Announcements

5 minutes

- This week: Milestone 3, 4, and Lab 6

- This weekend: Test 3 and Bonus Test 3

- Test 2 and Bonus Test 2 results are out

- Next week: Final Exam!

- I will send an updated grade this week, you should check it for errors and report ASAP

Principles of Effective Dashboard Design

August 10, 2021

DATA 301

15 minutes

Part 1: What *is* a Dashboard?

British Columbia COVID-19 Dashboard

Filter Dashboard Values by Health Authority: All | Interior | Fraser | Vancouver Coastal | Vancouver Island | Northern

Total Cases
15,884

Laboratory Diagnosec: 15,745
Epi-Linked: 139

Currently Hospitalized
27
Total to Date: 817

Currently in Critical Care
10

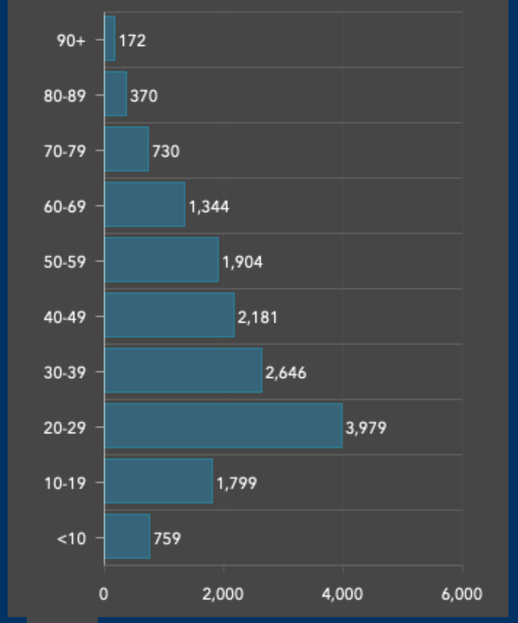
Confirmed Deaths
165

Recovered
13,961

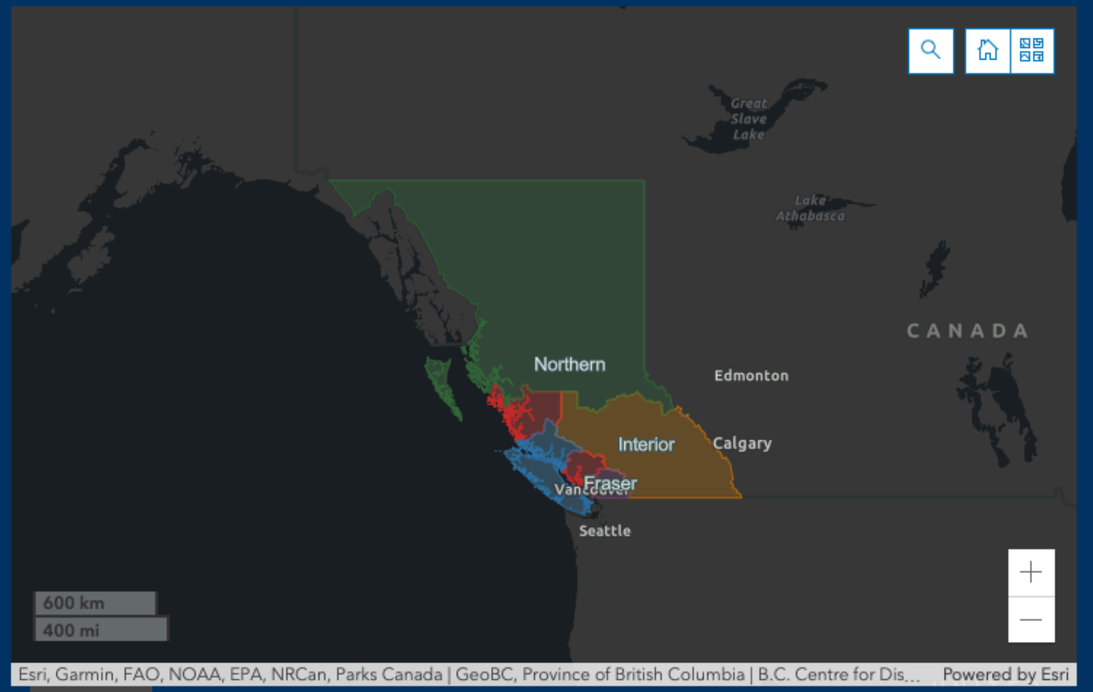
Total Vaccine Doses Administered in B.C.
7,067,738
Total Doses Distributed: 7,666,48(

Last Update
Aug 9, 2021, 4:00 PM

Distribution by Age



Age | Sex

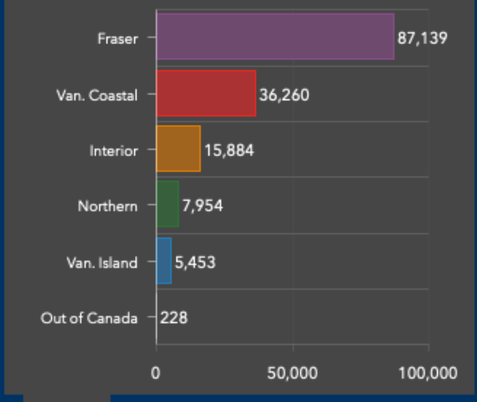


Case Map | Cumulative Rate Map | Average Daily Rate Map

Today's New Cases
149

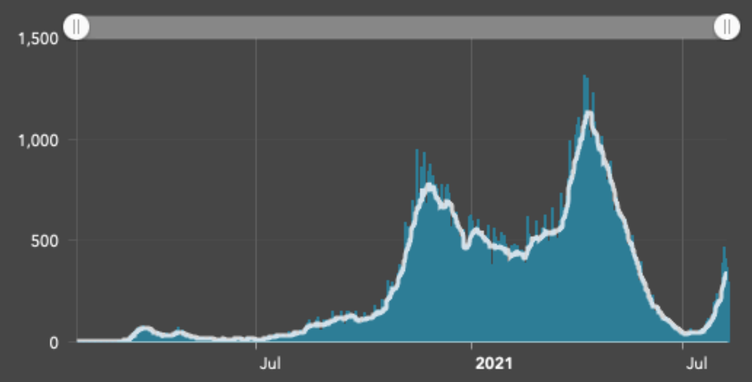
Active Cases
1,755

Total Cases Reported by Health Authority

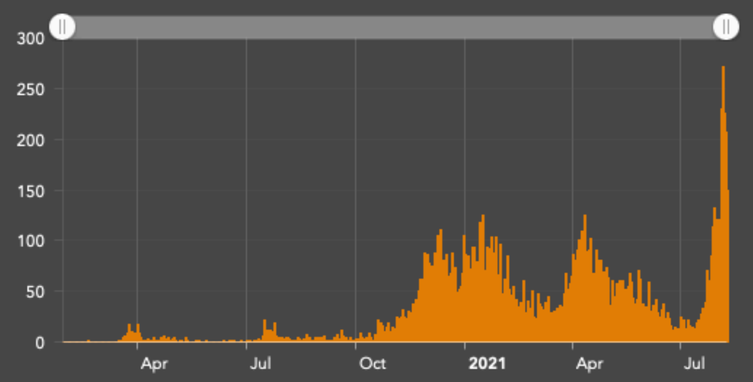


Cases | New | Active | List

B.C. Cases Reported to Public Health



Health Authority Cases Reported to Public Health



Note: Y-axis varies between graphs.

Note: In an effort to provide as current information as possible, "Today's New Cases" (as shown on this dashboard and reported publicly through daily media statements) are calculated at different points in time and may not align exactly to what is reported on the graphs. See the Data Notes for details.

Cases by Day | Cases (Moving Avg.) | New Tests | Turn-Around | Positivity | Vaccine Information

Total Tests
335,857

New Tests
1,137

B.C. Testing Rate
611,423
People per 1,000,000

Canadian Testing Rat
1,023,370
People per 1,000,000

Data notes, terms of use, disclaimer and limitations of liability

Explore the BCCDC COVID-19 Epidemiology App here.

The following data notes define the indicators presented on the public dashboard and describe the data sources involved. Data changes daily as new cases are identified, characteristics of

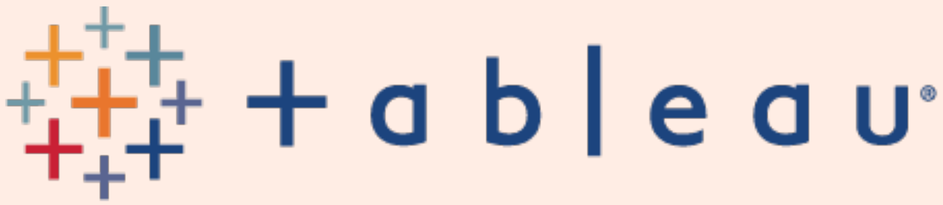
Provincial Health Services Authority
Province-wide solutions. Better health.

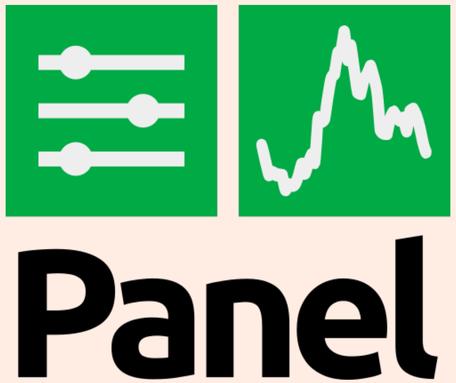
BC Centre for Disease Control

Dashboards are everywhere!

Source: CC4 image

Popular Tools for Dashboards





… many others!

Why do we need dashboards?

- Dashboards **tell stories** about analyses you've done

- Dashboards help users **see the punchline** faster, and more accurately than interpreting plots

- Dashboards help users explore their own questions from the data you've processed.

Tableau - Book1

Connect

Search for Data

Tableau Server

To a File

Microsoft Excel

Text file

JSON file

PDF file

Spatial file

Statistical file

More...

To a Server

Microsoft SQL Server

MySQL

Oracle

Amazon Redshift

More...

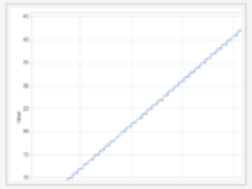
Saved Data Sources

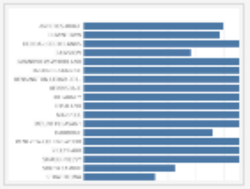
Sample - Superstore

World Indicators

Open

Open a Workbook


lab10


lab7


first_explore

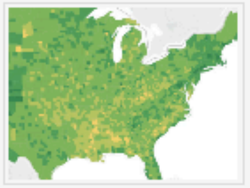

first_explore

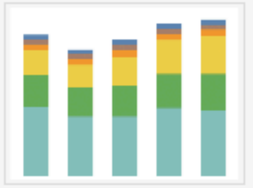

first_explore

Sample Workbooks

More Samples


Superstore


Regional


World Indicators

Discover

Training

Getting Started

Connecting to Data

Visual Analytics

Understanding Tableau

More training videos...

Resources

Get Tableau Prep

Blog - Read latest post

The NEW Community Forums

Sample data for Relationships

Do No Harm Guide

Learn how to collect and present data through a more diverse, equitable, and inclusive lens. →

Explore the Guide now

The Ultimate Cheat Sheet on Tableau Charts

Kate Strachnyi May 14, 2018 · 11 min read ★

Tableau Desktop is an awesome data analysis and data visualization tool. It allows you to see your data immediately (with a few drag and drops). The "Show Me" feature is extremely helpful especially for those just starting out with Tableau. Once you drag in or double click on the dimensions and measures that you want in your analysis, you can use the Show Me feature to see the available charts that you can create by simply clicking on the chart types.

One thing you'll notice is that some charts will be highlighted and some will appear to be more faded. The highlighted charts are the ones available for your use. This is determined by the number of measures, dimensions, bins, etc. that you have placed in your view. Each chart has a minimum specified number of dimensions, measures, bins, or other items that it needs in order to build that chart. As you hover over each view type, the description at the bottom shows the minimum requirements.

Types of Charts

There are 24 available charts in Tableau's Show Me feature. Let's discuss when we should be using each of these charts and what the minimum requirements are in terms of measures and dimensions — keep scrolling down :)

Reference: https://towardsdatascience.com/the-ultimate-cheat-sheet-on-tableau-charts-642bca94dde5

40 minutes

Part 2: Dashboards & Principles of Effective Dashboard Design

The “laws” of crappy dashboards

Source: http://attackwithnumbers.com/the-laws-of-shitty-dashboard

Law 1	Most software dashboards are crappy
Law 2	If it’s called “Dashboard”, it’s probably crappy
Law 3	If you don’t know what to take away from your dashboard, your users will definitely not
Law 4	Not talking to users will result in a crappy dashboard
Law 5	Give users **full control** of your dashboard, and users will **fully break** it
Law 6	Just because it was useful in a Powerpoint doesn’t mean it’s useful on a dashboard
Law 7	Just because it moves, does not mean it’s not crappy

Purpose-Driven Dashboards

Before you build a dashbard, make sure it has a purpose!

Do not build one just for the sake of building one and contribute more noise!

Questions to ask yourself:

- What is the research question?
- What is the business question?
- Who will use it (audience matters, a lot!)
- How long will they use it (one-time thing vs. continued use) ?
- Do you have time to build it, maintain it, and make it effective?

Rocketship

Search...

Feedback about this page?

- Home
- Payments
- Customers
- Products
- Reports
- Apps
- Developers
- Viewing test data

- Settings

Today

Net volume $456,581.14

Yesterday $253,702.97

USD Balance $5,383.52
Available to pay out
View detail

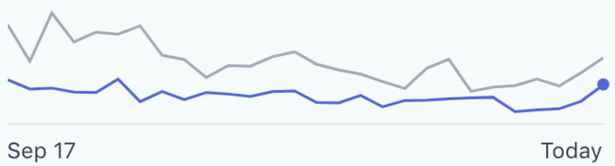
Payouts $229,069.82
Expected tomorrow
View detail

Analytics

4w | Sep 17, 2019 → Oct 14, 2019 vs. Aug 20, 2019 → Sep 16, 2019 | Daily | Customize

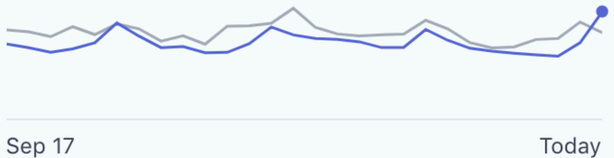
Gross volume −12.0%
$7.71M $8.76M

Connect gross volume −55.8%
$80,414.04 $182.0K



Net volume from sales −12.4%
$7.31M $8.34M

New customers −12.3%
128.4K 146.5K



New connected accounts −93.3%
1 15

Successful payments −10.4%
154.5K 172.6K

Source: Stripe docs

Rocketship

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✅

Today

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❗ y-axis ticks

USD Balance $5,383.52 View detail

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✅

Analytics

4w | Sep 17, 2019 → Oct 14, 2019 | vs. | Aug 20, 2019 → Sep 16, 2019 | Daily ✅ ✅ Customize

✅

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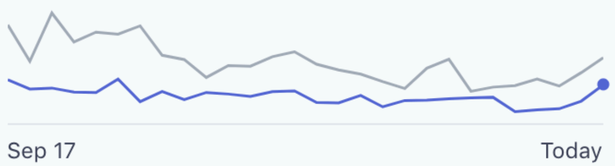

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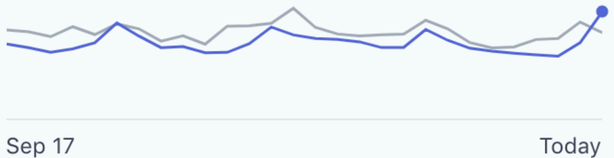

New connected accounts −93.3% 1 15

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Source: Stripe docs

Purpose-Driven Dashboards

Should Prison Sentences Be Based On Crimes That Haven't Been Committed Yet?

By Anna Maria Barry-Jester, Ben Casselman and Dana Goldstein

Graphics by Matthew Conlen, Reuben Fischer-Baum and Andy Rossback

Filed under Criminal Justice

Published Aug. 4, 2015

Principles of Effective Visualizations

Principle	Definition	Examples
• Proportional Ink	The amount of ink used to indicate a value should be proportional to the value itself.	Truncating the y-axis on a bar chart to exaggerate the difference between bars violates the principle of proportional ink.
• Data:ink ratio	Remove distracting visual elements to focus attention on the data	Lighten line weights, remove backgrounds, never use 3D or special effects, ~~remove~~ avoid unnecessary/redundant labels.
• Labels & legends	Use axes labels and titles to highlight/ communicate data	Never leave your data column names as axes labels! Generally good to add a title.
• Overplotting	With large datasets, points overlap, resulting in large clouds of data	To fix overplotting, could plot just a sample subset of the data, use alpha, and use smaller points. Or, jitter - but check if appropriate!
• Visualization choice	Must be informed by the **data** you have, the **research question** being asked and the **audience** that cares.	Pick the simplest plot that best shows most/all of the data needed to answer the research question. If you only have summary statistics, cannot show distributions. Tailor the visualization to your audience (within reason) but don't dumb it down.
• Colour & Accessibility	Colour can be used to encode information or for aesthetics/style/ design. However, colour can also be distracting if used inappropriately or poorly.	Choose a perceptually uniform colour palette; can be sequential or diverging for quantitative data. Opt for colour-blind friendly palettes. Categorical data can use qualitative colour schemes.

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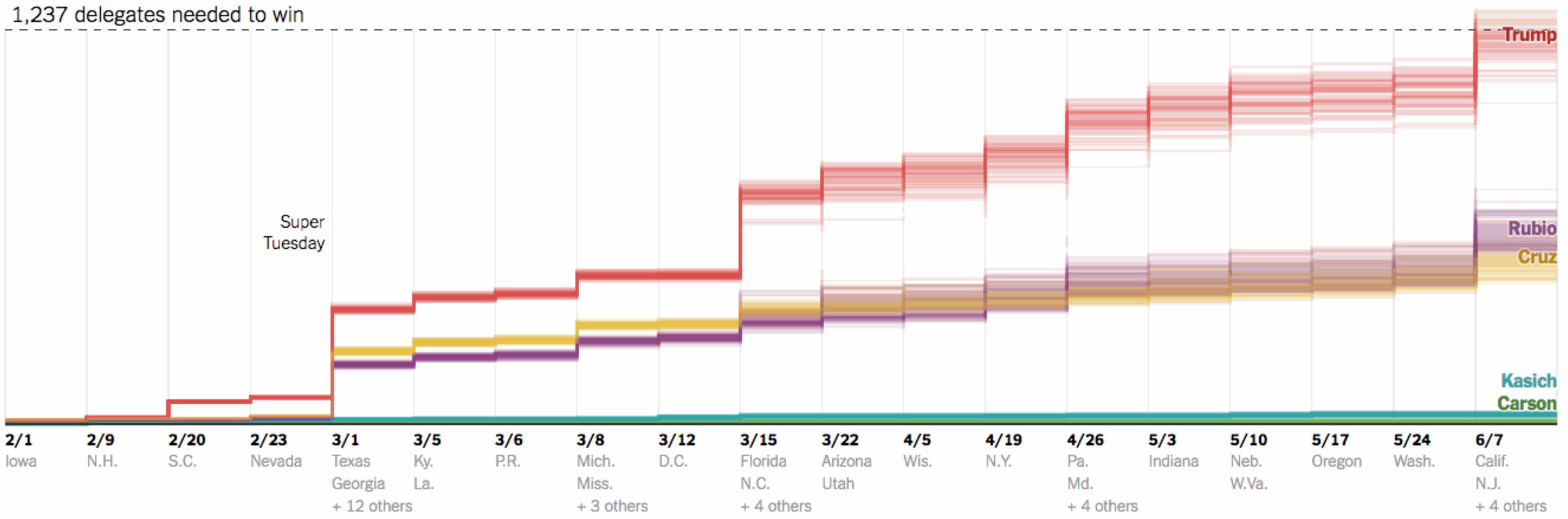
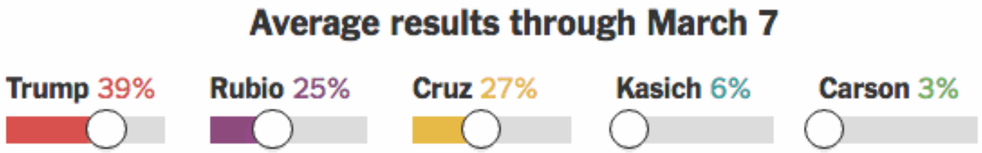
Follow these principles
and you will be 80% there
to making an effective dashboard !!

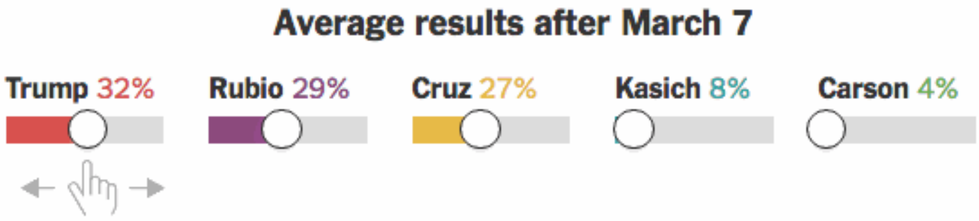
Principles of Effective Dashboards

Principle	Explanation
Audience Matters (a lot!)	You may need to build dashboards with different views: - one for a manager/executive - one for yourself to explore and understand the data - one for the public
Purpose-driven Dashboards	Every dashboard should have a purpose! Resist the idea to bake in the “purpose” as a dropdown or menu option. What are the usage scenarios? List your intent/purpose in your dashboard!
Choose defaults wisely	Interactivity with your dashboard should **NOT** be mandatory! When your audience first arrive at your app, self-sufficient.
Less is more	Resist the urge to “plot everything in every way for every category/option/filter. Go back to the “purpose” of the dashboard, make sure you stay true to that. Put cool charts you want people to look at in an appendix, or build a second app.
Add a narrative and signposts	Have a conversation with your reader, add sign-posts, consider adding a “reset/home/defaults” button so they can always get back to the main point if they mess around too much.
Aesthetics matter!	Styling, branding, colour schemes (including colour-blind friendly), typography, layout, user interface (UI) and experience (UX) matter! Think hard about them and make good choices. Find the right balance between aesthetics and functionality.

Purpose of Interactivity & Dashboards

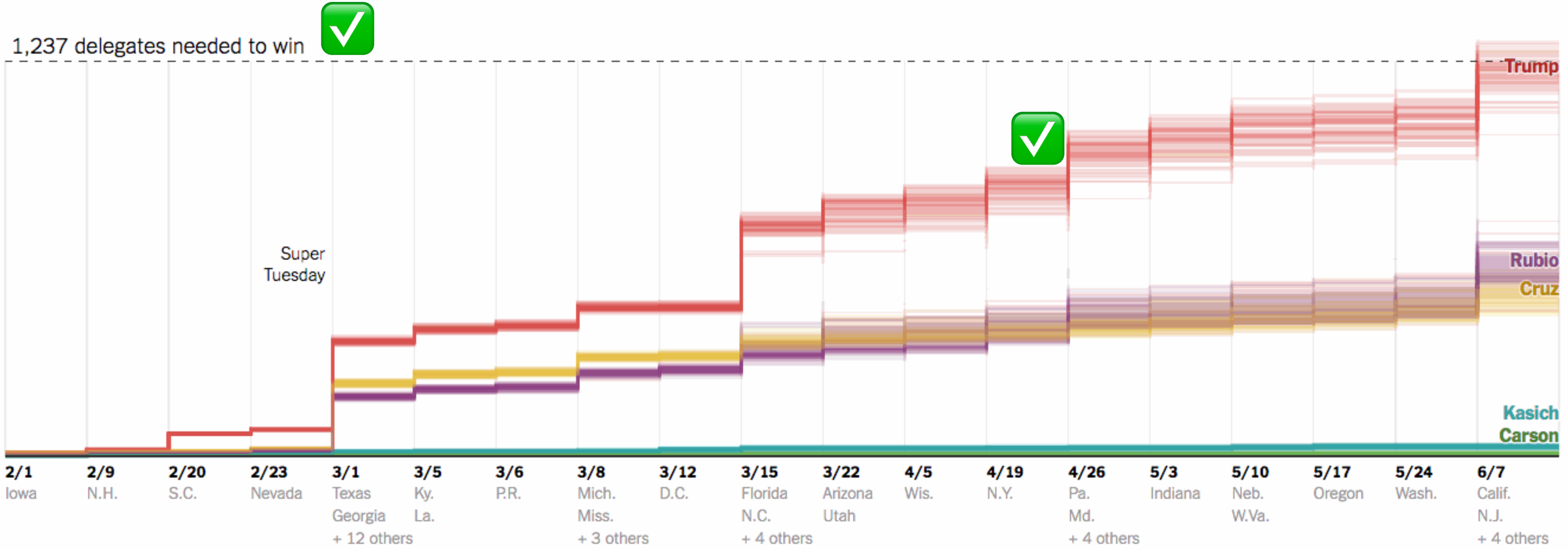


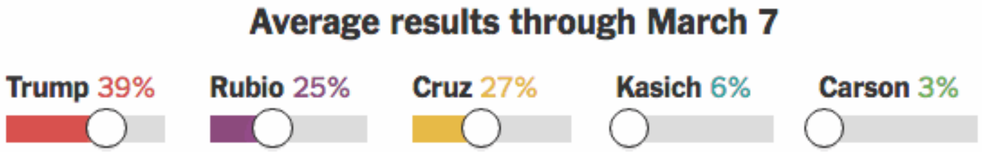


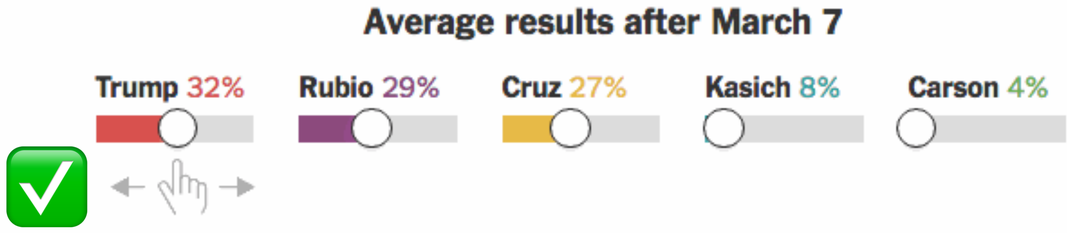


Source: Delegate Calculator and Blog post

Purpose of Interactivity & Dashboards







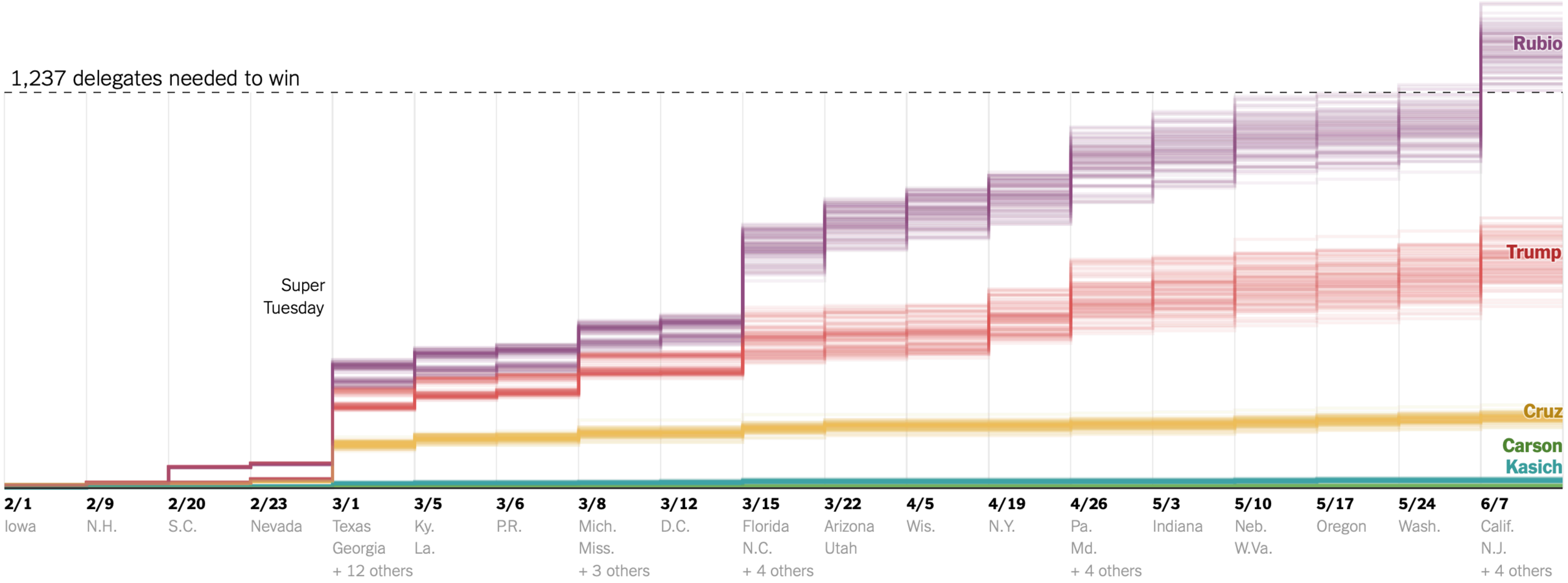
Source: Delegate Calculator and Blog post

Republican nomination. Here are some presets to get you started:

Rubio with small margins | Rubio and Trump head-to-head

Trump wins with huge margins | Cruz makes a comeback

Three-way tie | Trump hits a ceiling



Average results through February 28

Trump 31% | Rubio 34% | Cruz 26% | Kasich 6% | Carson 3%

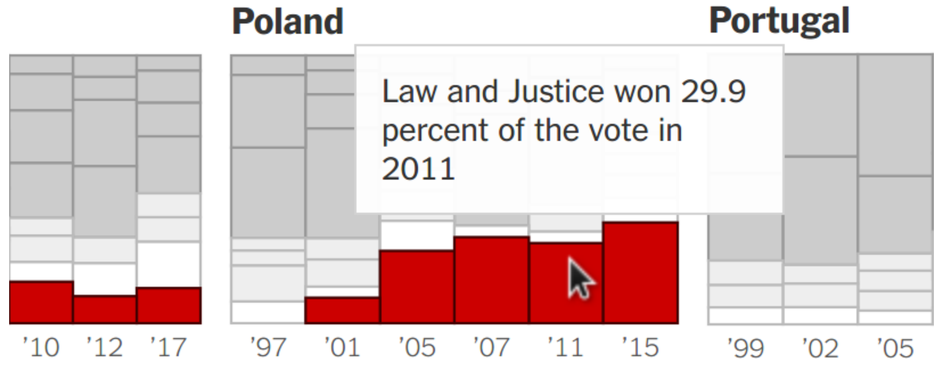
Average results after February 28

Trump 33% | Rubio 40% | Cruz 18% | Kasich 6% | Carson 3%

Purpose of Interactivity & Dashboards

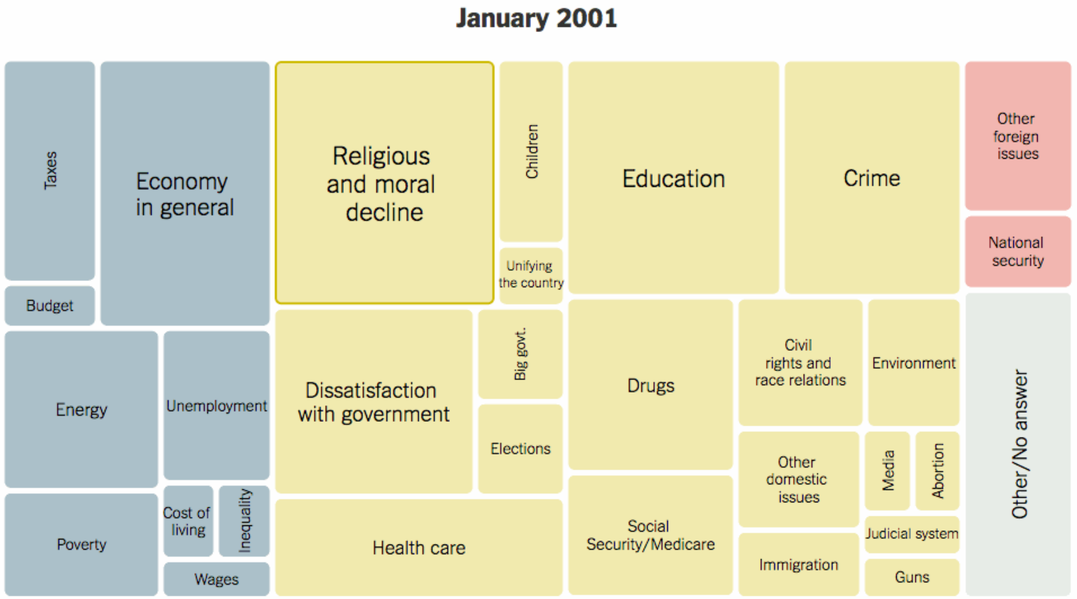
1. Tooltips allow your most interested users to dig deep

Take a look at the following graphic which summarized election results across 20 European countries. Everything you need to see is shown right away. You see the country names, the years and the red bars representing results of right-wing and far-right parties.



2. Interaction allow readers to discover the full dataset

There are cases when you have far more data than fit on a page, which means you have to select which charts to show and which to hide. To avoid cherry-picking we usually try to come up with a selection rule that we apply consistently throughout the piece. For instance, in a recent graphic we decided to show the first poll after the start of the term for each president. Deciding on such a rule is definitely better than just picking charts, but it can still feel arbitrary sometimes. Fortunately we had already set up the graphic in a way that the charts are rendered dynamically. So it didn't cost us much to add in a little bonus feature that allows browsing through the entire dataset.



Source: Election results in 20 EU countries and Blog post

Principles of Effective Dashboards

Principle	Explanation
Build trust in your analysis	Think about ways you can increase transparency of your data sources and analysis methods. Be upfront about missing data and accuracy of your data. Add tooltips so users can check data.
Think about the “onboarding” experience	What happens when users first visit your site? Related to “set good defaults” but more than that: how do they use it? Where are the controls? What do they do?
Use a consistent layout	Do not burden your users by making them think about the layout of your app and how it’s structured ; should be natural!
Use animations sparingly	Animations can be distracting, use them if you think it will help drive your point home (e.g., prison parole example)
Allow users to filter data (if applicable)	If you start with a giant dataset - say, the gapminder dataset - allow users the ability to filter the data and show data for the country they are interested in; have a good default comp
User testing is critical!	Get someone to look at your dashboard during development. Ideally someone who will be using it

5 minutes

DATA 301
Teaching Evaluation
(On Canvas)

20 minutes

Part 3: Speeding up Dashboards

Many ways to speed up dashboards, here are three:

1. Filtering data
2. Strategies for aggregating data
3. Precomputing data

Filtering Data

- Are you using all of your data ?
    - If not, set up an reproducible script to drop unused columns, and rows…
    - If yes, add components (dropdowns/slider) to less data is shown overall

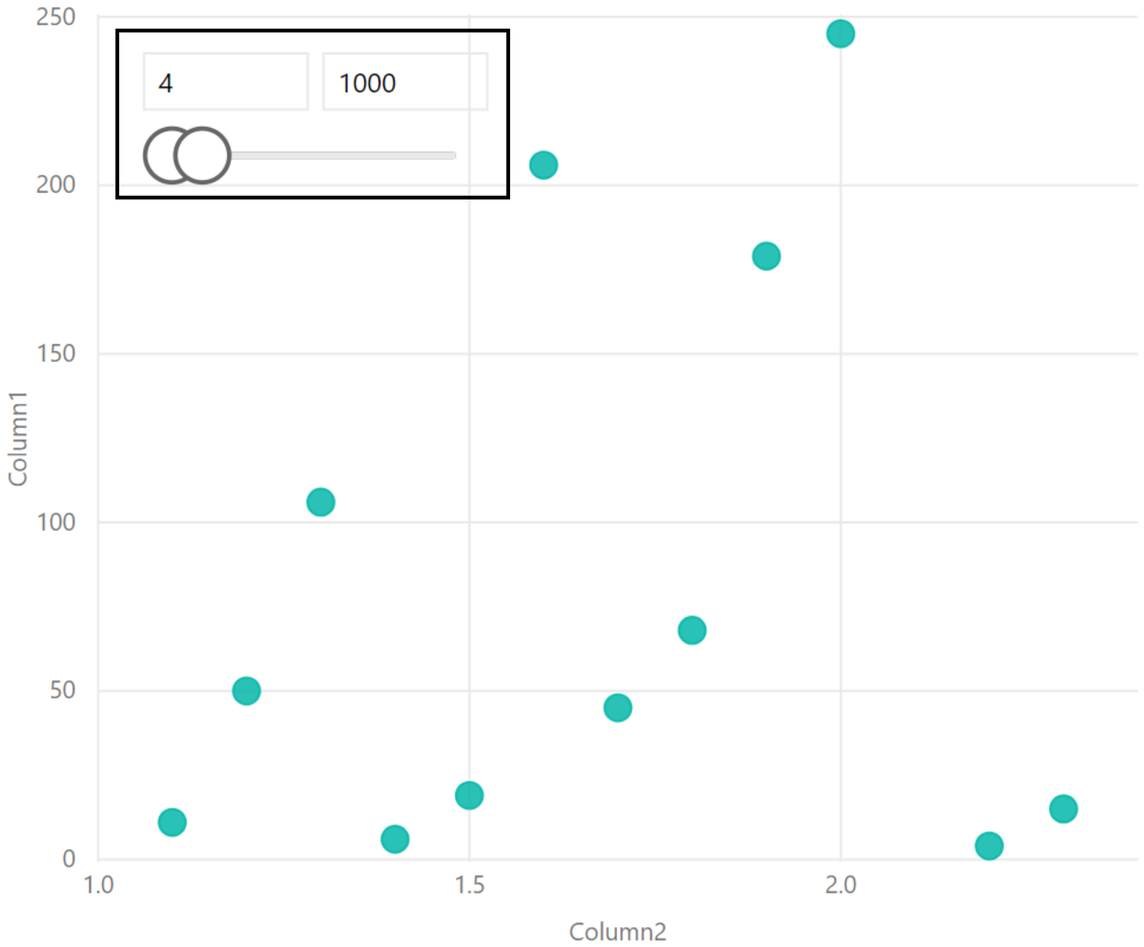
- Remember: purpose-driven dashboards. Is all your data useful to answer your research question?

Dealing with outliers

Source: DSCI 532 lecture slides from 2019/19 Cydney Nielsen

Dealing with outliers

interactive filtering is another solution - *appropriate when want to remove outliers*



Source: DSCI 532 lecture slides from 2019/19
Cydney Nielsen

Dealing with outliers

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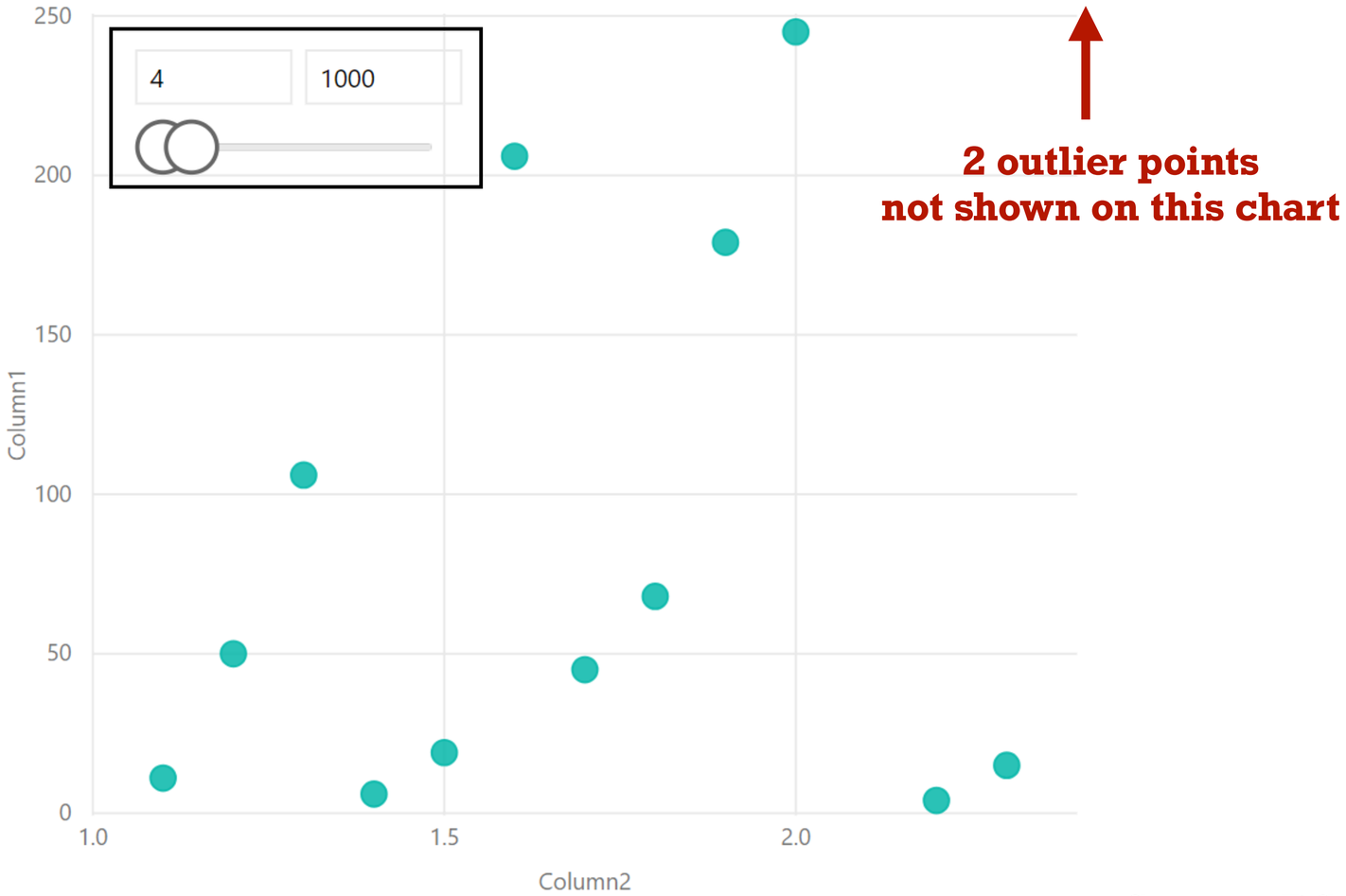
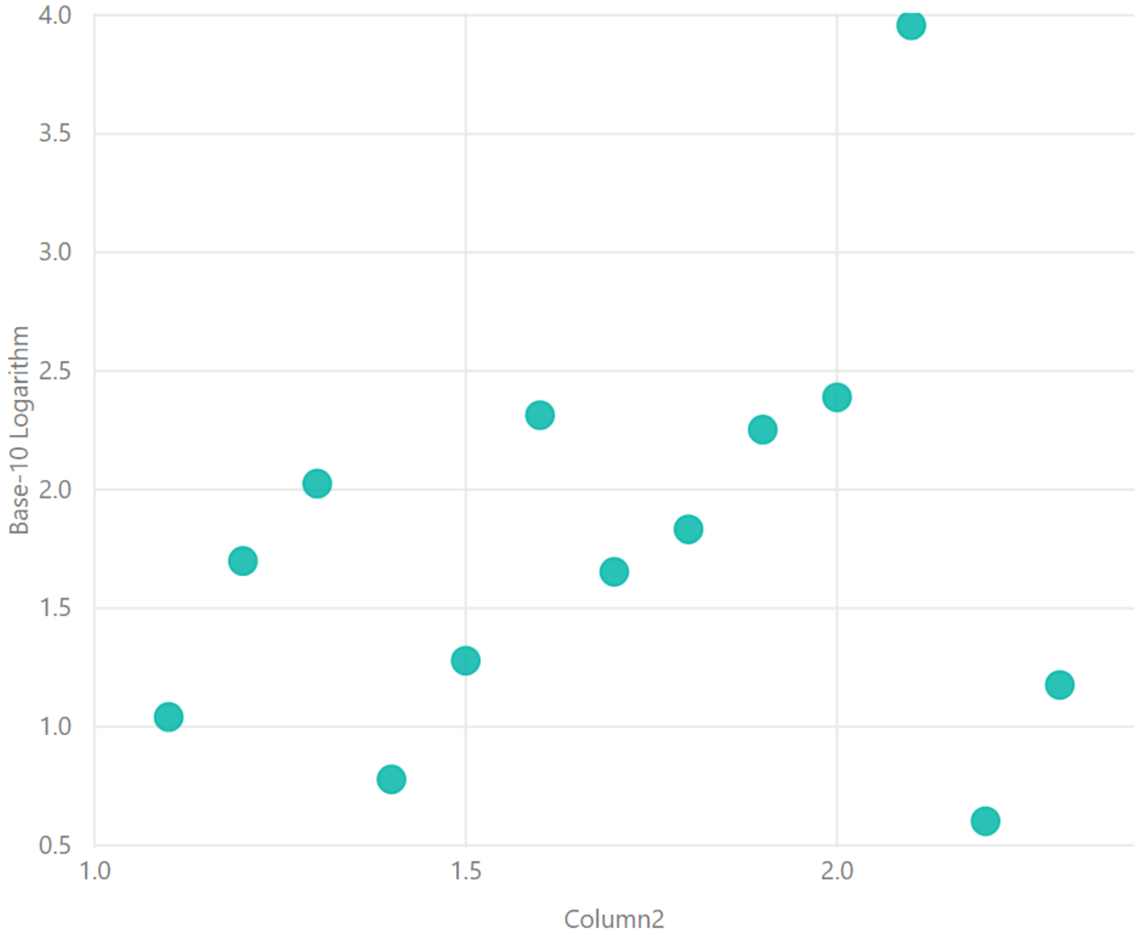


Source: DSCI 532 lecture slides from 2019/19
Cydney Nielsen

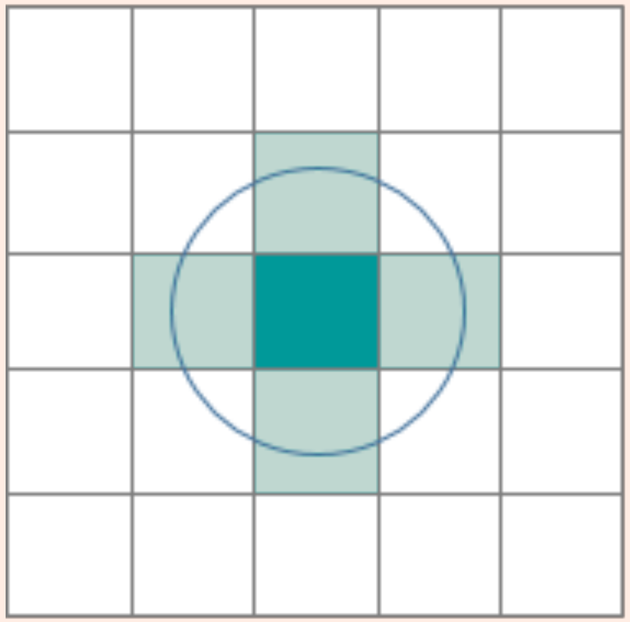
Dealing with outliers

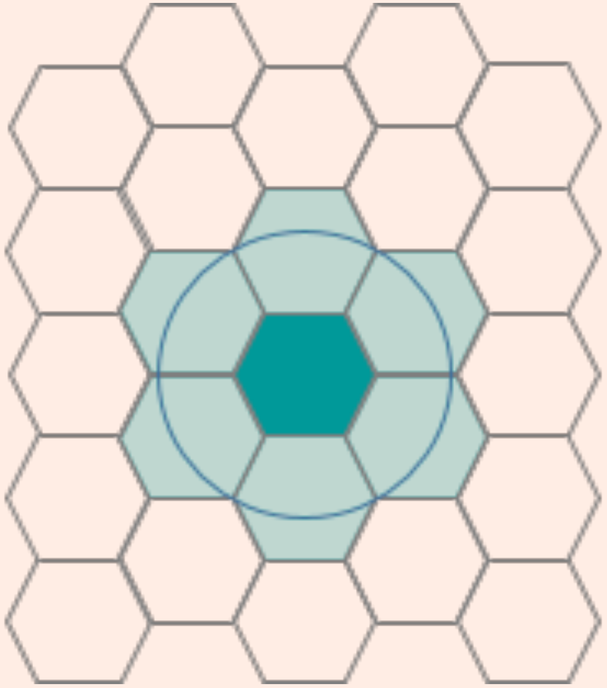
log scale helps - *appropriate if you want to keep all points*



Source: DSCI 532 lecture slides from 2019/19
Cydney Nielsen

Why Hexagons?





Hexagons:

- Reduce sampling bias

- Curves in data more naturally shown

- Grids draw our eyes to straight, unbroken parallel lines

Source: Many more arguments presented here ArcGIS Pro

Pre-computing Data

- Use vectorized functions and avoid loops at all costs!

- Setup a script/notebook to do any heavy wrangling and processing outside your app

- Load data at app start; **re-structure** your data to serve queries!

Summary

- Building good dashboards is HARD, you are fighting an uphill battle in the industry because of all the bad dashboards with terrible defaults

- But it is WORTH IT, dashboards are excellent for **exploring data**, **showcasing important results**, and creating a more **data-aware society**

- Audience matters! Context matters! Research questions matter!

Q&A

Additional Reading

Resources

- “The end of interactive visualizations”
- “In defence of interactive visualizations”
- “The laws of crappy dashboards”

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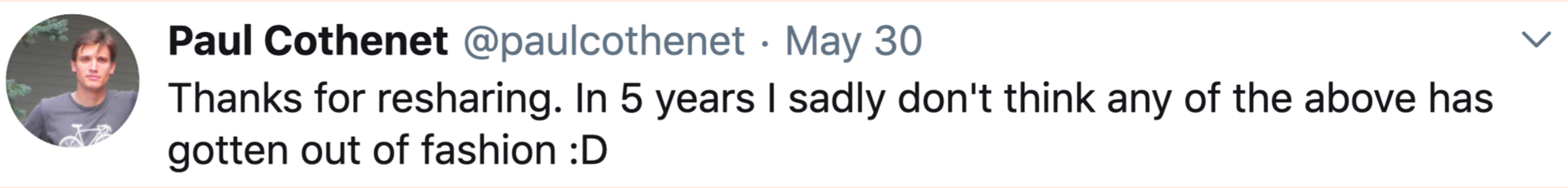


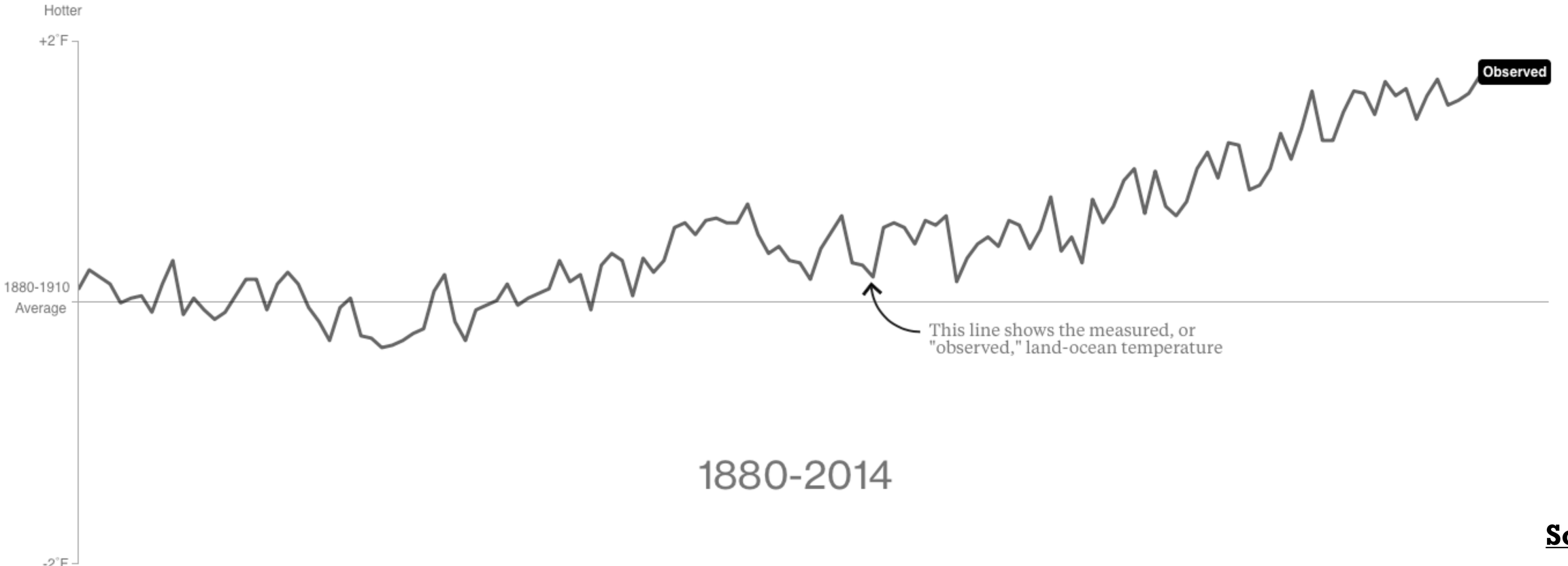
20 minutes

Part 3:
Dashboards case study

What's Really Warming the World?

By Eric Roston and Blacki Migliozzi | June 24, 2015

Skeptics of manmade climate change offer various natural causes to explain why the Earth has warmed 1.4 degrees Fahrenheit since 1880. But can these account for the planet's rising temperature? Scroll down to see how much different factors, both natural and industrial, contribute to global warming, based on findings from NASA's Goddard Institute for Space Studies.



Source

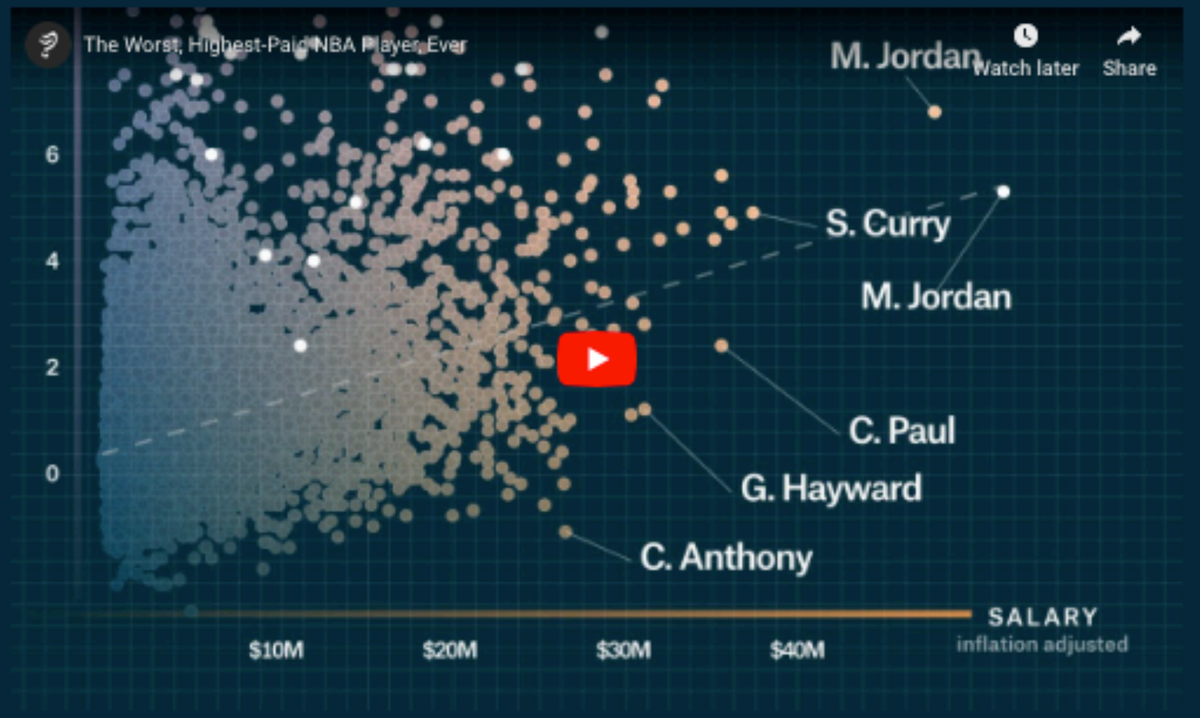
The Pudding

Finding the Worst, Highest-Paid NBA Player, Ever

Using advanced NBA stats to rank player performance against pay.

by Matt Daniels

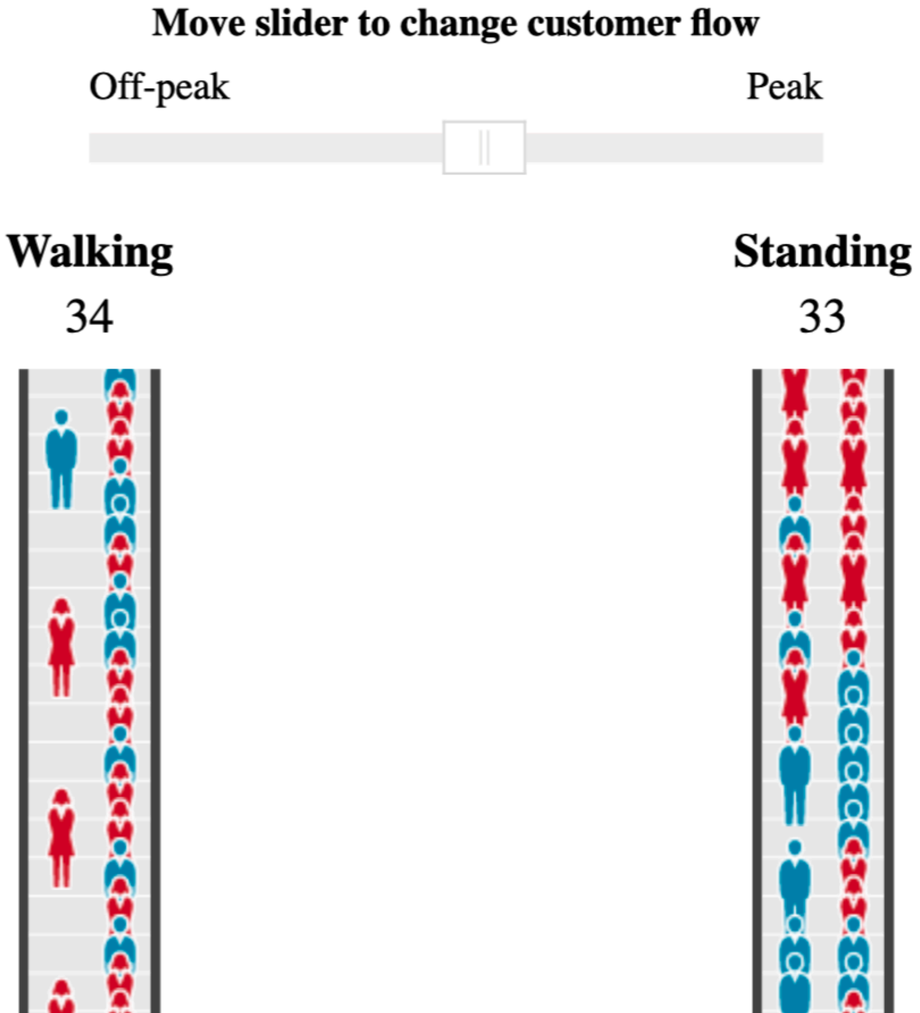
Watch the Video



Source

Does standing on both sides of the escalator work? Test it with our interactive simulator

The interactive below shows how the trial helped ease congestion - showing the number of people reaching the top of each escalator, and based on figures provided by TfL.



Source

You Draw It: How Family Income Predicts Children's College Chances

By **GREGOR AISCH, AMANDA COX and KEVIN QUEALY** MAY 28, 2015

How likely is it that children who grow up in very poor families go to college? How about children who grow up in very rich families?

We'd like you to **draw your guess** for every income level on the chart below.

If you think the chances of enrolling in college (or vocational school) are about the same for everyone, you should draw something like this: —— . If you think the odds are especially harsh for children from the poorest families, but higher for middle- and higher-income children, your drawing would instead look like this: ⁄ . Or here is one for a situation in which chances level off after a certain income threshold: ⁀ . Or for one that spikes ⁀ or dips ⁀ for the very richest.

Source

PARABLE OF THE POLYGONS

A PLAYABLE POST ON THE SHAPE OF SOCIETY

by vi hart + nicky case

español | deutsch | français | português | 日本語 | 中文 | polski
italiano | magyar | nederlands | हिन्दी | čeština | Русский | العربيّة | Українська

This is a story of how harmless choices can make a harmful world.

These little cuties are 50% Triangles, 50% Squares, and 100% slightly shapist.
But only slightly! In fact, every polygon *prefers* being in a diverse crowd:

Source

Can you form a stable government?

Combine parties as best you can to form a workable government. You need 323 votes, probably, to survive a confidence vote, but you may find that some parties get along together better than others

Choose your parties

Start by dragging either Labour or Conservatives

Ukip 3

SNP 52

PC 3

SDLP 3

Green 1

You have

582 seats

Reset

DUP 9

It's a bad match because ...

Source

Great list of fantastic interactive dashboards!

Rock 'n Poll

The power of Explorable Explanations

Maarten Lambrechts
@maartenzam

Mediafin

DataHarvest 2016

1

Dataharvest I: Rock 'n Poll

4 years ago 1 5,583

maartenzam PRO ★

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