# Introduction to Data Visualization & Data Storytelling

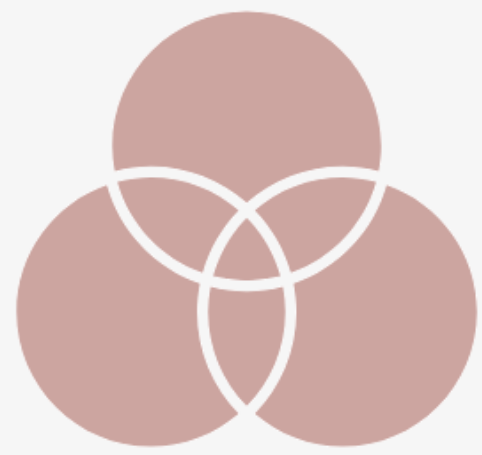Week 7

# Recap

# Assignment #4

# Final Project

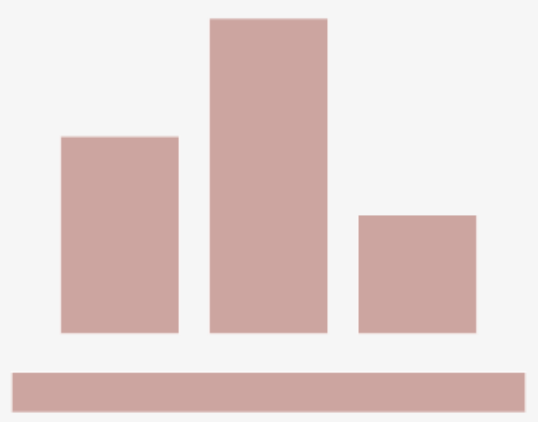# Exploring Different Chart Types

→

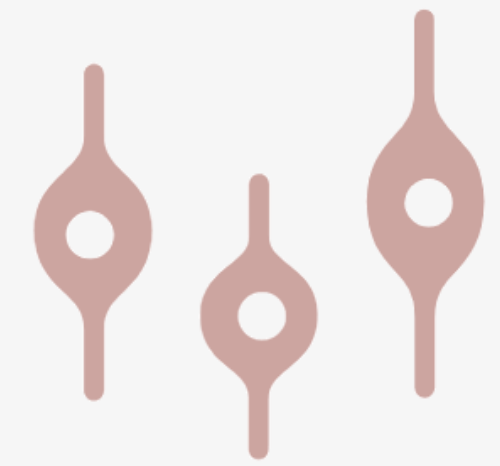**RELATIONSHIP**

**COMPARING CATEGORIES**

**DISTRIBUTION**

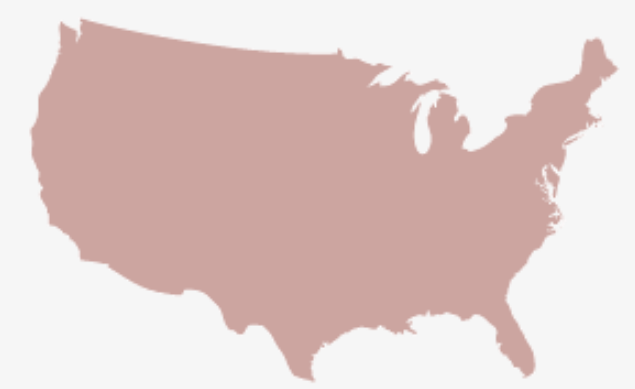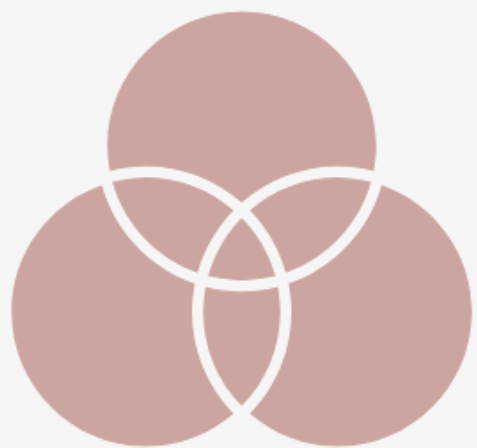**TIME**

**PART-TO-WHOLE**

**GEOSPATIAL**

RELATIONSHIP

COMPARING CATEGORIES

DISTRIBUTION

TIME

PART-TO-WHOLE

GEOSPATIAL

# Scatterplot

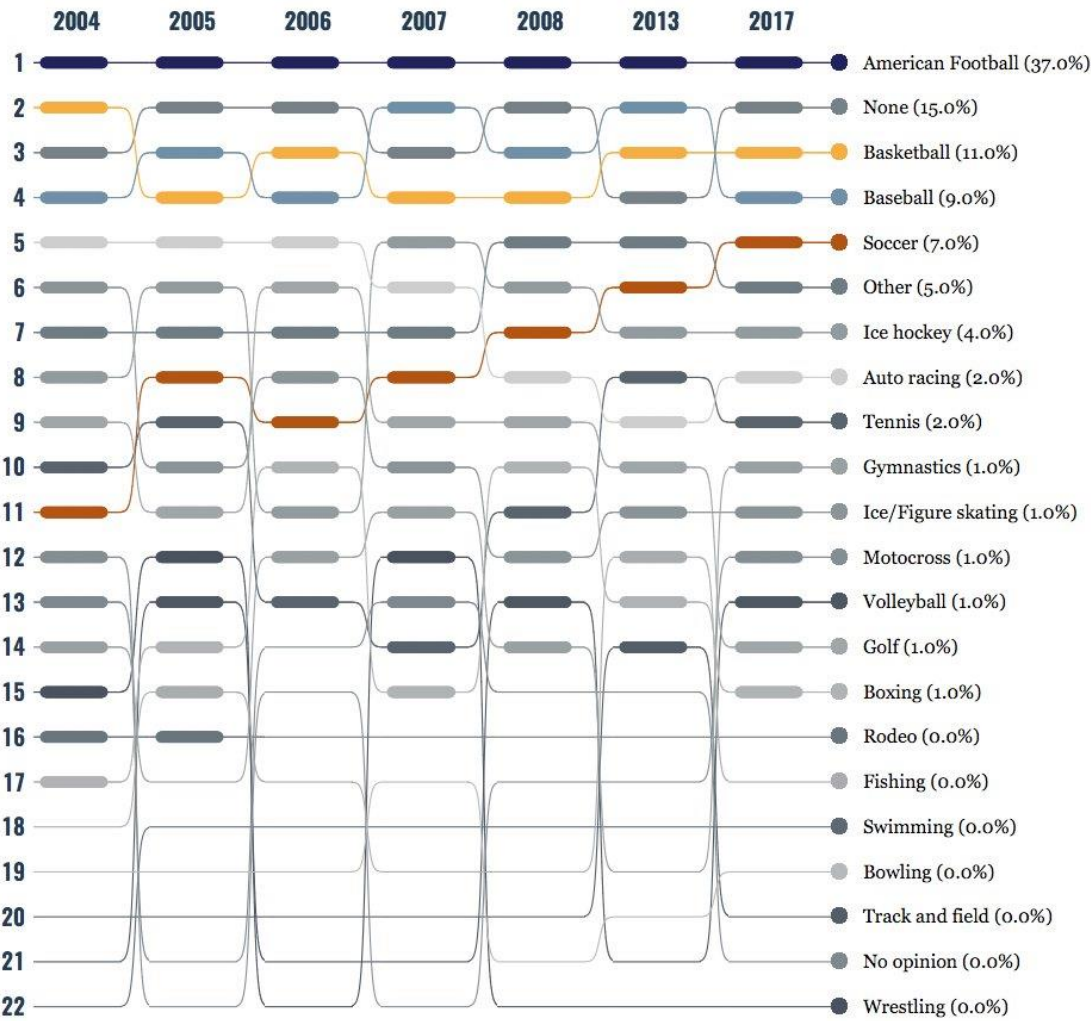↑ **Activity indoors**

Sit-down restaurants

8

Museums

Gyms

Nail salons

Fast-food

Malls

6 Self-storage

Gas stations

Historical sites

4

Parks

Amusement parks

4 6

**Level of contact →**
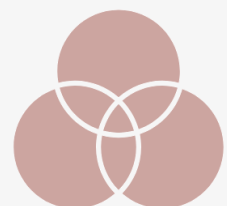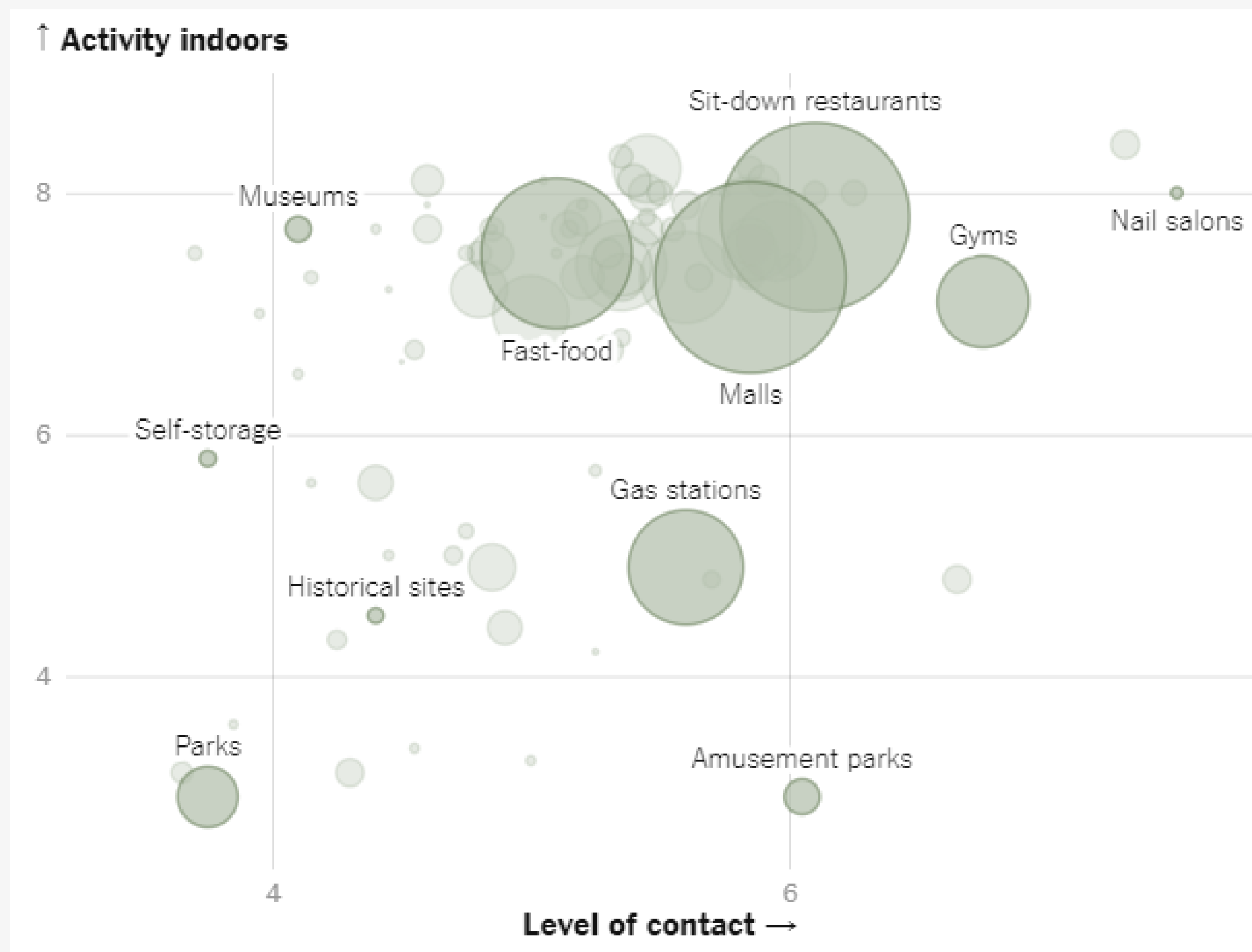
# Bump Chart



**GAINING GROUND: Soccer grows in the U.S.**

Major League Soccer (MLS) has come a long way over the past decade. While "football" continues to dominate as the most popular sport globally, soccer has been fighting an uphill battle to match the interest of American football in the U.S. becoming the fifth most viwed sport in 2017.
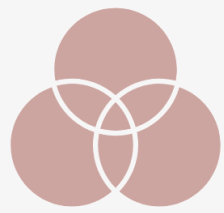
| | 2004 | 2005 | 2006 | 2007 | 2008 | 2013 | 2017 | |
|---|---|---|---|---|---|---|---|---|
| 1 | | | | | | | | American Football (37.0%) |
| 2 | | | | | | | | None (15.0%) |
| 3 | | | | | | | | Basketball (11.0%) |
| 4 | | | | | | | | Baseball (9.0%) |
| 5 | | | | | | | | Soccer (7.0%) |
| 6 | | | | | | | | Other (5.0%) |
| 7 | | | | | | | | Ice hockey (4.0%) |
| 8 | | | | | | | | Auto racing (2.0%) |
| 9 | | | | | | | | Tennis (2.0%) |
| 10 | | | | | | | | Gymnastics (1.0%) |
| 11 | | | | | | | | Ice/Figure skating (1.0%) |
| 12 | | | | | | | | Motocross (1.0%) |
| 13 | | | | | | | | Volleyball (1.0%) |
| 14 | | | | | | | | Golf (1.0%) |
| 15 | | | | | | | | Boxing (1.0%) |
| 16 | | | | | | | | Rodeo (0.0%) |
| 17 | | | | | | | | Fishing (0.0%) |
| 18 | | | | | | | | Swimming (0.0%) |
| 19 | | | | | | | | Bowling (0.0%) |
| 20 | | | | | | | | Track and field (0.0%) |
| 21 | | | | | | | | No opinion (0.0%) |
| 22 | | | | | | | | Wrestling (0.0%) |

Data source: Gallup | Data Visualisation: @PabloLGomez | Graphic Design: I FOR IDEAS | #MakeoverMonday 2020 Week 1

**What is America's most popular sport since 2004?**

For many years, **Gallup has regularly asked** Americans which sport is their favorite to watch. The ranking chart above shows the most profound shift that's occurred in the US sporting landscape so far when the United States was a baseball country. Now, Americans are a football country — a place where **nearly two thirds** of all Americans say they regularly watch football, and regular season games get bigger TV ratings than Game 7 of the Baseball World Series. Basketball, in fact, has entered a tie with baseball for third and fourth place since the early 2000's. Gallup data also shows the growth os Soccer to become the fifth favourite sport in the United States.
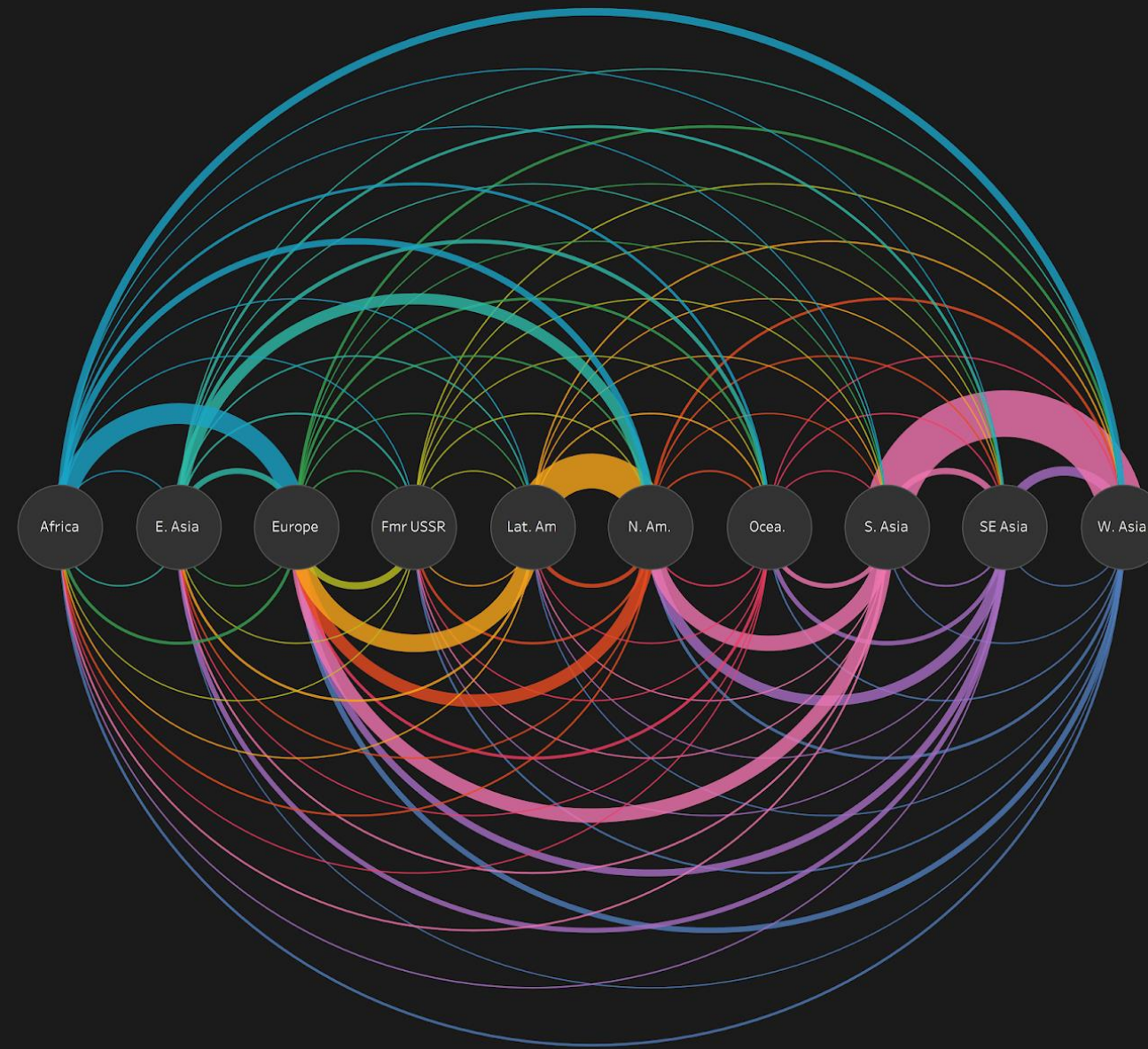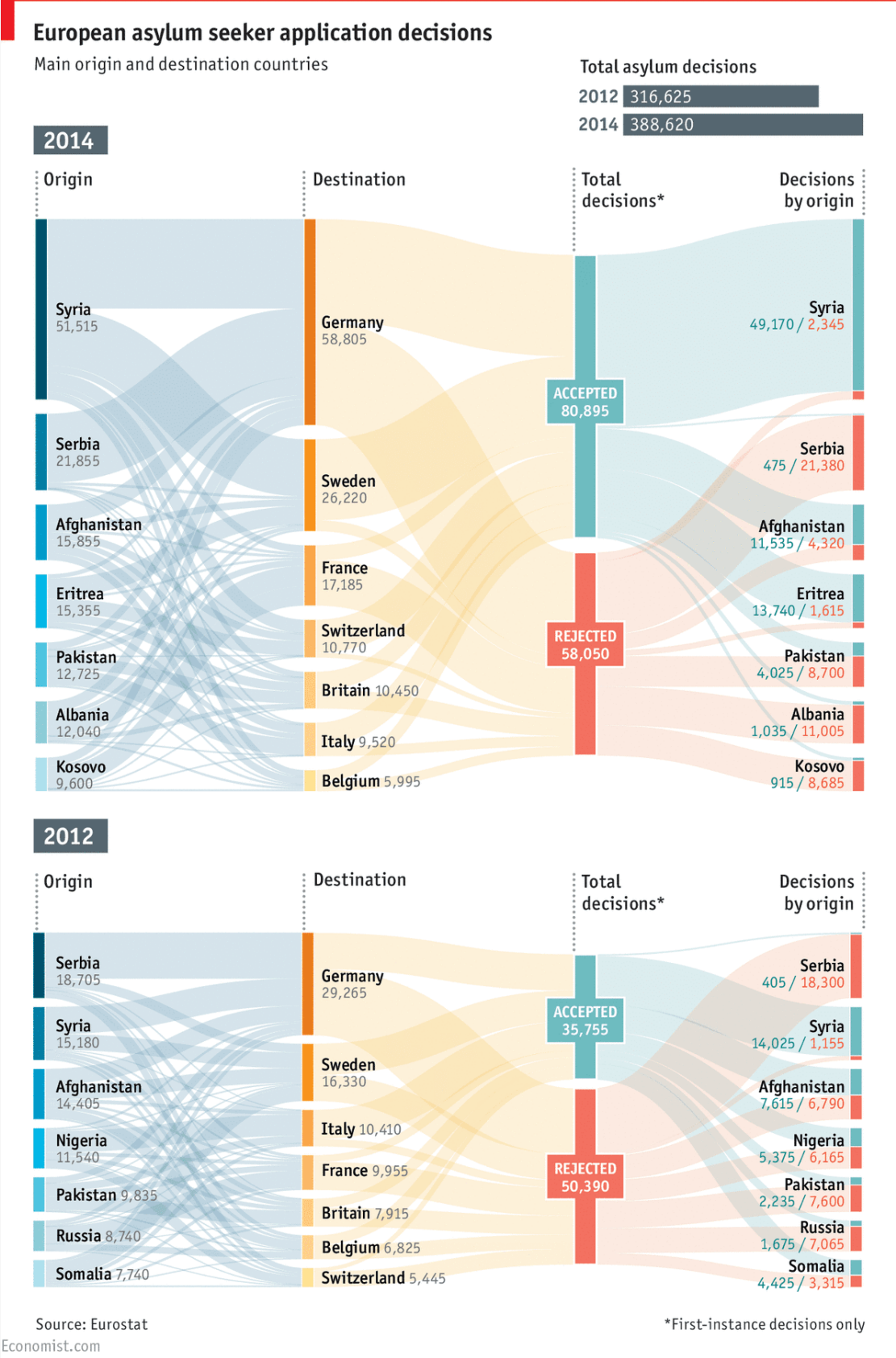
*Source: MakeoverMonday*

# Arc Sankey

RELATIONSHIP

# Alluvial Diagram

**RELATIONSHIP**



European asylum seeker application decisions
Main origin and destination countries

Total asylum decisions
2012  316,625
2014  388,620

**2014**

| Origin | Destination | Total decisions* | Decisions by origin |

Syria 51,515 — Germany 58,805 — ACCEPTED 80,895 — Syria 49,170 / 2,345
Serbia 21,855 — Sweden 26,220 — Serbia 475 / 21,380
Afghanistan 15,855 — France 17,185 — Afghanistan 11,535 / 4,320
Eritrea 15,355 — Switzerland 10,770 — Eritrea 13,740 / 1,615
Pakistan 12,725 — Britain 10,450 — REJECTED 58,050 — Pakistan 4,025 / 8,700
Albania 12,040 — Italy 9,520 — Albania 1,035 / 11,005
Kosovo 9,600 — Belgium 5,995 — Kosovo 915 / 8,685

**2012**

| Origin | Destination | Total decisions* | Decisions by origin |

Serbia 18,705 — Germany 29,265 — ACCEPTED 35,755 — Serbia 405 / 18,300
Syria 15,180 — Sweden 16,330 — Syria 14,025 / 1,155
Afghanistan 14,405 — Italy 10,410 — Afghanistan 7,615 / 6,790
Nigeria 11,540 — France 9,955 — Nigeria 5,375 / 6,165
Pakistan 9,835 — Britain 7,915 — REJECTED 50,390 — Pakistan 2,235 / 7,600
Russia 8,740 — Belgium 6,825 — Russia 1,675 / 7,065
Somalia 7,740 — Switzerland 5,445 — Somalia 4,425 / 3,315

Source: Eurostat
Economist.com
*First-instance decisions only

*Source: The Economist*

METRICS

**HANNAH FAIRFIELD**

# Driving Shifts Into Reverse

ECONOMISTS have long studied the relationship between driving habits and gasoline prices. Low gas prices can bring periods of profligate driving, and a quick jump in prices can cause many vehicles to languish in garages.

Until recently, Americans have driven more each year than the previous one, with a few brief exceptions. In 1956, Americans of driving age drove about 4,000 miles a year, on average. Fifty years later, that figure had climbed above 10,000.

But the latest recession has caused some big changes. High unemployment meant that fewer people were driving to work, and a slump in consumer spending

meant that less freight needed to be moved around the country. As gas prices soared in 2005, the number of miles driven — including commercial and personal — began to fall, and continued to drop after 2008 even as gasoline became cheaper.

"People were surprised by the very rapid rise in gas prices, and they changed their driving behavior," said Kenneth A. Small, a transportation economist at the University of California, Irvine. "But my suspicion is that it is temporary. As soon as unemployment gets back to pre-recession levels, we will see Americans doing a lot more driving again."

**Energy crisis**

**The swing backward**

The average number of miles that Americans drive annually begins to fall, so the chart appears to turn around.

**Cheap gas, longer commutes**

**The Arab oil embargo**

**Record low prices**

Price of a gallon of gasoline

Annual average for regular grade, adjusted for inflation

Miles driven per capita each year →

7,000 mi.   8,000 mi.   9,000 mi.   10,000

$3.00

$2.50

$2.00

$1.50

5,000 mi.   6,000 mi.   7,000 mi.   8,000 mi.   9,000 mi.

Source: https://www.nytimes.com/2010/05/02/business/02metrics.html

# Chord Diagram

# Heatmap



*Source: https://www.visualcinnamon.com/portfolio/why-do-cats-and-dogs/*
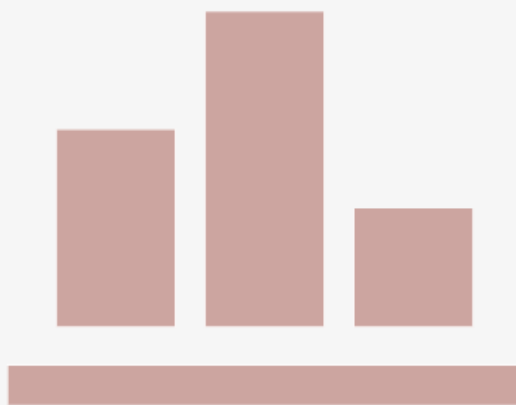


*Source: MakeoverMonday*

RELATIONSHIP

RELATIONSHIP

COMPARING CATEGORIES

DISTRIBUTION

TIME
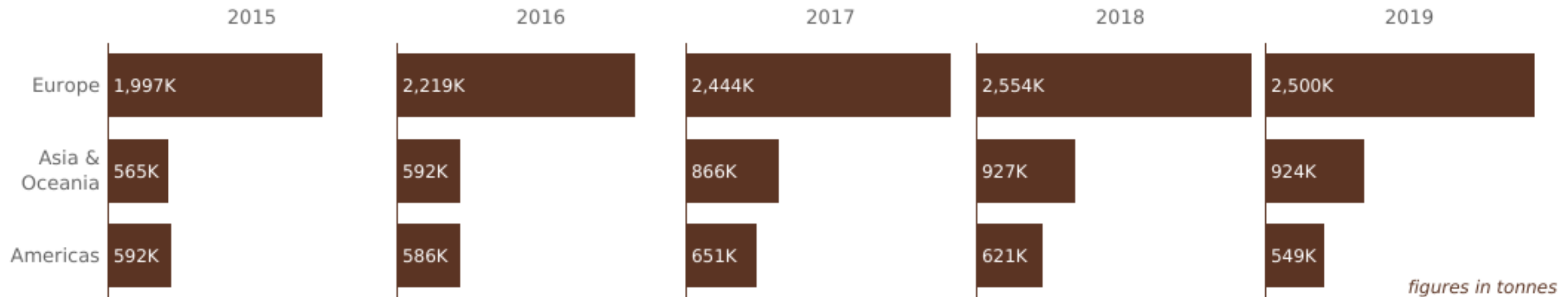
PART-TO-WHOLE

GEOSPATIAL

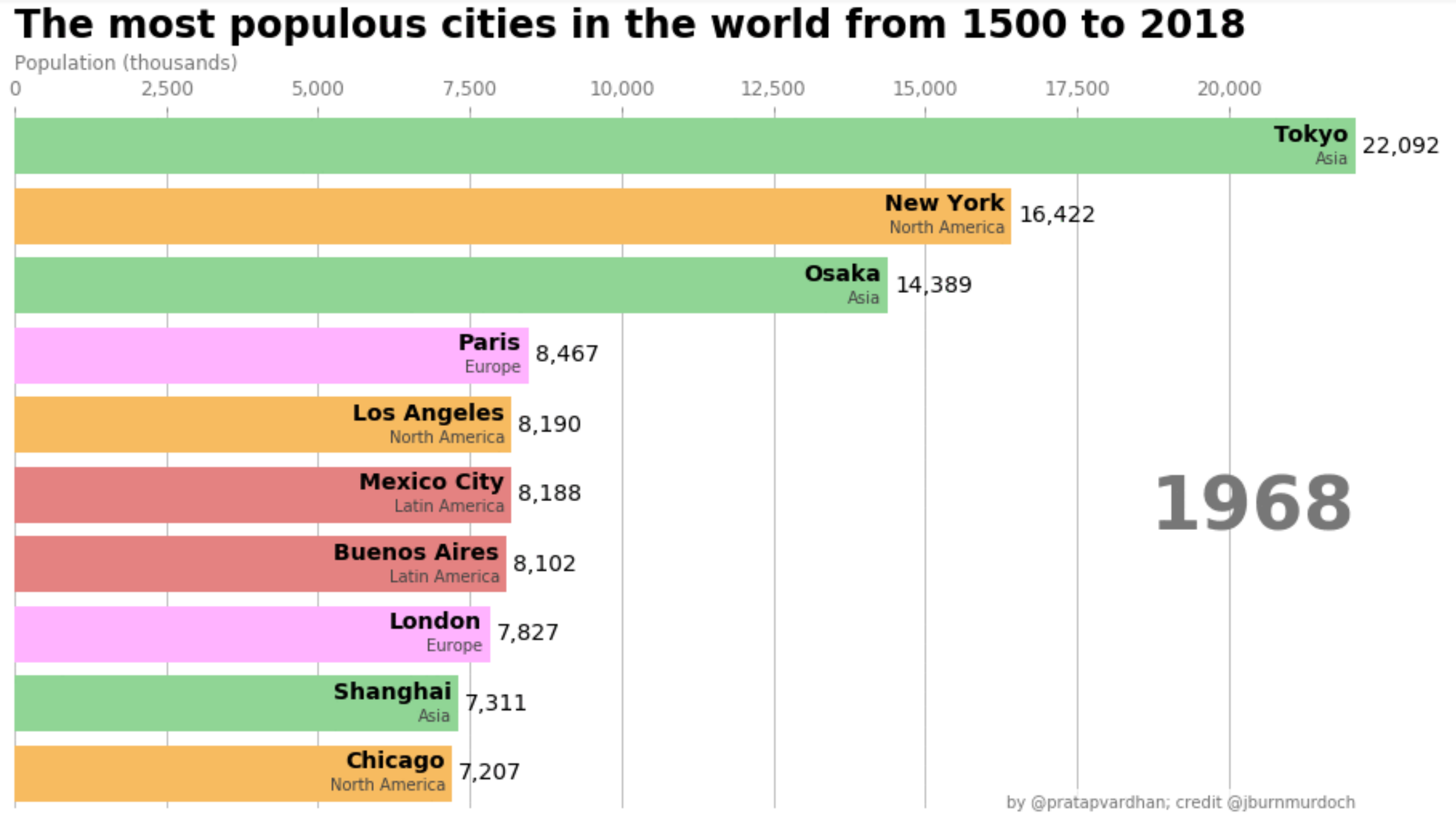# Bar Charts

## EUROPE REMAINS BIGGEST IMPORTER OF COCOA BEANS

Between 2015 and 2019, Europe continuously imported more cocoa beans than Asia, Oceania and the Americas combined. Imports by European countries grew by 25% over the five year period. Asia & Oceania imported over 63% more, while imports from the Americas fell by 7% in the same period.

**Data**: CBI (Centre for the Promotion of Imports)
**Analysis & Design**: Eva Murray | @TriMyData

| | 2015 | 2016 | 2017 | 2018 | 2019 |
|---|---|---|---|---|---|
| Europe | 1,997K | 2,219K | 2,444K | 2,554K | 2,500K |
| Asia & Oceania | 565K | 592K | 866K | 927K | 924K |
| Americas | 592K | 586K | 651K | 621K | 549K |

*figures in tonnes*

*Source: https://public.tableau.com/profile/eva.murray#!/vizhome/MakeoverMondayWeek522020-CocoaImports/CocoaImports*

# Bar Chart Race

## The most populous cities in the world from 1500 to 2018

Population (thousands)

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 0 | 2,500 | 5,000 | 7,500 | 10,000 | 12,500 | 15,000 | 17,500 | 20,000 |

**Tokyo** Asia — 22,092

**New York** North America — 16,422

**Osaka** Asia — 14,389

**Paris** Europe — 8,467

**Los Angeles** North America — 8,190

**Mexico City** Latin America — 8,188

**Buenos Aires** Latin America — 8,102

**London** Europe — 7,827

**Shanghai** Asia — 7,311

**Chicago** North America — 7,207

1968

by @pratapvardhan; credit @jburnmurdoch

Source: *https://towardsdatascience.com/bar-chart-race-in-python-with-matplotlib-8e687a5c8a41*

# Paired Bar Charts



Source: https://public.tableau.com/profile/andy.kriebel#!/vizhome/MakeoverMonday2021Week7-WhatismostimportantonValentinesDay/MM2021W7

# Stacked Bar Charts

→



THE TRUMP DIARIES

A breakdown of how the US president spent his time between 7 November 2018 and 1 February 2019, according to schedules leaked by a White House source...

**63** Working Days

**479** hours Total Time

**297** hrs Executive Time

**182** hours Other Time

How much of Trump's time is taken up by **Executive time**?

Day after Thanksgiving

Martin Luther King Day

100%

50%

0%

7 Nov 2018

3 Dec 2018

2 Jan 2019

1 Feb 2019
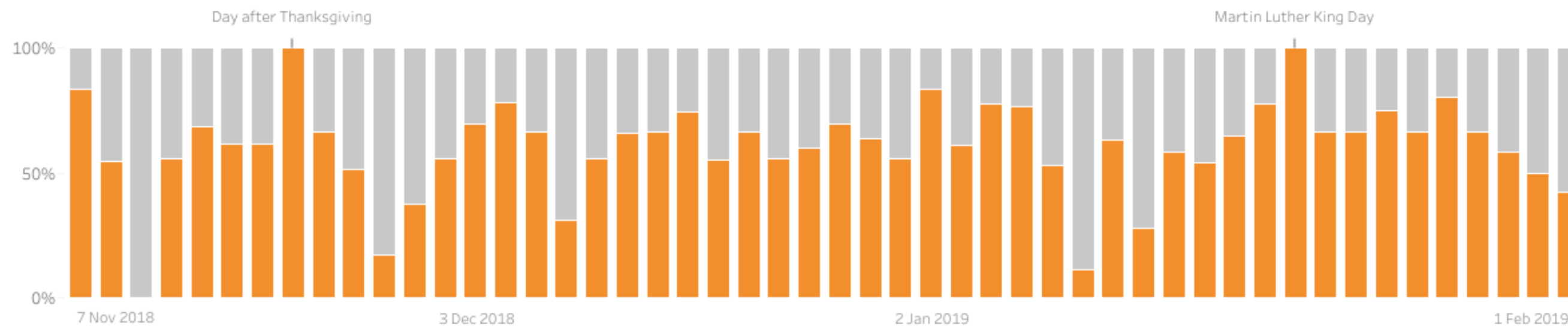
**Data Source**: Axios   ●●●   **Design**: Eva Murray ● @TriMyData

*Source: https://public.tableau.com/profile/eva.murray#!/vizhome/Week7-TrumpTime/TheTrumpDiaries*

# Diverging Bar Charts

**JAMES BOND CANNOT BE...**

Non-British James Bond is opposed by both sides

**REMAIN**
voters

**LEAVE**
voters

Of a non-British nationality

47.0%     64.0%

Female

42.0%     65.0%

Gay

28.0%     52.0%

From an ethnic minority

17.0%     41.0%

Source: YouGov
% of respondents to polls say it is unacceptable for the chracter James Bond to be...

#MakeoverMonday 2020W5
@YanningWang

# Marimekko

*Source: https://public.tableau.com/profile/jonathan.drummey#!/vizhome/marimekko-mosaicplot/MarimekkowGT*
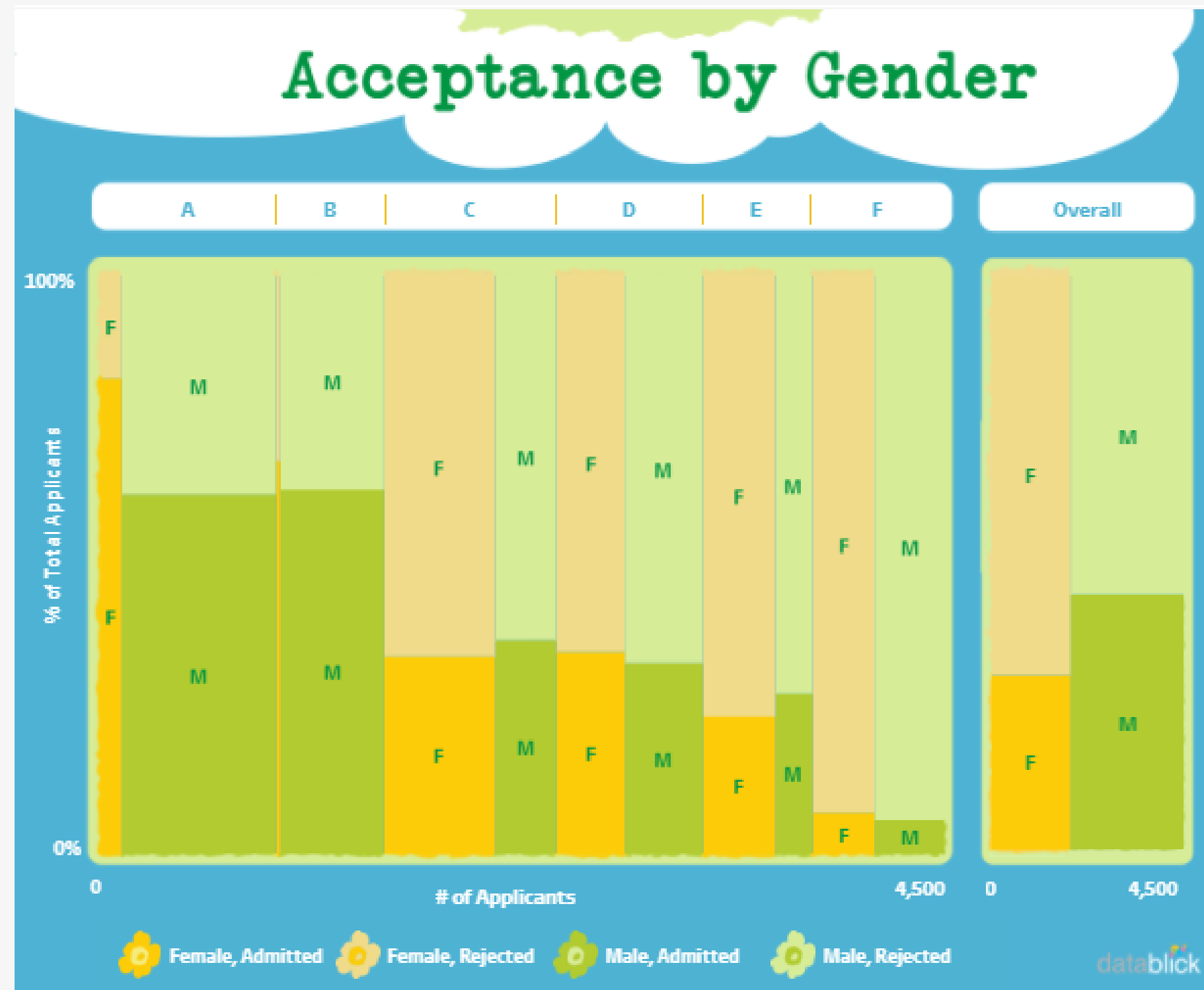
# Isotype
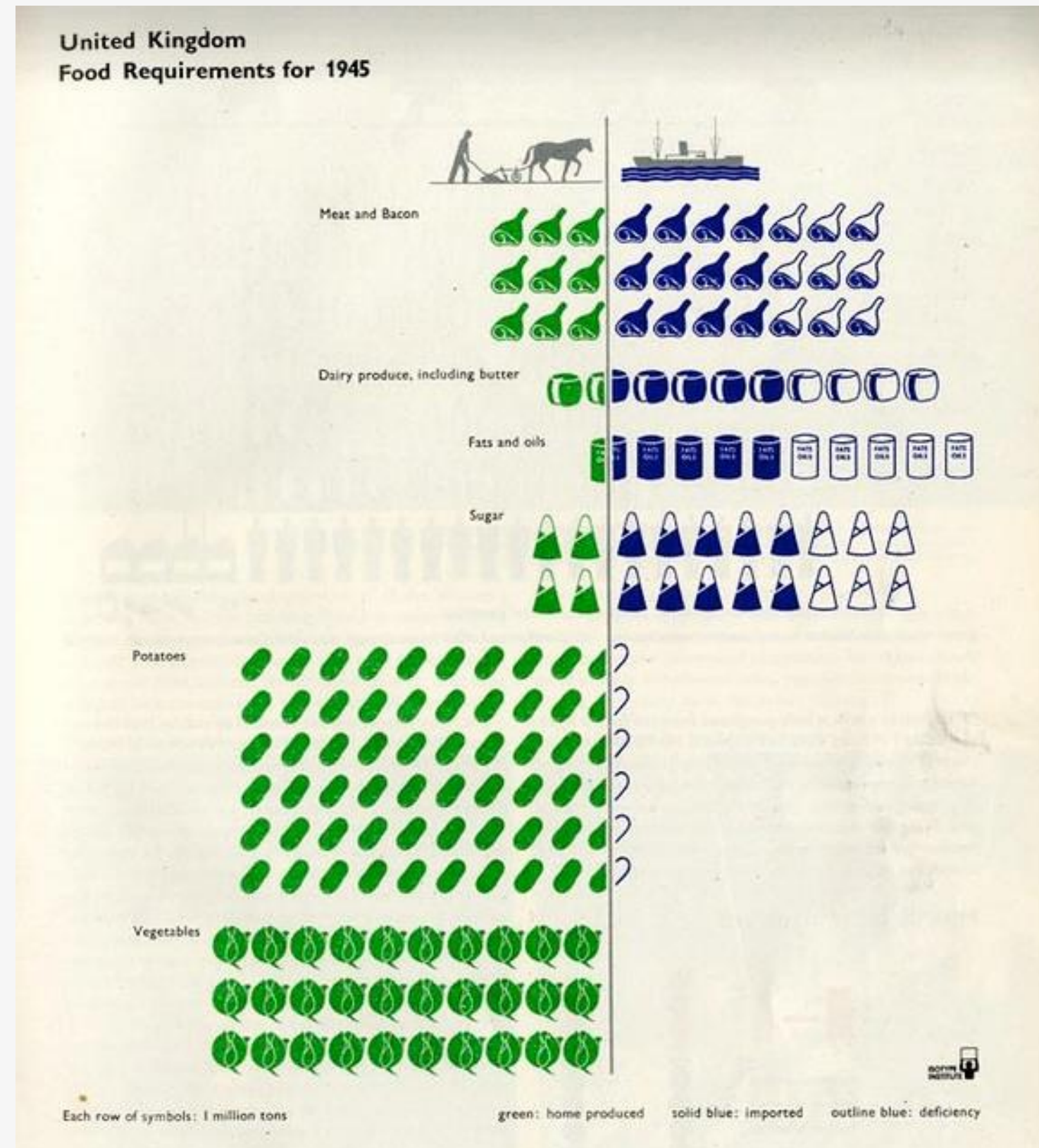


*Author: Otto Neurath*

# *Lollipop*

Low and middle-income countries with high and
rapidly rising needs for oxygen to treat Covid-19 patients

Daily number of large 'J' size oxygen cylinders ('000)

*Source: Financial Times*
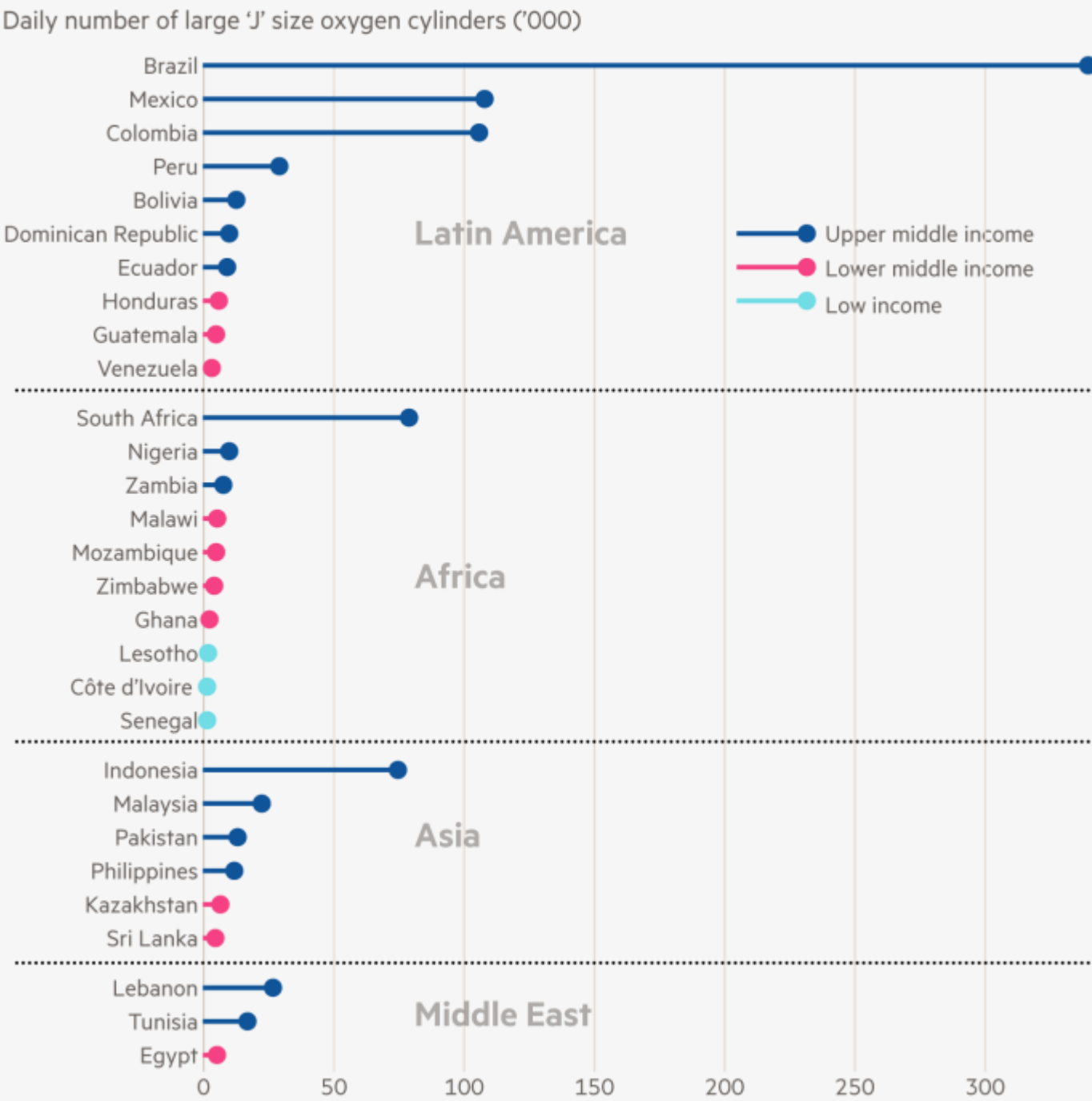
COMPARING
CATEGORIES

# Waffle Chart
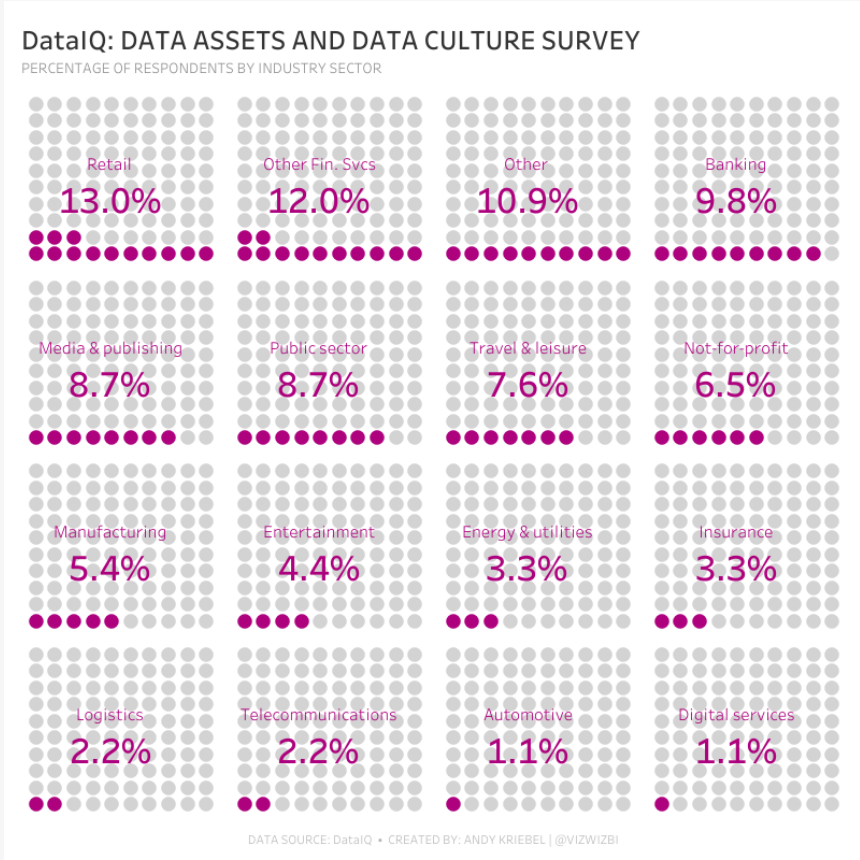
# Dot Plot
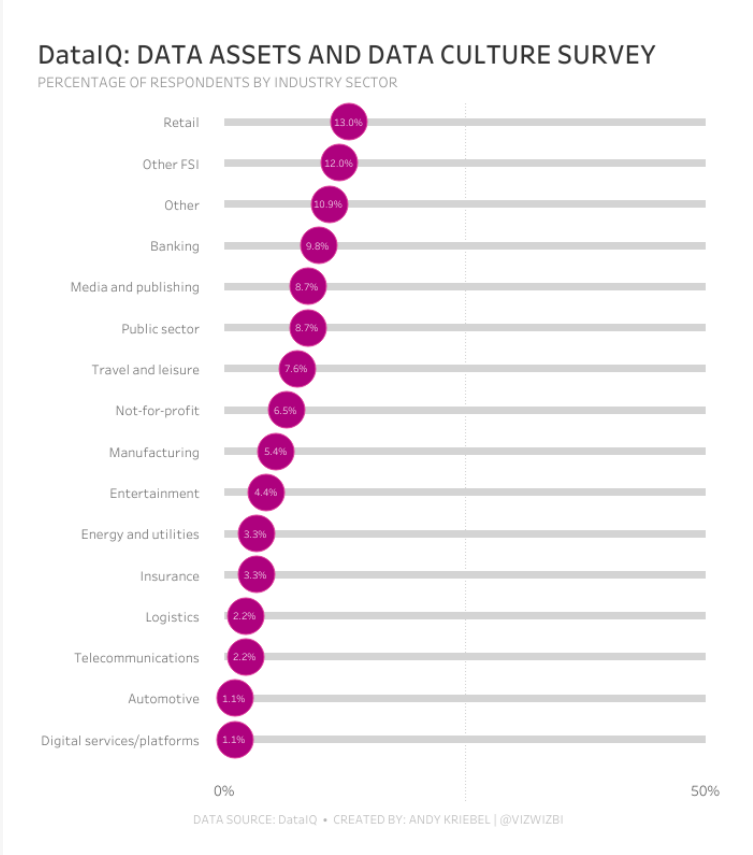
# Rounded Bar Chart

# Bar Chart

Source: https://public.tableau.com/profile/andy.kriebel#!/vizhome/MakeoverMondayWeek41-DataAssetsandDataCultureSurvey/BarChart
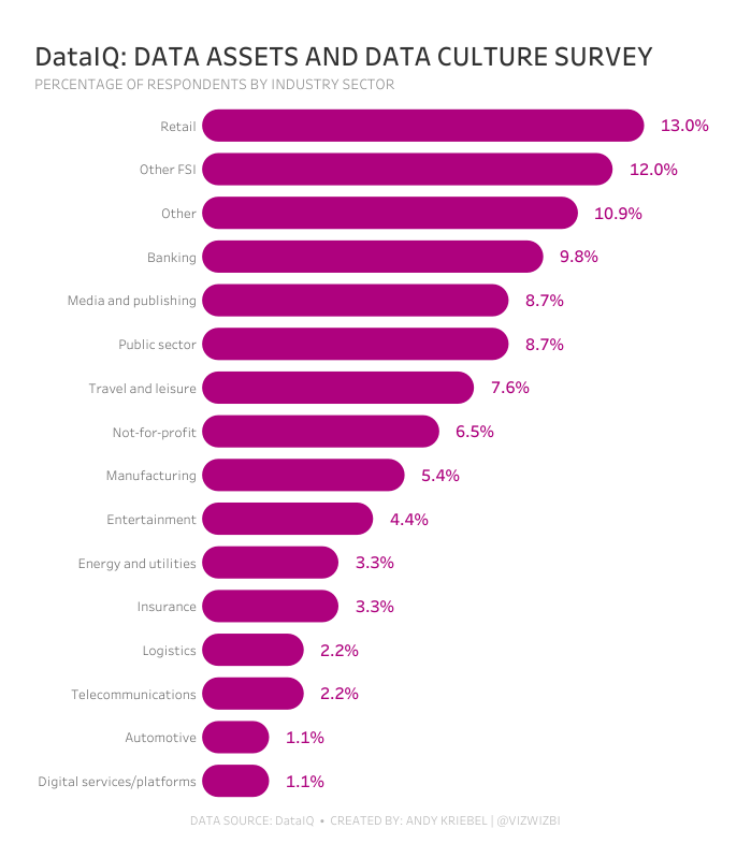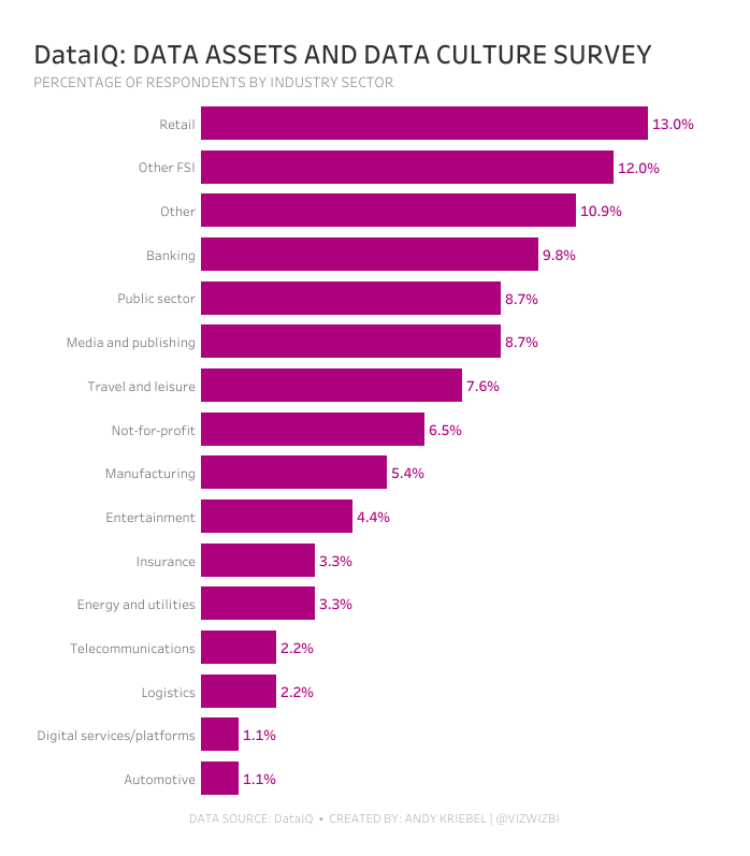
**Figure 5: Overall status of Internal Audit Recommendations by year as of 31 December 2020**[10]



Legend: Implemented | Management Accepts Risk | In progress

| Year | Implemented | Management Accepts Risk | In progress |
|------|-------------|------------------------|-------------|
| 2020 (122 issued) | 24% | | 76% |
| 2019 (119 issued) | 61% | 3% | 37% |
| 2018 (139 issued) | 71% | 7% | 22% |
| 2017 (89 issued) | 85% | 12% | 2% |

→
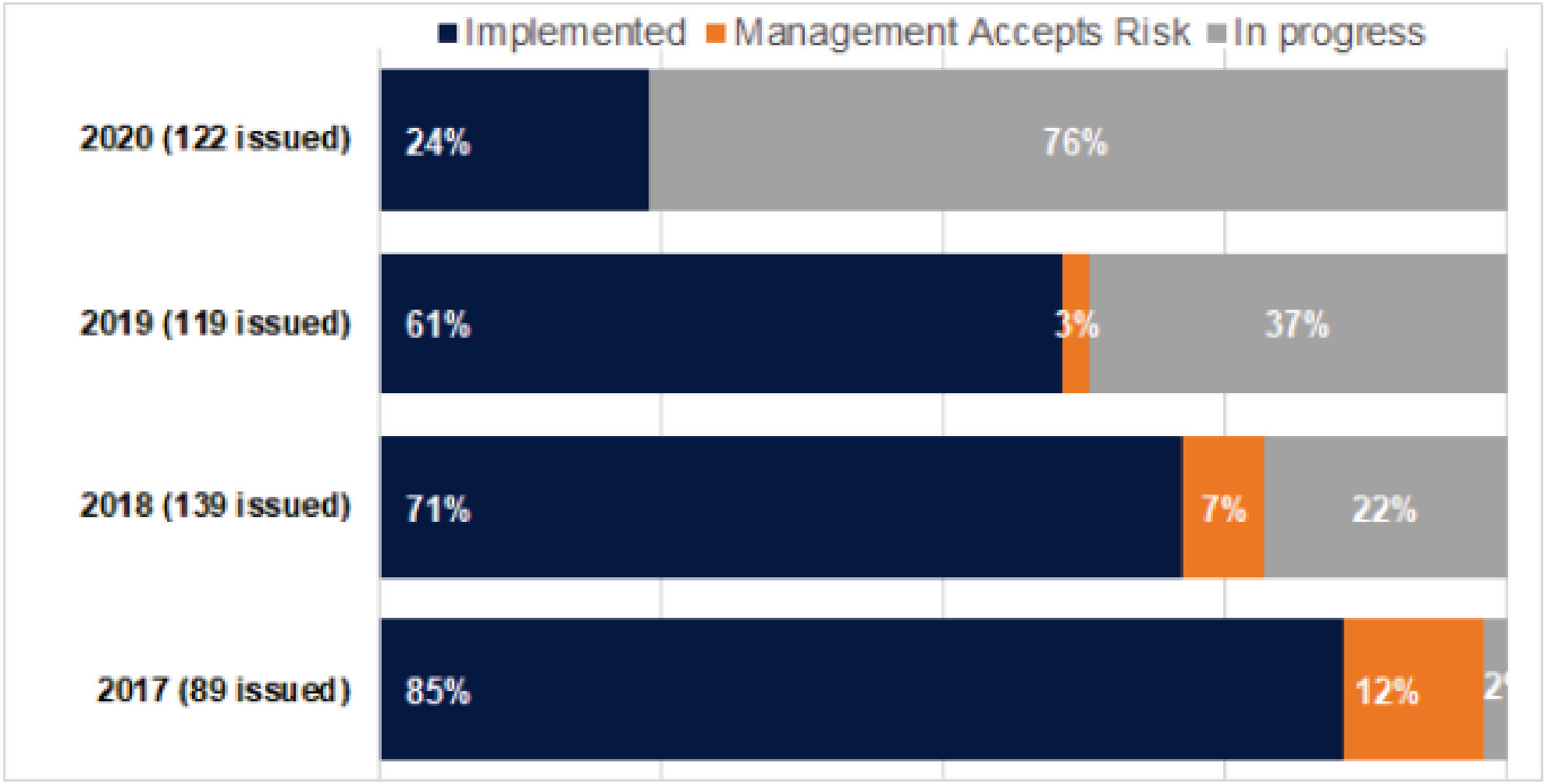
**Stacked column/bar**

**Pie**

**Treemap**
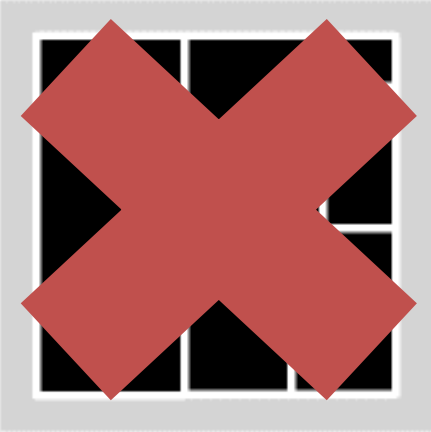
**Arc**

**Marimekko**

**Donut**

**Voronoi**

**Gridplot**
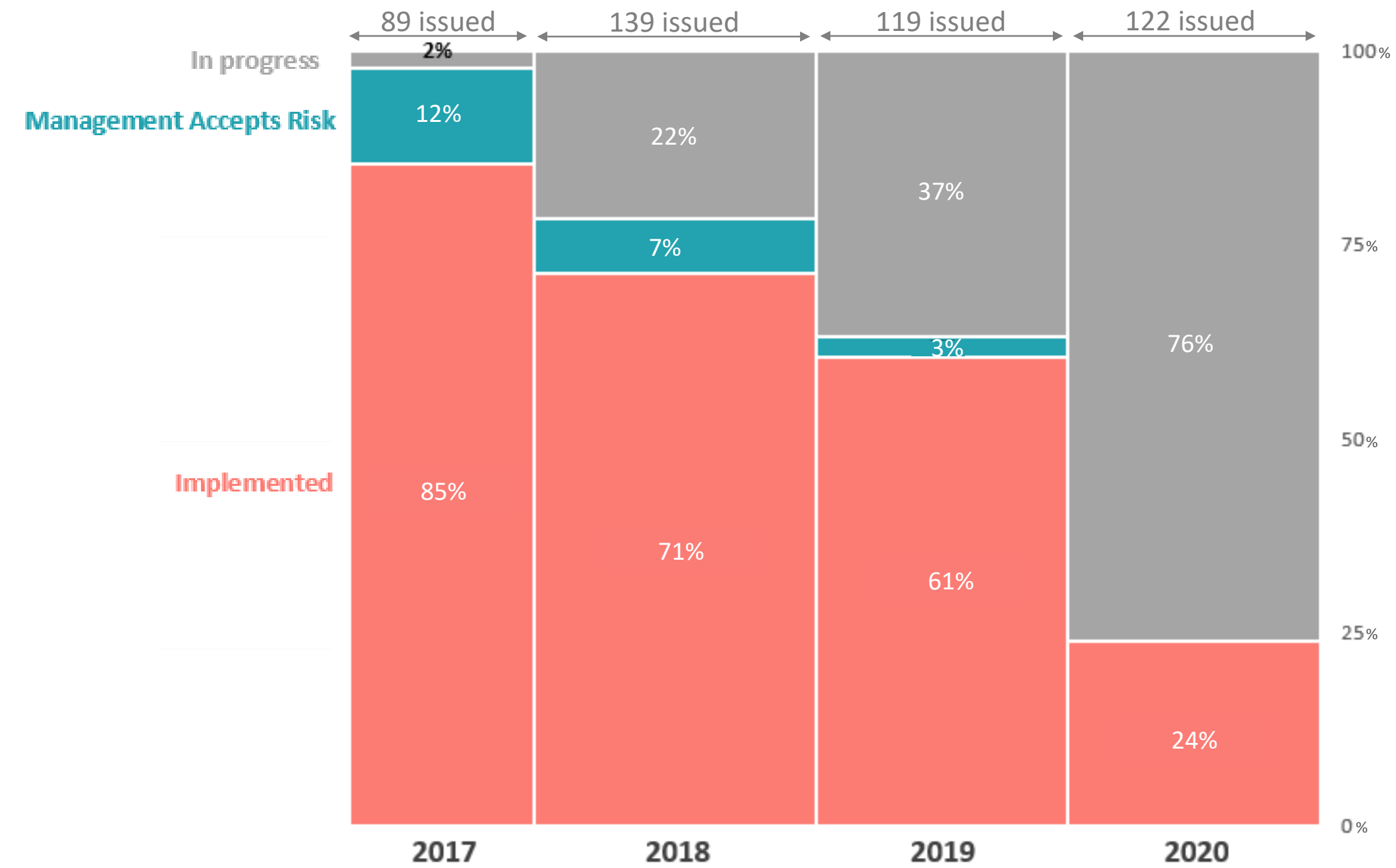
# Break

## 20 minutes
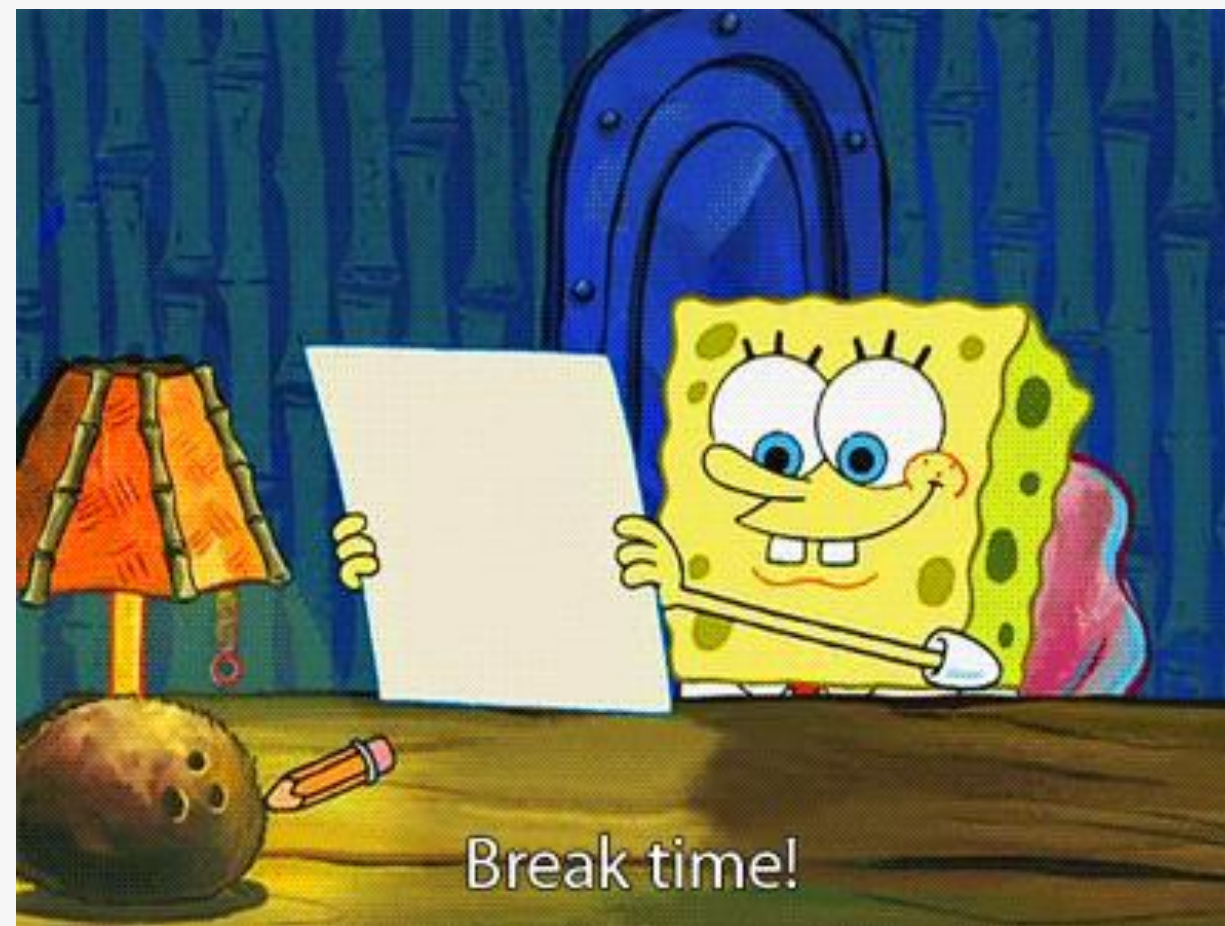
**RELATIONSHIP**

**COMPARING CATEGORIES**
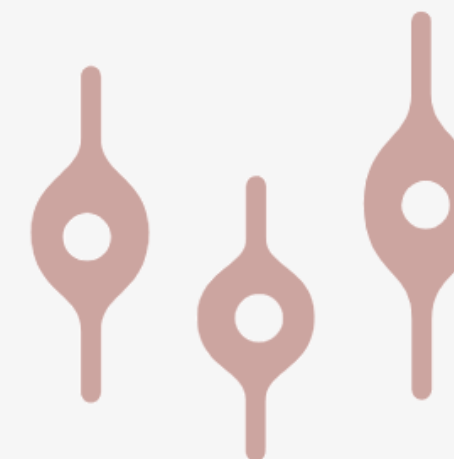
**DISTRIBUTION**

**TIME**

**PART-TO-WHOLE**

**GEOSPATIAL**

# Histogram

**Labor pains**

Australian House of Representatives, probability of Labor and the Greens seat total, 2019, %
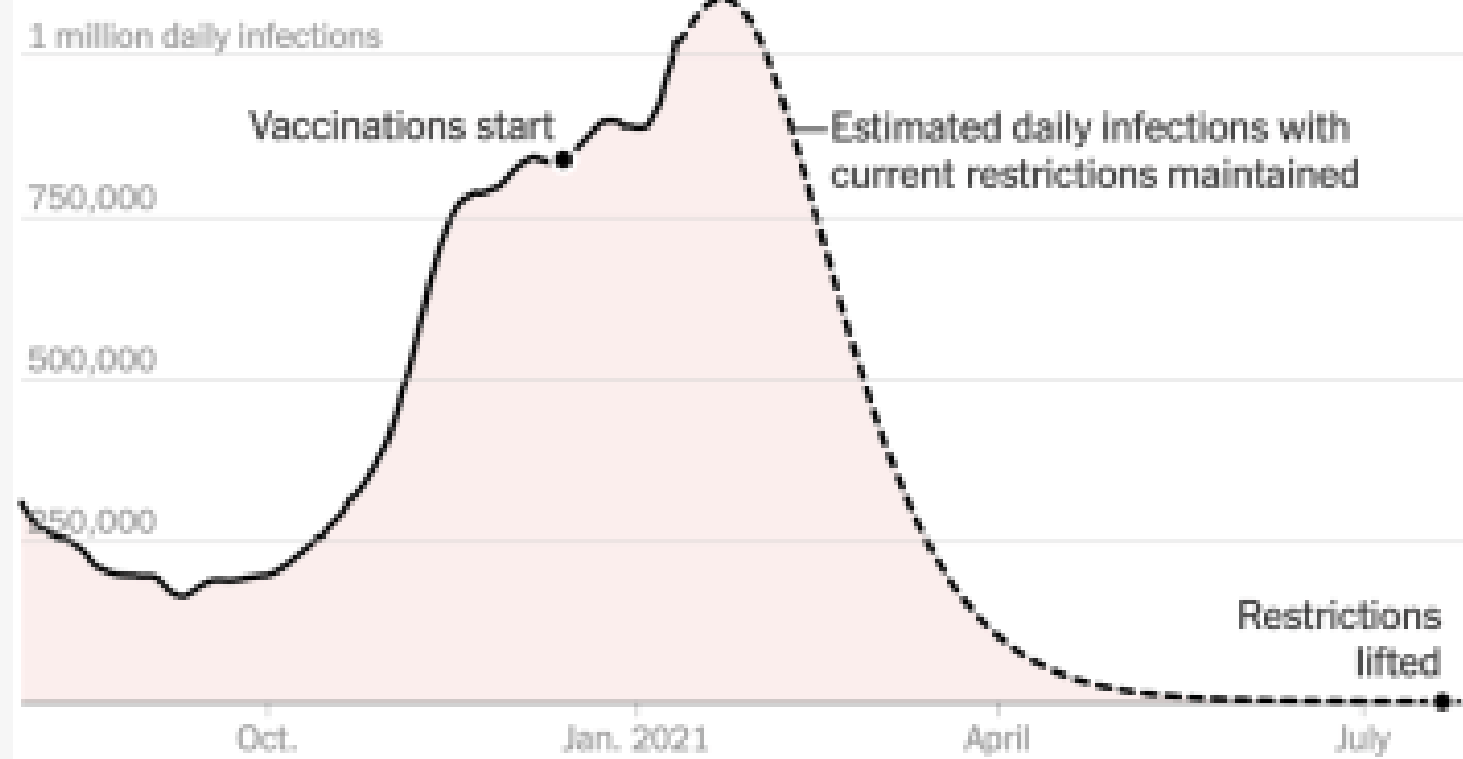
Actual seats won 68*

→ Win House majority

Total seats
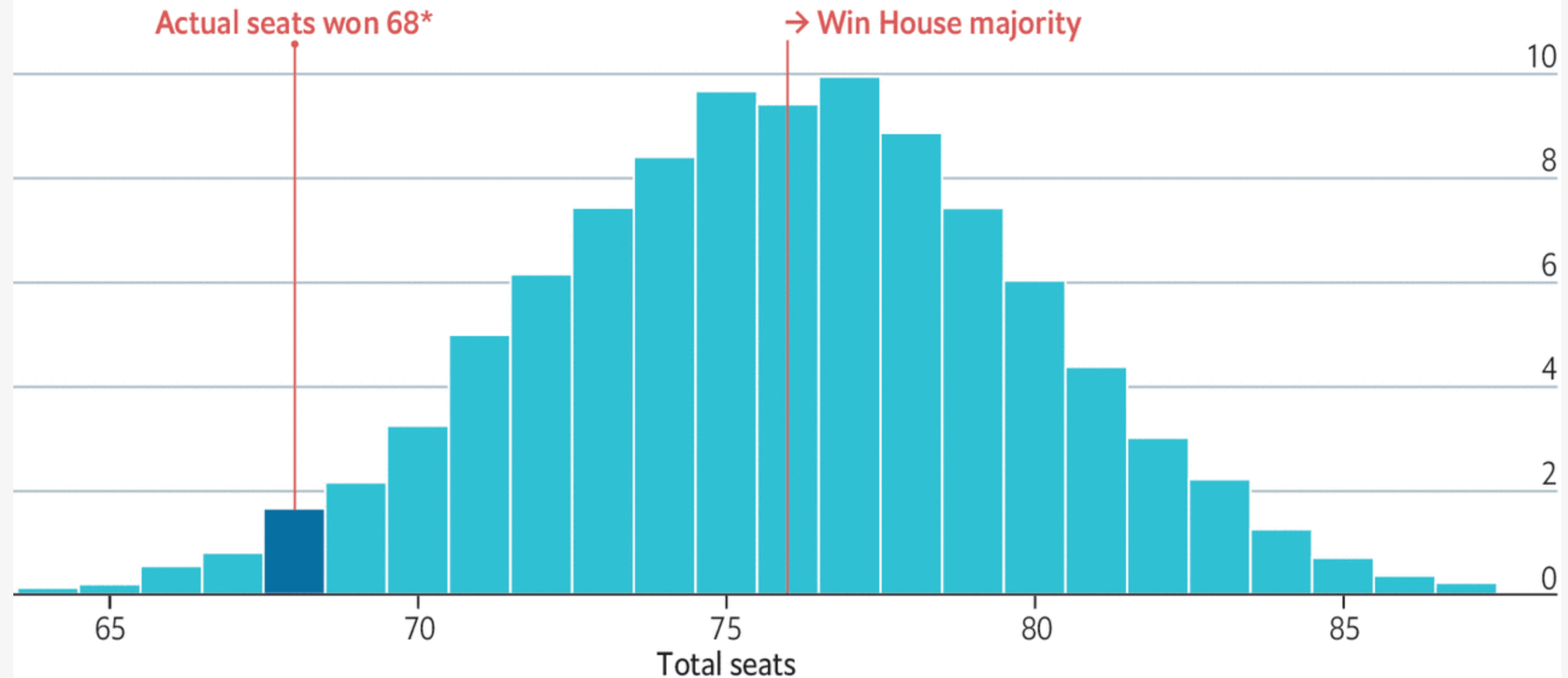
Source: Peter Ellis

*According to ABC projections on May 21st 2019

The Economist

*Source: The Economist*

# Density Plot



*Source: https://www.nytimes.com/interactive/2021/01/24/us/covid-vaccine-rollout.html*

# Pyramid Chart

DISTRIBUTION



US POPULATION PREDICTIONS 2016 - 2060

2016

Press Play
2016
☐ Show history

| Age Ranges | Women | Men |
|---|---|---|
| 80+ | 6,794,547 | 4,093,163 |
| 61-80 | 28,684,938 | 25,030,615 |
| 41-60 | 43,095,395 | 41,629,461 |
| 21-40 | 43,217,096 | 44,191,009 |
| 0-20 | 42,256,591 | 44,134,698 |

Women          Men

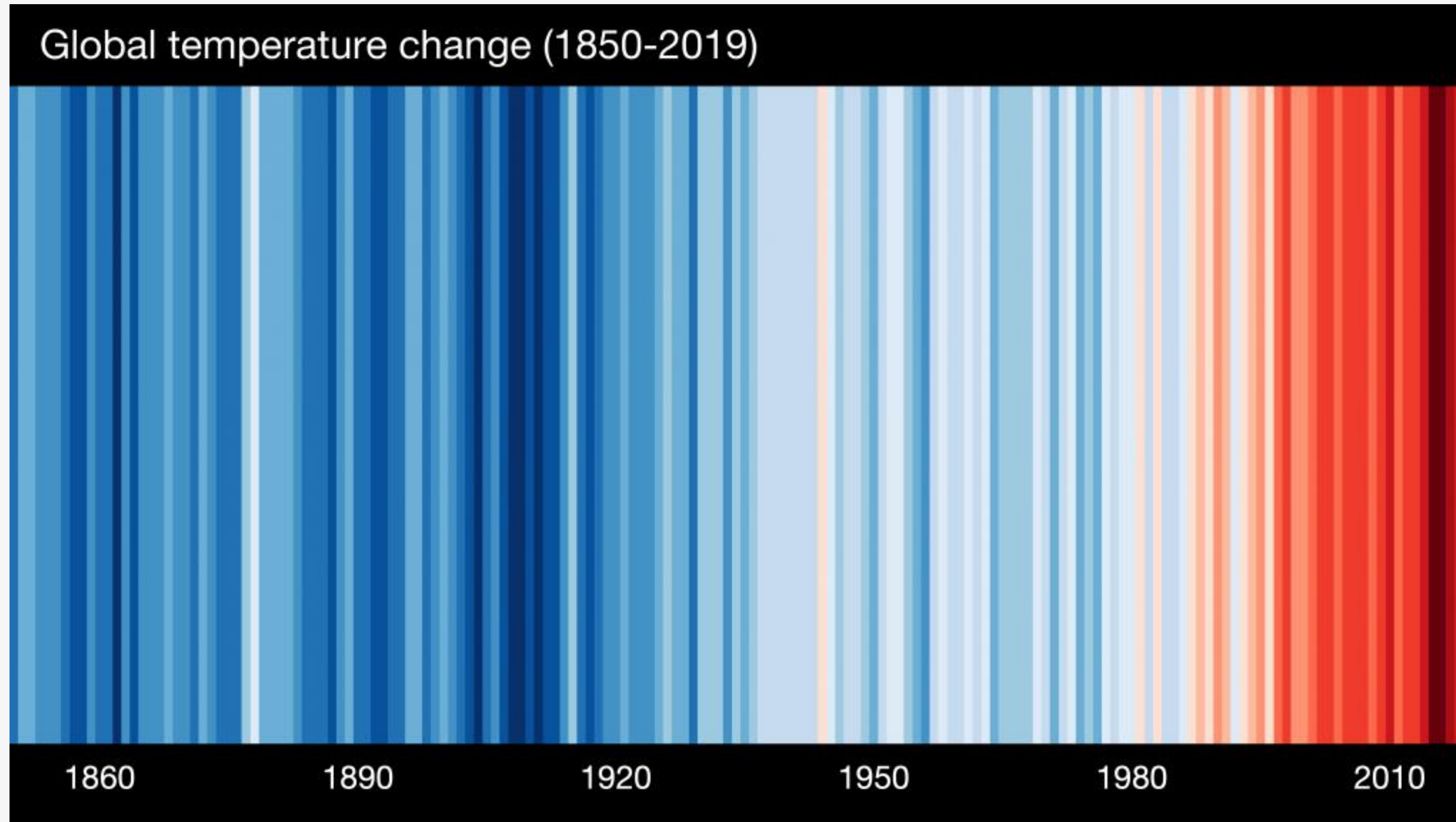Data Source: United States Census Bureau   ●●●   Design: Eva Murray | @TriMyData
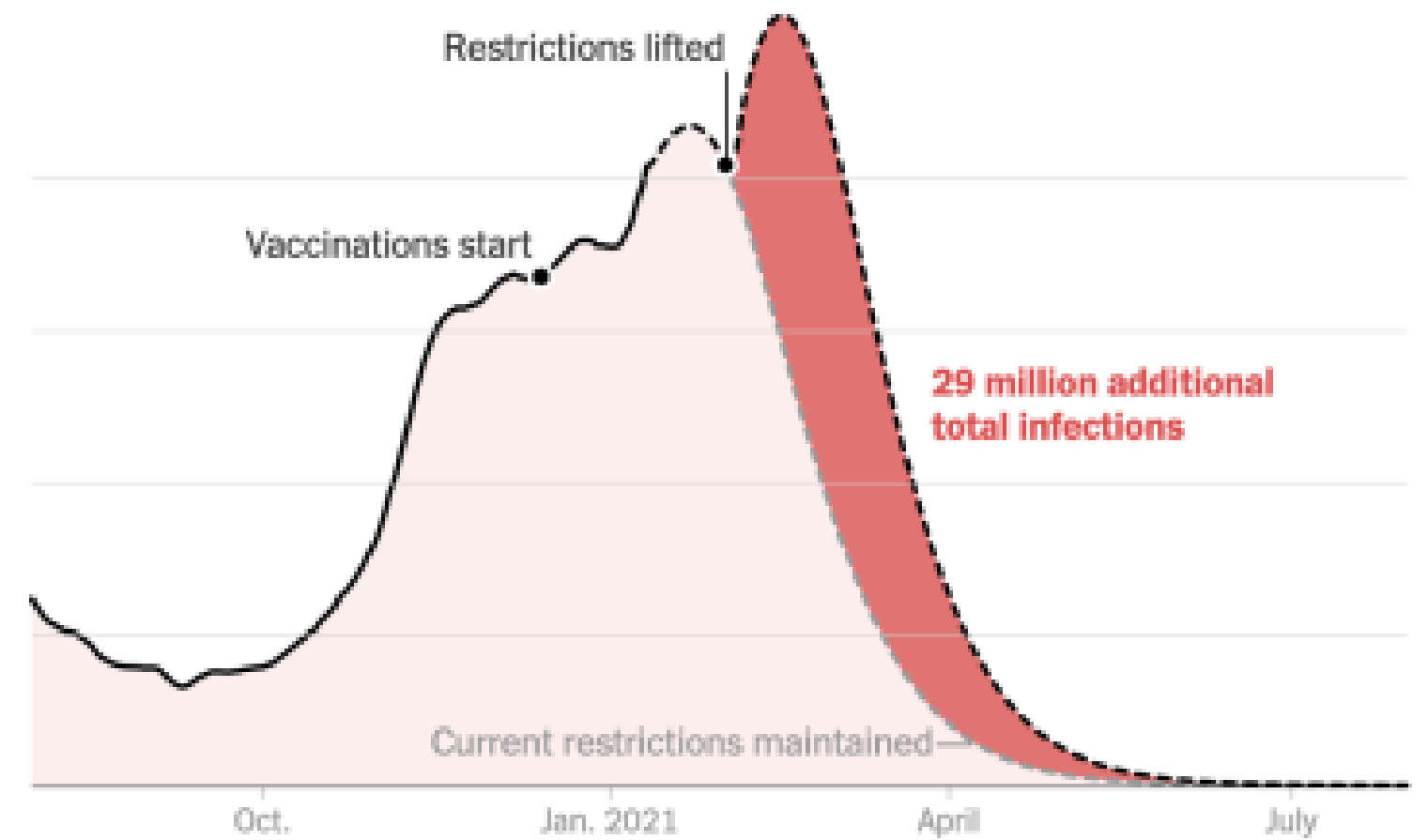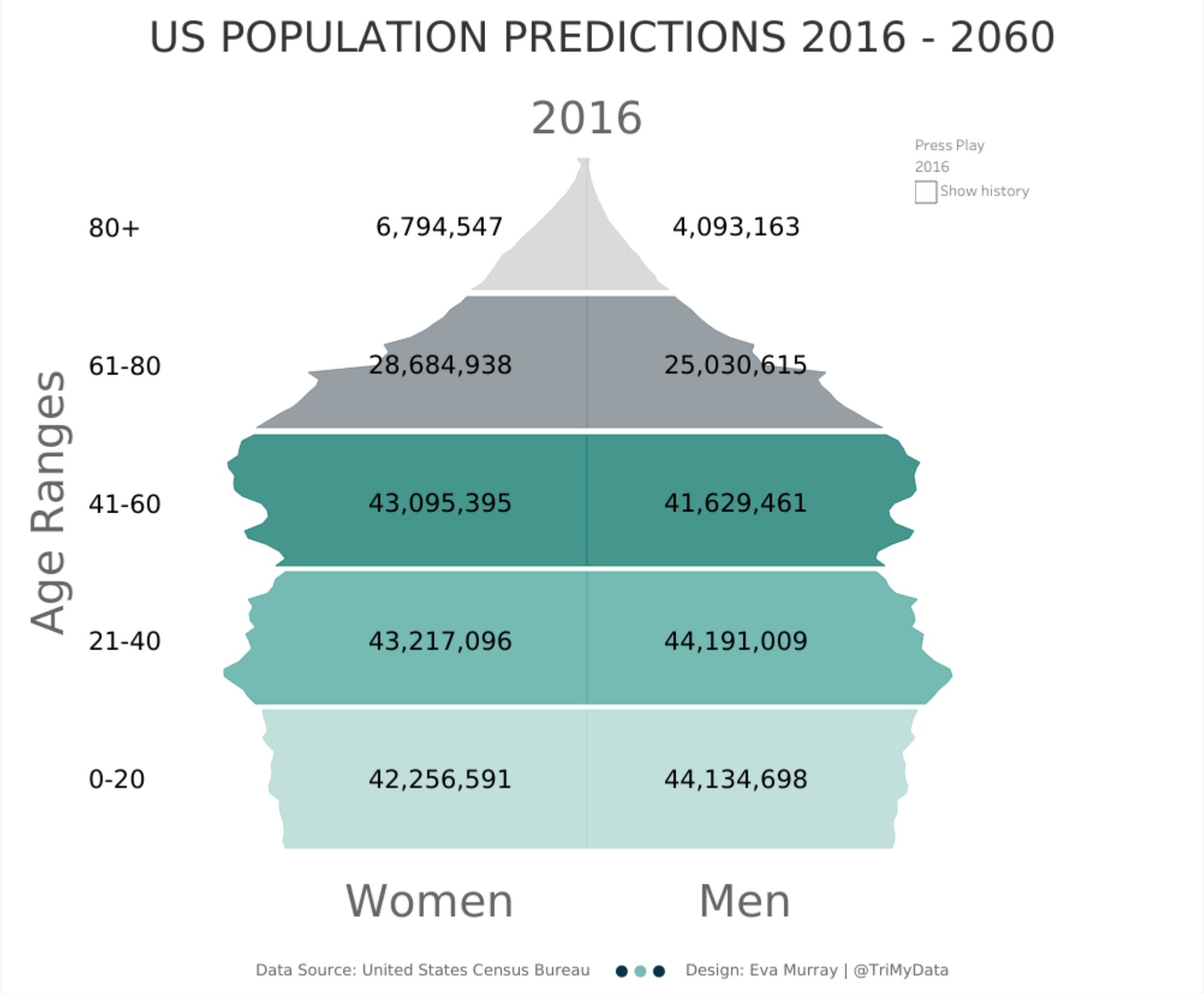
Source: https://public.tableau.com/profile/eva.murray#!/vizhome/PopulationEstimates_7/PopulationPredictions
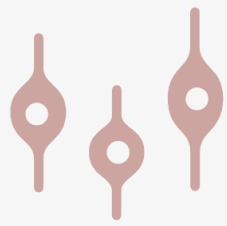
DISTRIBUTION

# *Barcode Plot*



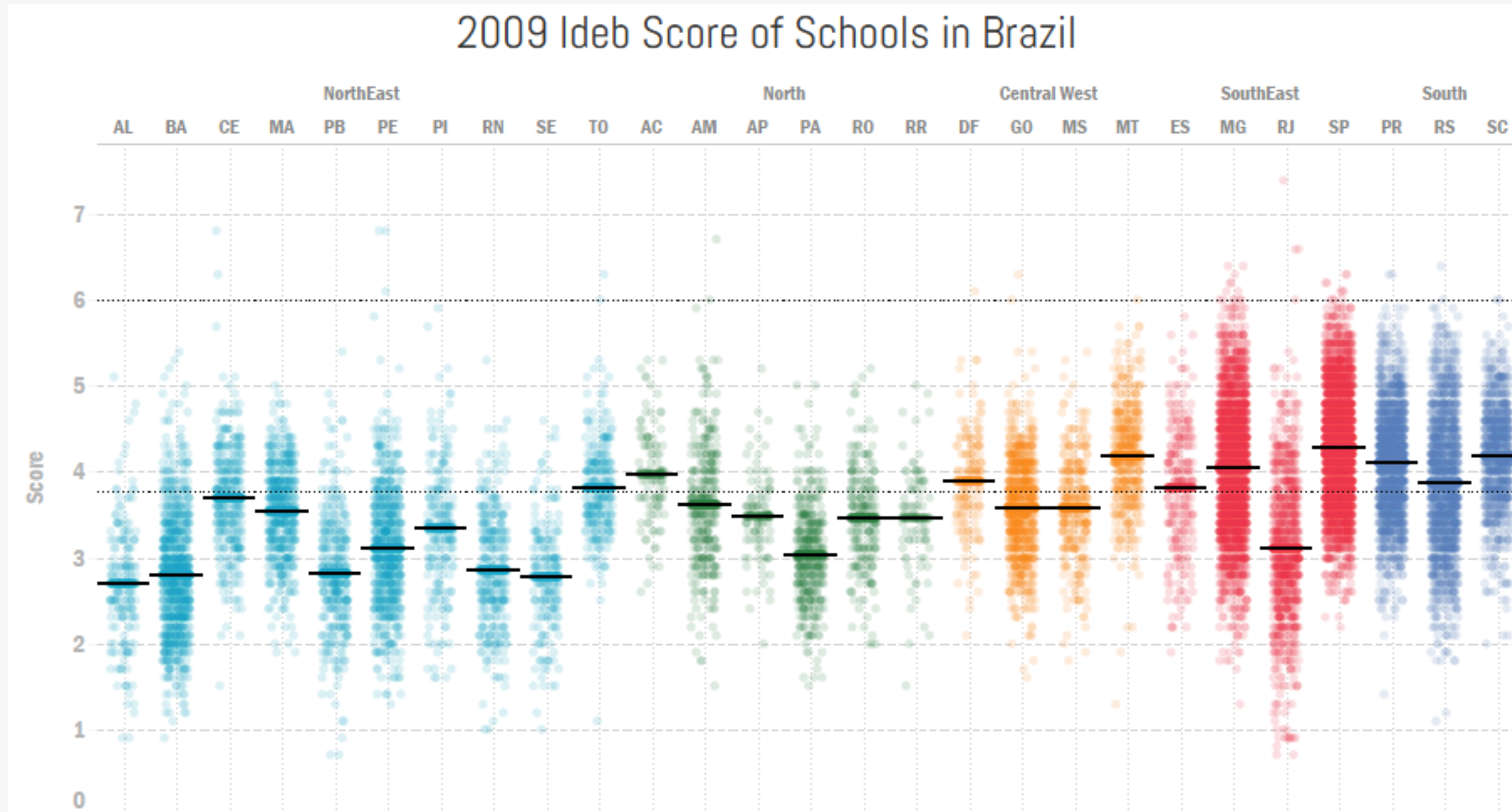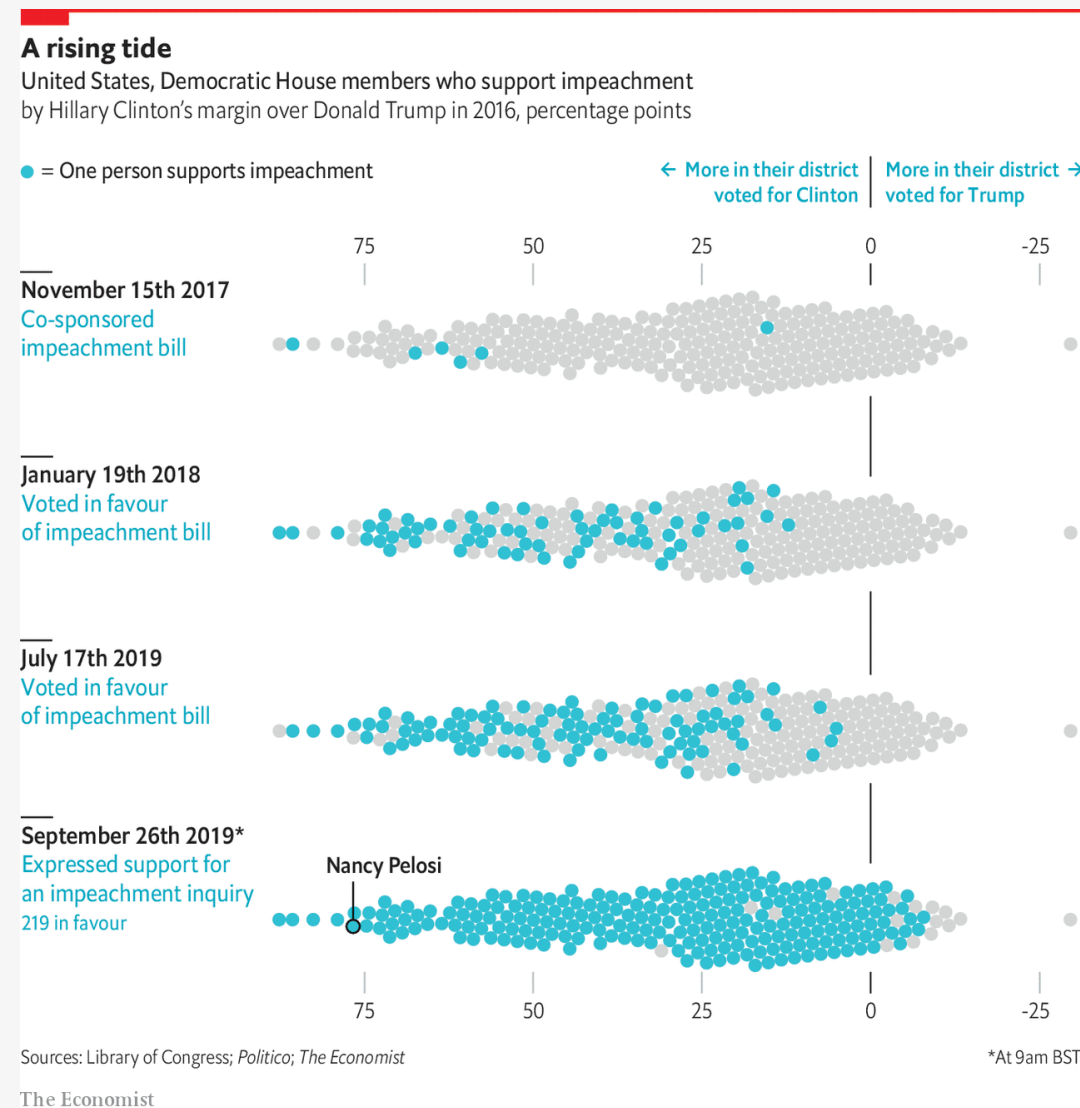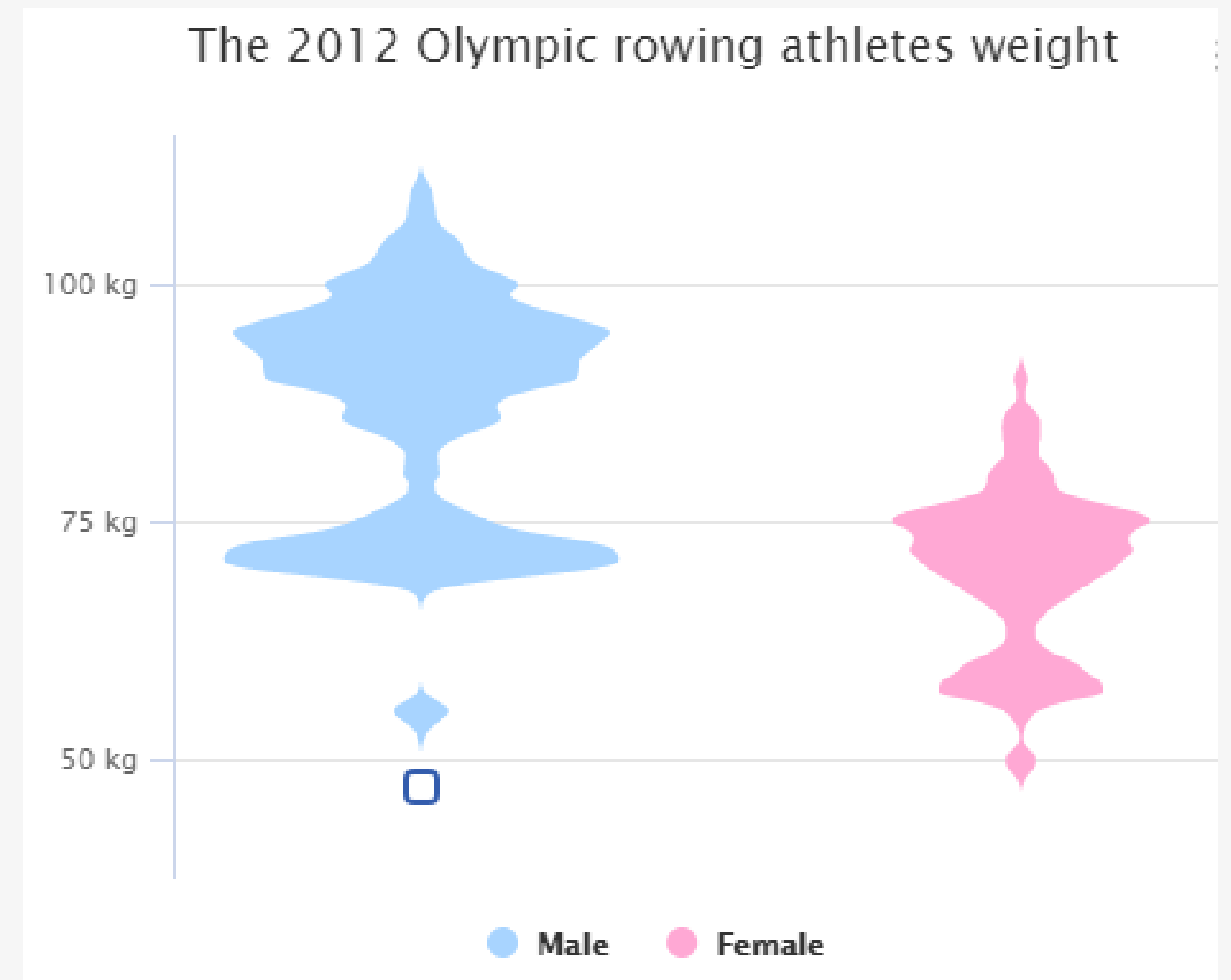Global temperature change (1850-2019)

1860    1890    1920    1950    1980    2010

*Source: https://showyourstripes.info/*

# Jitter Plot

2009 Ideb Score of Schools in Brazil

Source: https://www.doingdata.org/blog/how-to-create-jitter-plot-strip-plot-in-tableau
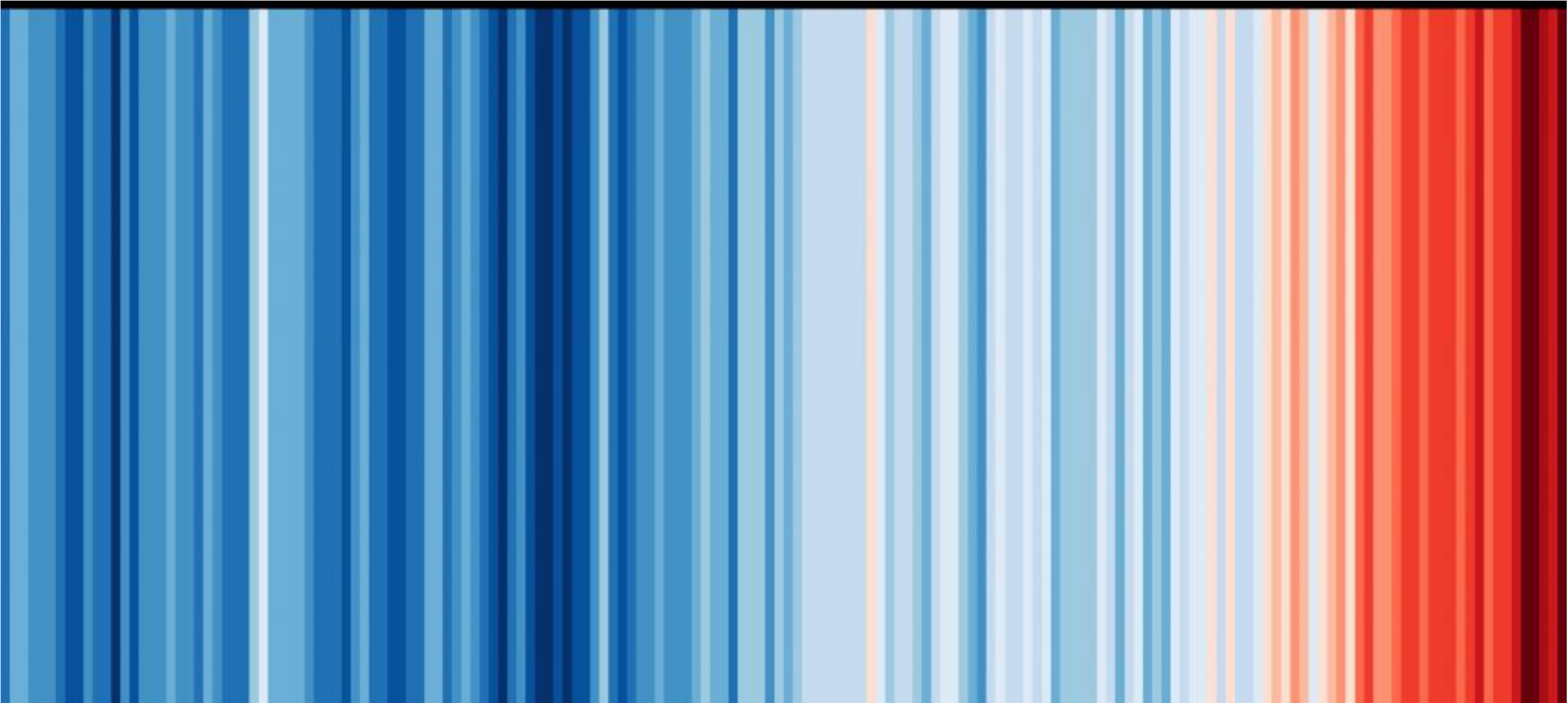
# Beeswarm Plot



Source: The Economist

# Box-and-Whisker Plot



Source: https://flowingdata.com/2013/06/12/what-the-sexes-want-in-speed-dating/

# Violin Plot



Source: https://www.highcharts.com/blog/tutorials/violin-plot-with-highcharts/

# *Exercise*

# America's Aging Population

When will older adults above 65 outnumber childer under 18?

# WHAT DID YOU LEARN?