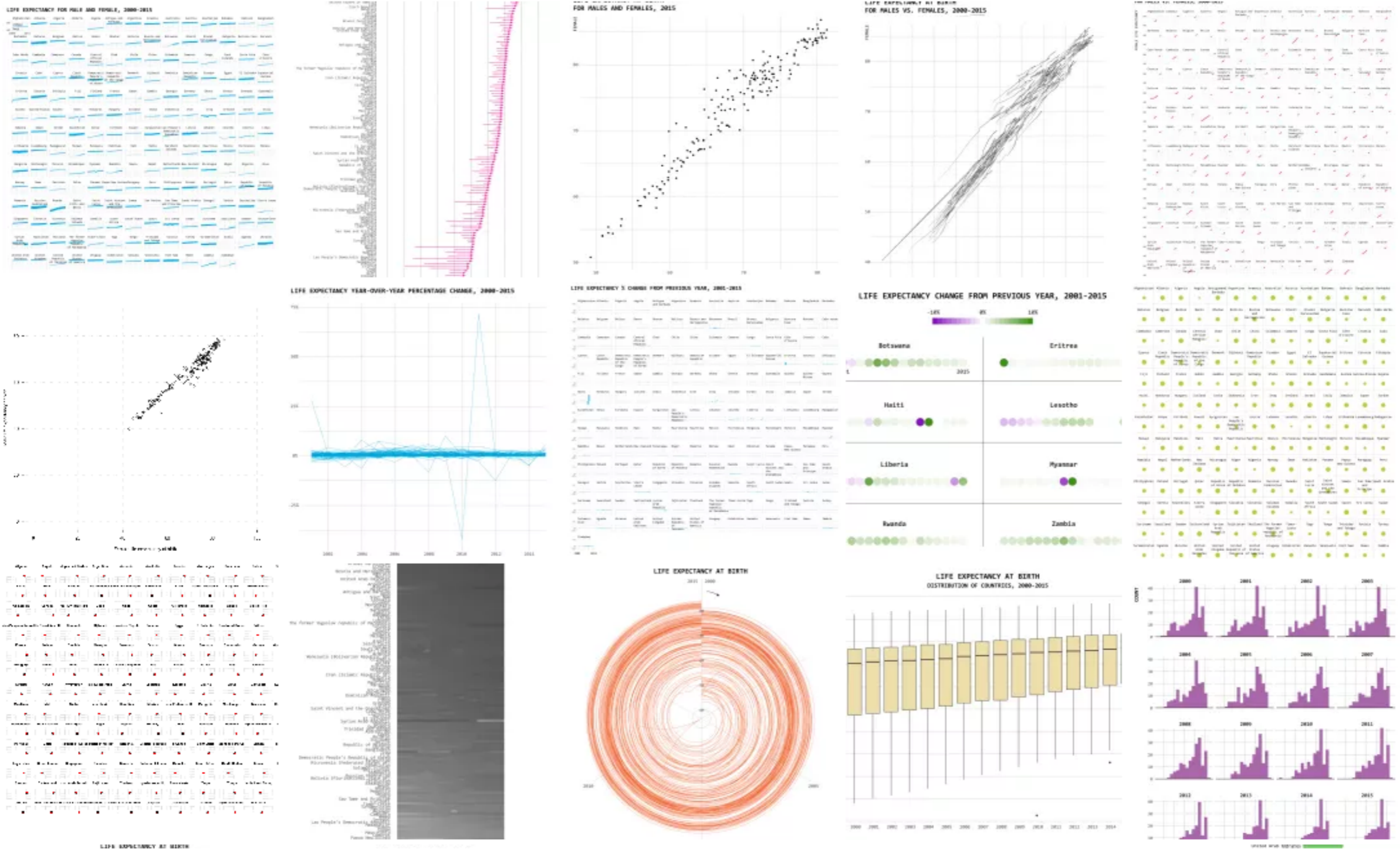
- Scroll bars (scrollytelling)
- Panning
- Steppers
- Direct walk (e.g. hyperlink travel)



# Reconfigure: show me a different arrangement



# Encode: show me a different representation

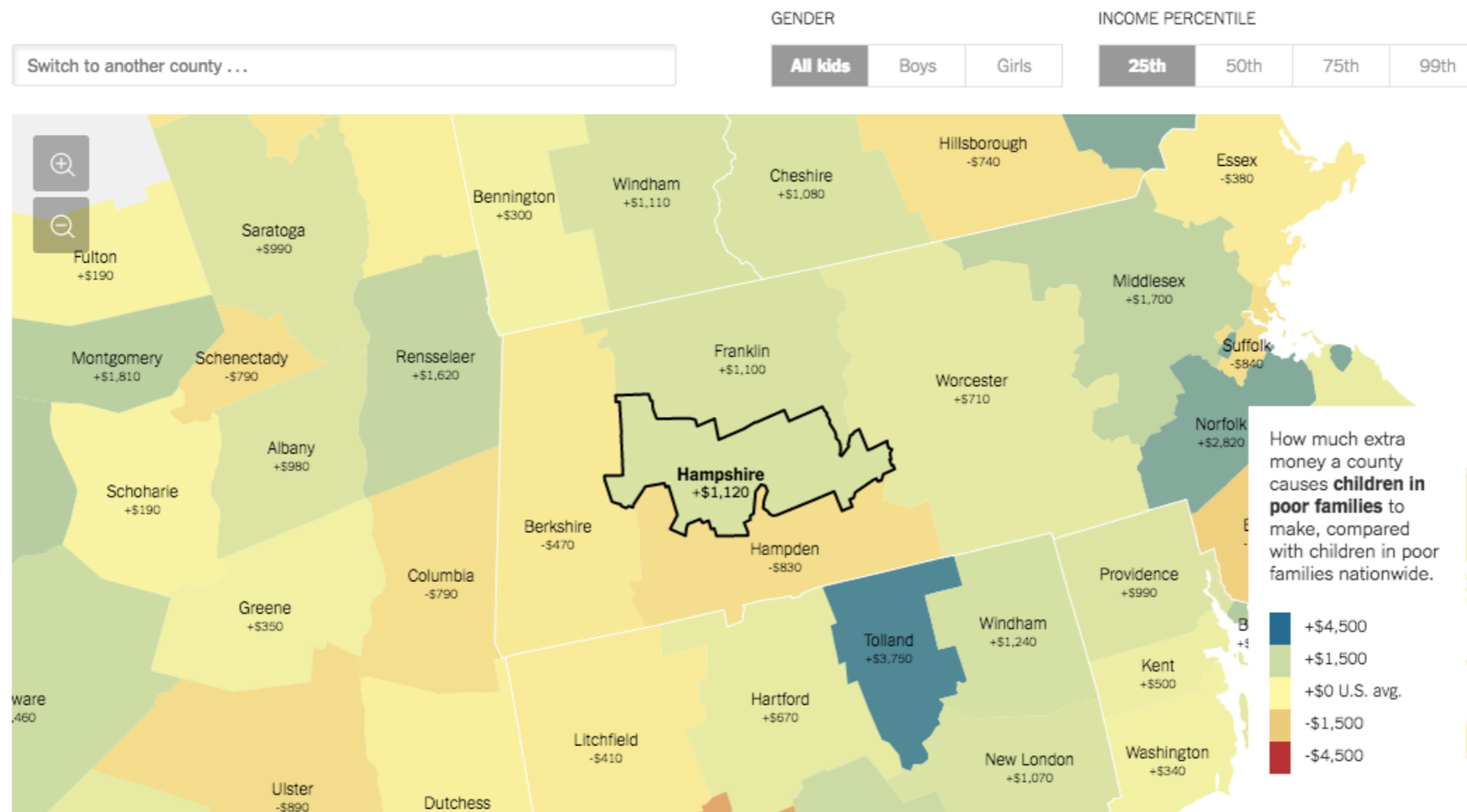


# Abstract/Elaborate: show me more or less detail

## The Best and Worst Places to Grow Up: How Your Area Compares

MAY 4, 2015

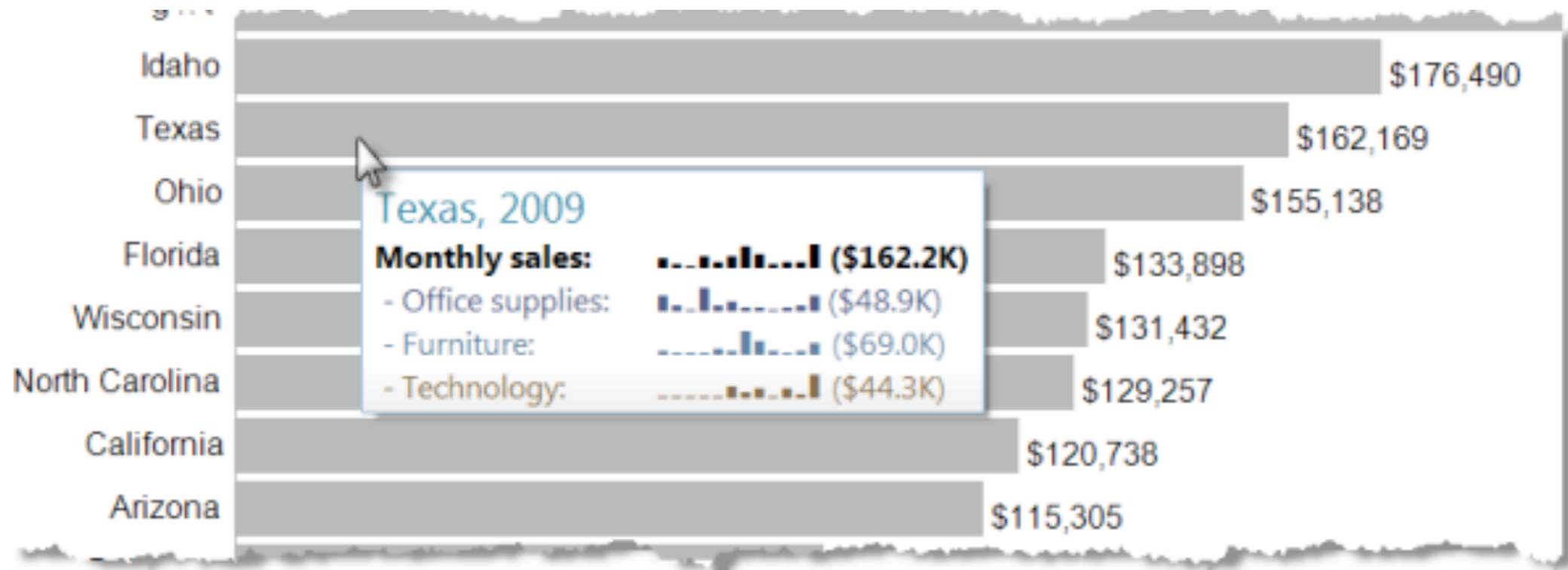
Children who grow up in some places go on to earn much more than they would if they grew up elsewhere. [RELATED ARTICLE](#)



Hampshire County is about average for income mobility for children in poor families. It is better than about 57 percent of counties.



# Abstract/Elaborate: show me more or less detail



# Filter: show me something conditionally

**NameVoyager: Explore baby names and name trends letter by letter**  
Looking for the perfect baby name? [Sign up for free](#) to receive access to our expert tools!

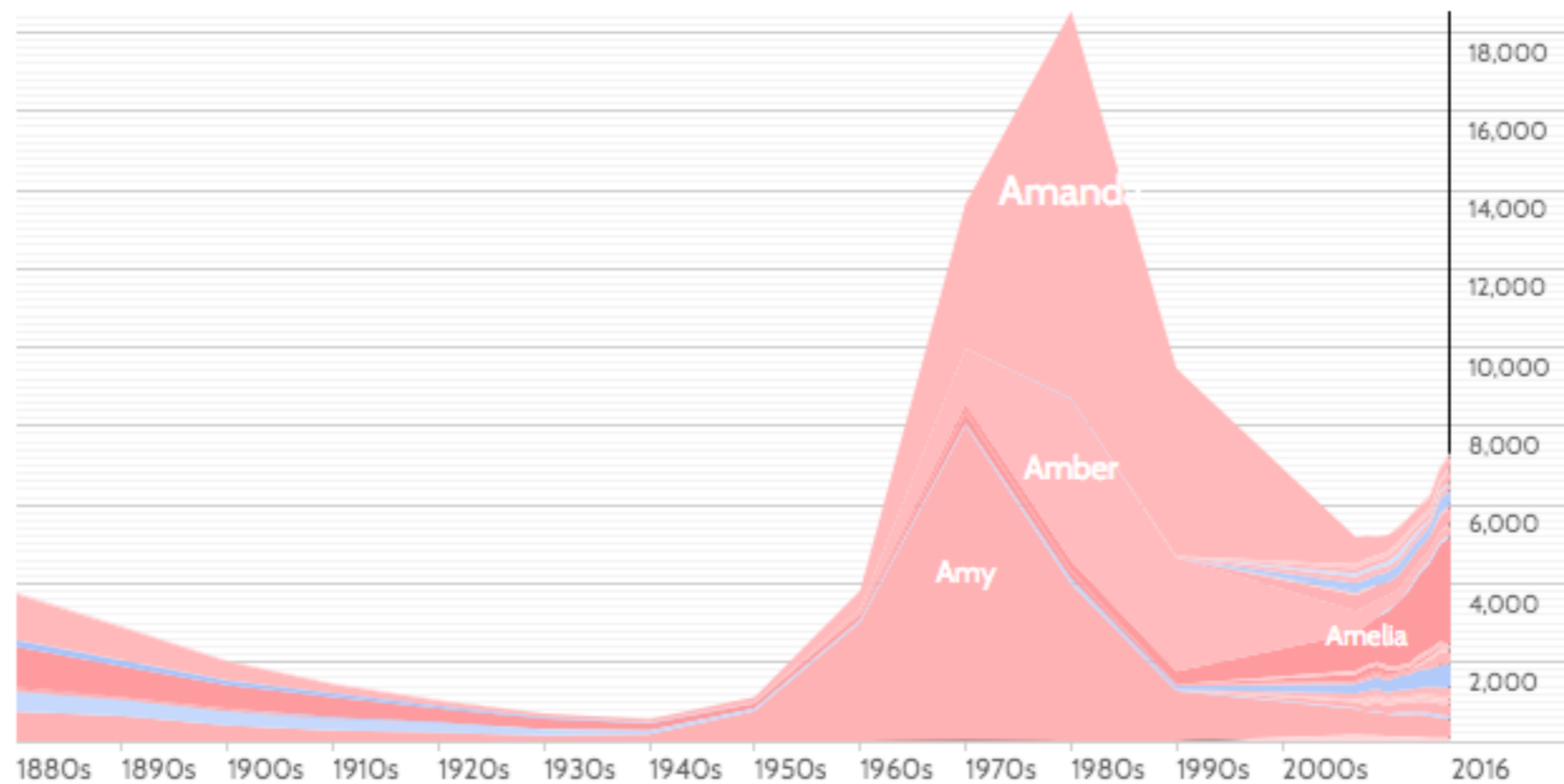
Baby Name >   Both  Boys  Girls

boys	1000	500	100	25	1
girls	1000	500	100	25	1

Names starting with 'AM' per million babies

Current rank:

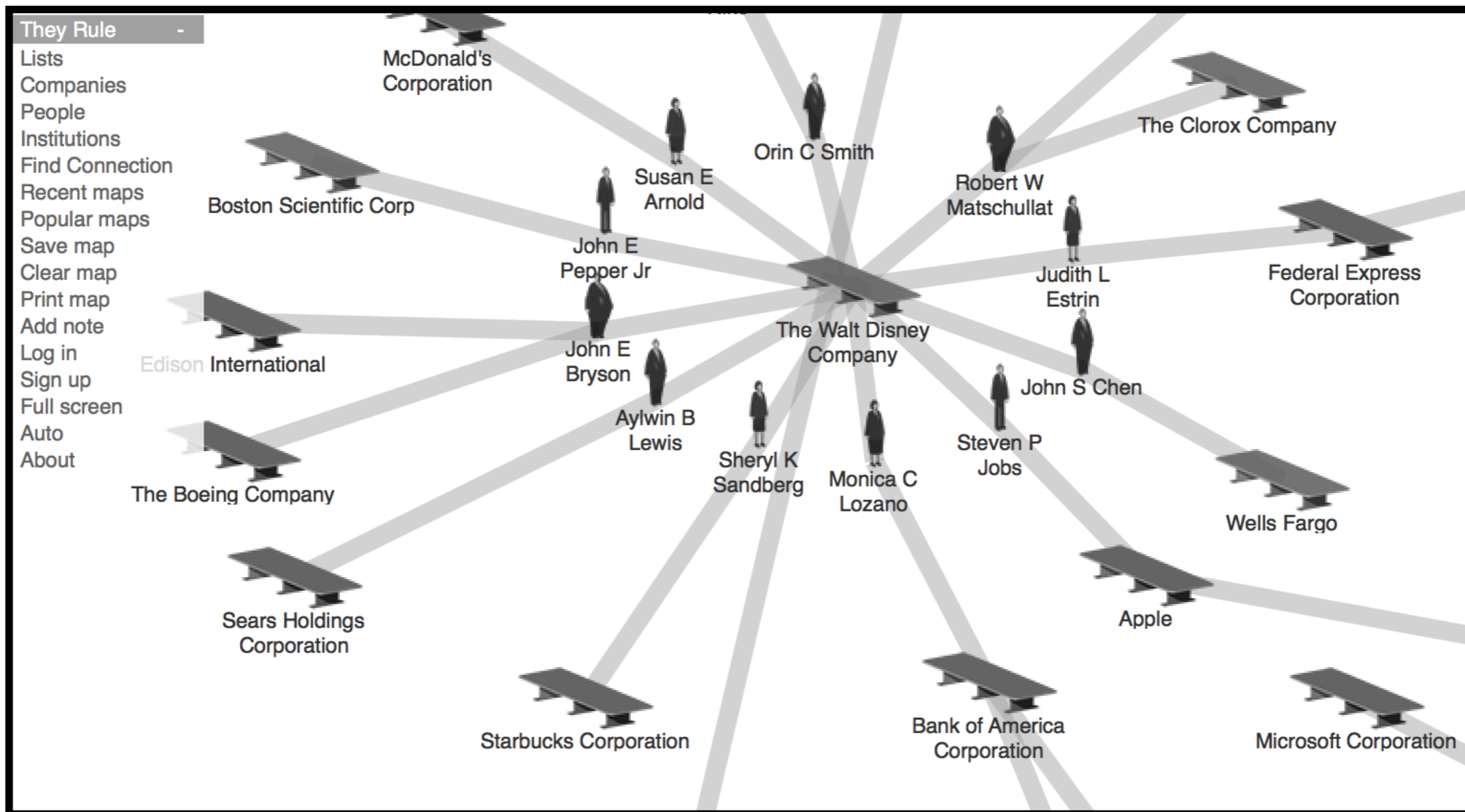
per million births



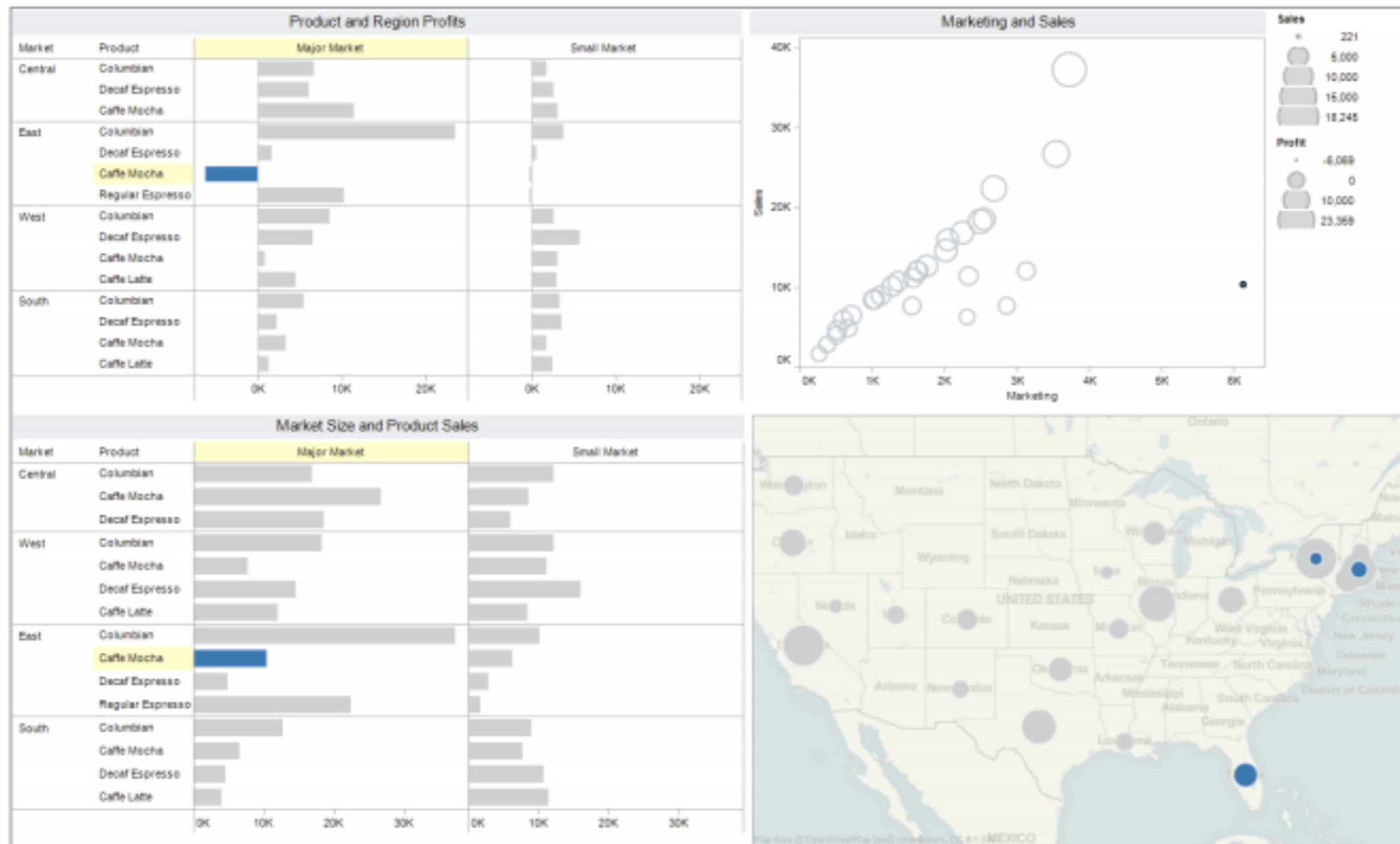
Click a name graph to view that name. Double-click to read more about it.

[enlarge](#)

# Connect: show me related items



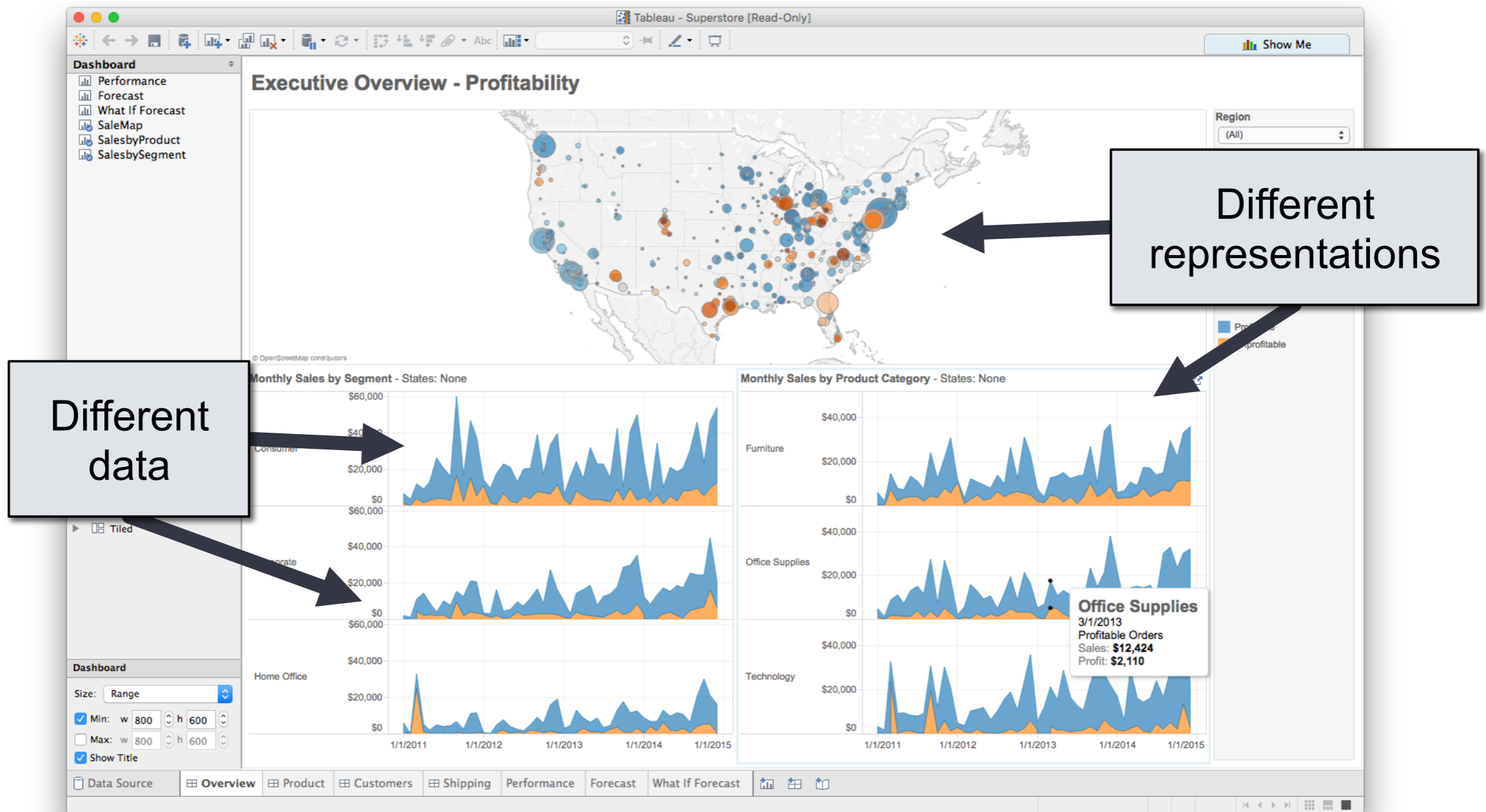
# Connect: show me related items



Stephen Few. (2010). Coordinated highlighting in context.

[https://www.perceptualedge.com/articles/visual\\_business\\_intelligence/coordinated\\_highlighting\\_in\\_context.pdf](https://www.perceptualedge.com/articles/visual_business_intelligence/coordinated_highlighting_in_context.pdf)

# Multiple views



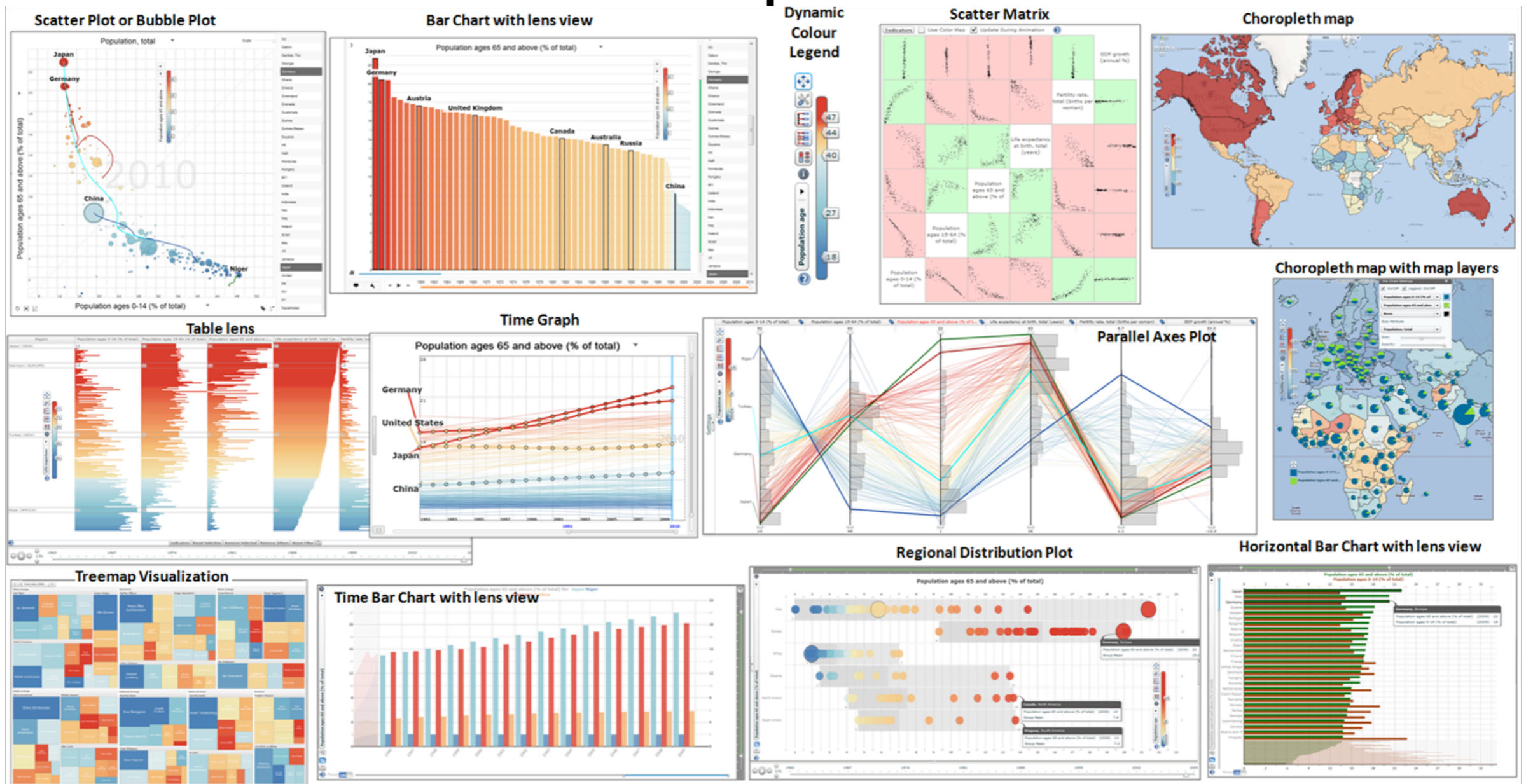
Systems that use **two or more distinct views**

to support the exploration of a single concept or domain

# Why use multiple views?

- The data is too big
  - Lots of attributes
  - Lots of observations
- The data is too complicated
  - Lots of data sources
  - Lots of data types
- The data has several interesting parts, but no one visualization highlights them all

# Problems with multiple views- resource optimization



# Guidelines for multiple views

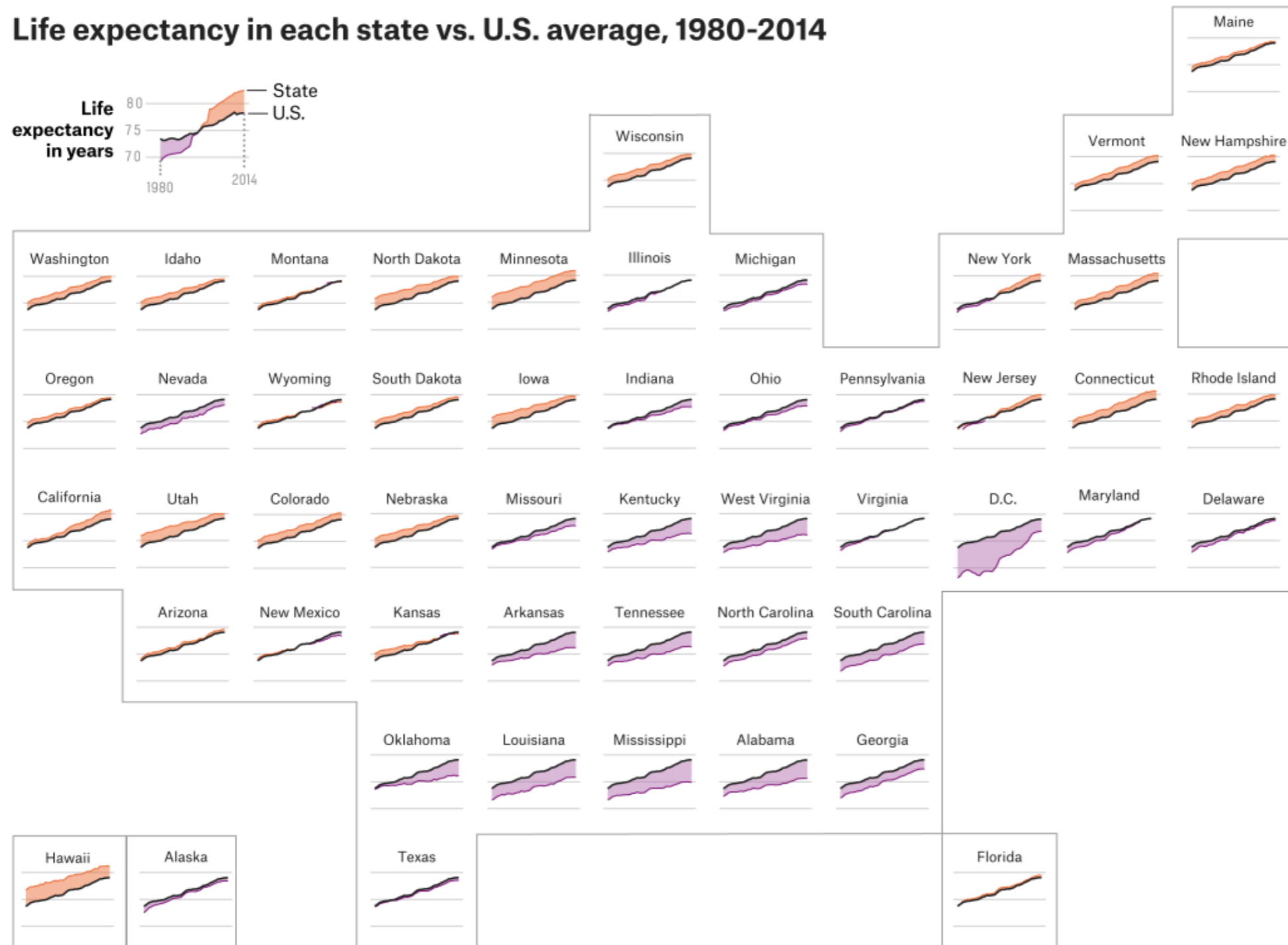
- Balance the **costs** of presenting multiple views with the **benefits** of using the views
- Split complex data into multiple views to create **manageable chunks**
- Use views that are complimentary, bringing out **correlations and/or disparities**
- Use **perceptual cues** to:
  - make relationships more apparent to the reader
  - focus the reader's attention on the right view at the right time



Iteration

# Small multiples

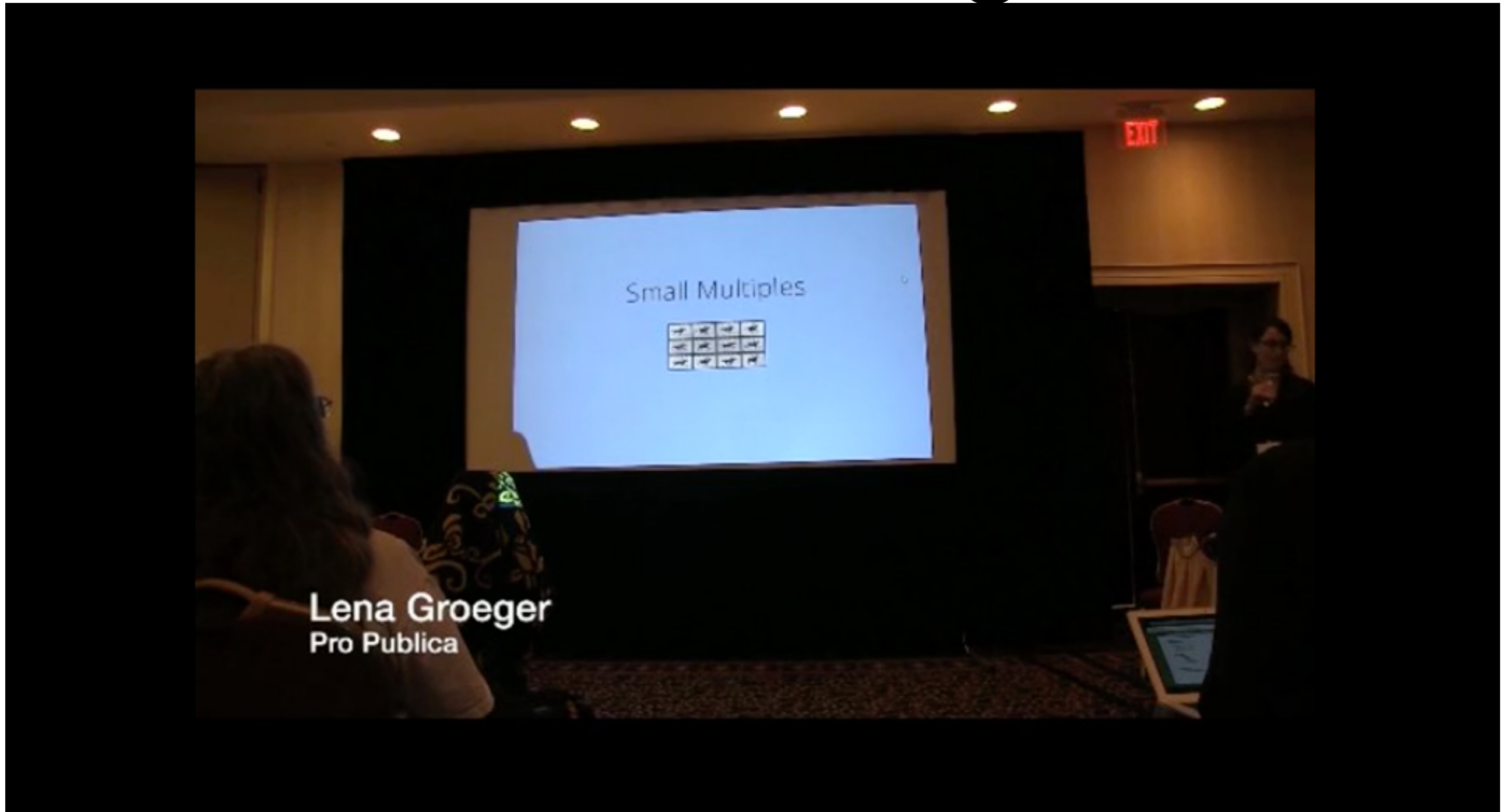
Life expectancy in each state vs. U.S. average, 1980-2014



FiveThirtyEight

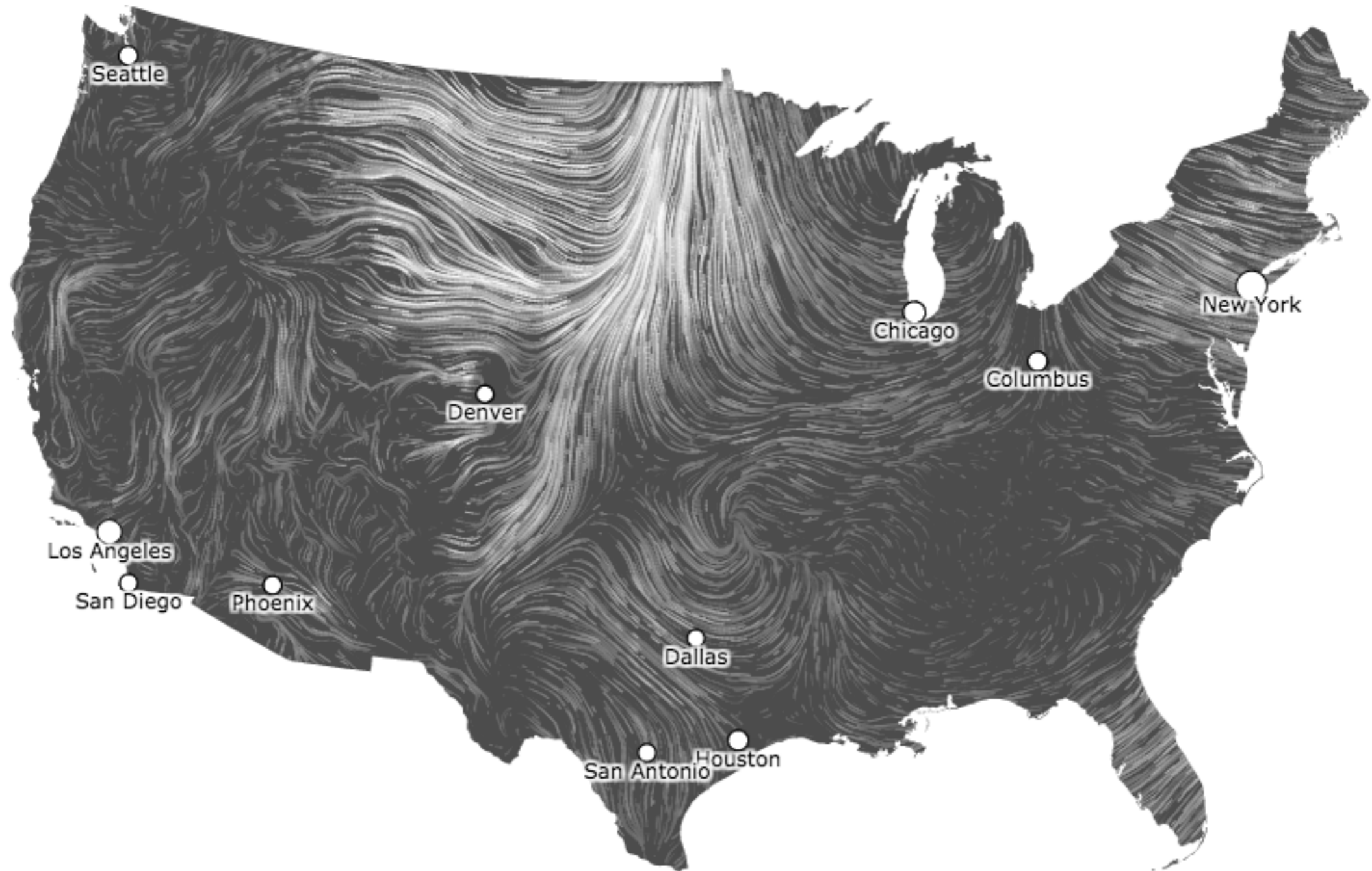
SOURCE: INSTITUTE FOR HEALTH METRICS AND EVALUATION

# Small things



Animation

# As encoding

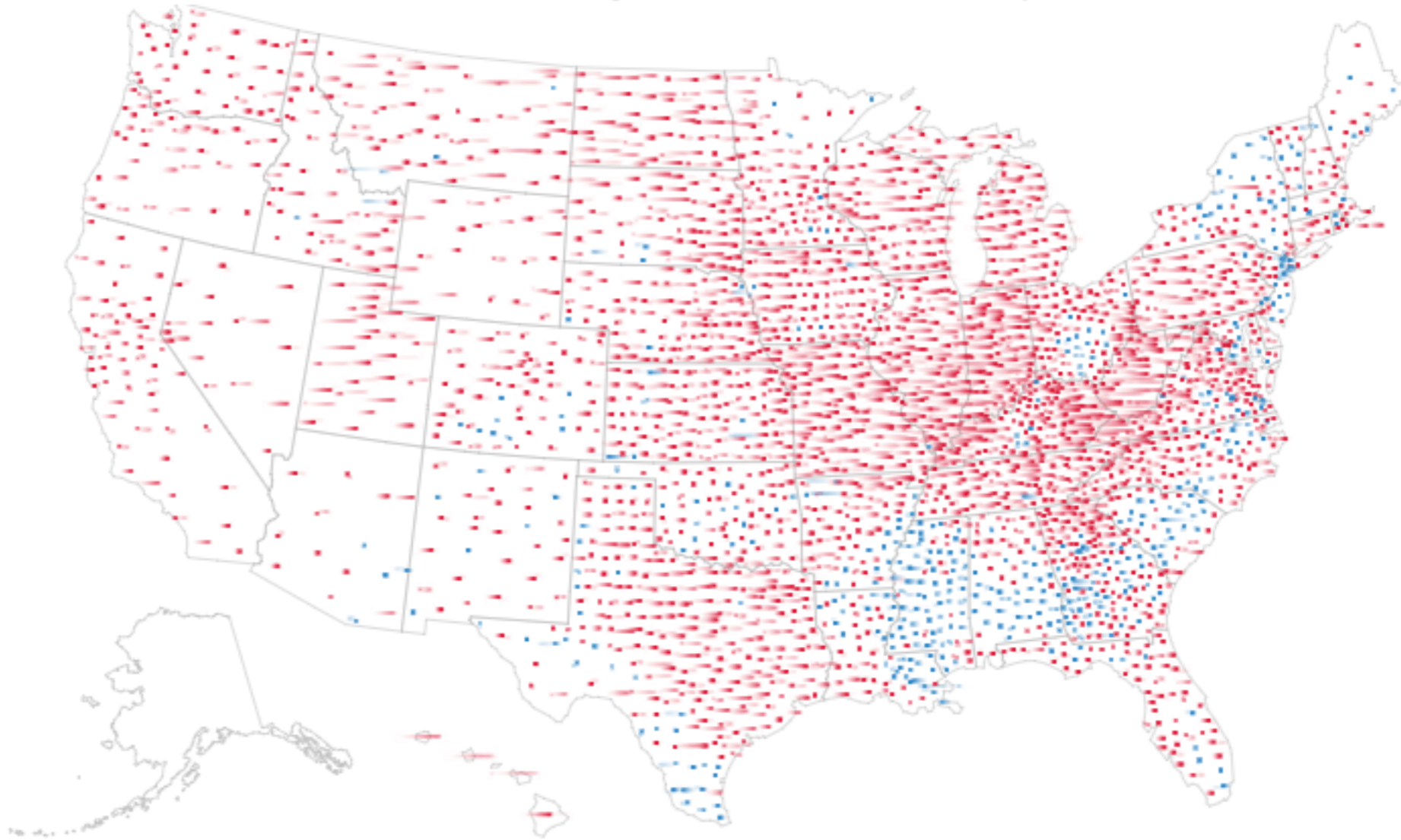


## Romney's Shift Wasn't Enough

2008

2012

Most of the nation shifted to the right in Tuesday's vote, but not far enough to secure a win for Mitt Romney.



Became more: ■ Democratic ■ Republican

# Presidential Election Results: Donald J. Trump Wins

AUG. 9, 2017, 9:00 AM ET

Donald J. Trump won [the Electoral College](#) with 304 votes compared to 227 votes for Hillary Clinton. Seven electors voted for someone other than their party's candidate.

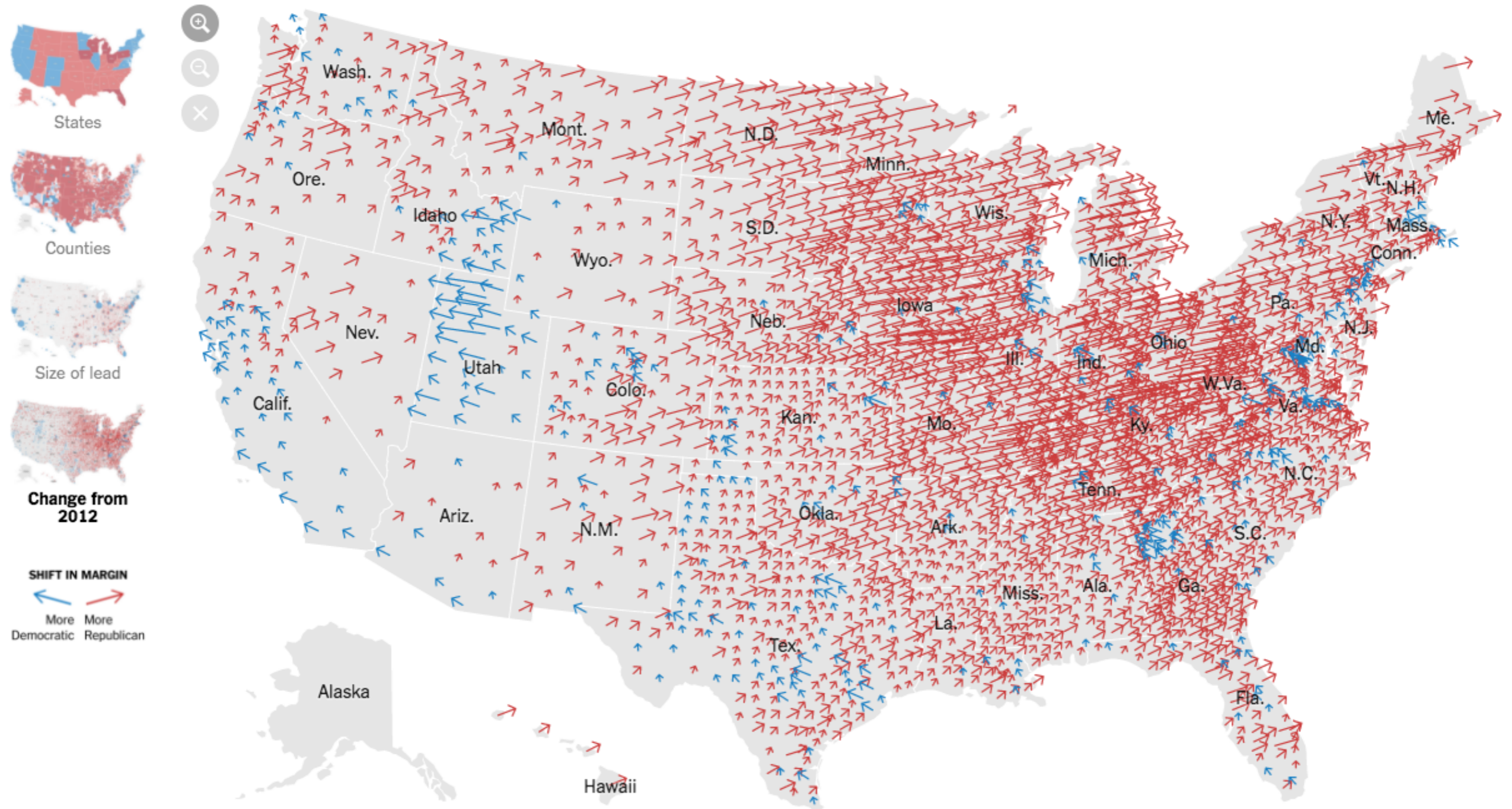
**232** Hillary Clinton

**306** Donald J. Trump

65,853,625 votes (48.0%)

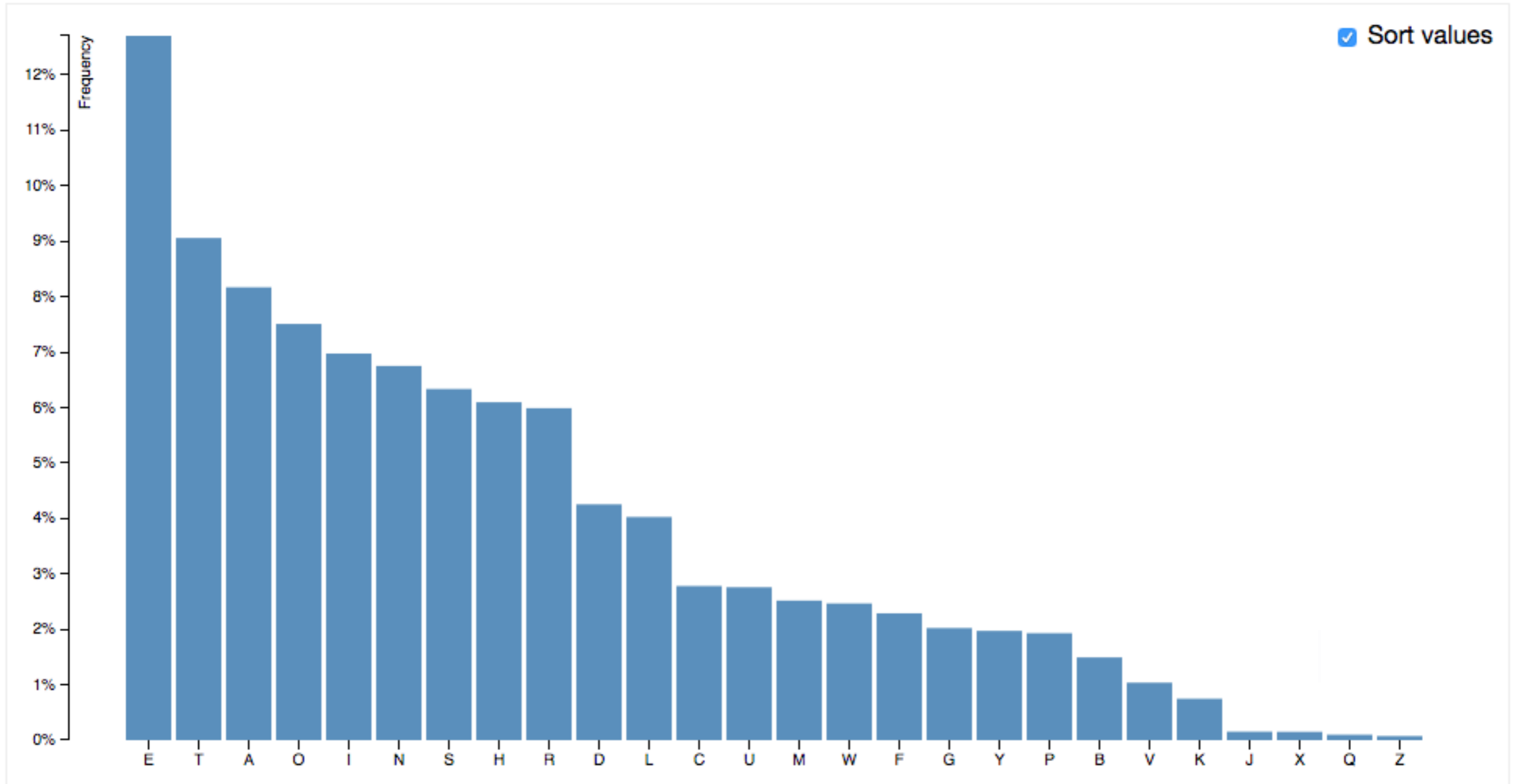
270 to win

62,985,106 votes (45.9%)



# As transition

## Sortable Bar Chart





# Four Ways to Slice Obama's 2013 Budget Proposal

Explore every nook and cranny of President Obama's federal budget proposal.

- All Spending
- Types of Spending
- Changes
- Department Totals

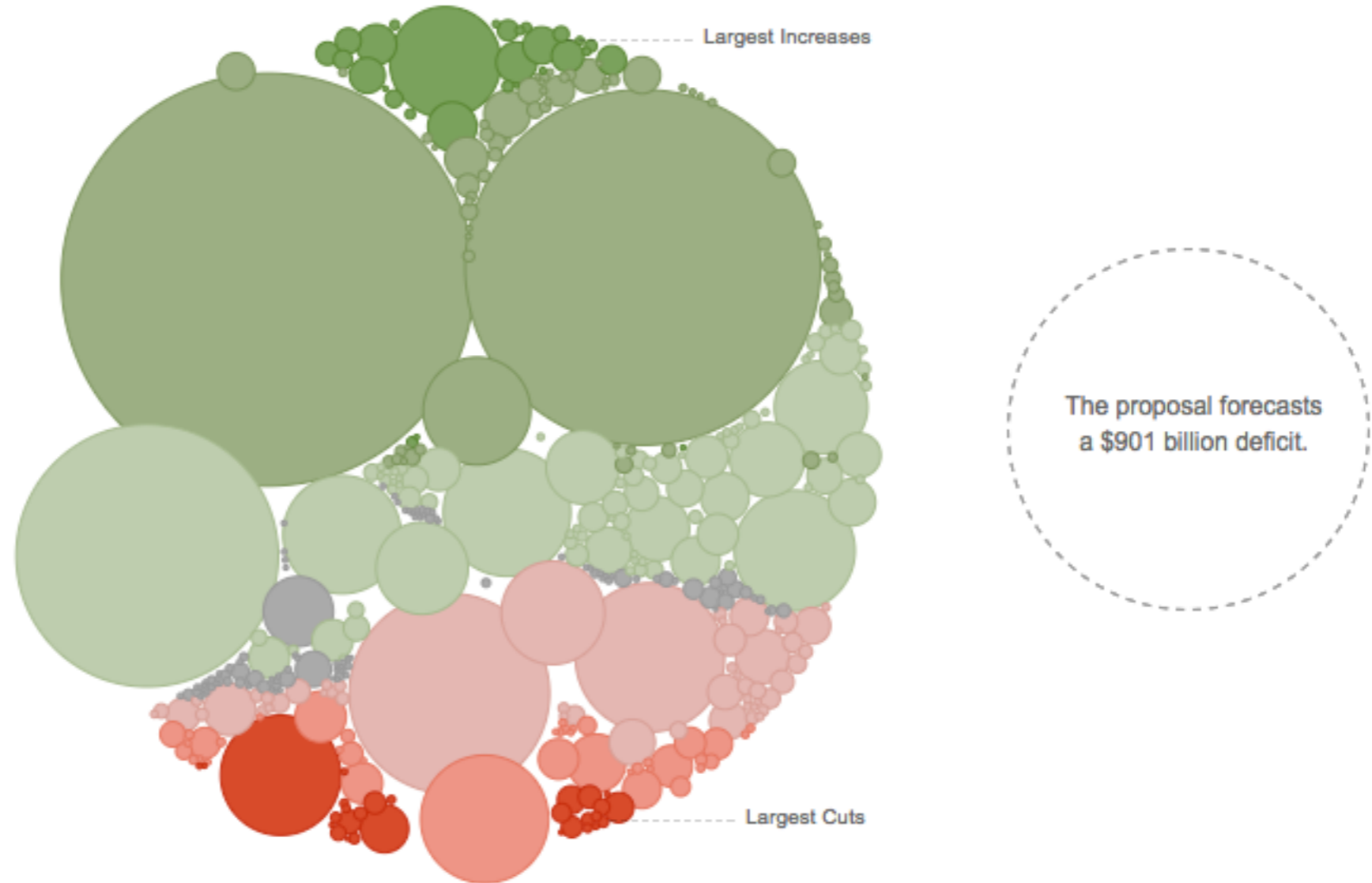
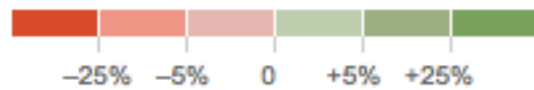
## How \$3.7 Trillion Is Spent

Mr. Obama's budget proposal includes \$3.7 trillion in spending in 2013, and forecasts a \$901 billion deficit.

Circles are sized according to the proposed spending.



Color shows amount of cut or increase from 2012.



# Lab: dashboards

- Create a dashboard with at least two plots
- Enable cross filter
- Add some text and styling
- Share on #lab8, with a link and screenshot

- Chart
- Dash App
- Dashboard
- Database Query
- Dataset
- Jupyter Notebook
- Presentation
- Folder

# Plotly Community Feed

Search charts by Plotly users

Handpicked

Chart Type

Grid View / List View



Loading plots...

### DEVELOPERS

- Python
- R & Shiny
- MATLAB
- JavaScript
- REST API

### COMPANY

- About
- Industries
- Blog
- Modern Data
- PLOTCON

### RESOURCES


- Developer Support
- Community Support
- Terms
- Privacy

### DATA SCIENCE

- Dash
- Plotly.js
- Plotly for R & Shiny
- Plotly for Python

### BUSINESS INTELLIGENCE

- Charts
- Dashboards
- Slide Decks
- Database Connectors

Dashboard 

This dashboard is empty.

Get started by adding a:

[Plot](#) [Text](#) [Webpage](#)

Dashboard

Enter a title...

Save Remove

Add a Plot

URL Your Files

### Select a Plot



accept



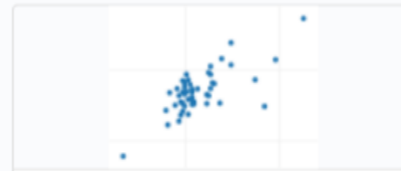
Accept and Top



spm



barchart



HouseholdVChildren

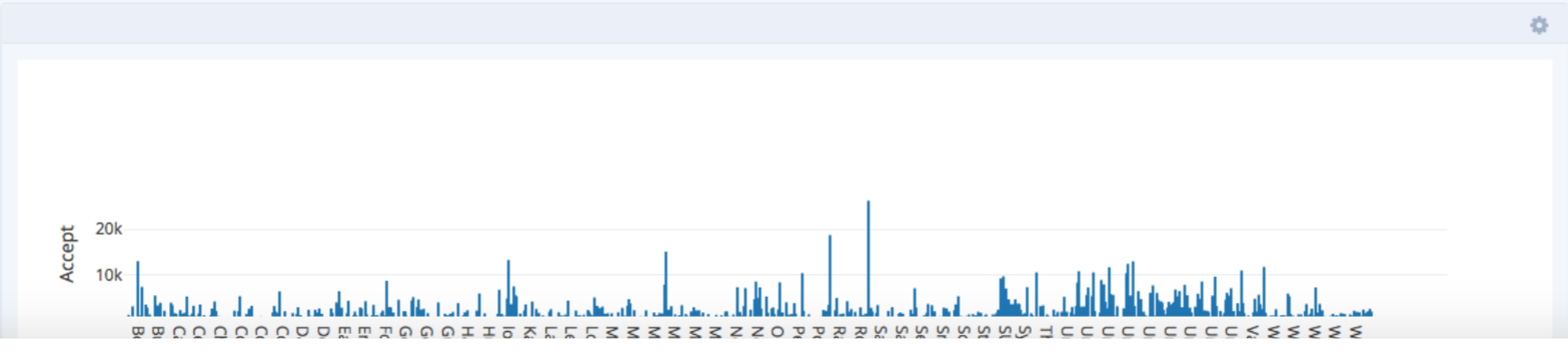
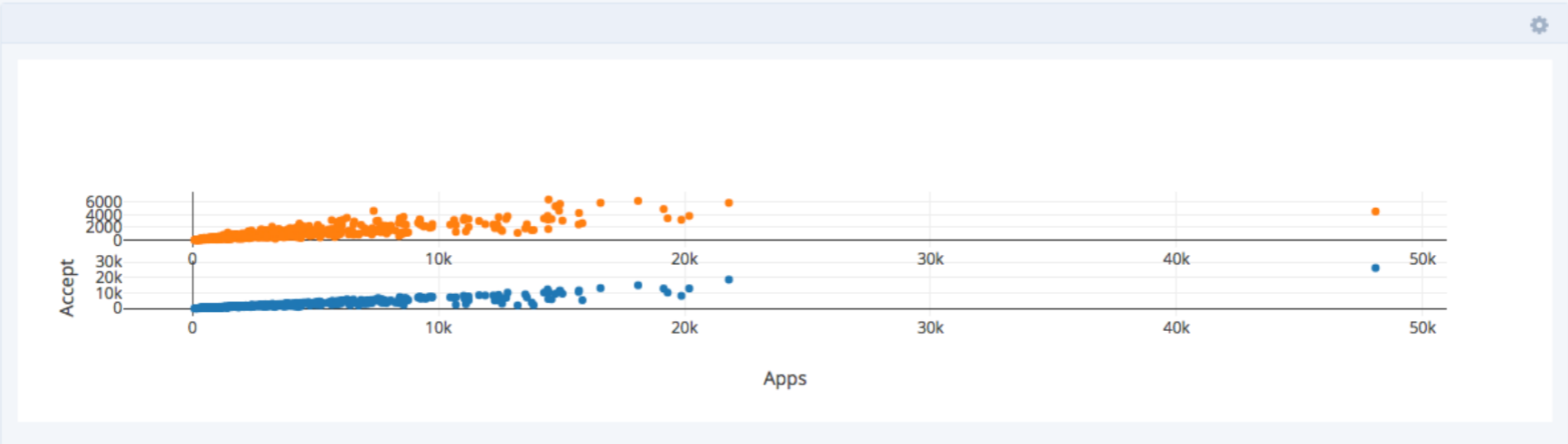
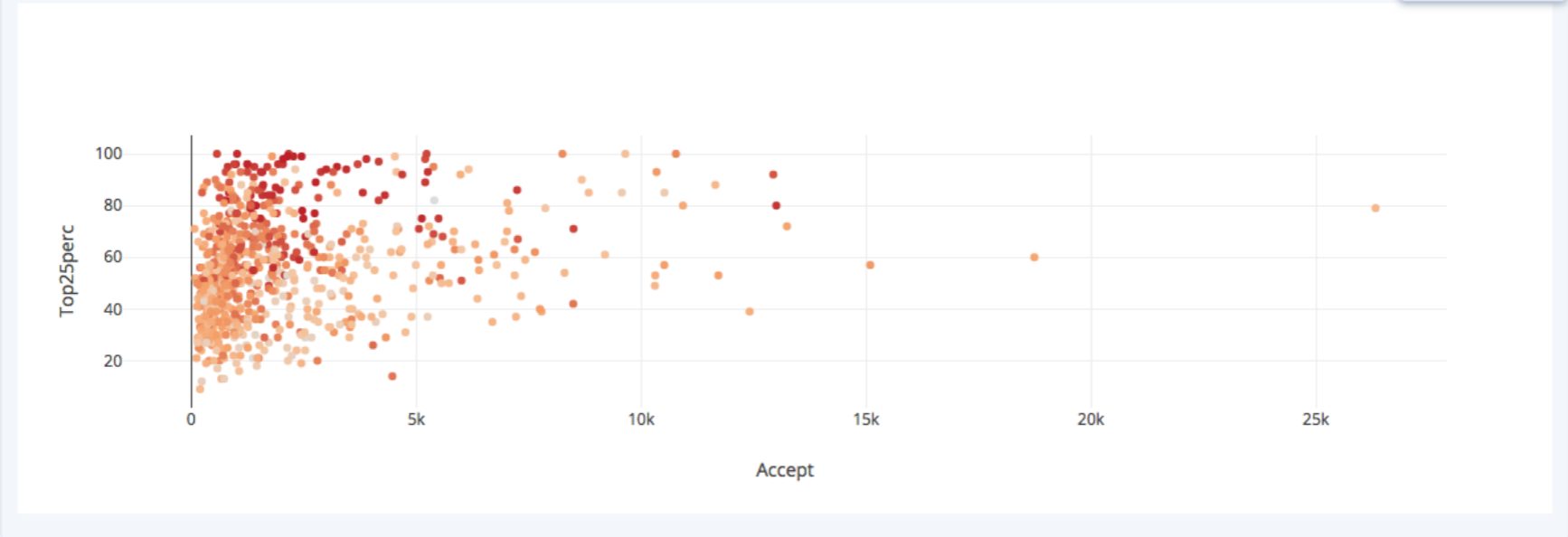


Land versus water

< 1 > of 1

Dashboard

Edit  
Full window

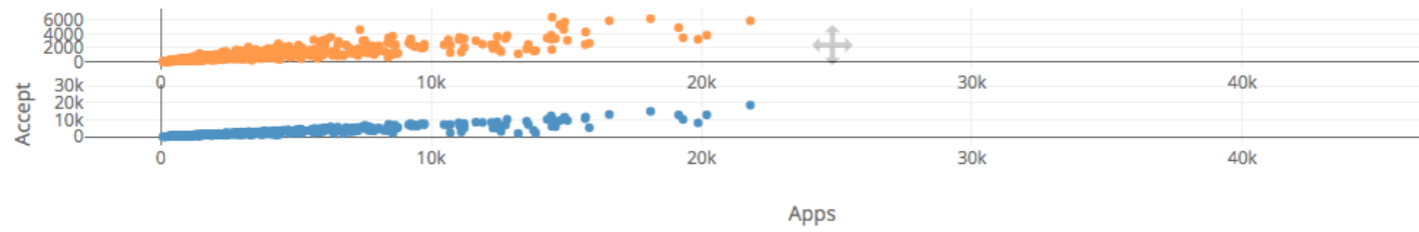


Dashboard

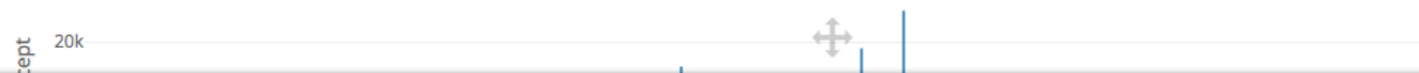
Enter a title...



Enter a title...



Enter a title...



Search Bar

- Show
- Hide

Crossfilter

- Enable
- Disable

+ Plot

+ Text

+ Webpage