# Show, don’t tell

## Visual data communication

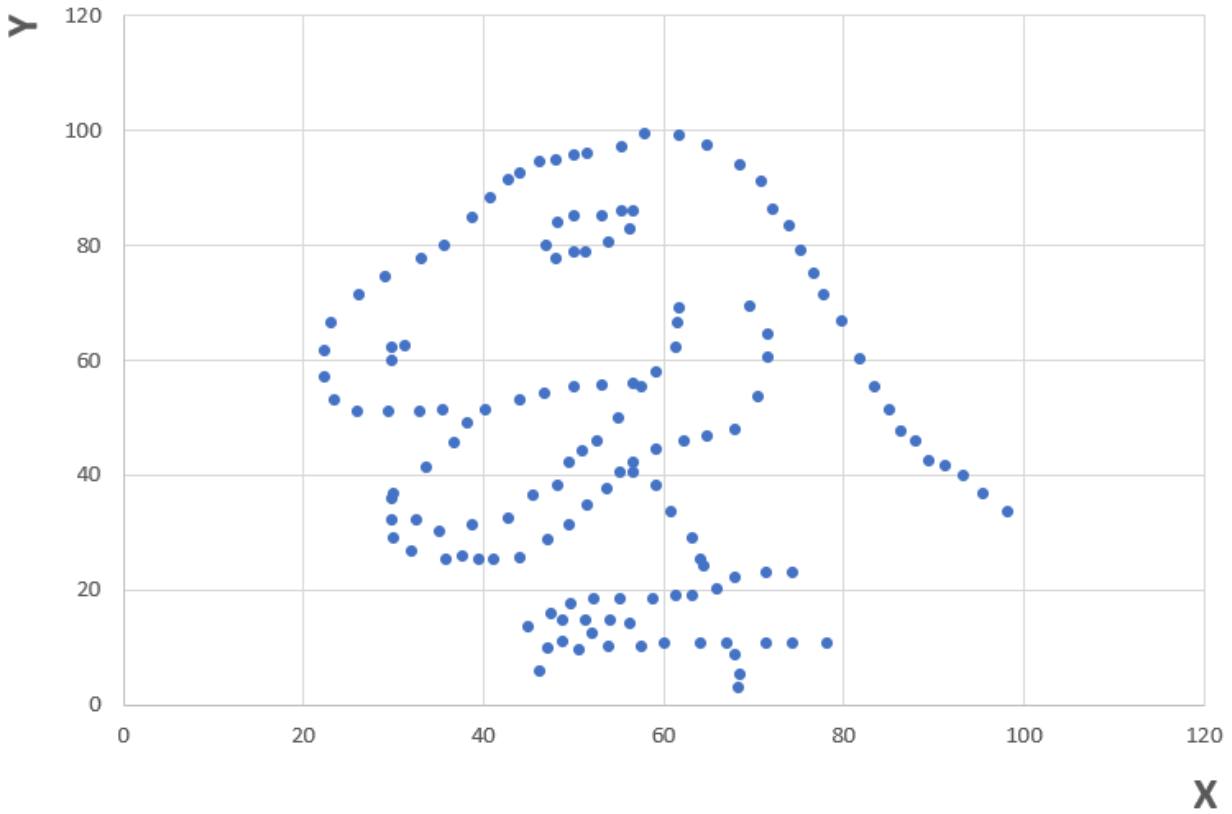
*Koen Van den Eeckhout - Baryon*

## All the slides and all the links:

baryon.be/dataviz-resources

| x | y |
|---|---|
| 55.3846 | 97.1795 |
| 51.5385 | 96.0256 |
| 46.1538 | 94.4872 |
| 42.8205 | 91.4103 |
| 40.7692 | 88.3333 |
| 38.7179 | 84.8718 |
| 35.641 | 79.8718 |
| 33.0769 | 77.5641 |
| 28.9744 | 74.4872 |
| 26.1538 | 71.4103 |
| 23.0769 | 66.4103 |
| 22.3077 | 61.7949 |
| 22.3077 | 57.1795 |
| 23.3333 | 52.9487 |
| 25.8974 | 51.0256 |
| 29.4872 | 51.0256 |
| 32.8205 | 51.0256 |
| 35.3846 | 51.4103 |
| 40.2564 | 51.4103 |
| 44.1026 | 52.9487 |
| 46.6667 | 54.1026 |

```
X Mean:  54.26
Y Mean:  47.83
X SD   :  16.76
Y SD   :  26.93
Corr.  :  -0.06
```




*More info: [autodeskresearch.com/publications/samestats](autodeskresearch.com/publications/samestats)*

# Why visual data communication?

**INFORMATION DENSITY**

better at summarizing large amounts of information

# Introductions

**2004 - 09**
Engineering physics

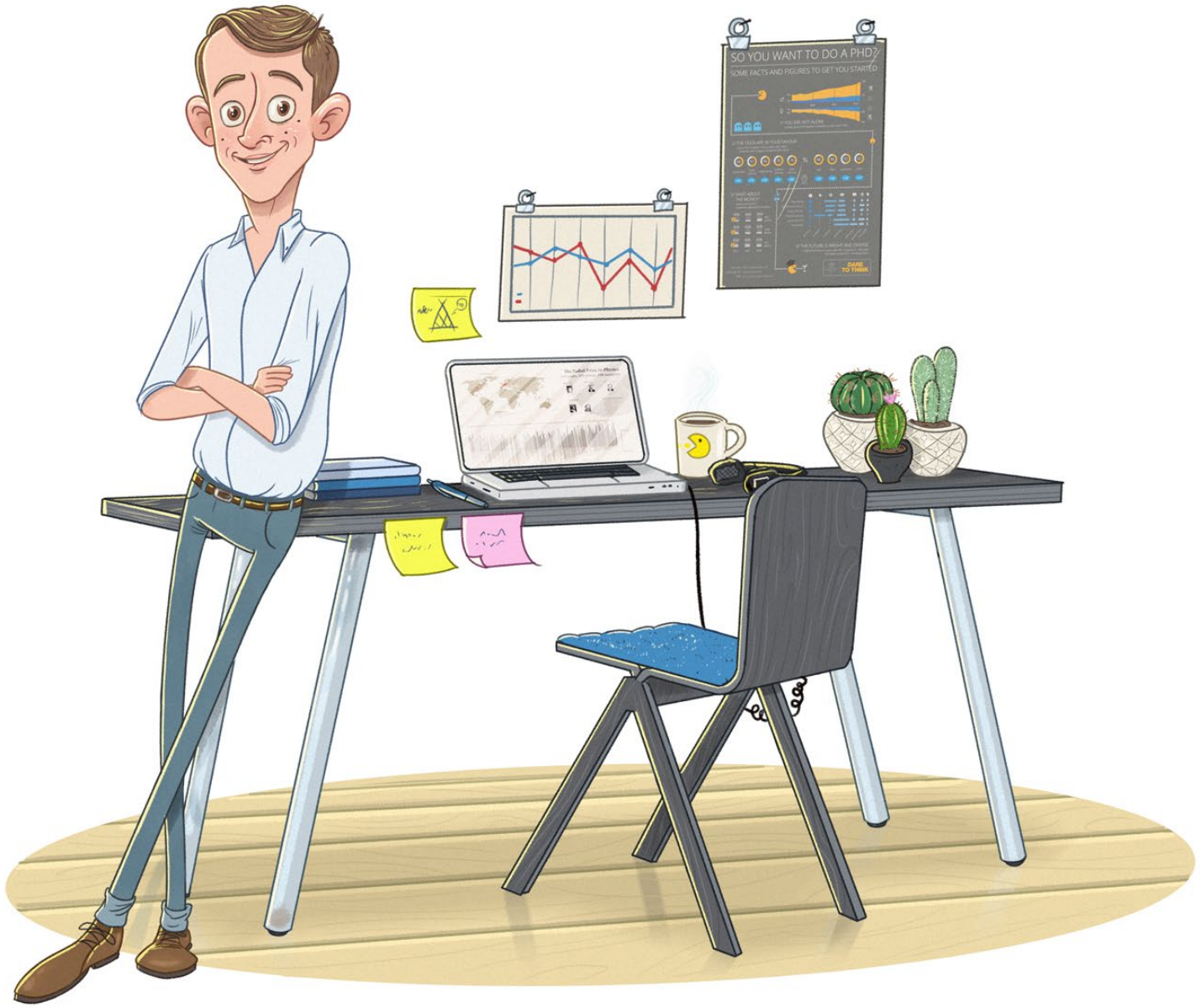
**2009 - 13**
PhD in physics

**2013 - 15**
Post-doctoral researcher

**2015 - 18**
Consultant grants & incentives
Founded Baryon

**2019 - now**
Full-time information designer
at Baryon

koen@baryon.be



| | |
|---|---|
| **Introduction** | Why visual data communication? |
| **Data visualization principles** | Clear, correct, and attractive<br>Signal-to-noise ratio |
| **Guidelines and approaches** | Choosing the right chart<br>Case studies |
| **Telling a story** | Objective versus subjective data visuals<br>Q&A |

# Why visual data communication?

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# Why visual data communication?

**ATTRACTIVE**

better at catching the reader's attention

**INFORMATION DENSITY**

better at summarizing large amounts of information

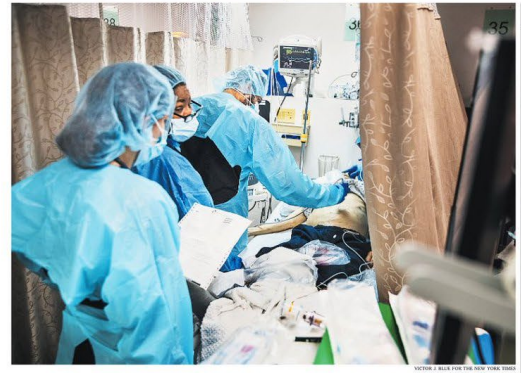
"All the News That's Fit to Print"

# The New York Times

**Late Edition**
**Today,** clouds giving way to some sunshine, morning rain, high 63. **Tonight,** clear early, increasing clouds late, low 44. **Tomorrow,** rain, high 52. Weather map appears on Page B16.

VOL. CLXIX . . . No. 58,645 © 2020 The New York Times Company NEW YORK, FRIDAY, MARCH 27, 2020 $3.00

# JOB LOSSES SOAR; U.S. VIRUS CASES TOP WORLD



VICTOR J. BLUE FOR THE NEW YORK TIMES

Since the coronavirus descended on Brooklyn Hospital Center three weeks ago, the staff has handled over 800 potential cases.

## Under Trump, Unfilled Posts Hinder Action

By JENNIFER STEINHAUER and ZOLAN KANNO-YOUNGS

WASHINGTON — Of the 75 senior positions at the Department of Homeland Security, 20 are either vacant or filled by acting officials, including Chad F. Wolf, the acting secretary who recently was unable to tell a Senate committee how many respirators and protective face masks were available in the United States.

The National Park Service, which like many federal agencies is full of vacancies in key posts, tried this week to fill the job of a director for the national capital region after hordes of visitors flocked to see the cherry blossoms near the National Mall, creating a potential public health hazard as the coronavirus continues to spread.

At the Department of Veterans Affairs, workers are scrambling to order medical supplies on Amazon after its leaders, lacking experience in disaster responses, failed to prepare for the onslaught of patients at its medical centers.

Ever since President Trump came into office, a record high turnover and unfilled jobs have emptied offices across wide sections of the federal bureaucracy. Now, current and former administration officials and disaster experts say the coronavirus has exposed those failings as never be-

Continued on Page A11

## Online Class With No Way To Get There

By NIKITA STEWART

Allia Phillips was excited about picking up an iPad from her school in Harlem last week. She did not want to miss any classes and hoped to land on the fourth-grade honor roll again.

On Monday, the first day that New York City public schools began remote learning, the 10-year-old placed her iPad on a tray she set up over her pillow on a twin bed in a studio that she shares with her mother and grandmother inside a homeless shelter on the Upper West Side.

And then, Allia saw nothing.

"I went downstairs to find out that they don't have any internet," said Kasha Phillips-Lewis, Allia's mother. "You're screwing up my daughter's education. You want to screw me up? Fine. But not my daughter's education."

The Department of Education, which runs the largest school system in the country with more than 1.1 million students, began attempting to teach all students through remote learning this week because schools were closed to slow the spread of the coronavirus.

Shuttering the vast system, which includes 1,800 schools, was a serious challenge for the city, and the large-scale, indefinite school closures are uncharted territory, altering the lives and rou-

Continued on Page A16

## Courage at a Brooklyn Hospital, At the Front of an Invisible War

### With Supplies Waning, Workers Soldier On

By SHERI FINK

It was not even 9 in the morning and Dr. Sylvie de Souza's green N95 mask, which was supposed to form a seal against her face, was already askew.

In freezing rain on Monday, she trudged in clogs between the emergency department she chairs at the Brooklyn Hospital Center and a tent outside, keeping a sharp eye on the trainee doctors, nurses and other staff members who would screen nearly 100 walk-in patients for the coronavirus that day.

Inside her E.R., more than a dozen people showing signs of infection waited for evaluation in an area used just a few weeks ago for stitches and casts. Another dozen lay on gurneys arranged one in front of the next, like a New York City car park. One man on a ventilator was waiting for space in the intensive care unit.

Minutes before paramedics wheeled in a heart attack patient, Dr. de Souza pointed to beds reserved for serious emergencies, separated by a newly constructed wall from the suspected virus cases. "This is our safe area," she told a reporter. Then she corrected herself: "This is thought to be safe." There was really no way

Continued on Page A14

## No Crowd, but I'll Take You Out to the Ballgame

### A Fan Writes a Fantasy for Opening Day

By DAN BARRY

Professional baseball greeted a new season this afternoon with an Opening Day game for the ages, an extra-inning masterpiece that vividly unfolded on the sun-dappled field of the imagination. The crack of the bat could almost be heard, the blur of white almost seen, the communal joy nearly felt.

From the moment the first batter tipped his helmet — and a bird flew out — to the walk-off home run by a faltering pinch-hitter, this 11-inning affair redefined what constitutes a perfect game. No one cared about the outcome; the distraction was reward enough.

Don't misunderstand: This game between the New York Gothams and the Cincinnati Greens mattered, but in ineffable ways beyond the columns of wins and losses. It mattered so much that complaints about baseball's slow pace yielded to the universal wish that this game would last forever.

"I could've played into the night," said the redeemed Gothams left fielder Sammy Sosa, who missed part of last season after sneezing so hard that he strained a ligament in his back. "I didn't

Continued on Page A13

## New Data Shows Staggering Toll of Outbreak

*This article is by* ***Ben Casselman, Patricia Cohen*** *and* ***Tiffany Hsu.***

More than three million people filed for unemployment benefits last week, sending a collective shudder throughout the economy that is unlike anything Americans have experienced.

The alarming numbers, in a report released by the Labor Department on Thursday, provide some of the first hard data on the economic toll of the coronavirus pandemic, which has shut down whole swaths of American life faster than government statistics can keep track.

Just three weeks ago, barely 200,000 people applied for jobless benefits, a historically low number. In the half-century that the government has tracked applications, the worst week ever, with 695,000 so-called initial claims, had been in 1982.

Thursday's figure of nearly 3.3 million set a grim record. "A large part of the economy just collapsed," said Ben Herzon, executive director of IHS Markit, a business data and analytics firm.

The numbers provided only the first hint of the economic cataclysm in progress. Even comparatively optimistic forecasters expect millions more lost jobs, and with them foreclosures, evictions and bankruptcies. Thousands of businesses have closed in response to the pandemic, and many will never reopen. Some economists say the decline in gross domestic product this year could rival the worst years of the Great Depression.

And there was fresh evidence on Thursday of the relentless course of the virus itself. Cases in the United States now exceed 80,000, the most of any nation, even China and Italy, according to a New York Times database. More than 1,000 deaths across the country have been linked to the virus.

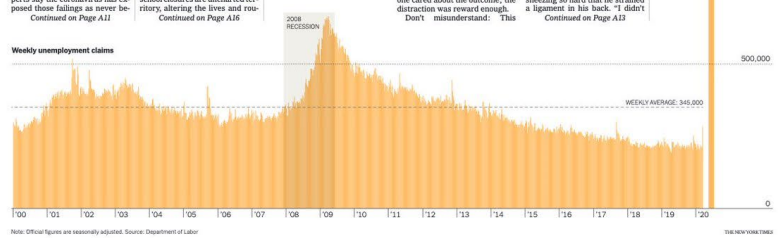
At least 160 million people na-

Continued on Page A17

### Labeling Regions by Risk

President Trump told governors he planned to classify counties according to the danger of coronavirus infection. Page A11.

**Nearly 3.3 million** unemployment claims were filed last week, a record number.




Note: Official figures are seasonally adjusted. Source: Department of Labor

THE NEW YORK TIMES

BUSINESS B1-9

**Armed With Sewing Machines**
With hospitals desperate for masks, people are pulling out their sewing machines to fill the void. PAGE B4

**A Gusher Can't Be Contained**
A chaotic mismatch between supply and demand for oil means the world is running out of places to store it. PAGE B9

INTERNATIONAL A18-20

**Maduro Is Indicted in U.S.**
Federal prosecutors accused the Venezuelan president, whom the U.S. no longer recognizes, of participating in a narco-terrorism conspiracy. PAGE A20

**Netanyahu Rival Relents**
The Israeli prime minister was set to maintain power after his rival reversed course, citing the pandemic. PAGE A19

**Brushing Aside a Slaughter**
Russia and China, which often revel in grudges against other countries, are employing selective memory to address a massacre that occurred on their border in 1900. PAGE A18

NATIONAL A21-23

**New Focus on Health System**
The pandemic gives added urgency to a central issue that was already a main talking point for Joseph R. Biden Jr. and other Democrats. PAGE A21

**Starting Over on Foster Care**
A lawsuit led New Mexico to remake its failing system into one advocates hope will serve as a national model. PAGE A22

SPORTSFRIDAY B11-15

**Slow to Embrace a Delay**
Athletes question why U.S. Olympic leaders took so long to join calls to postpone the Tokyo Games. PAGE B11

WEEKEND ARTS C1-16

**For Pint-Size Paleontologists**
Like dinosaurs? Have crayons? Take a peek at two pages reprinted from The New York Times for Kids. PAGE C6

**It's Virtually Perfect**
Donald Judd's installation, below, at the Gagosian Gallery is impressive, in person or, for now, online. PAGE C13

OBITUARIES A24-25

**Chronicler of U.S. History**
Richard Reeves's books on Nixon, Clinton and others could be as unsparing as his column. He was 83. PAGE A24

**Globetrotters' Dean of Dribble**
Fred "Curly" Neal dazzled fans with his ball-handling wizardry in more than 6,000 games. He was 77. PAGE A25

EDITORIAL, OP-ED A26-27

**Paul Krugman** PAGE A27

# Why visual data communication?

**ATTRACTIVE**

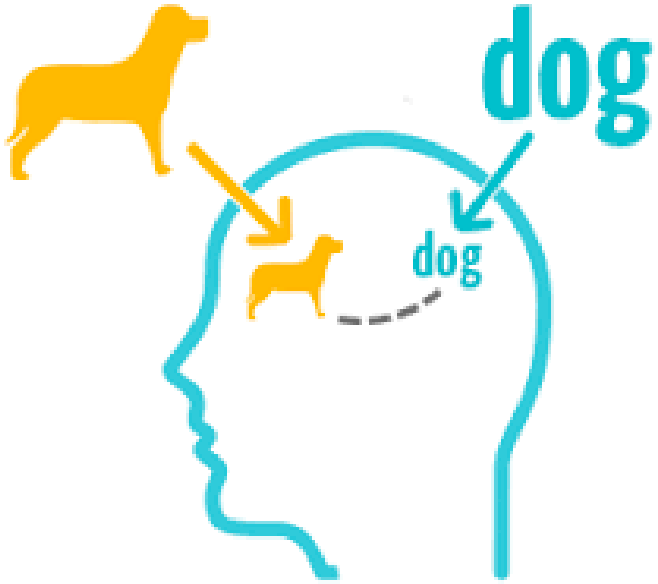
better at catching the reader's attention

**INFORMATION DENSITY**

better at summarizing large amounts of information

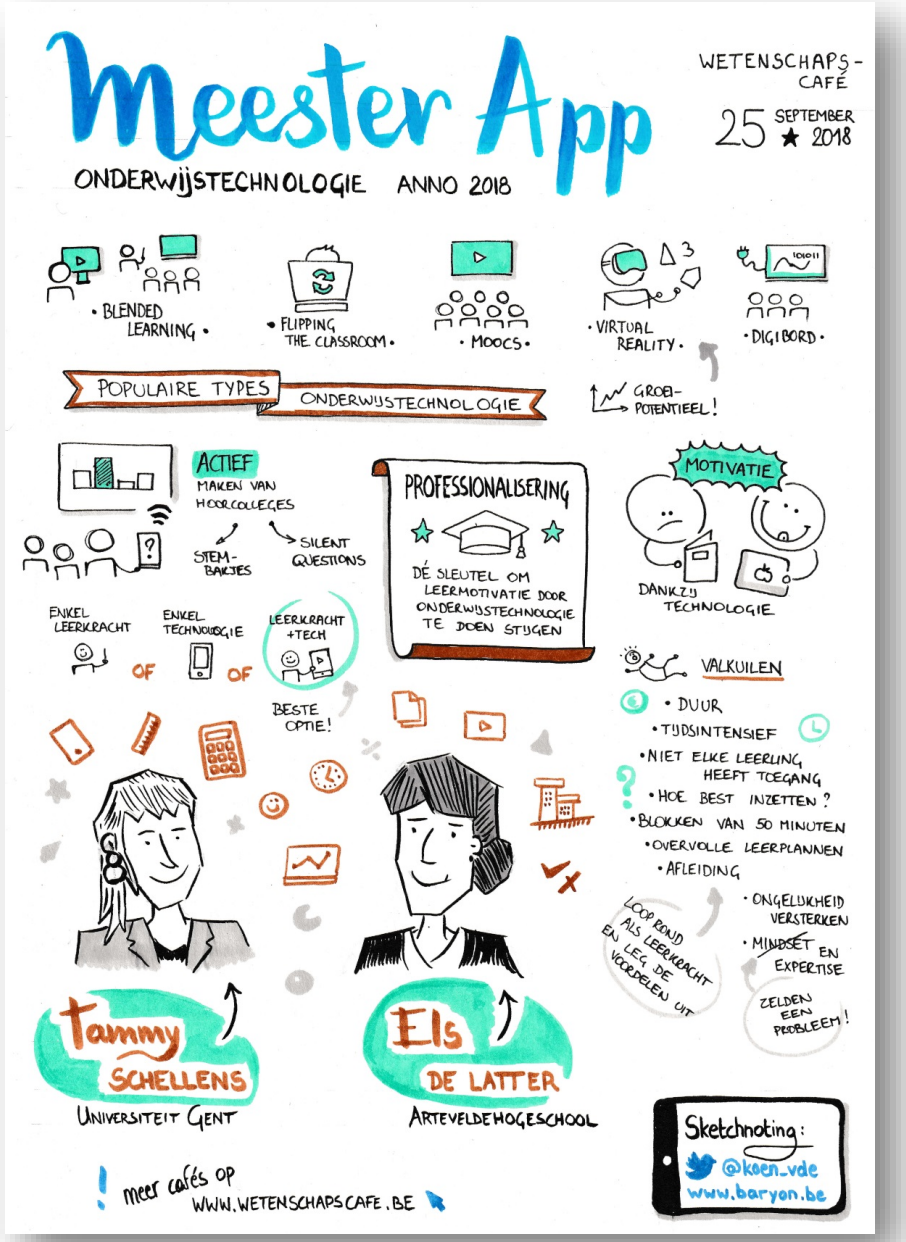
**DUAL CODING**

better at keeping the reader engaged




## DUAL CODING THEORY

a combination of
**visual stimuli** (pictures) and **verbal stimuli** (words)
stimulates the brain to make connections




## SKETCHNOTING

combining simple illustrations
with small amounts of text
= a great way of note-taking

# Why visual data communication?

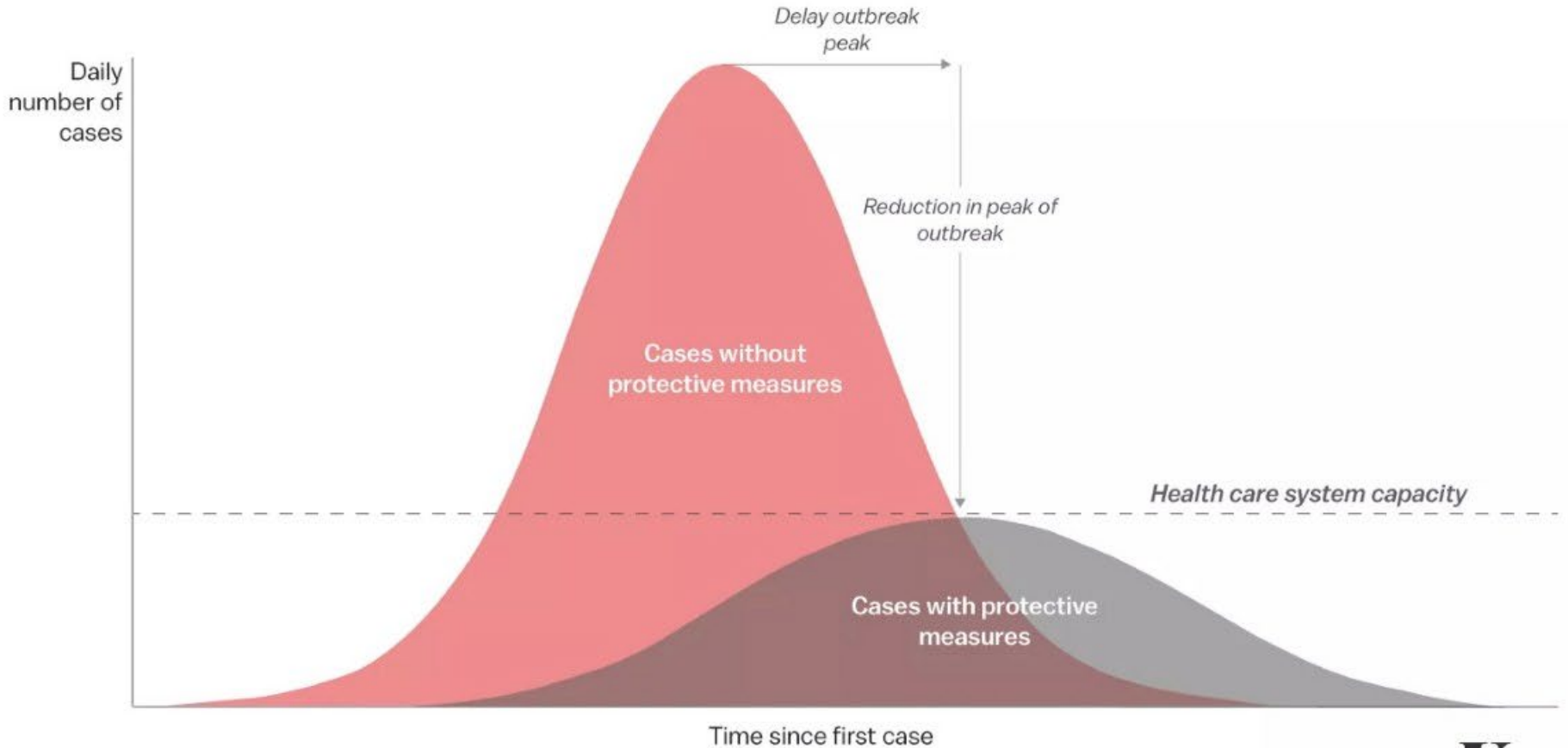
**ATTRACTIVE**
better at catching the reader's attention

**INFORMATION DENSITY**
better at summarizing large amounts of information

**KNOWLEDGE RETENTION**
easier to memorize the information

**DUAL CODING**
better at keeping the reader engaged

# Flattening the curve

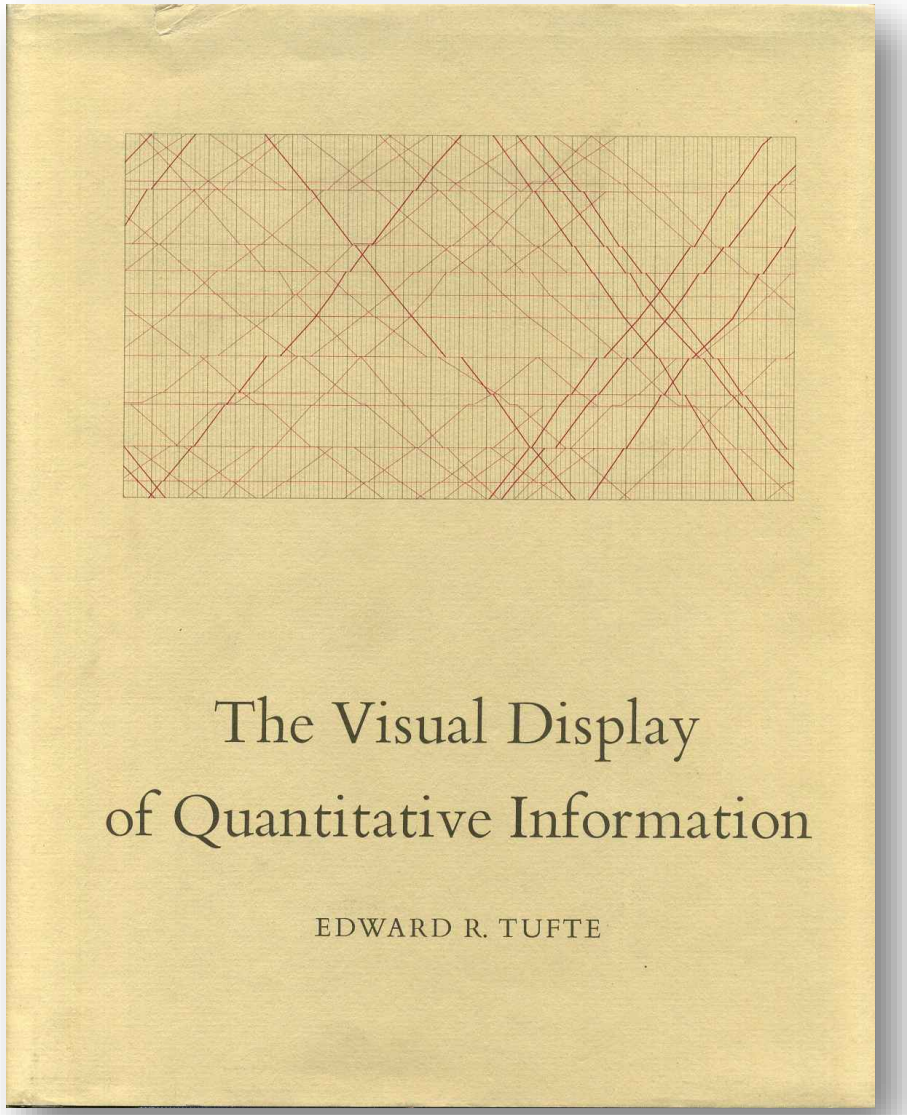



Source: CDC

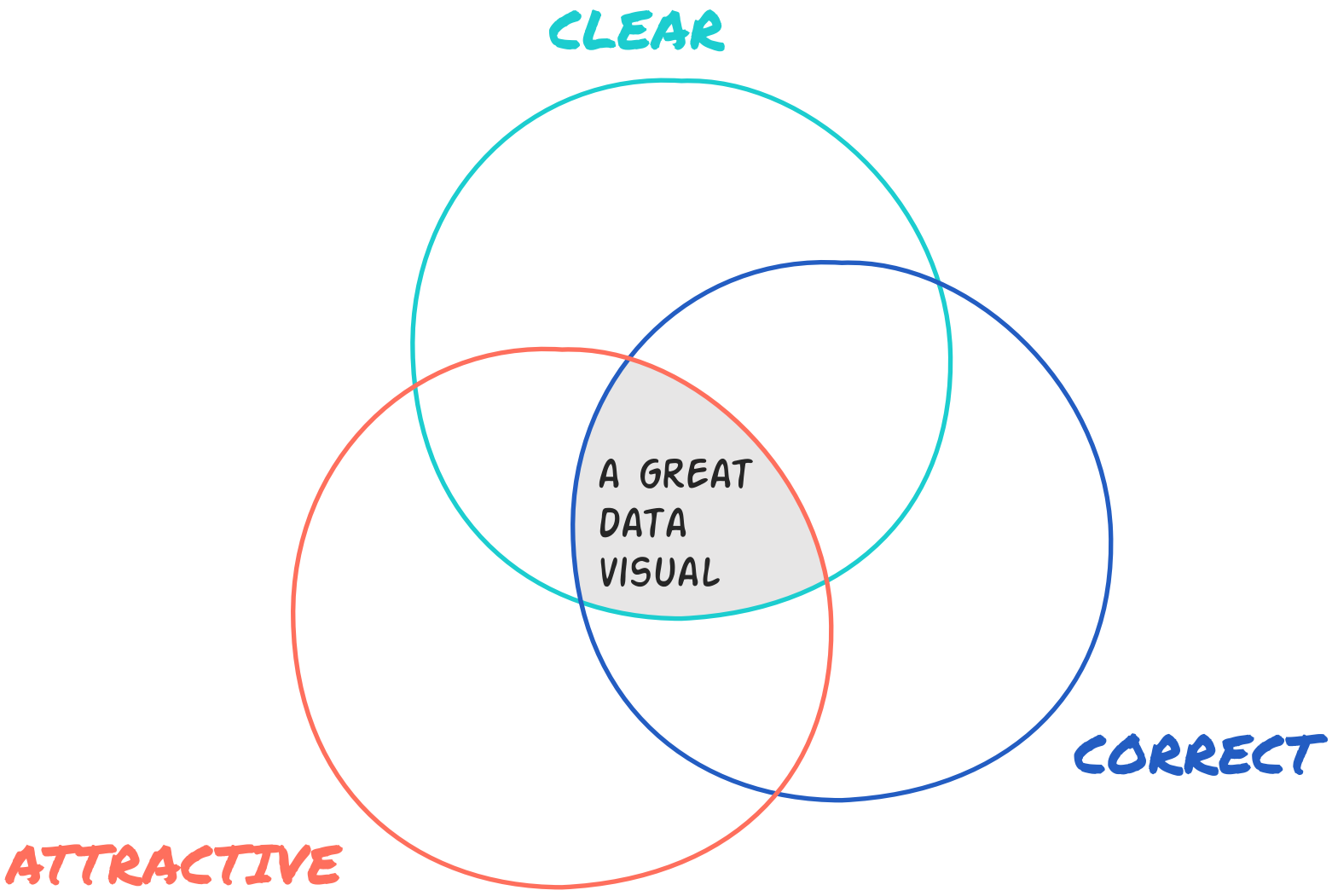
Vox

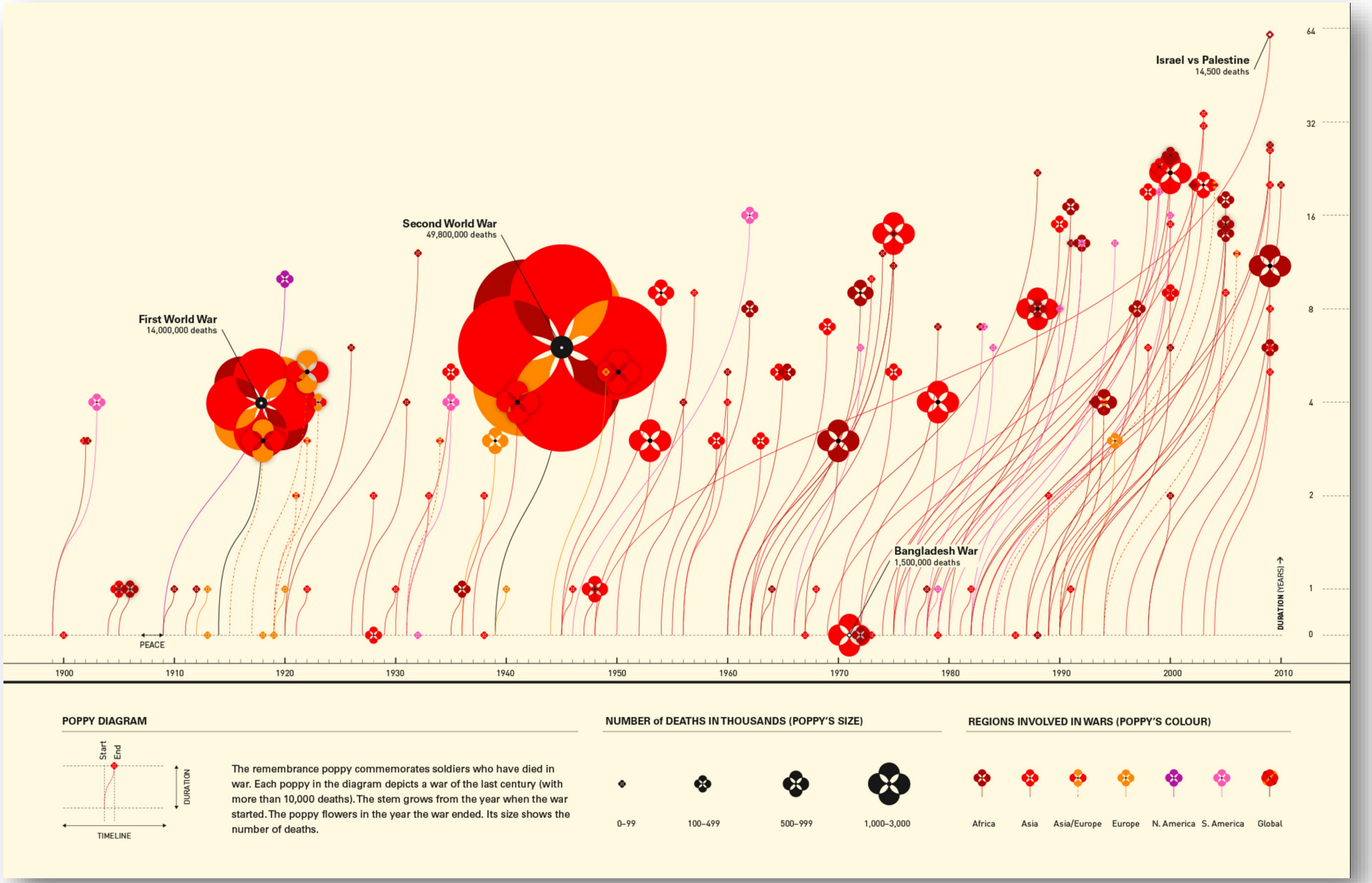
# Data visualization principles

# Clear, correct, and attractive




“Excellence in statistical graphics consists of complex ideas communicated with **clarity**, **precision**, and **efficiency**.”


CLEAR
A GREAT
DATA
VISUAL
CORRECT
ATTRACTIVE

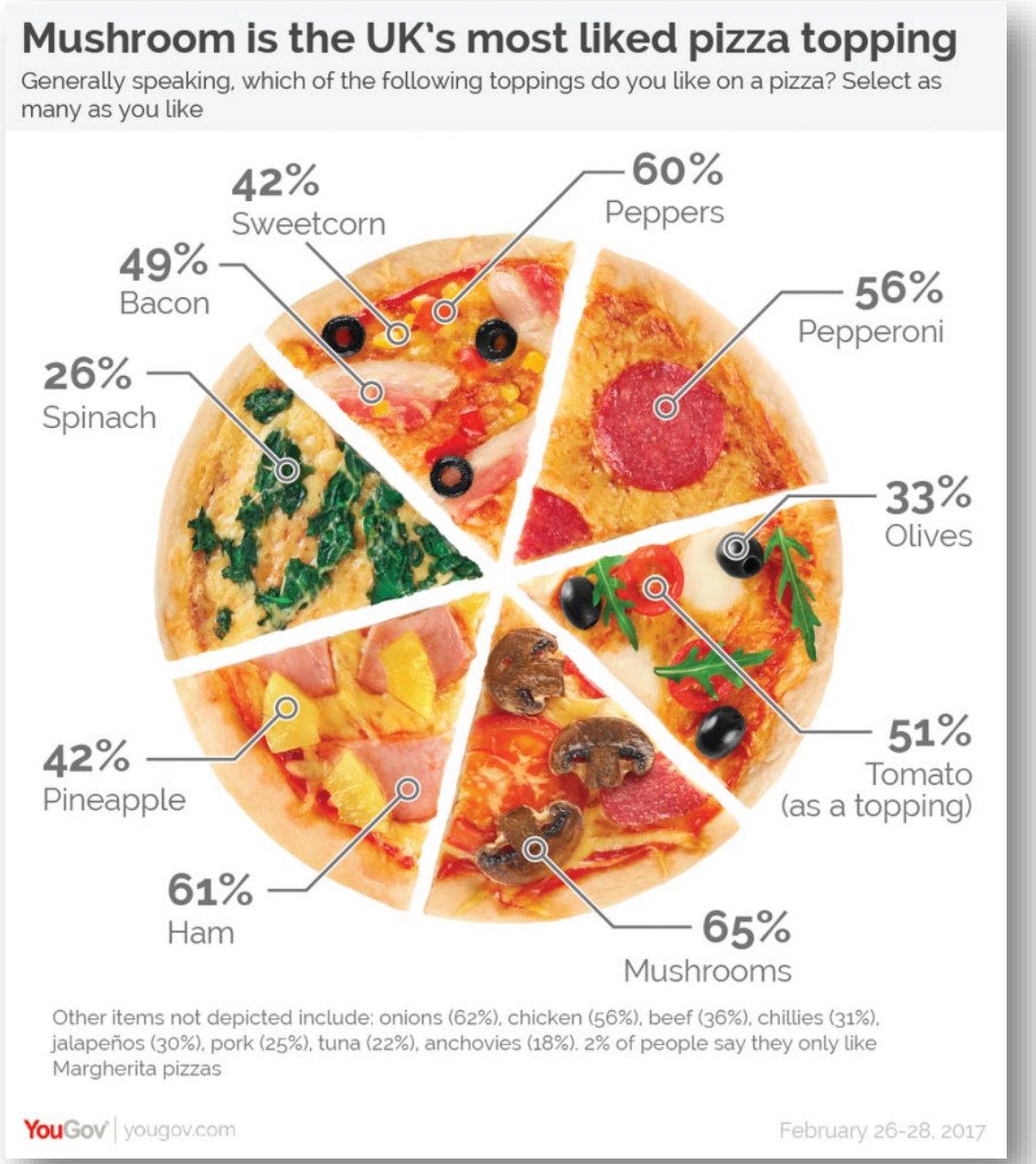



COMPLICATED DATA ART

~~clear~~

correct

attractive




BEAUTIFUL
BUT WRONG

clear

~~correct~~

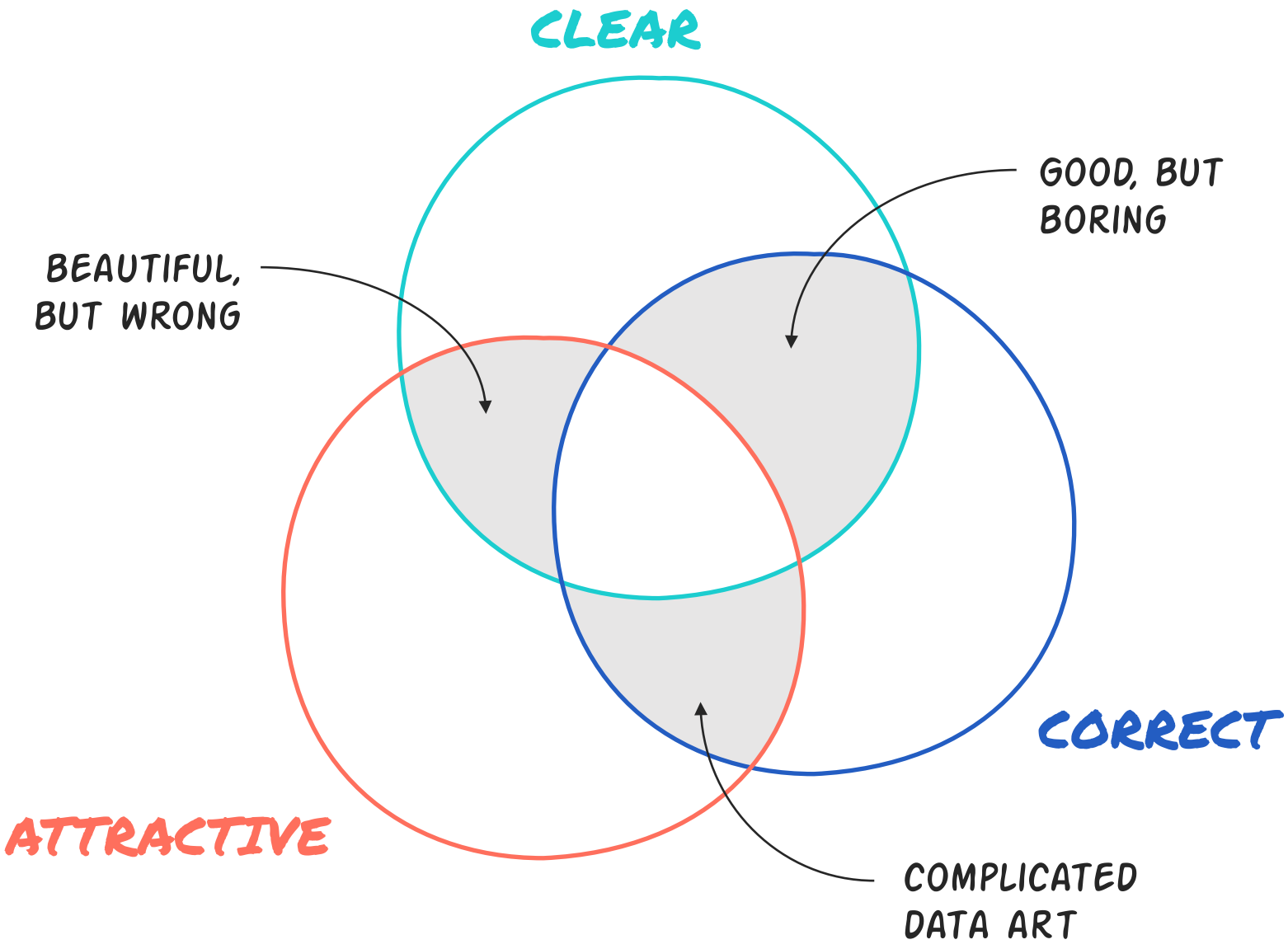
attractive

GOOD,
BUT BORING

clear

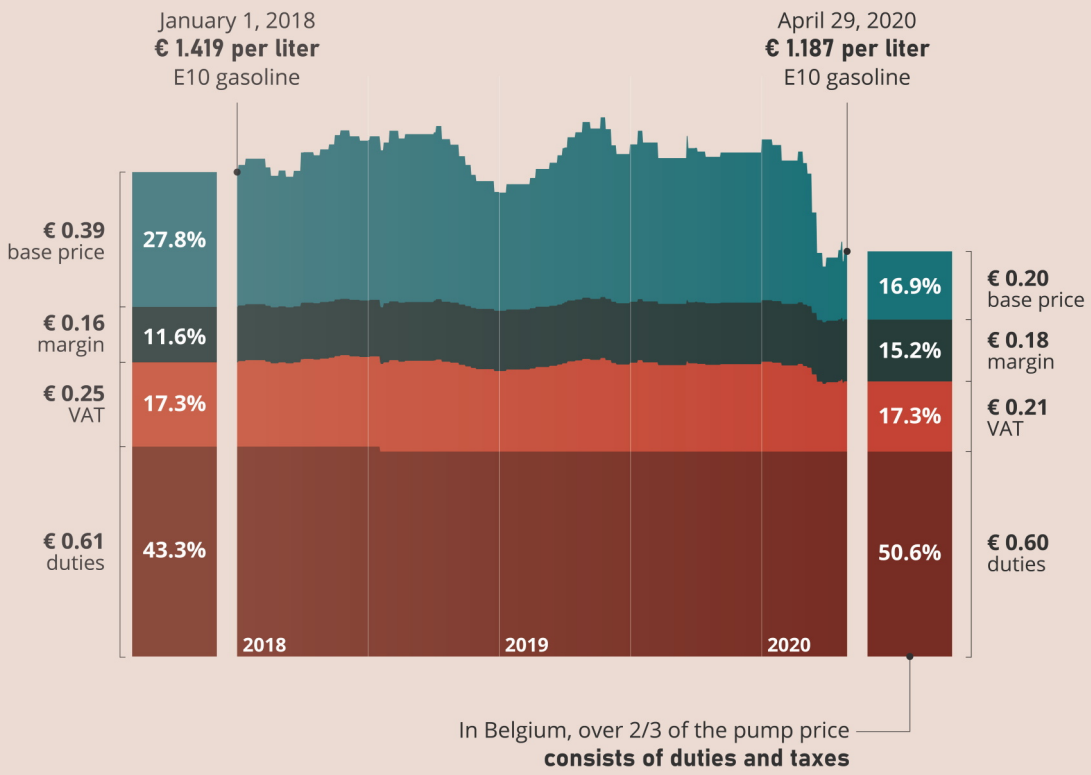
**correct**

~~attractive~~


CLEAR
GOOD, BUT BORING
BEAUTIFUL, BUT WRONG
CORRECT
ATTRACTIVE
COMPLICATED DATA ART

# Oil Time Low

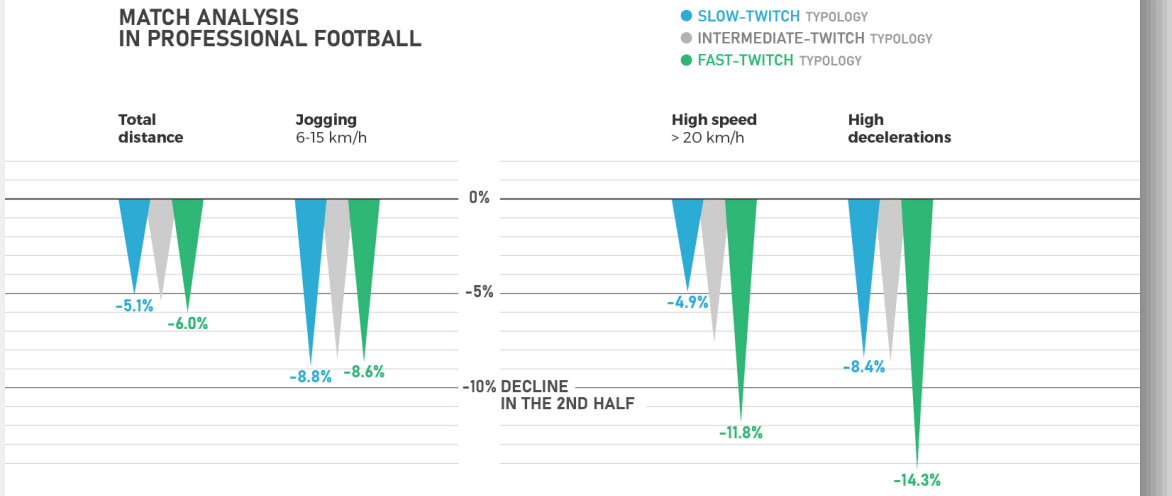
Crude oil prices are at their lowest point since 1998, dropping over 85% in the past few months. But at the pump, we pay for more than just the oil.

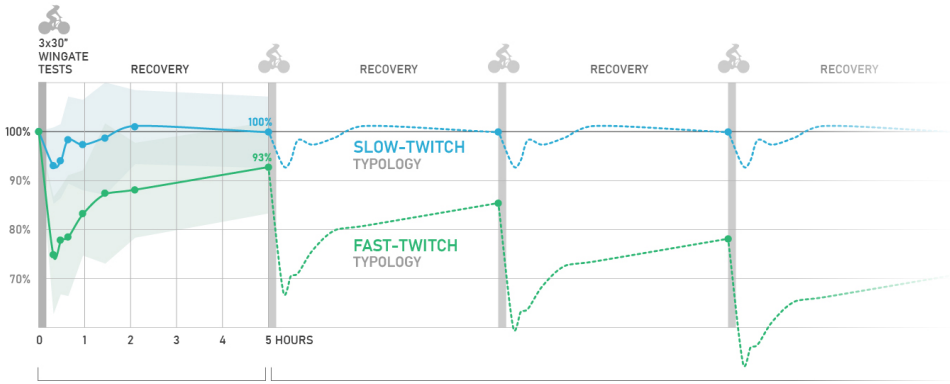



**Source:** Belgian Petroleum Federation, FOD Economie, Statbel

A #MakeoverMonday visualization
by **Koen Van den Eeckhout** (@koen_vde)

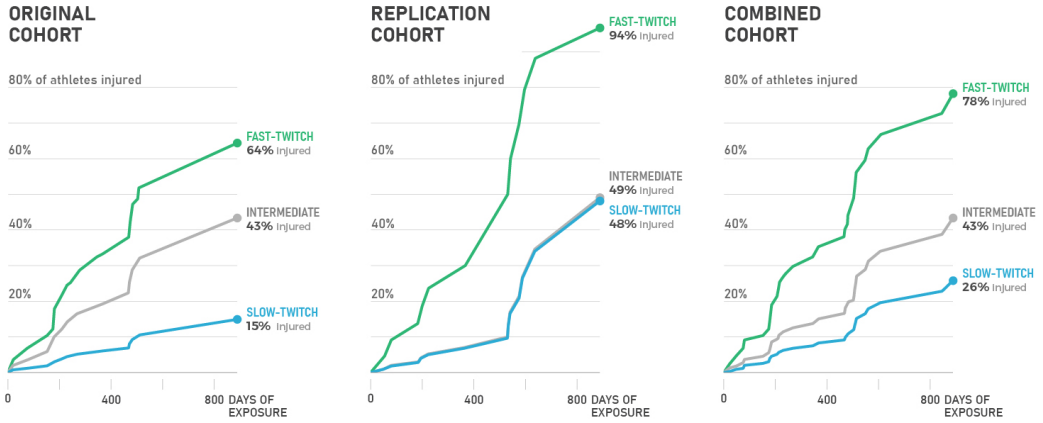
## MATCH ANALYSIS IN PROFESSIONAL FOOTBALL

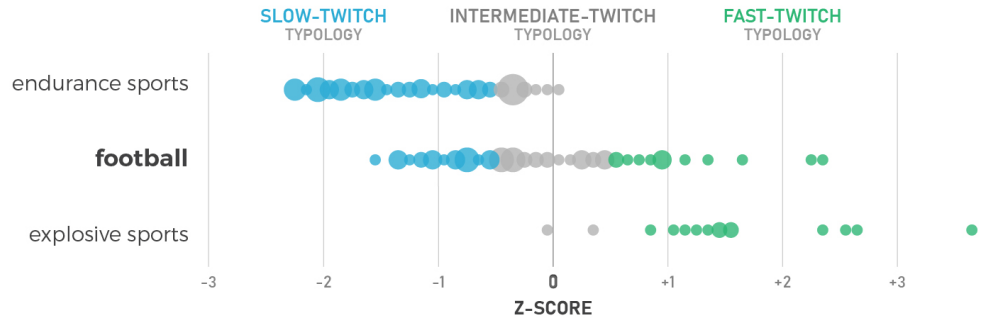



**ACUTE FATIGUE**
measured values for 21 test subjects

**ACCUMULATED FATIGUE**
modelled values based on acute fatigue data



# "Espresso"

1% Gekaramelliseerde suikerstroop

5% Toegevoegd suiker

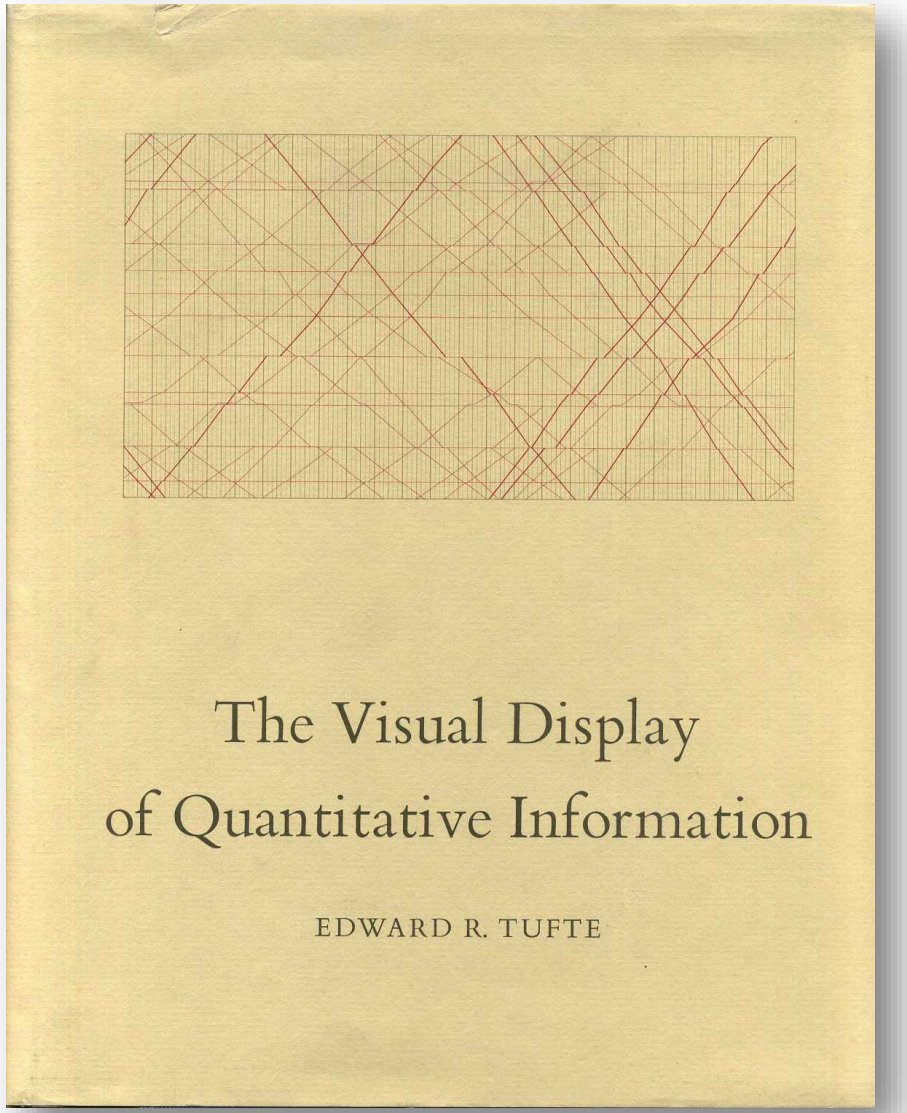
19% Arabicakoffie

75% Halfvolle melk

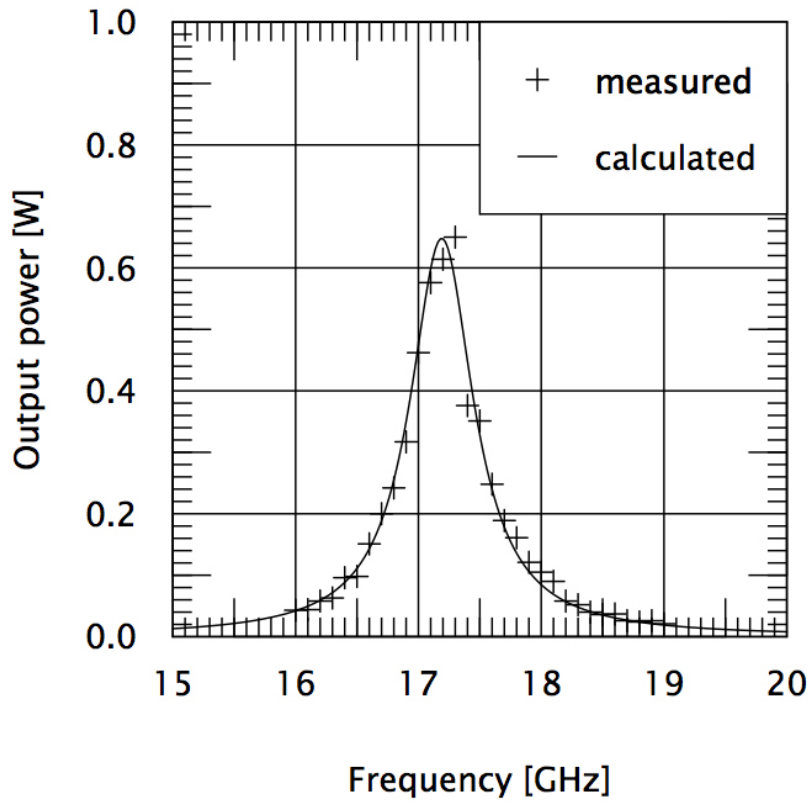
1. **75%** Melk
2. 9g Suiker/100ml
3. Geen espresso
4. GEEN ESPRESSO!

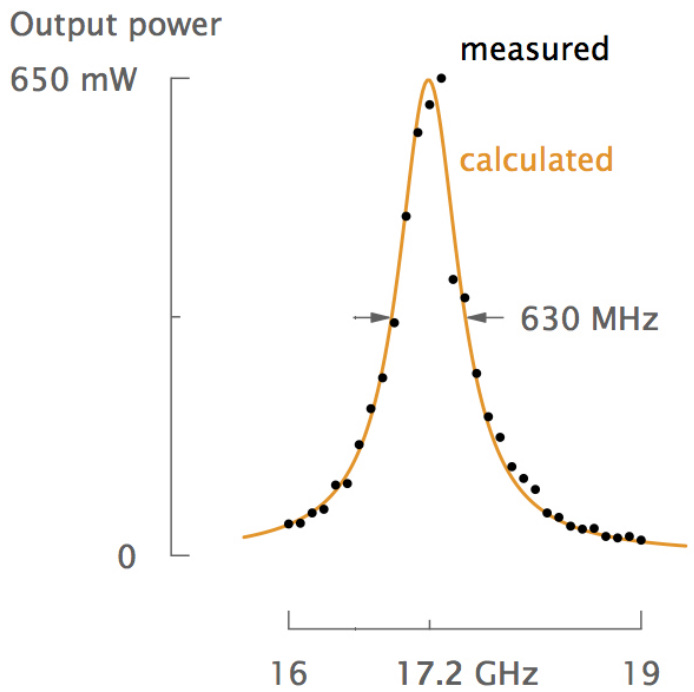
# Signal-to-noise ratio

GPS

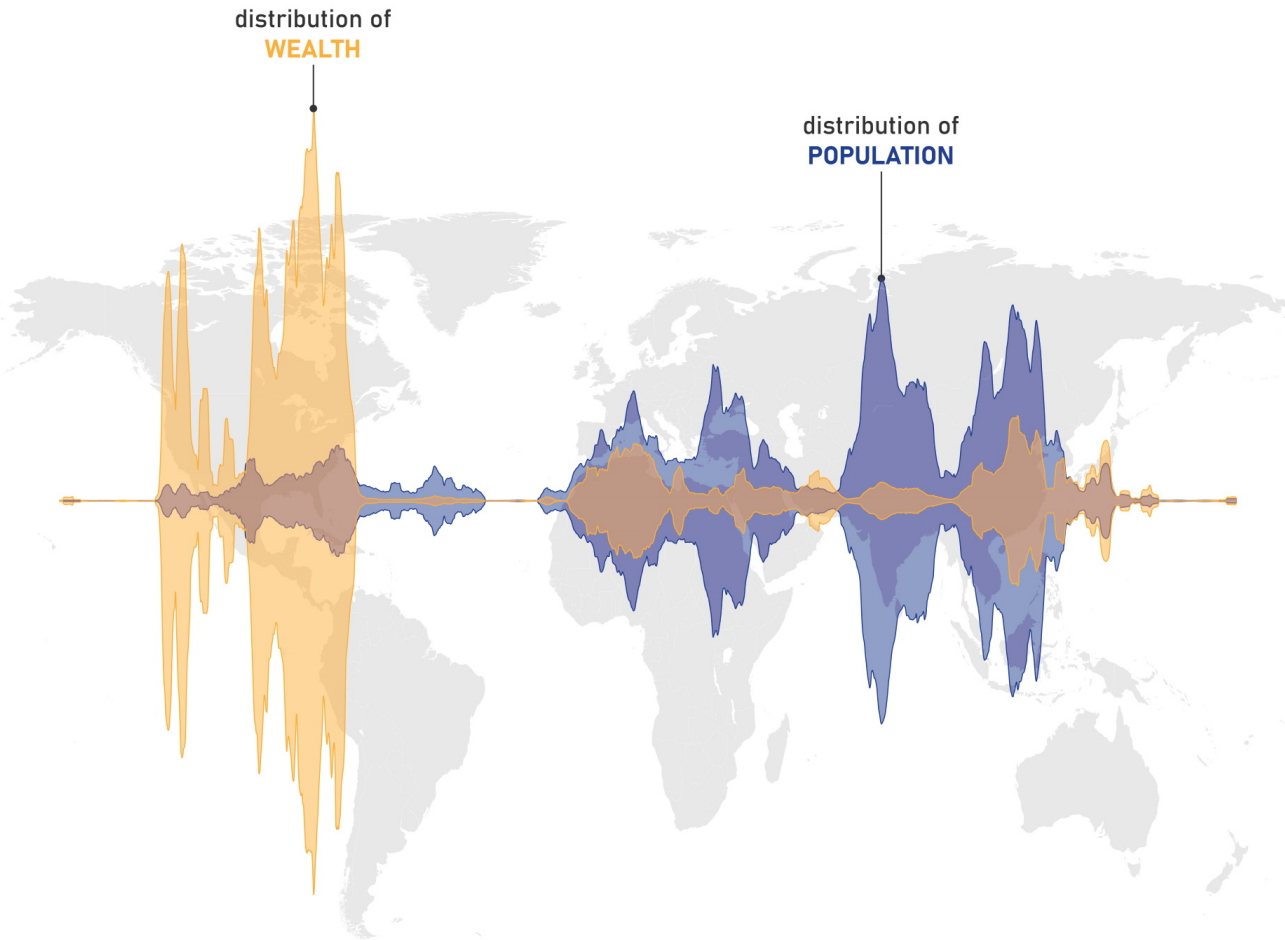



“Maximize the **data-ink ratio**”




Jean-Luc Doumont, Optics & Photonics Focus 2010




# The Wealthy West

Inequality is not just limited to North versus South

**Source:** Credit Suisse Global Wealth Report 2019; Socioeconomic Data and Applications Center - Gridded Population of the World v.11

A #MakeoverMonday visualization
by **Koen Van den Eeckhout** (@koen_vde)

anklemeat13 3 points · 14 days ago

Seriously how does this have so many awards it's doesn't even make sense.

Reply Give Award Share Report Save

bodie_ 4 points · 13 days ago

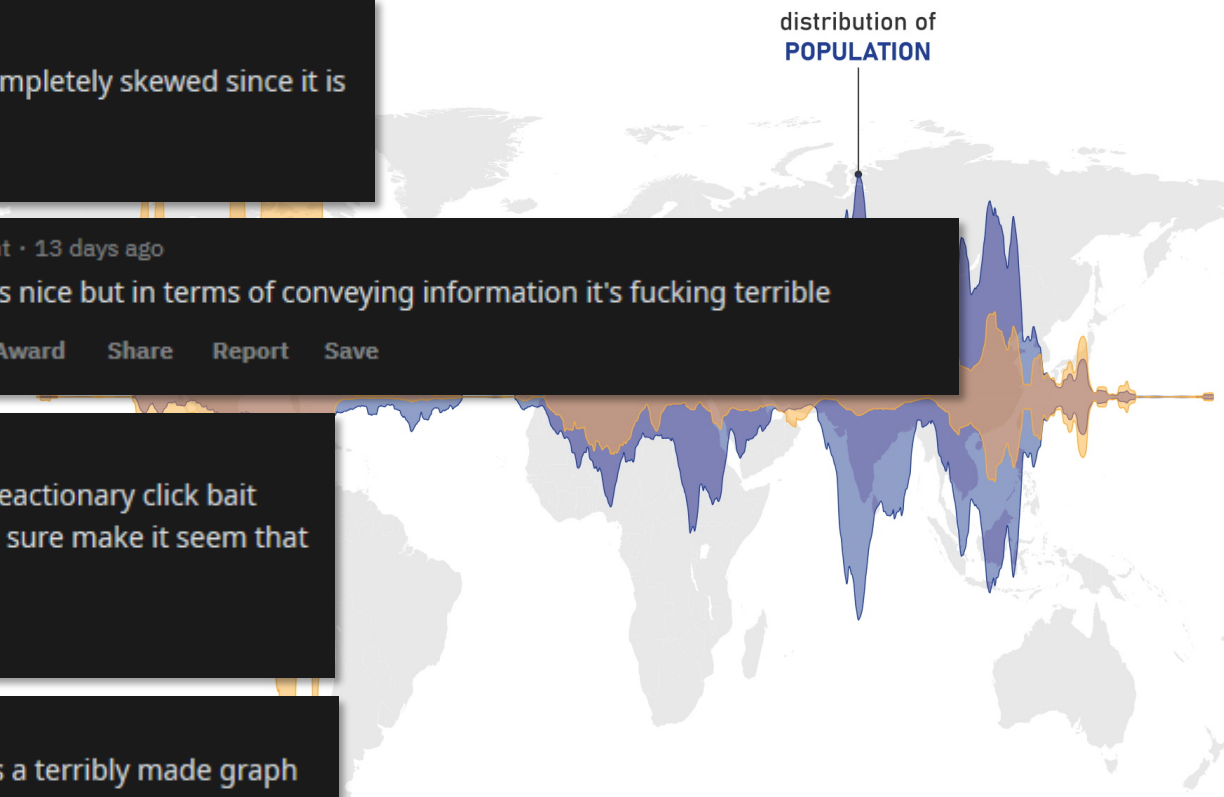
This graph is horrendous. I've read more than a hundred comments and no-one is able to explain how it's supposed to be read.

Reply Give Award Share Report Save

Craigmm114 680 points · 14 days ago

Am I reading this wrong or is this a terrible representation? Europe is completely skewed since it is right above Africa which would definitely mess it up.

Reply Give Award Share Report Save




willjoke4food 256 points · 14 days ago

This is extremely useless visualisation

Reply Give Award Share Report Save

memphi222 1 point · 13 days ago

This graph looks nice but in terms of conveying information it's fucking terrible

Reply Give Award Share Report Save

d80hunter 35 points · 14 days ago

You wasn't supposed to look that hard and notice the fine details, it is a reactionary click bait graph. The keywords "wealth inequality" and "west" with the data shown sure make it seem that way.

Reply Give Award Share Report Save

Specialey 36 points · 14 days ago

I cannot read the graph, it's either that I'm graphically illiterate or this is a terribly made graph

Reply Give Award Share Report Save

BillyBuckets 17 points · 14 days ago

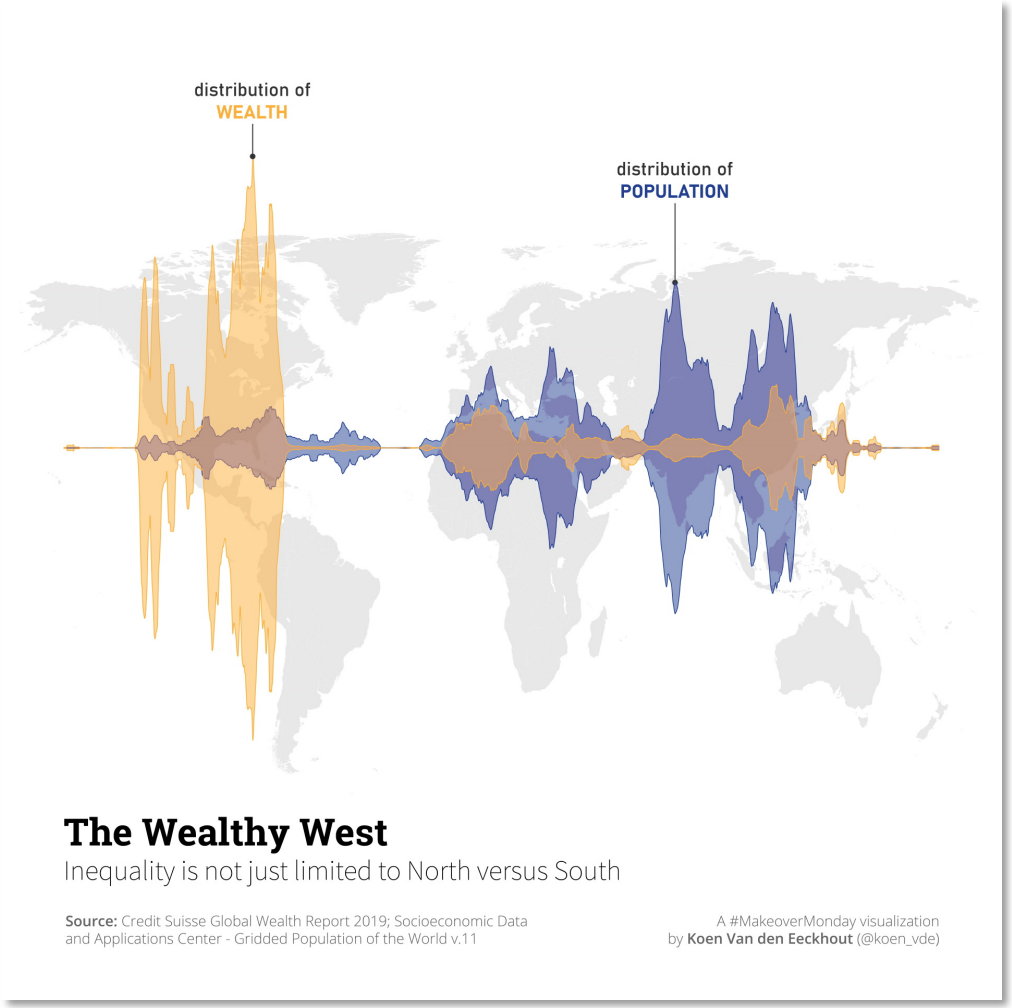
The second one.

Reply Give Award Share Report Save

Pikesmakker 8 points · 14 days ago

This presentation is fucking terrible

Reply Give Award Share Report Save

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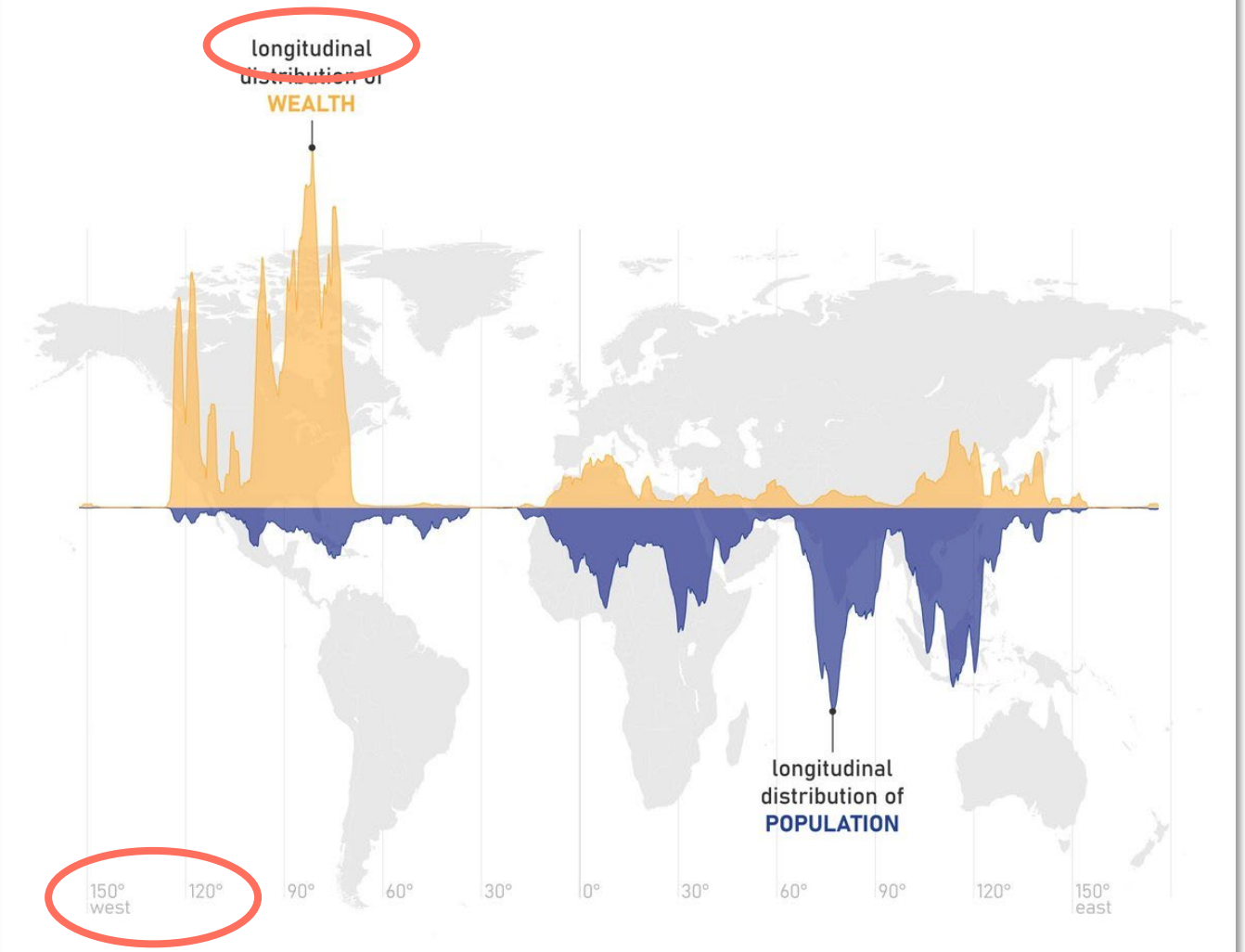


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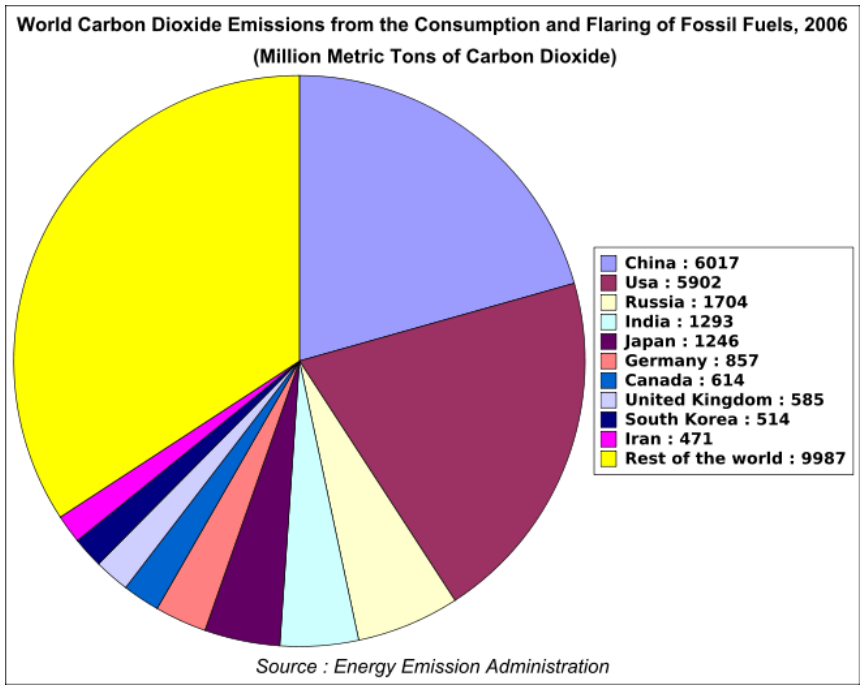
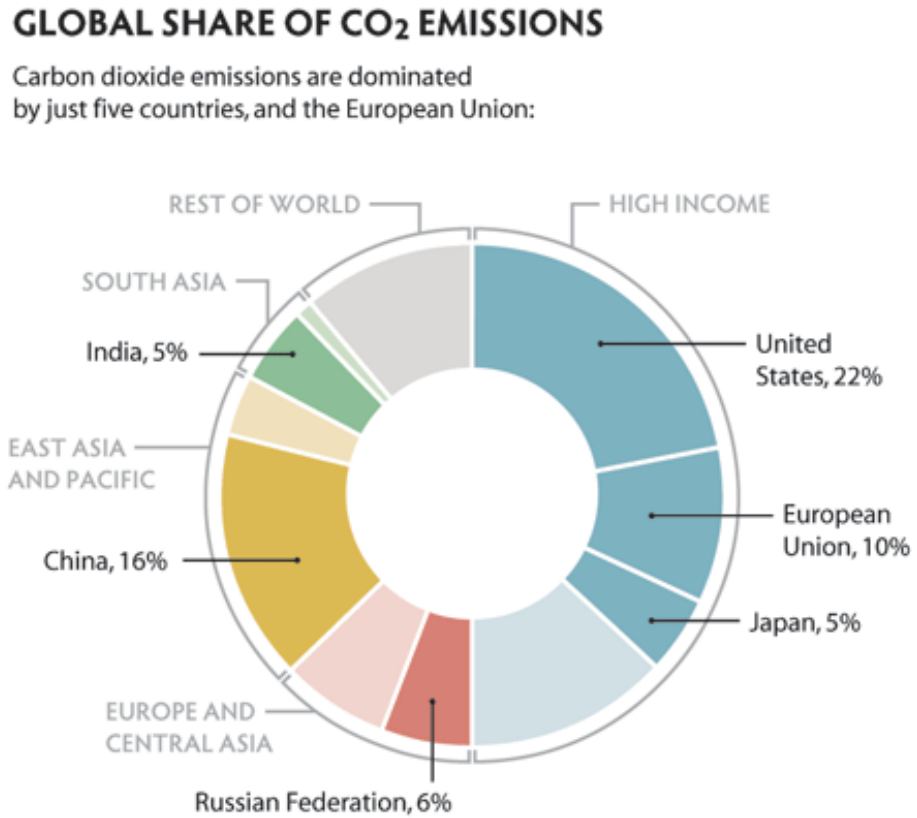
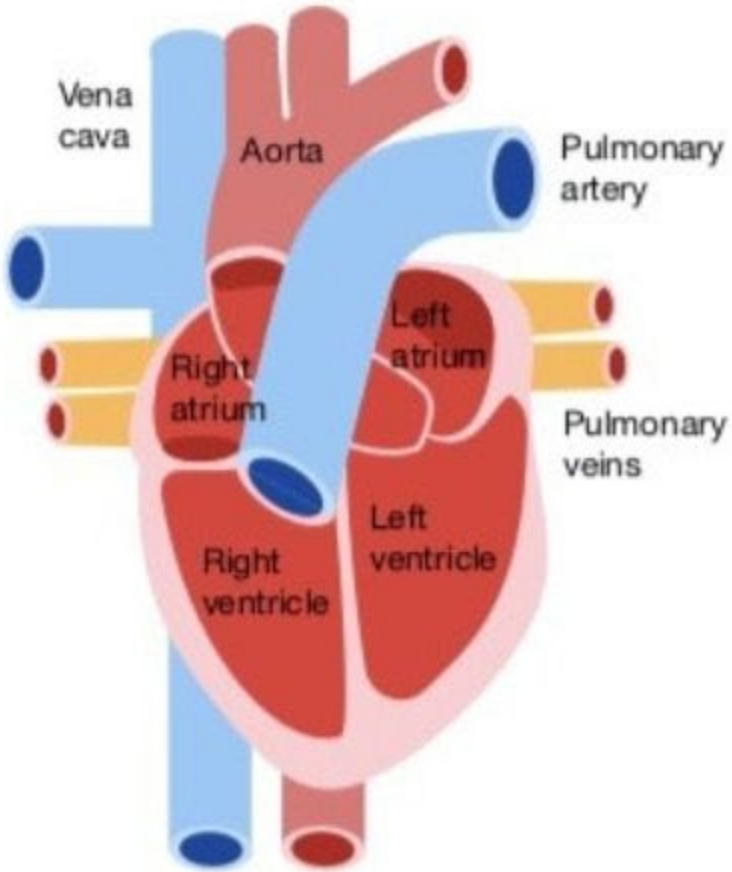
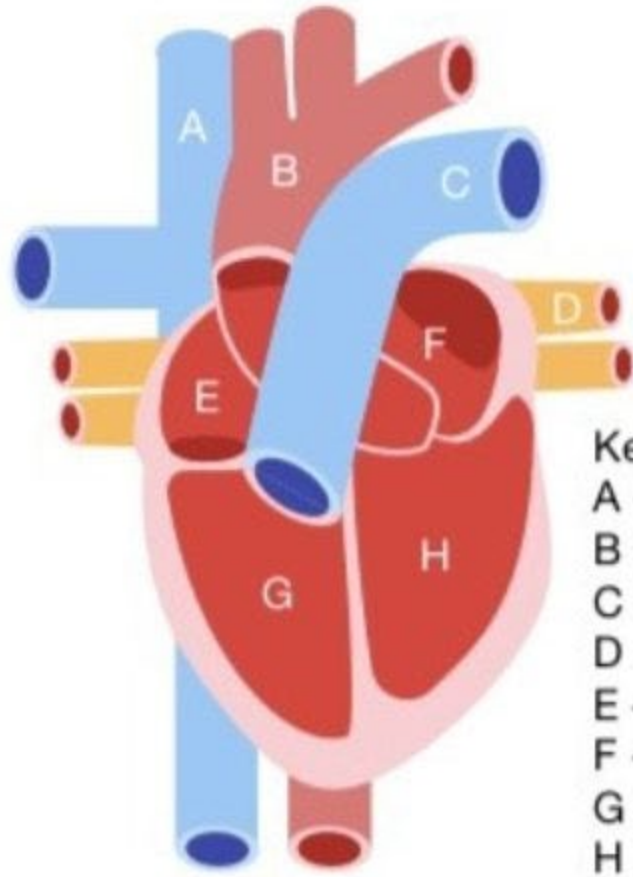

World Carbon Dioxide Emissions from the Consumption and Flaring of Fossil Fuels, 2006
(Million Metric Tons of Carbon Dioxide)
China : 6017
Usa : 5902
Russia : 1704
India : 1293
Japan : 1246
Germany : 857
Canada : 614
United Kingdom : 585
South Korea : 514
Iran : 471
Rest of the world : 9987
Source : Energy Emission Administration


GLOBAL SHARE OF $CO_2$ EMISSIONS
Carbon dioxide emissions are dominated by just five countries, and the European Union:
REST OF WORLD
HIGH INCOME
SOUTH ASIA
India, 5%
United States, 22%
EAST ASIA AND PACIFIC
European Union, 10%
China, 16%
Japan, 5%
EUROPE AND CENTRAL ASIA
Russian Federation, 6%

a)



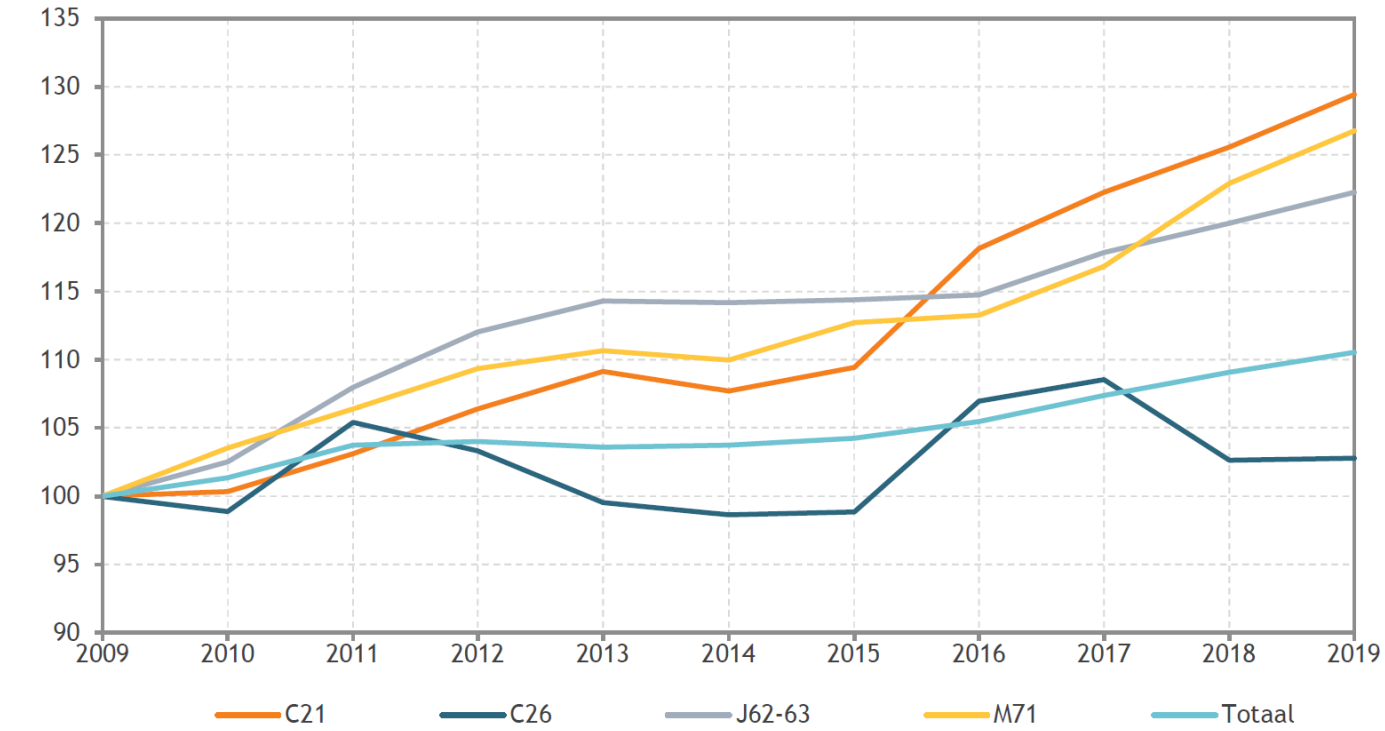

b)




Key
A - Vena cava
B - Aorta
C - Pulmonary artery
D - Pulmonary veins
E - Right atrium
F - Left atrium
G - Right ventricle
H - Left ventricle

**Figuur 3** **Evolutie van het arbeidsvolume (in uren), 2009-2019**

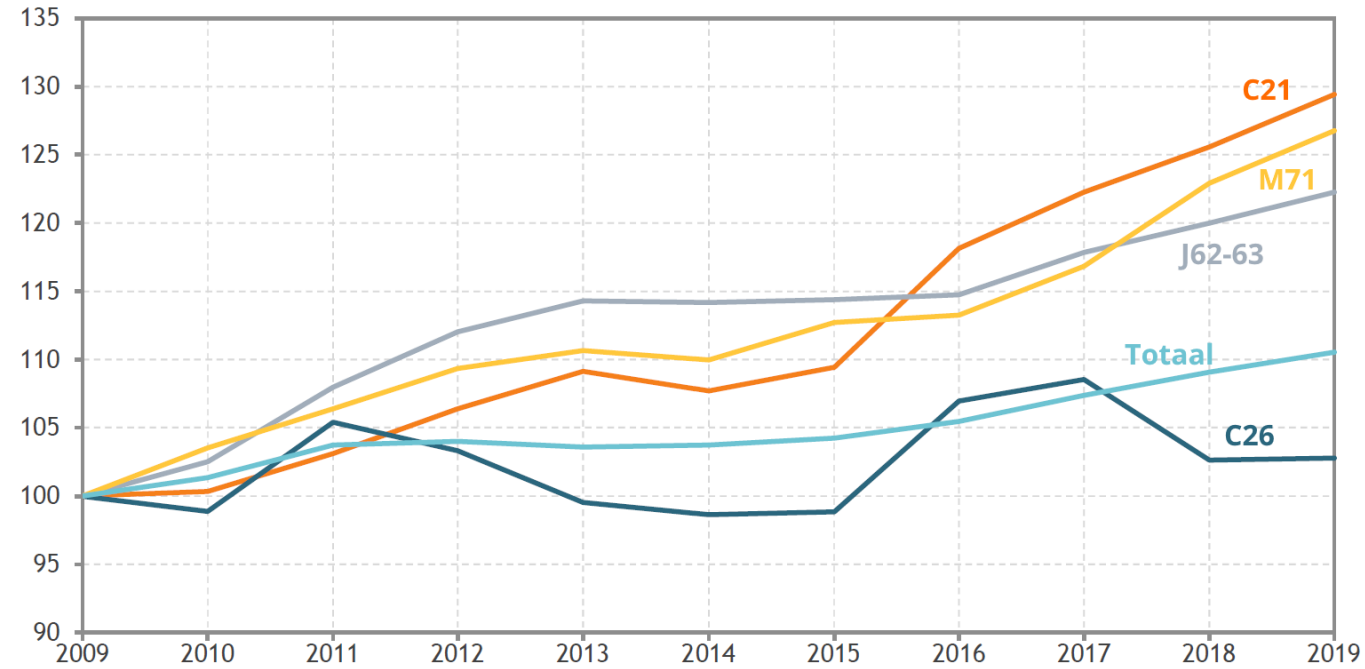
*Index 2009=100*




Bron: INR, FPB.

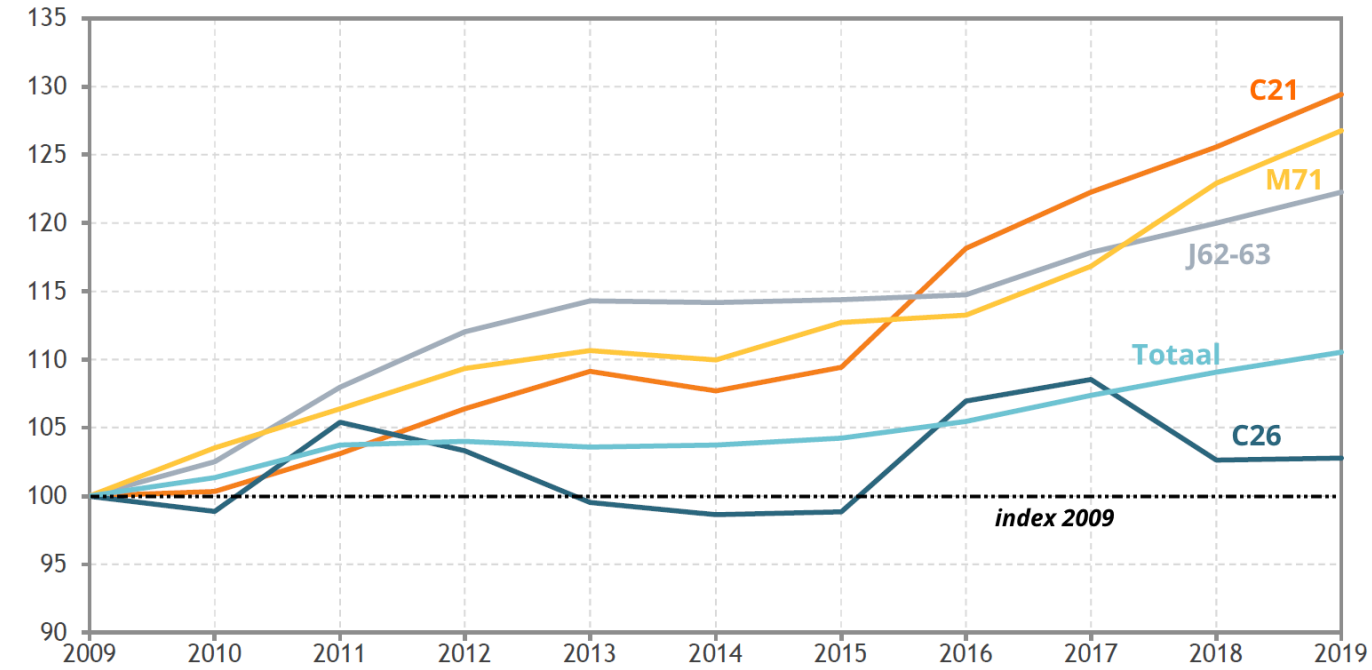
**Figuur 3** **Evolutie van het arbeidsvolume (in uren), 2009-2019**

*Index 2009=100*



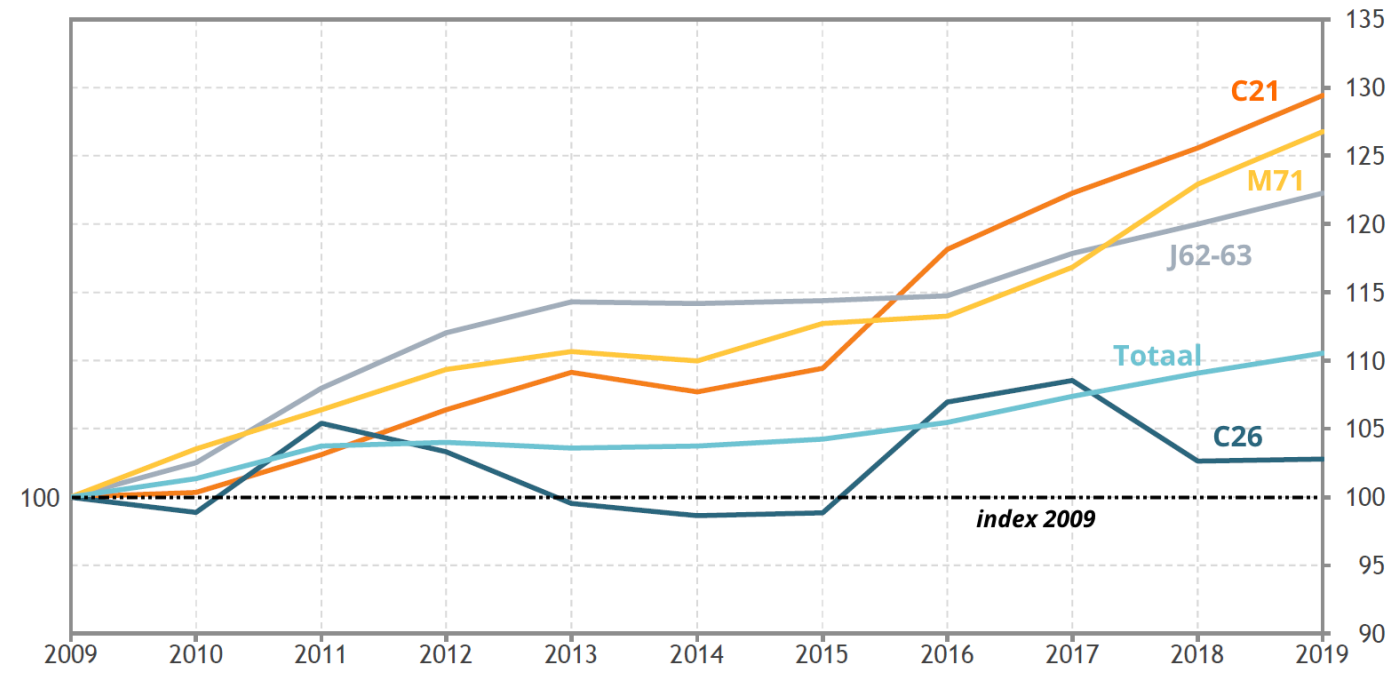

Bron: INR, FPB.

Figuur 3 Evolutie van het arbeidsvolume (in uren), 2009-2019




Bron: INR, FPB.

Figuur 3 Evolutie van het arbeidsvolume (in uren), 2009-2019




Bron: INR, FPB.

# Signal-to-noise ratio

remove noise and distractions

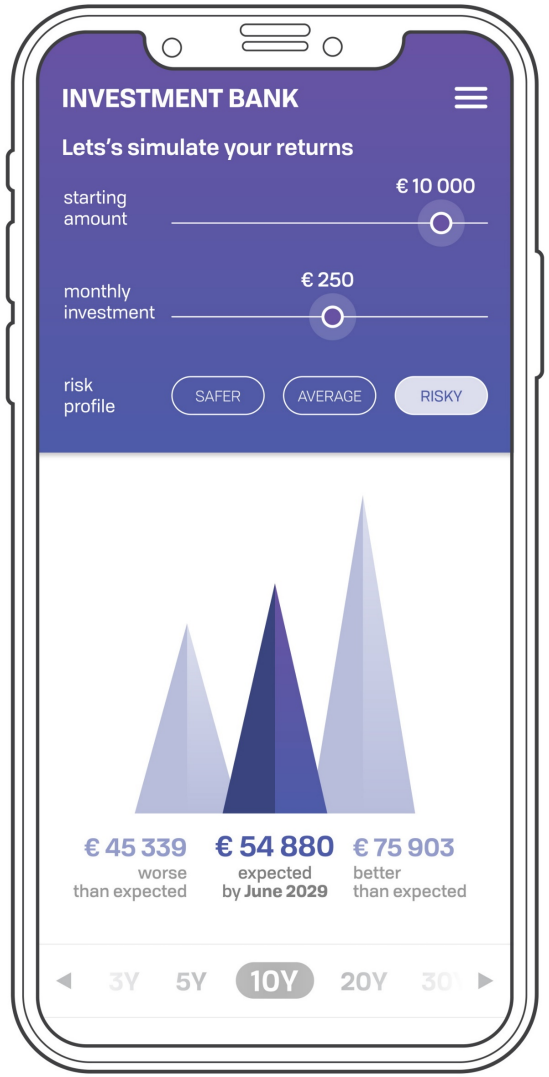
add helpful annotations

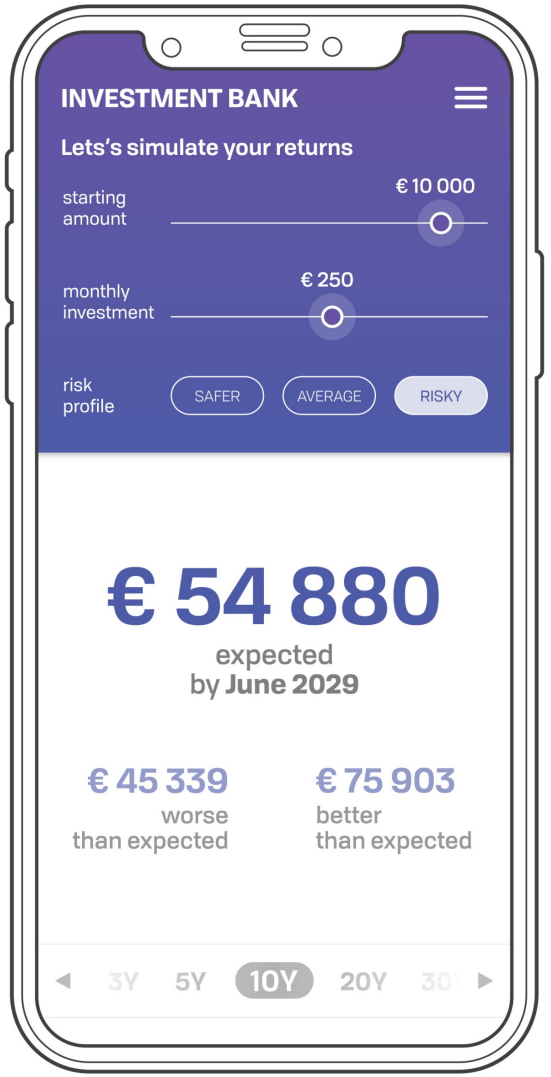
place labels close to the data

# Guidelines and approaches

# Choosing the right chart

# Do I really need a chart?



# Maybe a table is sufficient?

UPDATED JAN. 12, 2021, AT 12:03 AM

## Club Soccer Predictions

Forecasts and Soccer Power Index (SPI) ratings
for 39 leagues, updated after each match.

**See also:** How this works  Global club soccer rankings

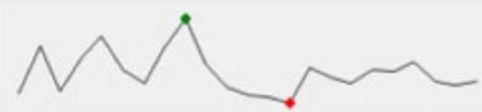
England: Premier League | **Standings** | Matches

**PREMIER LEAGUE**
2020-21

**England**
Updated Jan. 4, 2021, at 4:56 p.m.

| | TEAM RATING | | | AVG. SIMULATED SEASON | | END-OF-SEASON PROBABILITIES | | | |
|---|---|---|---|---|---|---|---|---|---|
| TEAM | SPI | OFF. | DEF. | GOAL DIFF. | PTS. | EVERY POSITION (↓ 20th 1st ↓) | RELEGATED | QUALIFY FOR UCL | WIN PREMIER LEAGUE |
| Man. City 29 pts | 93.7 | 2.9 | 0.2 | +49 | 83 | | <1% | 97% | 69% |
| Liverpool 33 pts | 88.6 | 2.6 | 0.4 | +36 | 74 | | <1% | 80% | 15% |
| Man. United 33 pts | 84.5 | 2.5 | 0.6 | +23 | 72 | | <1% | 70% | 10% |
| Tottenham 29 pts | 81.6 | 2.3 | 0.6 | +23 | 65 | | <1% | 39% | 2% |
| Chelsea 26 pts | 85.8 | 2.4 | 0.5 | +25 | 64 | | <1% | 33% | 1% |
| Leicester 32 pts | 79.1 | 2.1 | 0.6 | +14 | 64 | | <1% | 29% | 1% |
| Aston Villa 26 pts | 78.5 | 2.2 | 0.7 | +16 | 60 | | <1% | 18% | <1% |
| Everton 29 pts | 74.5 | 2.0 | 0.7 | +3 | 58 | | <1% | 10% | <1% |
| Arsenal 23 pts | 80.5 | 2.2 | 0.6 | +8 | 57 | | <1% | 8% | <1% |

*More info: [fivethirtyeight.com](fivethirtyeight.com)*

| Company | LatestWeek Volume | PriorWeek Volume | Change | % Change | Volume Trend Last 31 days as of 31-10-2018 |
|---|---|---|---|---|---|
| | 16,356,600 | 8,707,400 | 7,649,200 | 87.85% | |
| | 195,375,400 | 103,700,700 | 91,674,700 | 88.40% | |
| | 198,068,600 | 174,145,400 | 23,923,200 | 13.74% | |
| | 60,965,900 | 29,933,500 | 31,032,400 | 103.67% | |
| | 6,393,500 | 8,870,600 | 2,477,100 | 27.92% | |
| | 288,745,200 | 199,505,500 | 89,239,700 | 44.73% | |
| | 52,925,900 | 50,509,900 | 2,416,000 | 4.78% |  |
| | 228,612,200 | 161,738,200 | 66,874,000 | 41.35% | |

| REGION | CASES | DEATHS | CASES Fewer More |
|---|---|---|---|
| **Mainland China** Avoid travel | 80,572 | 3,042 | Jan. 22 March 5 |
| **South Korea** Avoid travel | 6,593 | 42 | |
| **Iran** Avoid travel | 4,747 | 124 | |
| **Italy** Avoid travel | 3,858 | 148 | |
| **Japan** Reconsider | 1,065 | 8 | |
| **Germany** | 577 | 0 | |
| **France** | 423 | 7 | |
| **Spain** | 360 | 5 | |
| **United States** | 230 | 12 | |

| Day | Fat | Carbs | Protein |
|---|---|---|---|
| Monday | 70g | 94g | 81g |
| Tuesday | 65g | 85g | 95g |
| Wednesday | 88g | 71g | 105g |
| Thursday | 57g | 102g | 78g |
| Friday | 73g | 96g | 84g |
| **Average** | 74g | 85g | 88g |

| Name (Symbol) | Div | Vol | Yld | P/E | Day Last | % Change |
|---|---|---|---|---|---|---|
| SkyHighCorp (SHC) | -- | 3143 | -- | 76 | 21.25 | +.25 |
| LowDownInc (LDI) | 2.35 | 2735 | 5.7 | 18 | 41.00 | -.50 |
| ValueNowInc (VNI) | 1.00 | 1894 | 4.5 | 12 | 22.00 | +.10 |
| DoinBadlyCorp (DBC) | -- | 7601 | -- | -- | 33.50 | -.75 |

| Proportional | Tabular |
|---|---|
| 390,209,000 | 390,209,000 |
| 112,371,000 | 112,371,000 |

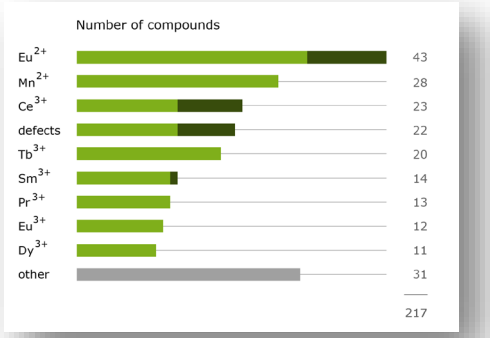
| | Invoice | Invoice date | Due date | Status | Amount |
|---|---|---|---|---|---|
| | #09293 | 05/10/2019 | 05/10/2019 | Unpaid | $2,350.00 |
| 56px | #98273 | 05/10/2019 | 05/10/2019 | Paid | $750.83 |
| | #19293 | 05/10/2019 | 05/10/2019 | Pending | $1,200.00 |
| | #12839 | 05/11/2019 | 05/11/2019 | Paid | $2,500.00 |
| | 81727 | 05/11/2019 | 05/11/2019 | Unpaid | $3,200.00 |

*More info: [The Ultimate Guide to Designing Data Tables]*

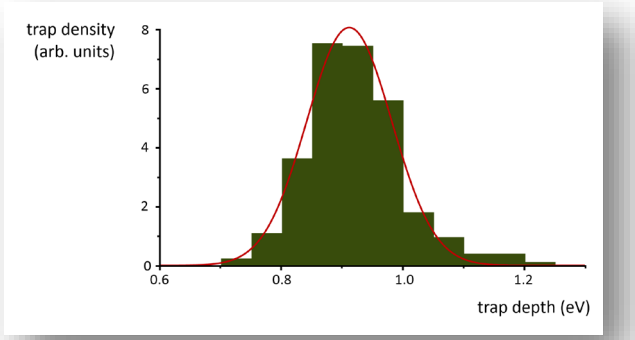
# Chart types

# Graphic representation categories

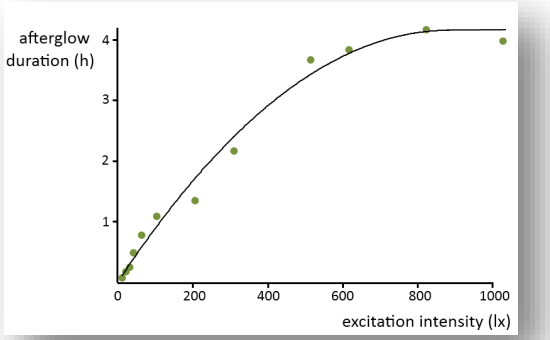
## comparison



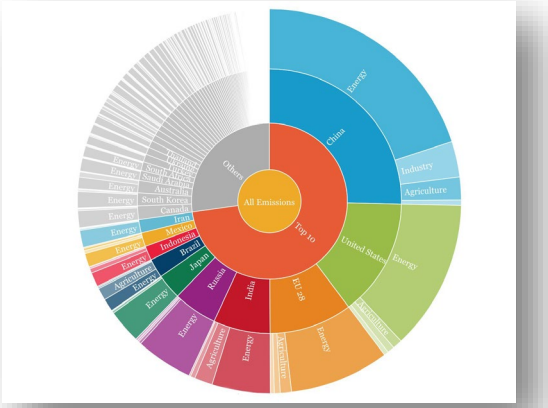

## distribution



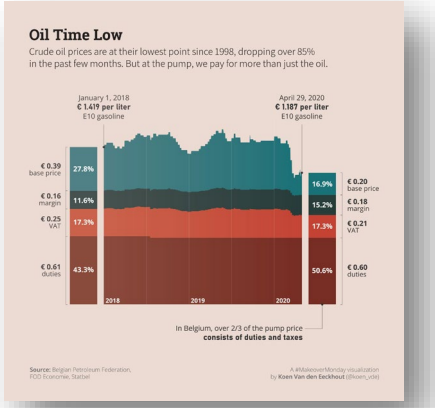

## correlation



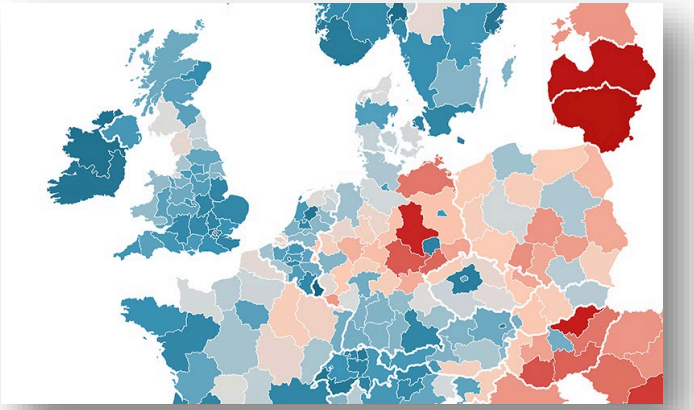

## hierarchy




## evolution

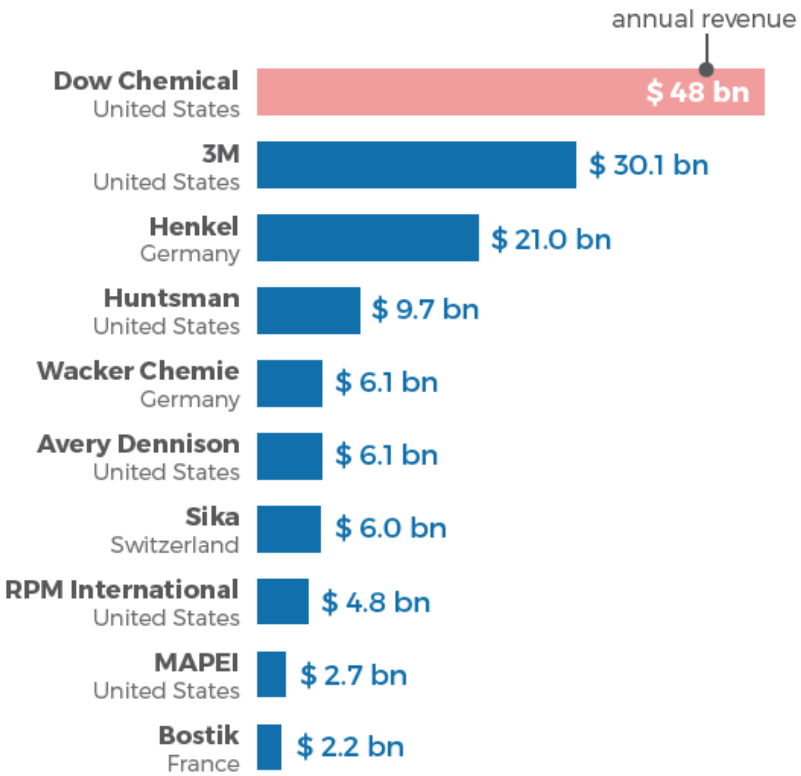



## spatial

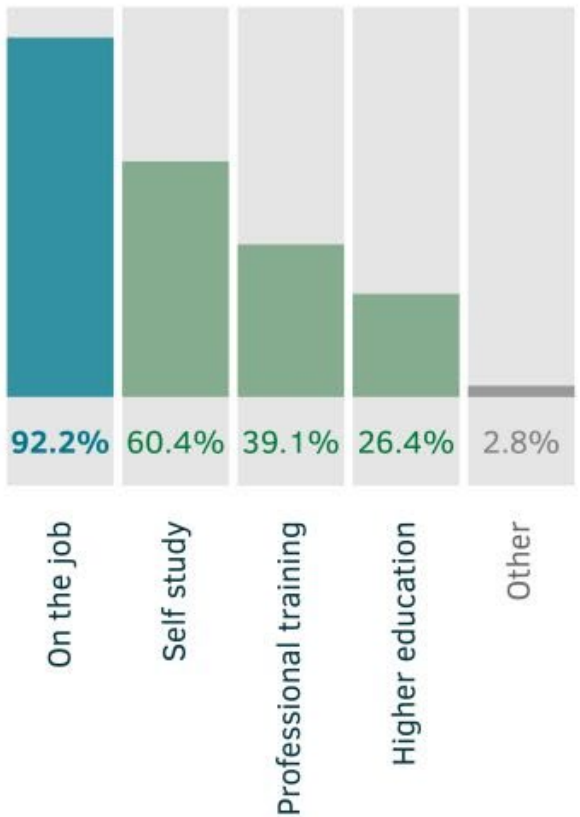


# Common chart types

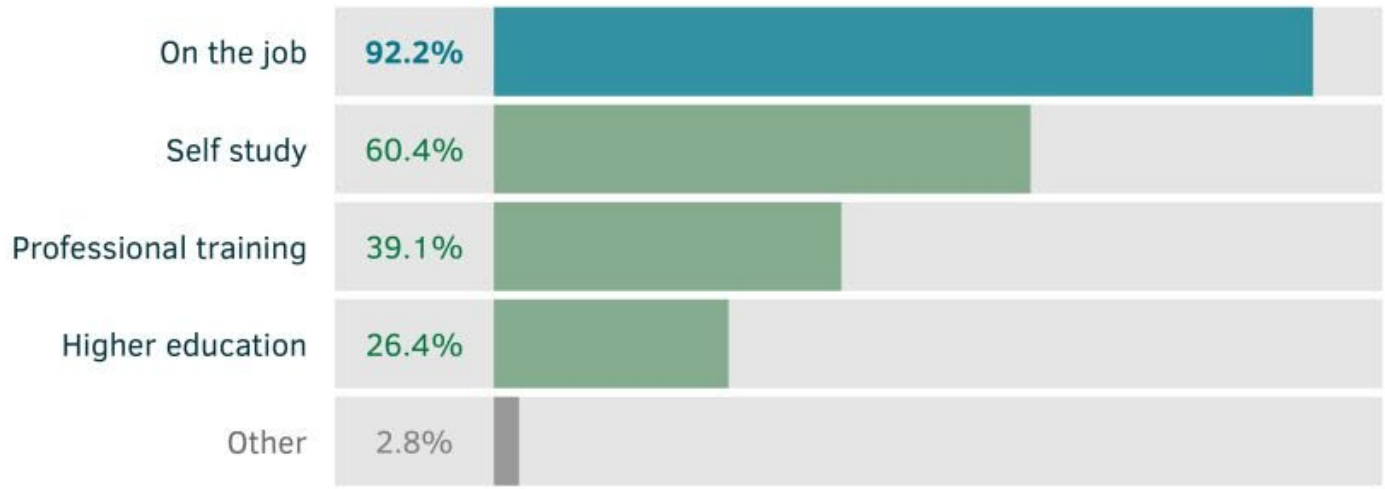
## Bar charts: **comparison** using **size**



## Where did you learn your skills?

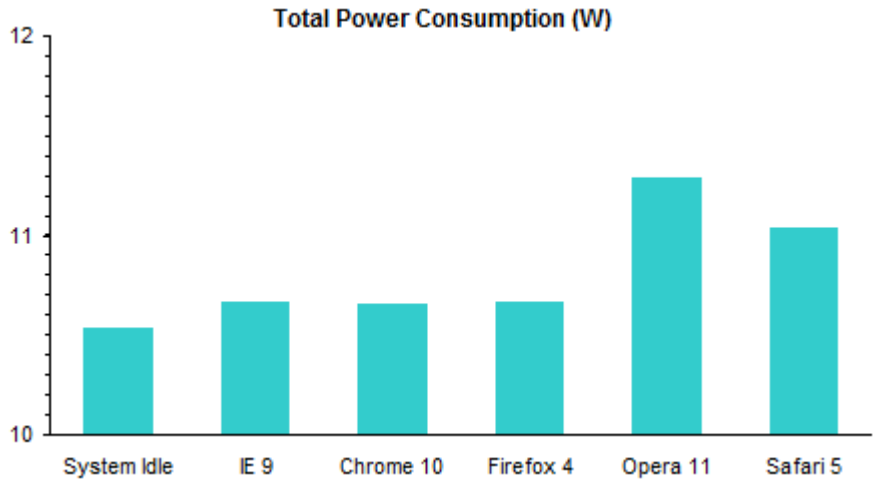


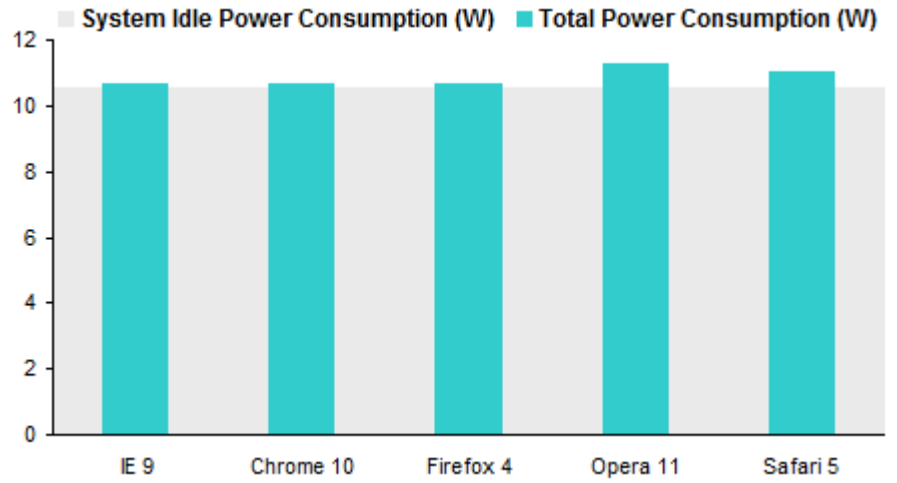

## Where did you learn your skills?



# Pitfall

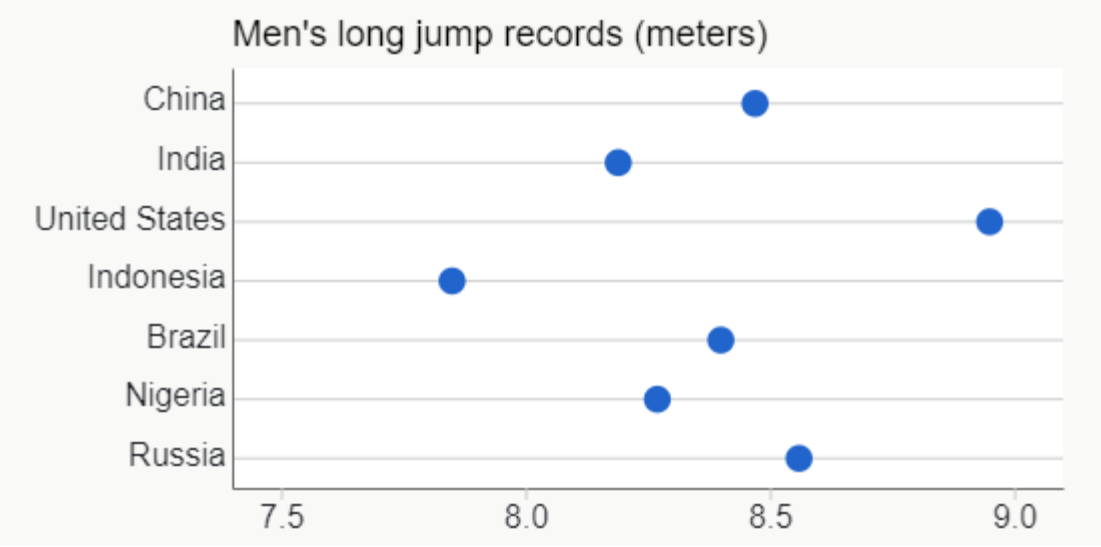
## Bar chart not starting from zero



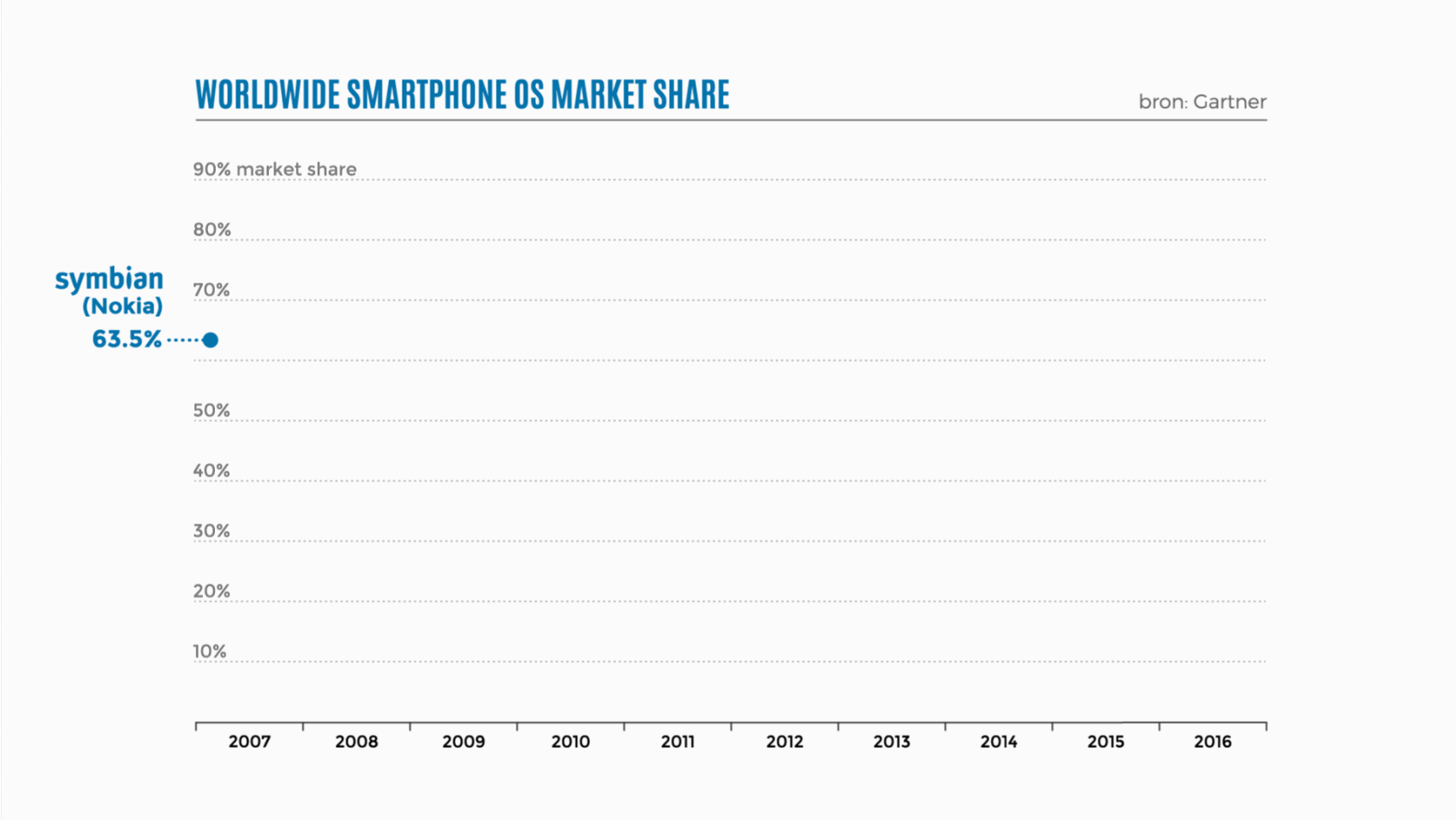
# Alternative solution

Use a dot plot



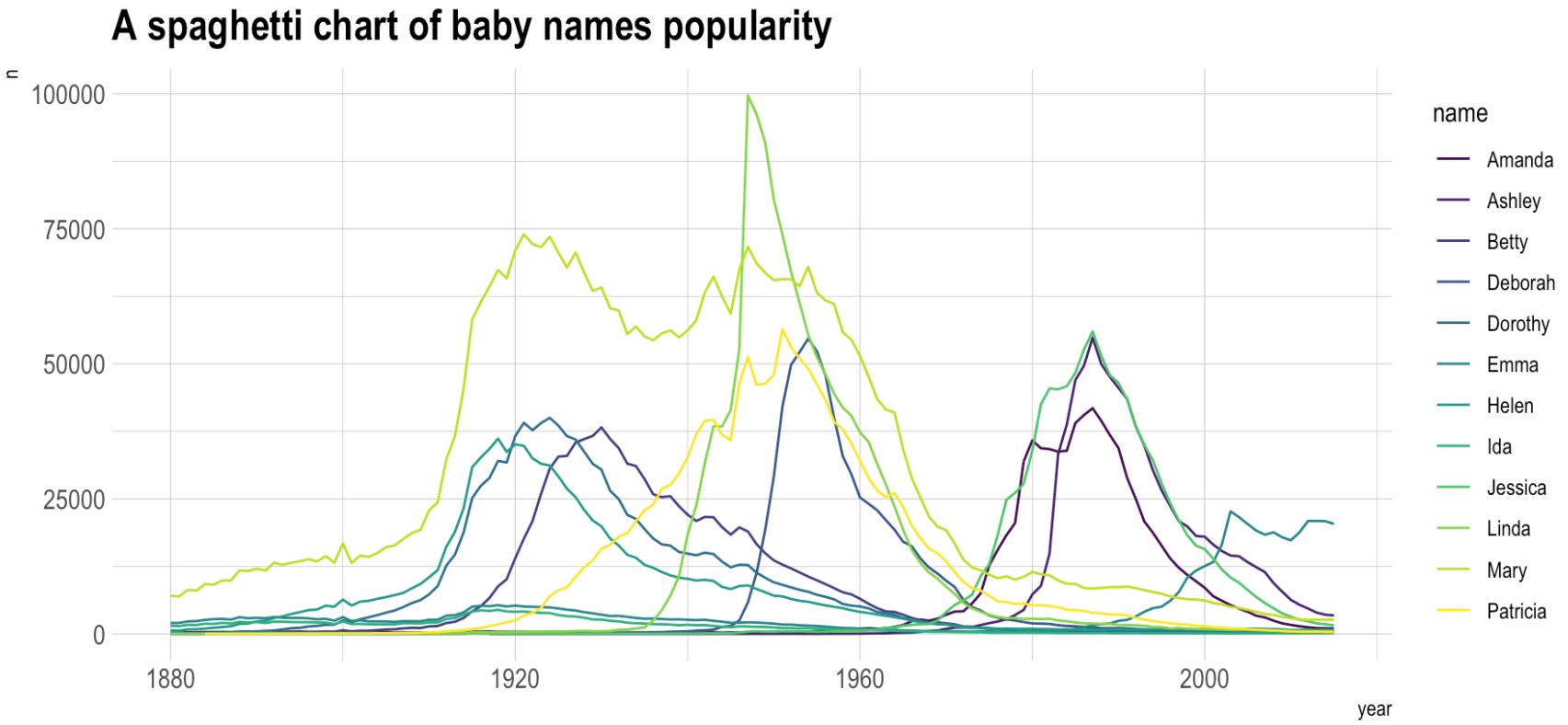
# Common chart types

Line charts: **evolution** using **position** and **orientation**



# Pitfall

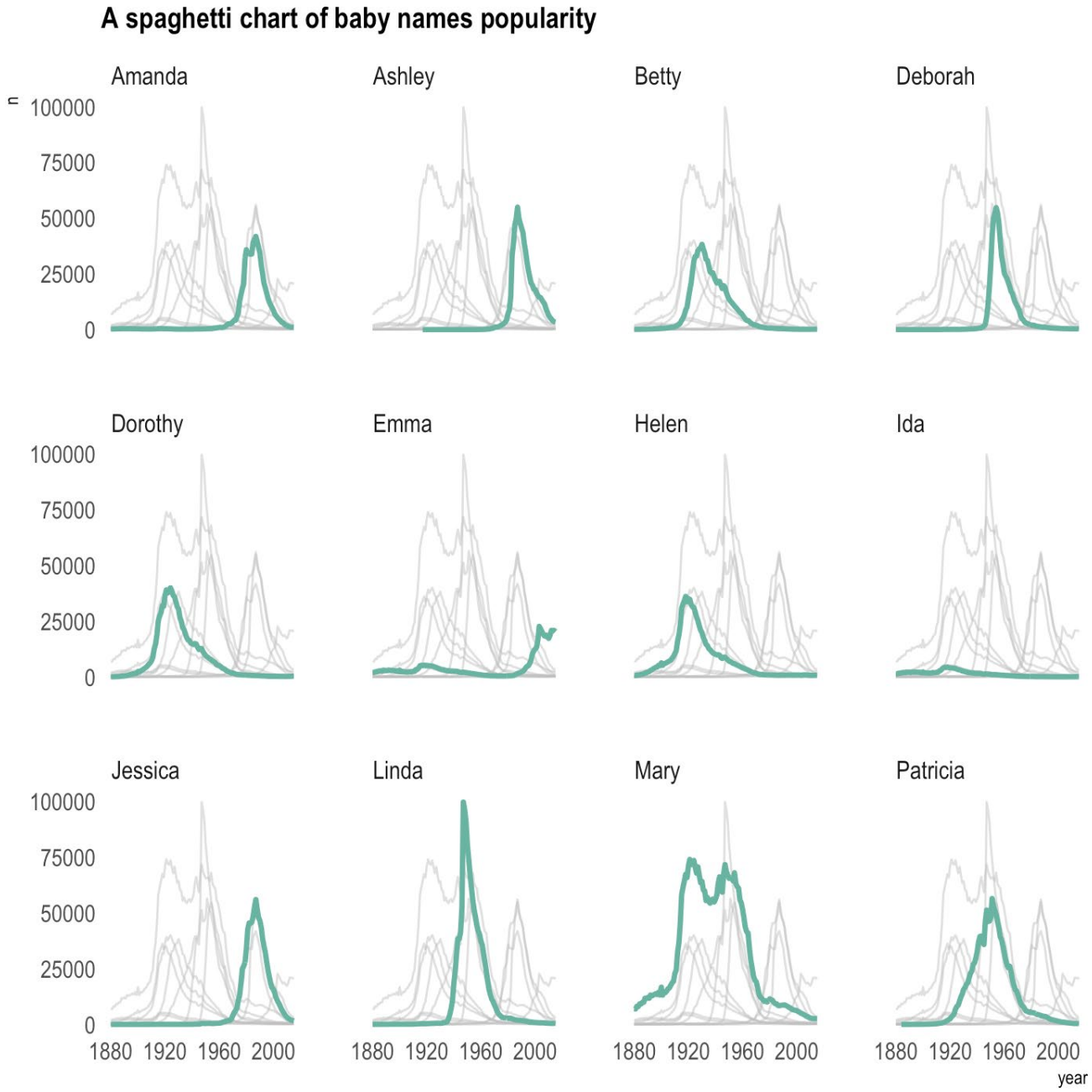
## Line chart spaghetti




https://itsmecevi.github.io/dataviz/caveat/spaghetti.html

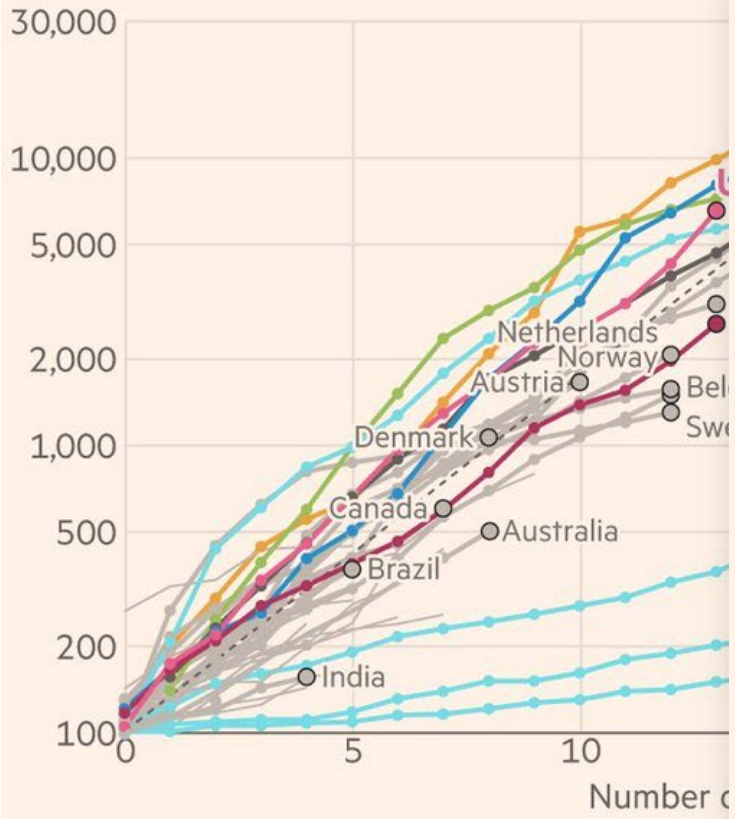
# Alternative solution

Make one line stand out



## Most western countries are on t
## and Singapore have limited the s

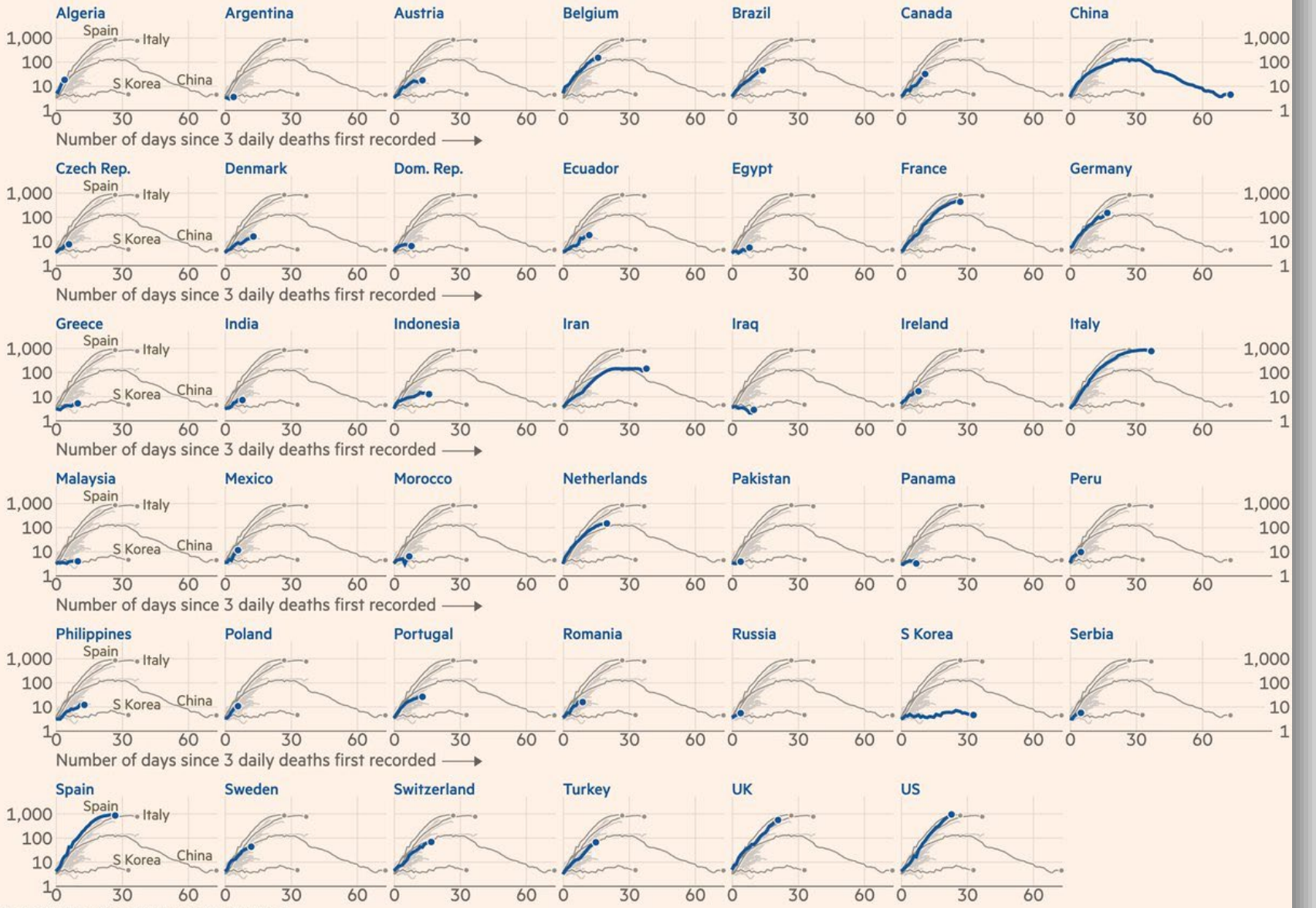
Cumulative number of cases, by number of




FT graphic: John Burn-Murdoch / @jburnmurdoch
Source: FT analysis of Johns Hopkins University, CSSE; Wor
© FT

## Daily death tolls are still accelerating in most countries

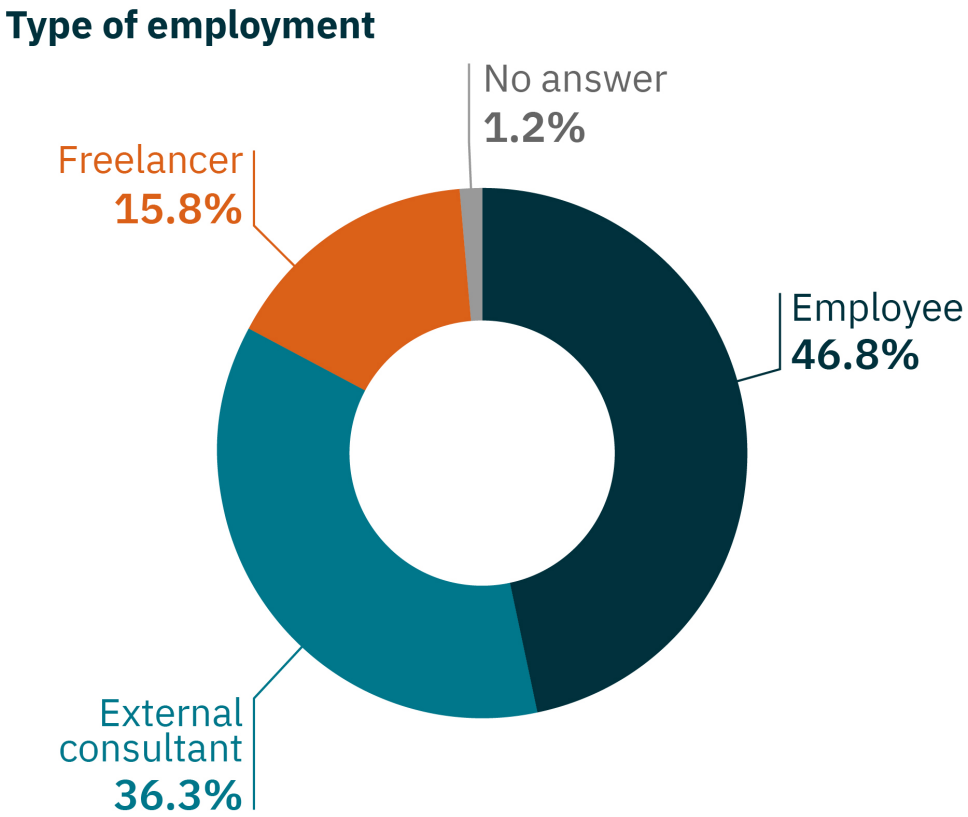
Daily deaths with coronavirus (7-day rolling average), by number of days since 3 daily deaths first recorded




FT graphic: John Burn-Murdoch / @jburnmurdoch
Source: FT analysis of European Centre for Disease Prevention and Control; Worldometers; FT research. Data updated April 05, 19:00 GMT
© FT

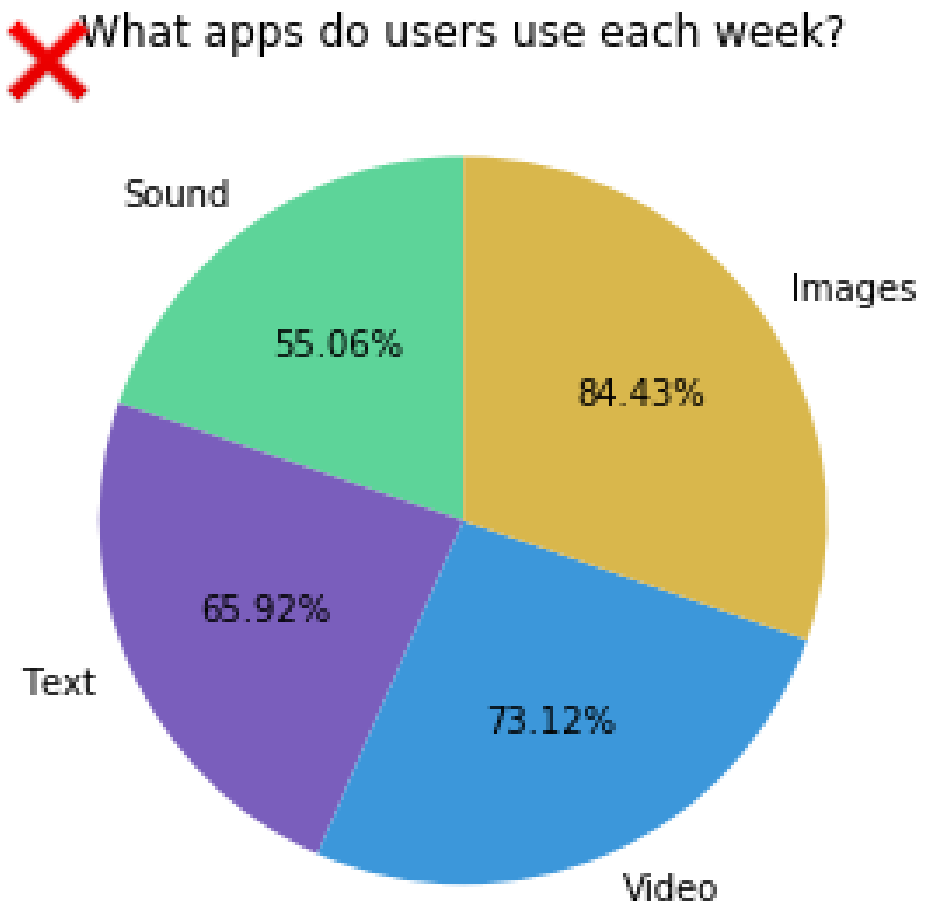
# Common chart types

Pie charts: **distribution** using **size**



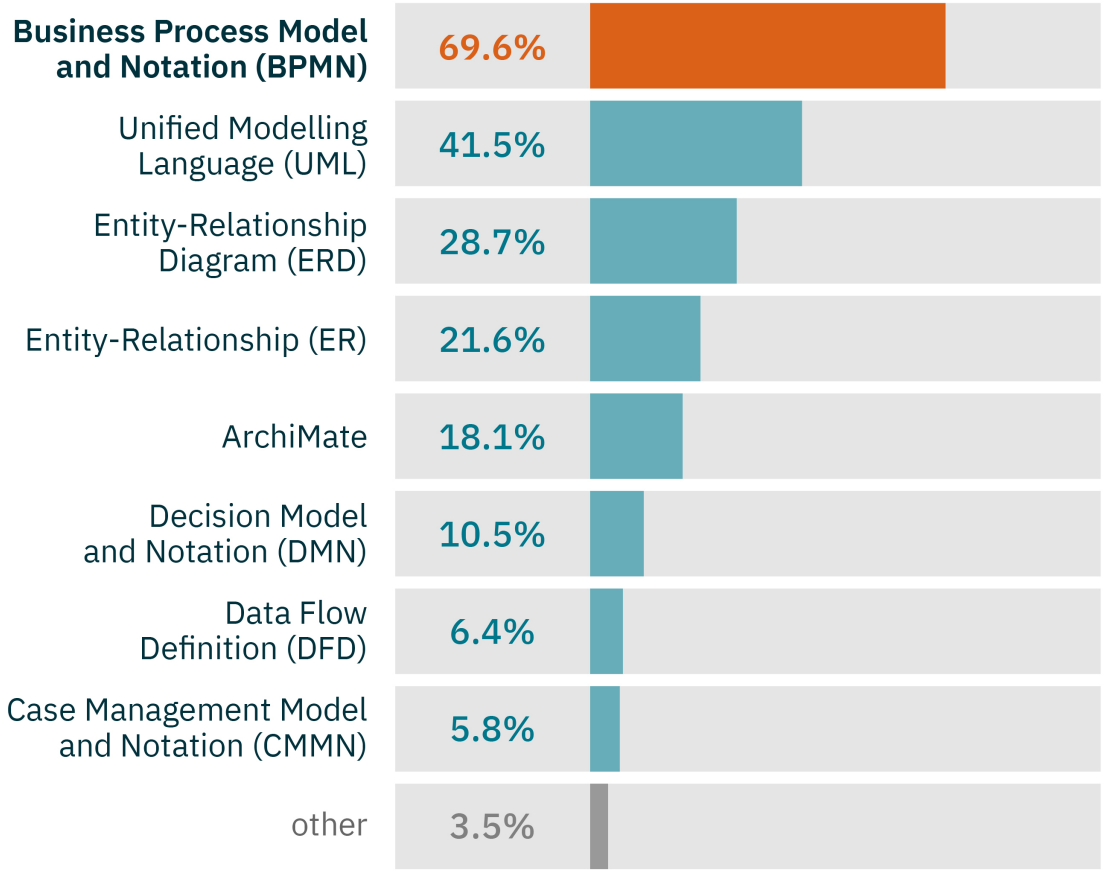
# Pitfall

It doesn’t add up



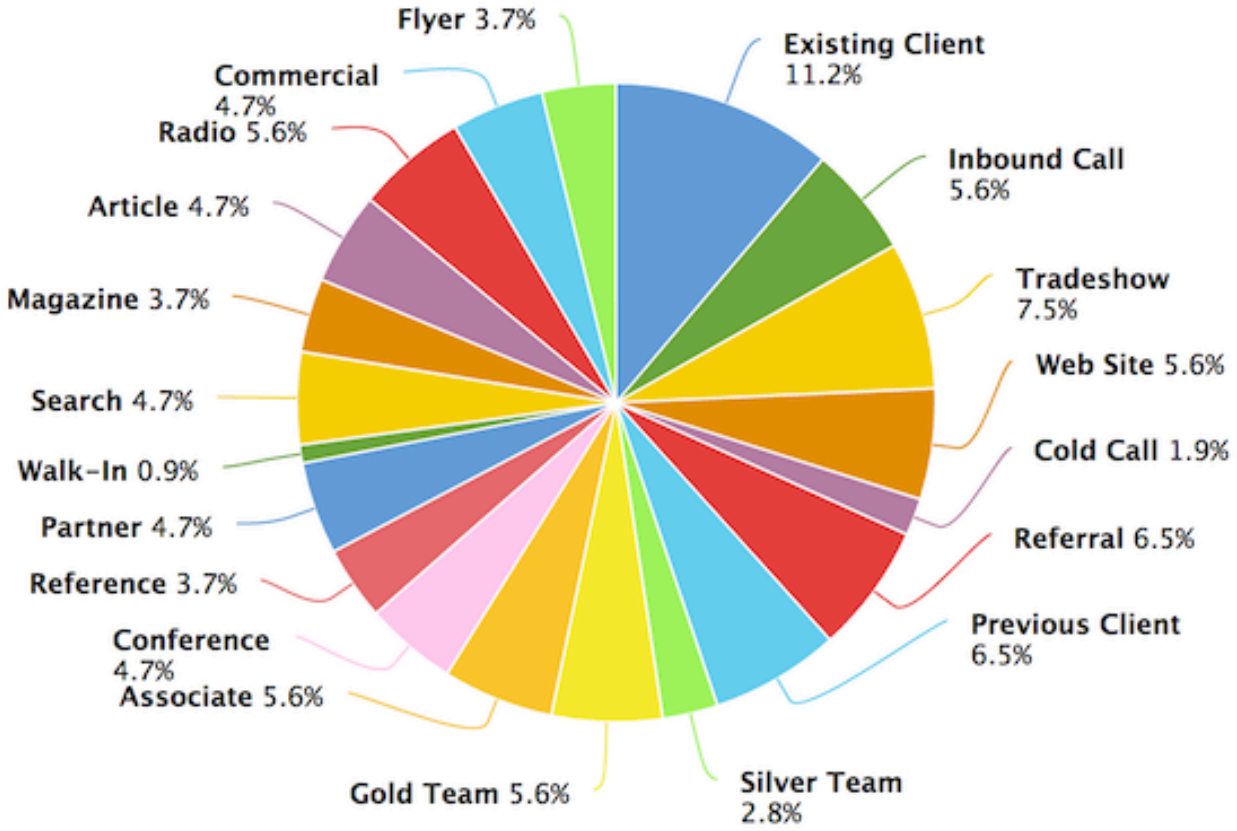
# Alternative solution

## Use a bar chart



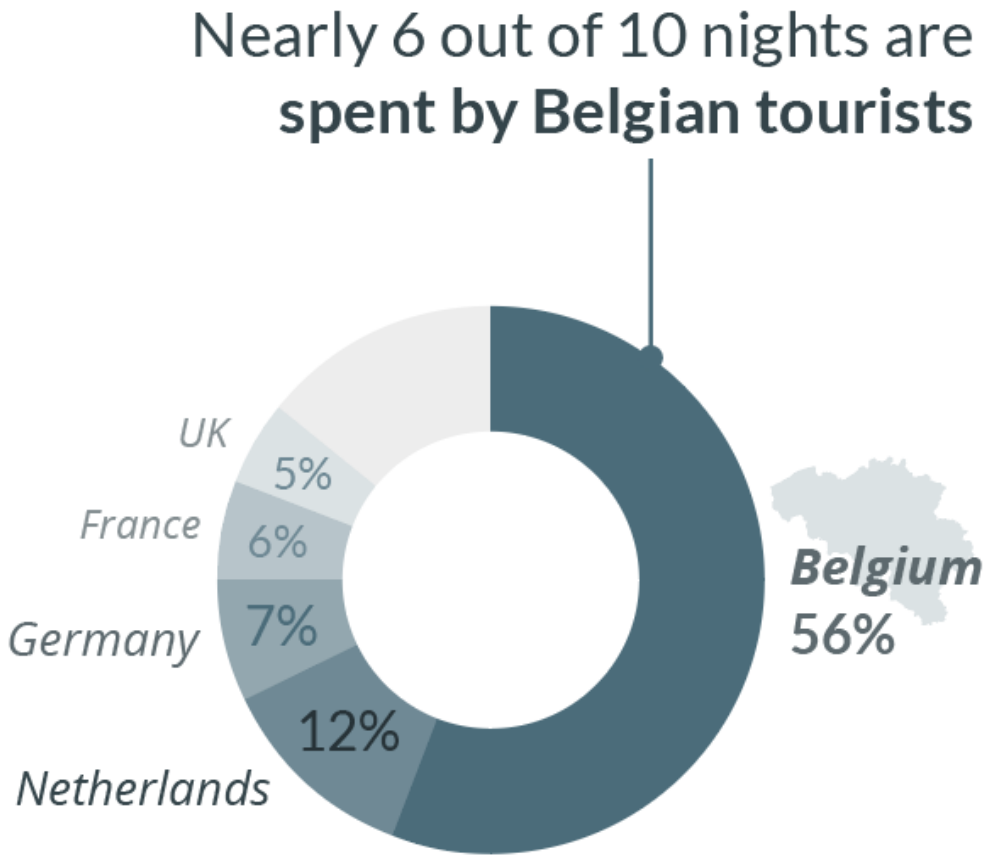
# Pitfall

## Too many categories



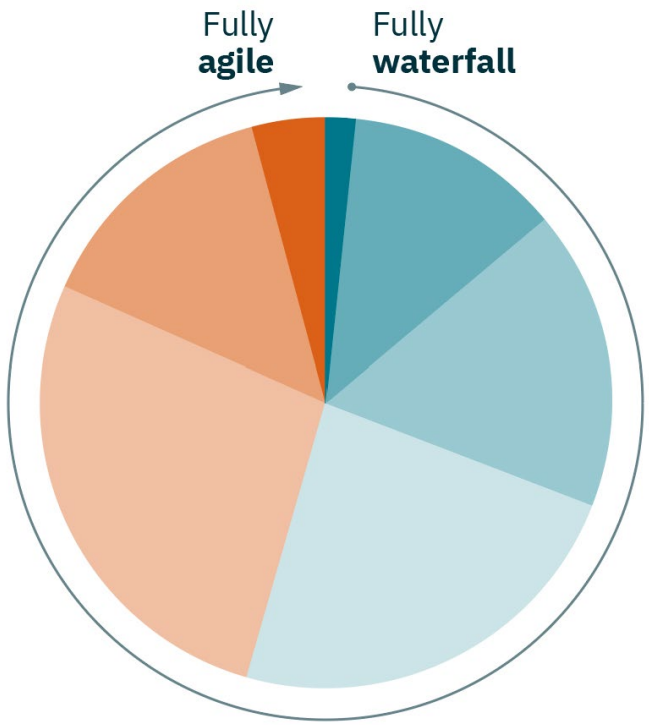
# Alternative solution

Group categories together



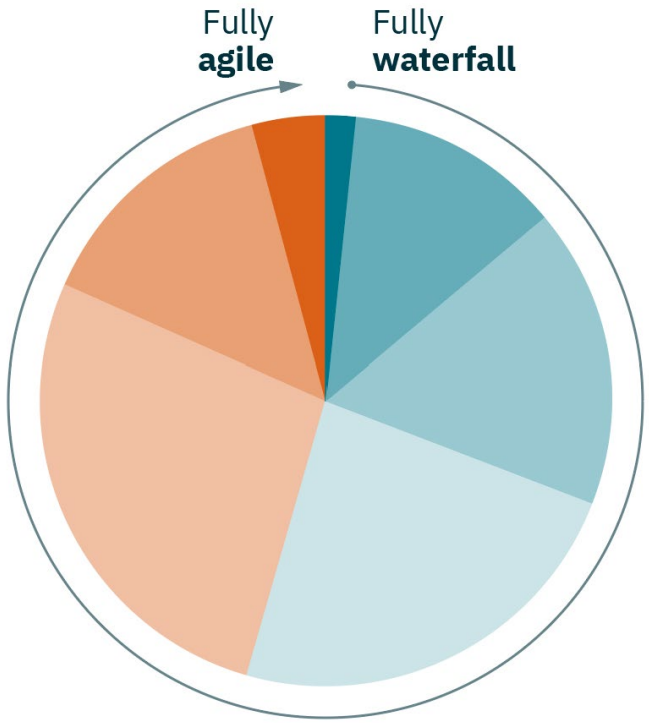
# Pitfall

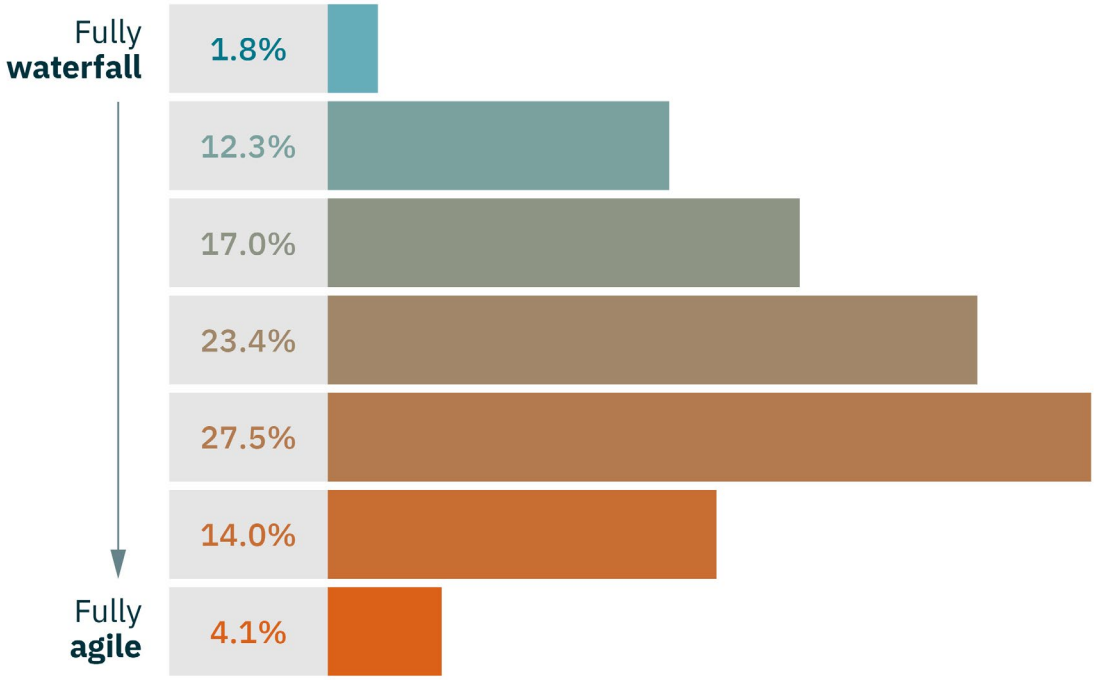
## Difficult to compare



# Alternative solution

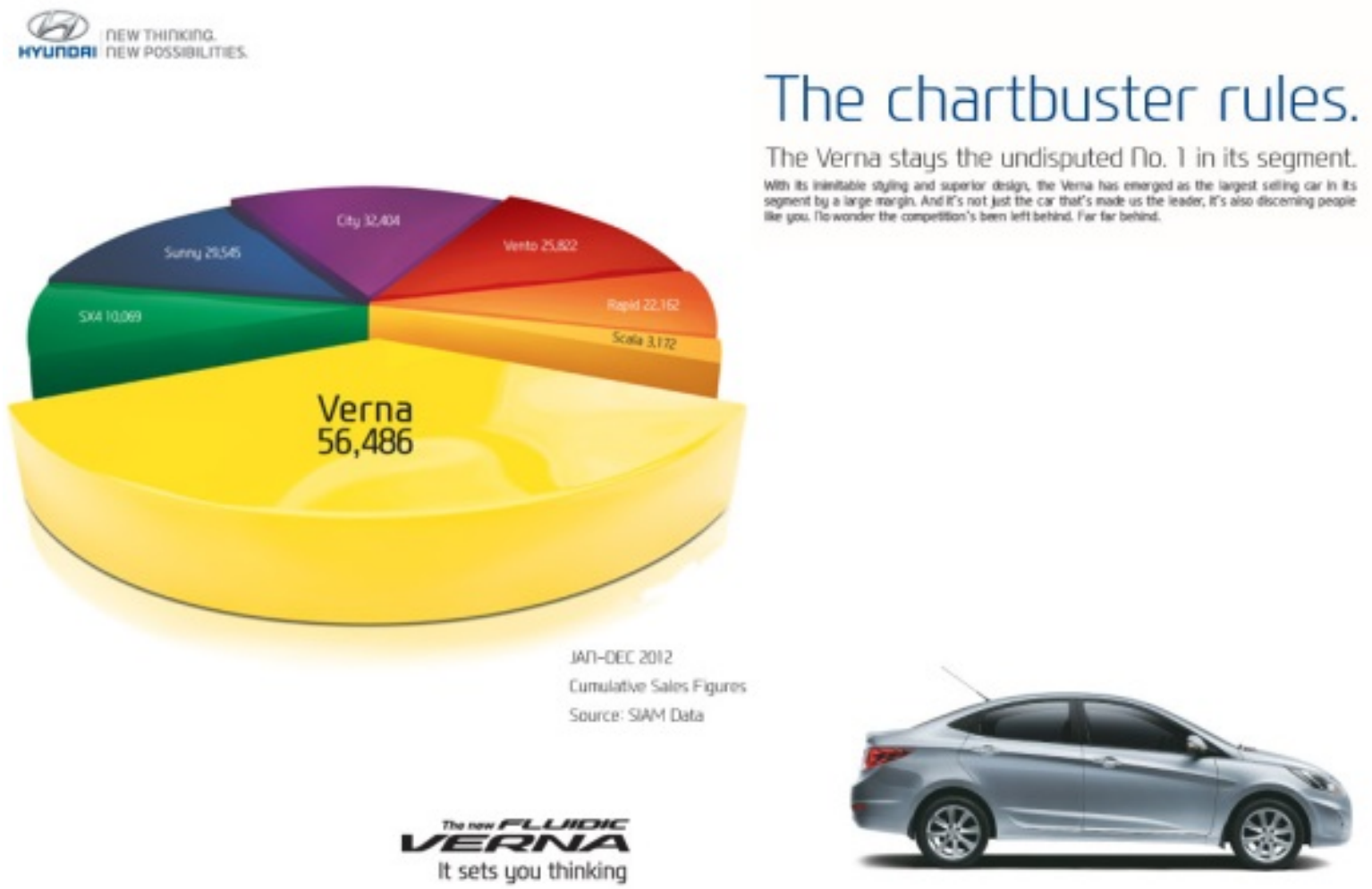
## Use a bar chart



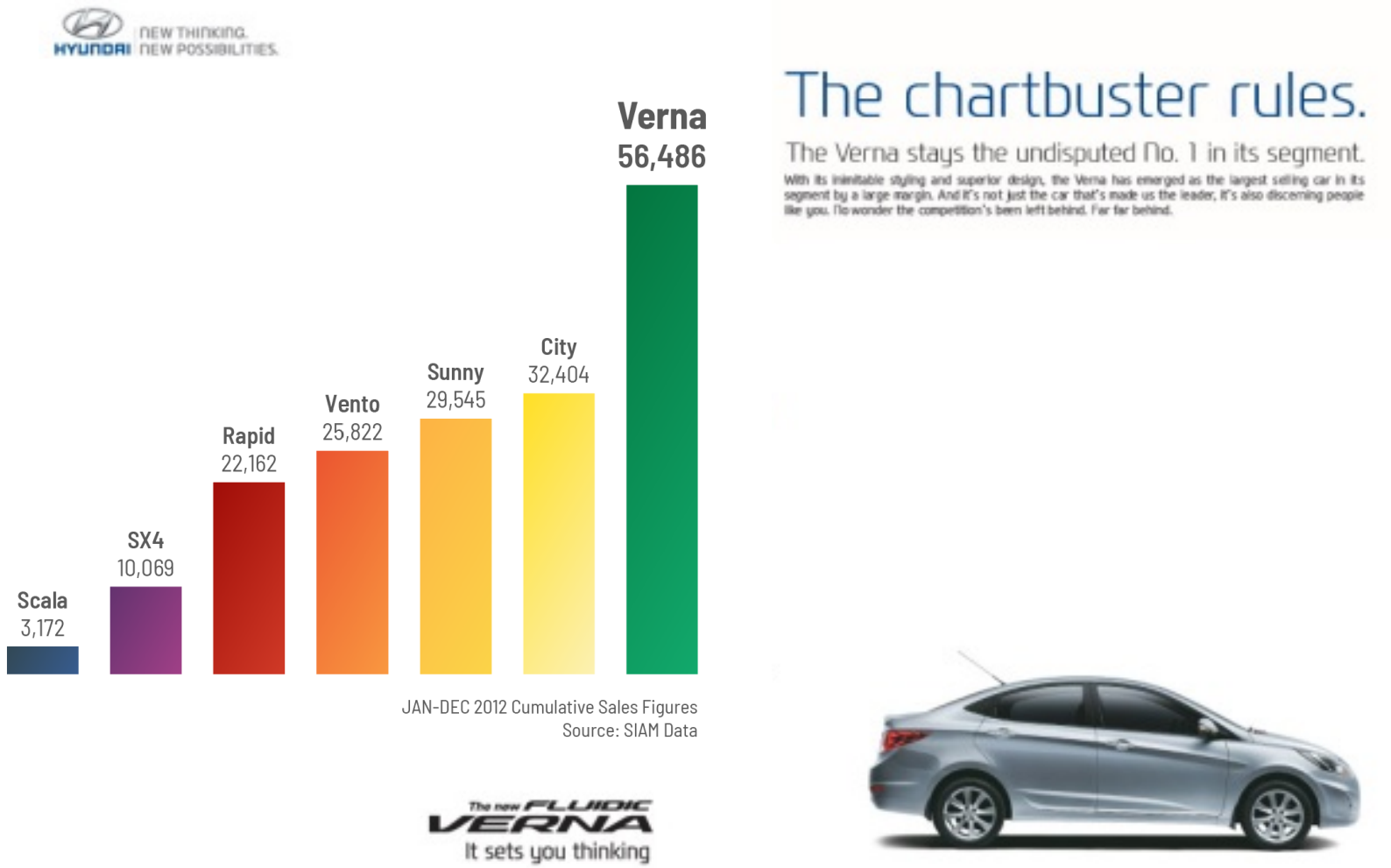
# Pitfall

3D pie charts



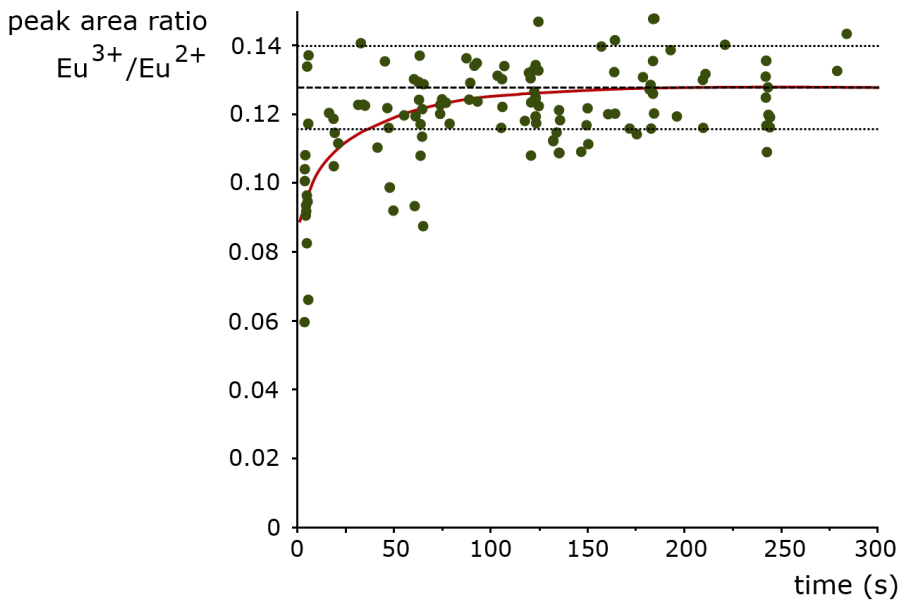
# Alternative solution

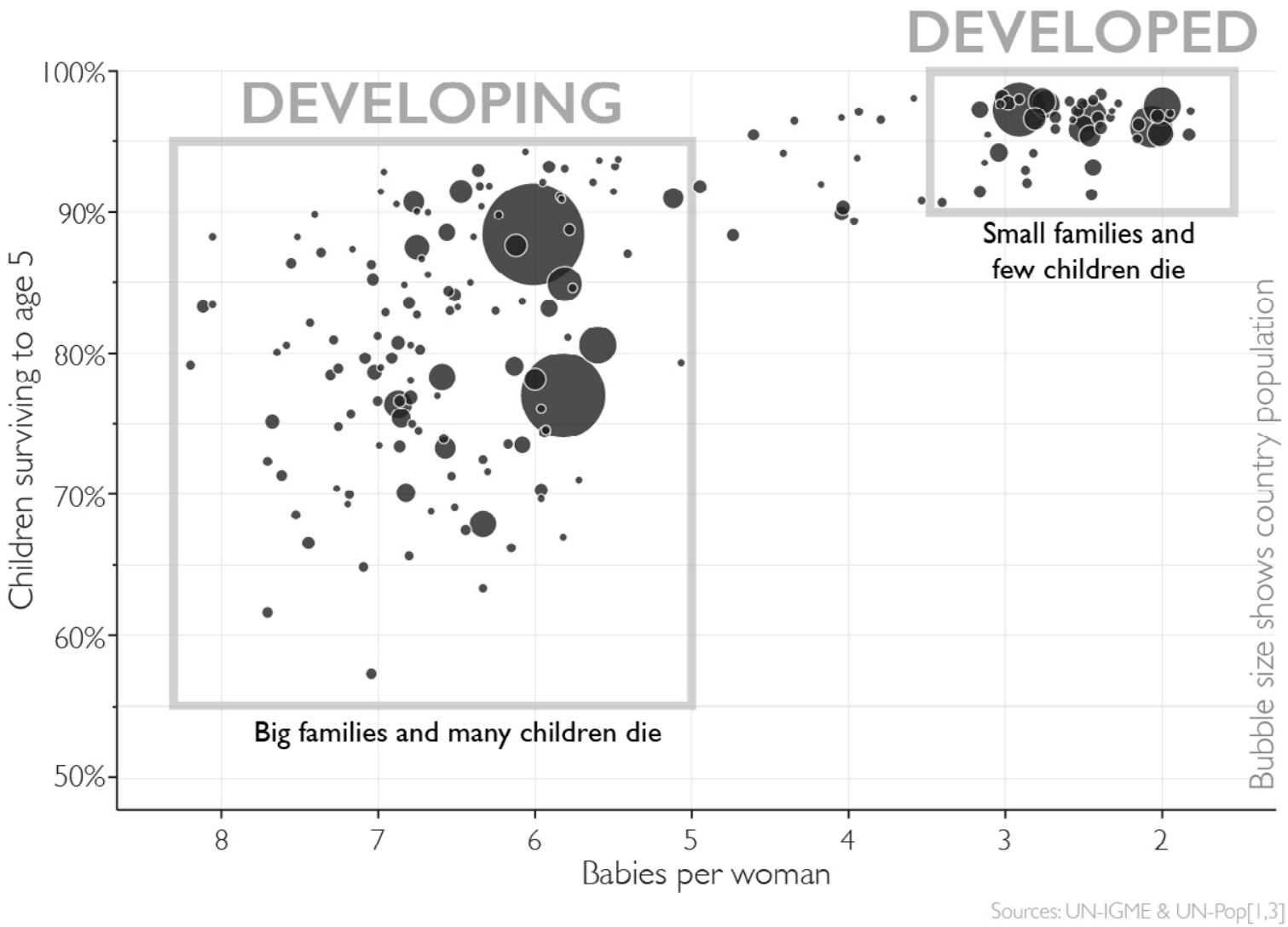
## Use a bar chart



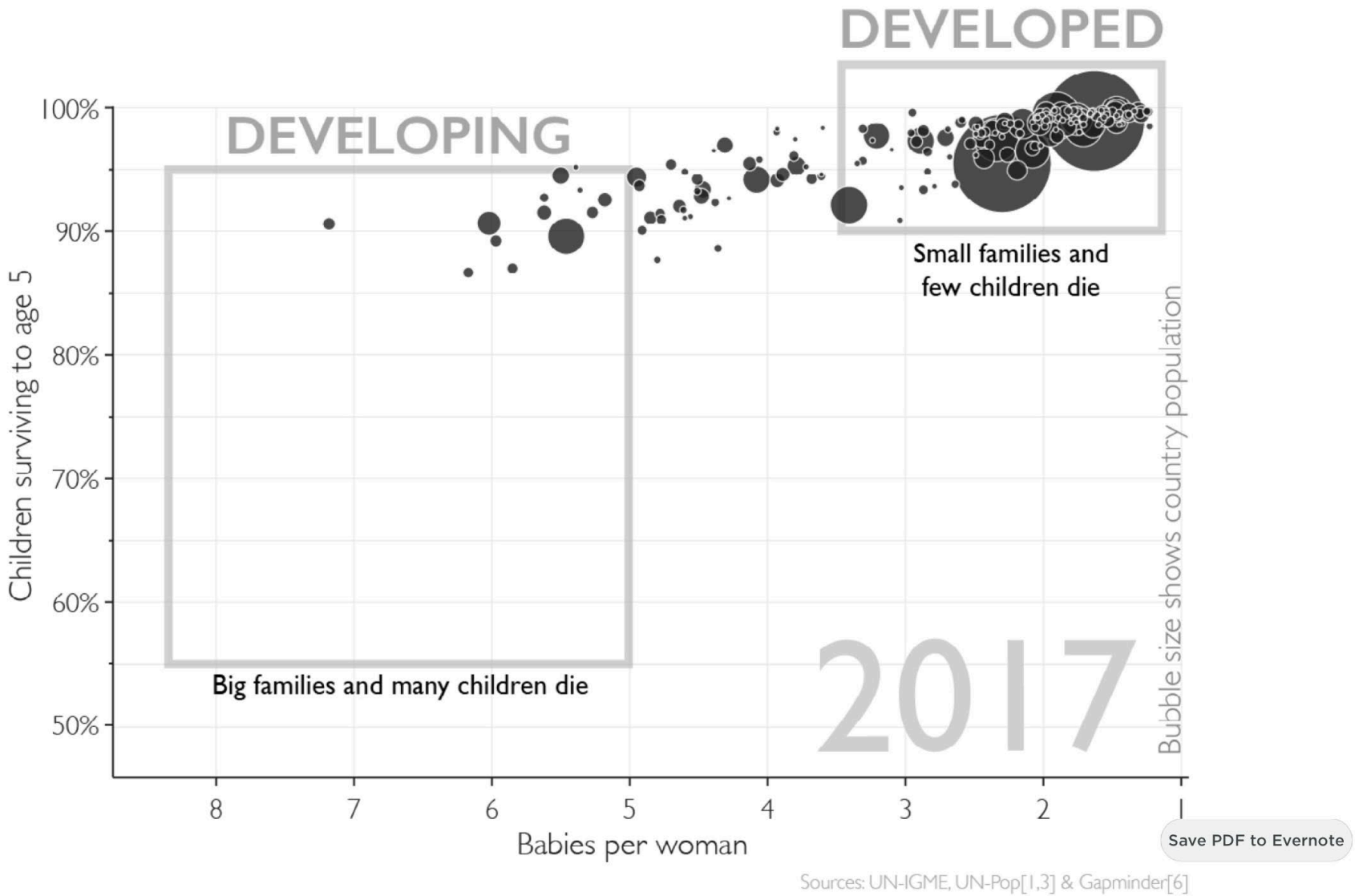
# Common chart types

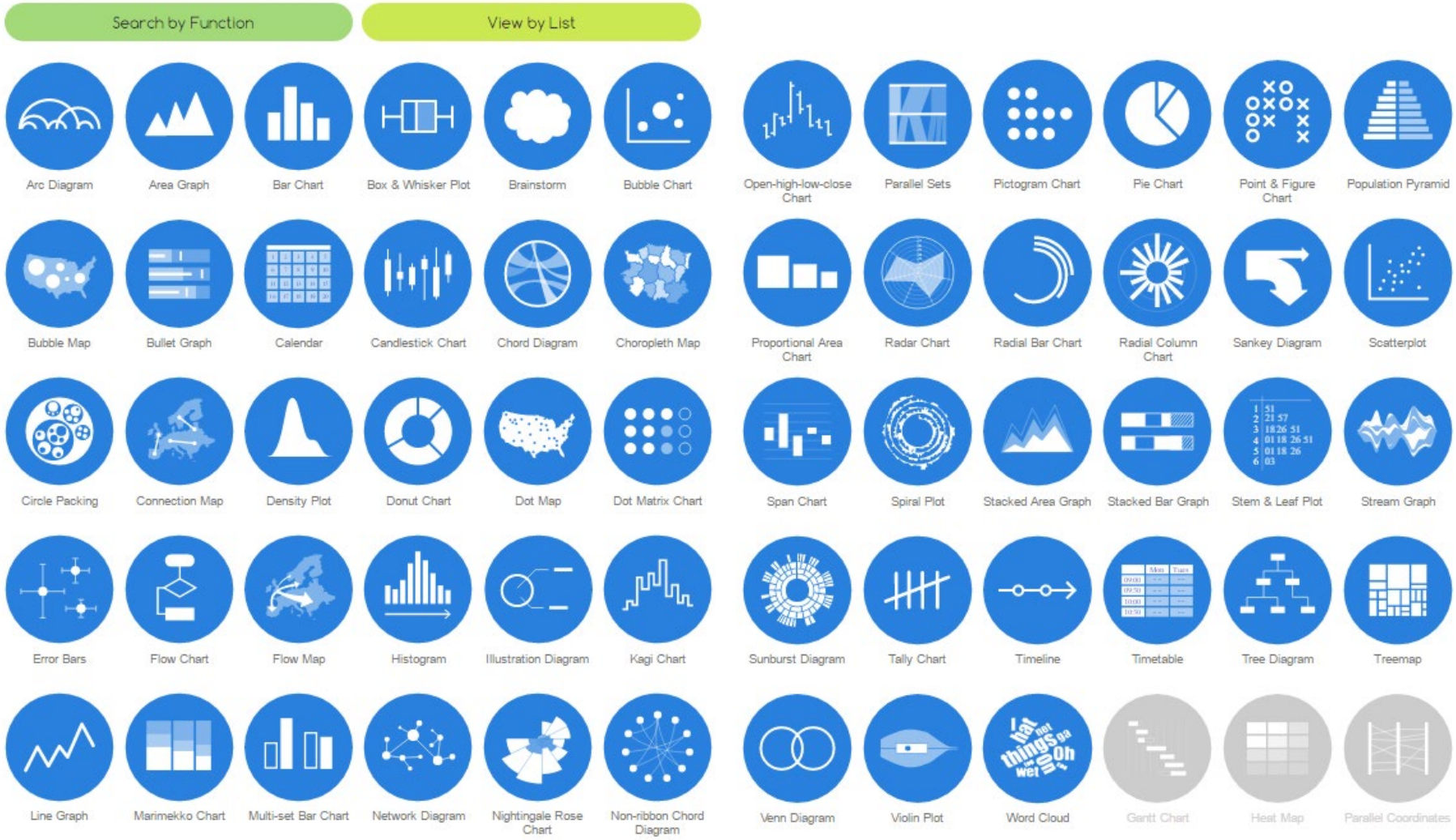
Scatter plots: **correlation** and **distribution** using **position**






Hans Rosling, Factfulness


DEVELOPED
DEVELOPING
100%
90%
80%
70%
60%
50%
Children surviving to age 5
Small families and
few children die
Big families and many children die
2017
Bubble size shows country population
8
7
6
5
4
3
2
1
Babies per woman
Save PDF to Evernote
Sources: UN-IGME, UN-Pop[1,3] & Gapminder[6]




www.datavizcatalogue.com

# Treemap

## Description

Treemaps are an alternative way of visualising the hierarchical structure of a Tree Diagram while also displaying quantities for each category via area size. Each category is assigned a rectangle area with their subcategory rectangles nested inside of it.

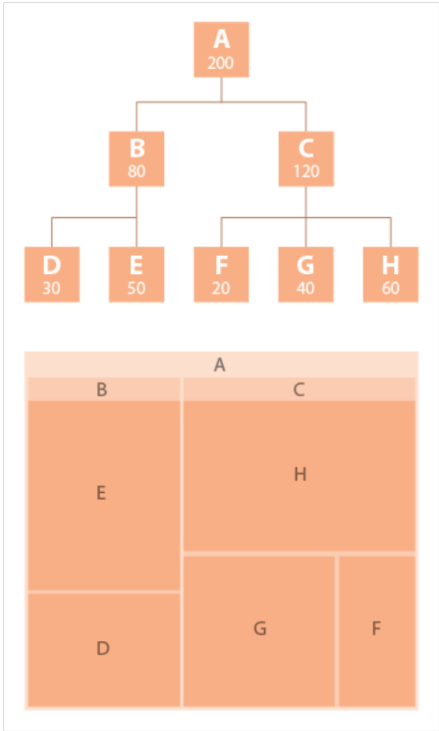
When a quantity is assigned to a category, its area size is displayed in proportion to that quantity and to the other quantities within the same parent category in a part-to-whole relationship. Also, the area size of the parent category is the total of its subcategories. If no quantity is assigned to a subcategory, then it's area is divided equally amongst the other subcategories within its parent category.

The way rectangles are divided and ordered into sub-rectangles is dependent on the tiling algorithm used. Many tiling algorithms have been developed, but the "squarified algorithm" which keeps each rectangle as square as possible is the one commonly used.

Ben Shneiderman originally developed Treemaps as a way of visualising a vast file directory on a computer, without taking up too much space on the screen. This makes Treemaps a more compact and space-efficient option for displaying hierarchies, that gives a quick overview of the structure. Treemaps are also great at comparing the proportions between categories via their area size.

The downside to a Treemap is that it doesn't show the hierarchal levels as clearly as other charts that visualise hierarchal data (such as a Tree Diagram or Sunburst Diagram).

## Anatomy




## Functions

Comparisons | Hierarchy | Part-to-a-whole | Proportions

## Similar Charts

Circle Packing

Marimekko Chart

Sunburst Diagram

## Tools to Generate Visualisation

AnyChart (code)
amCharts (code)
D3 (code)
Datamatic
Google Charts (code) or Google Docs
Infogram
jChartFX (JavaScript plugin)
JSCharting (JS Library)
RAWGraphs
Slemma
Vega (code)
Vizzlo
ZingChart (code)

## Examples

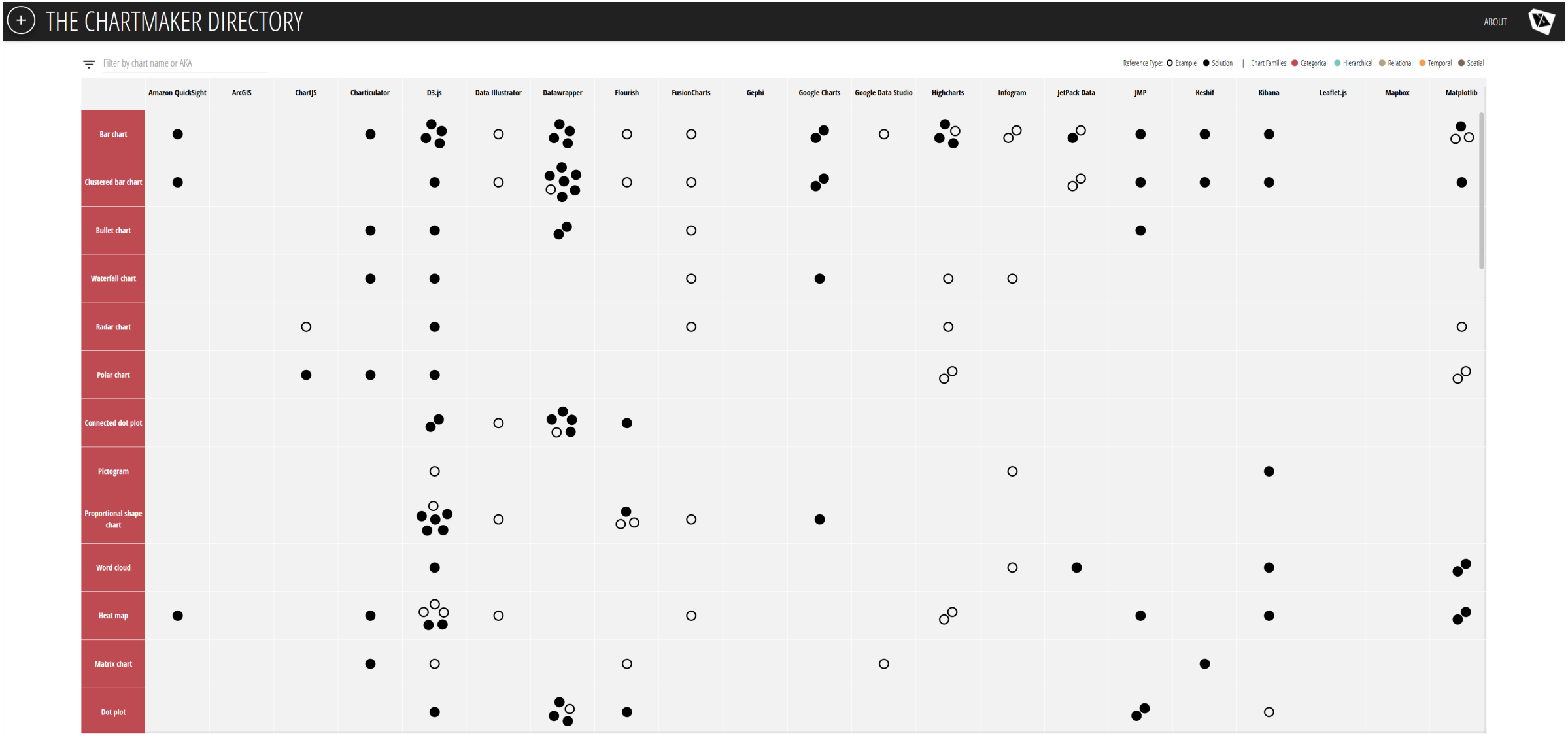
Region-wise Literacy Rates in 2015, World Population - FusionCharts

Top 10 Chinese Exports to the World - AnyChart

Treemap - Datamatic


Need to access this page offline? Download the eBook from here.

Merchandise & other related dataviz products can be found at the store

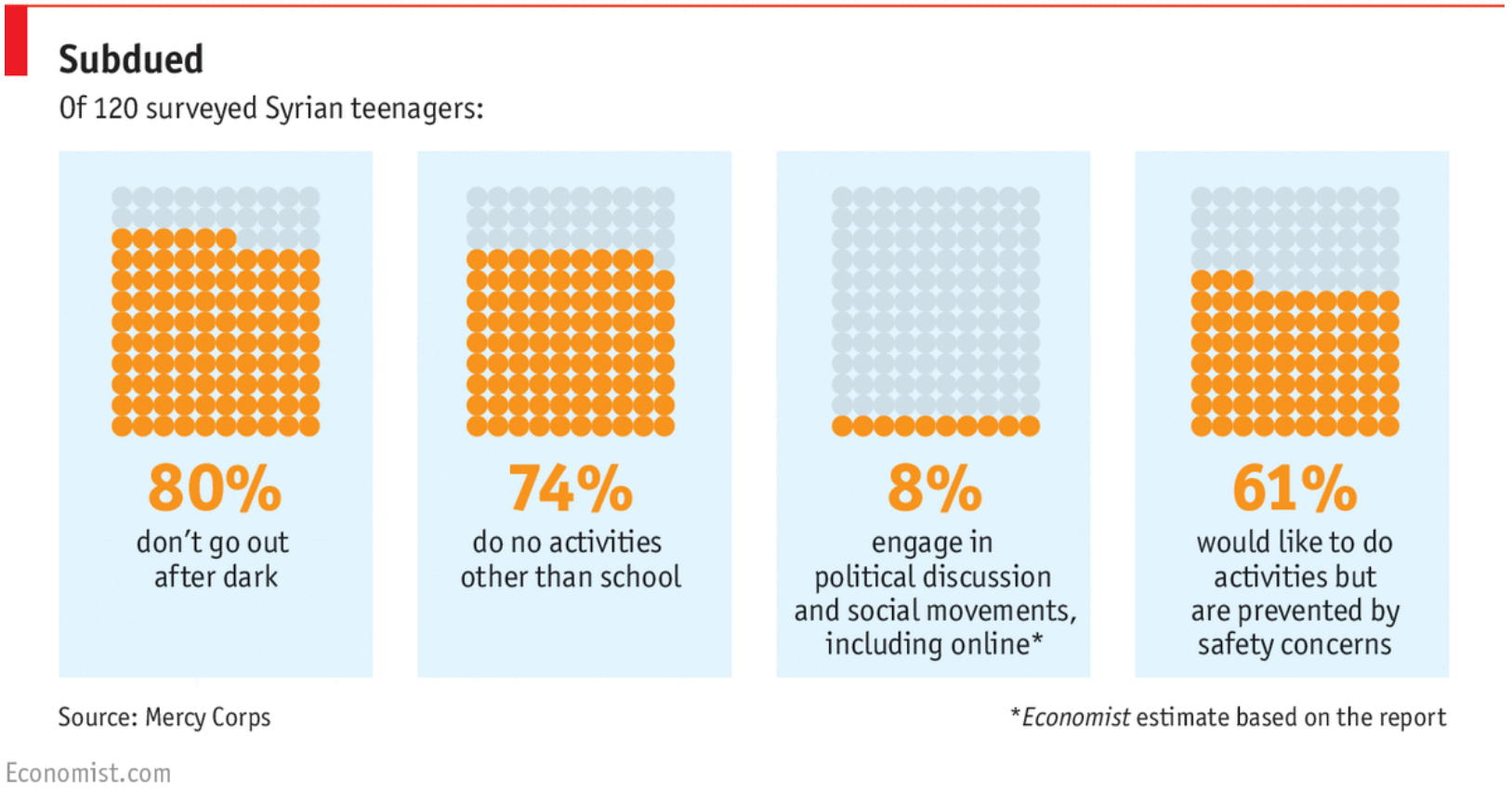



http://chartmaker.visualisingdata.com

https://chart.guide/

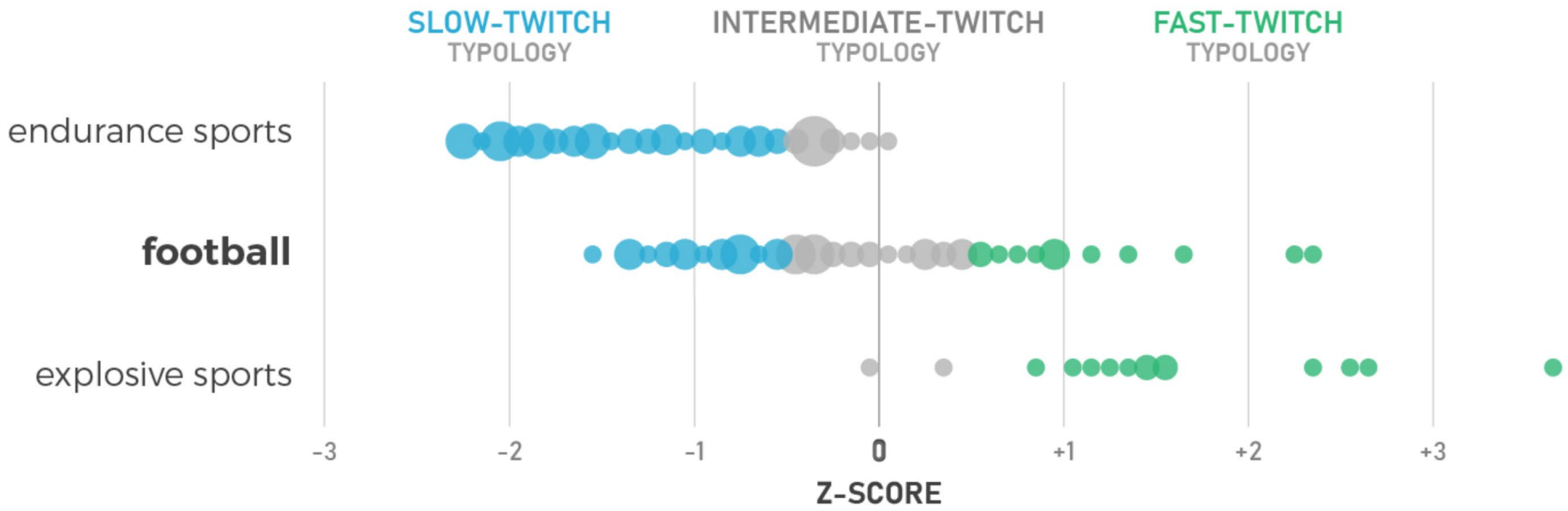
# Less common chart types

## Waffle charts



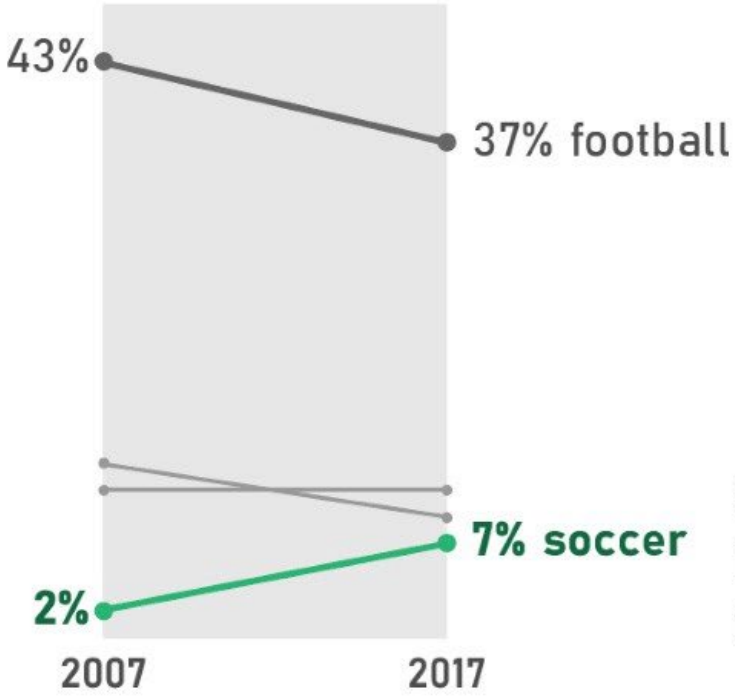
# Less common chart types

## Strip charts



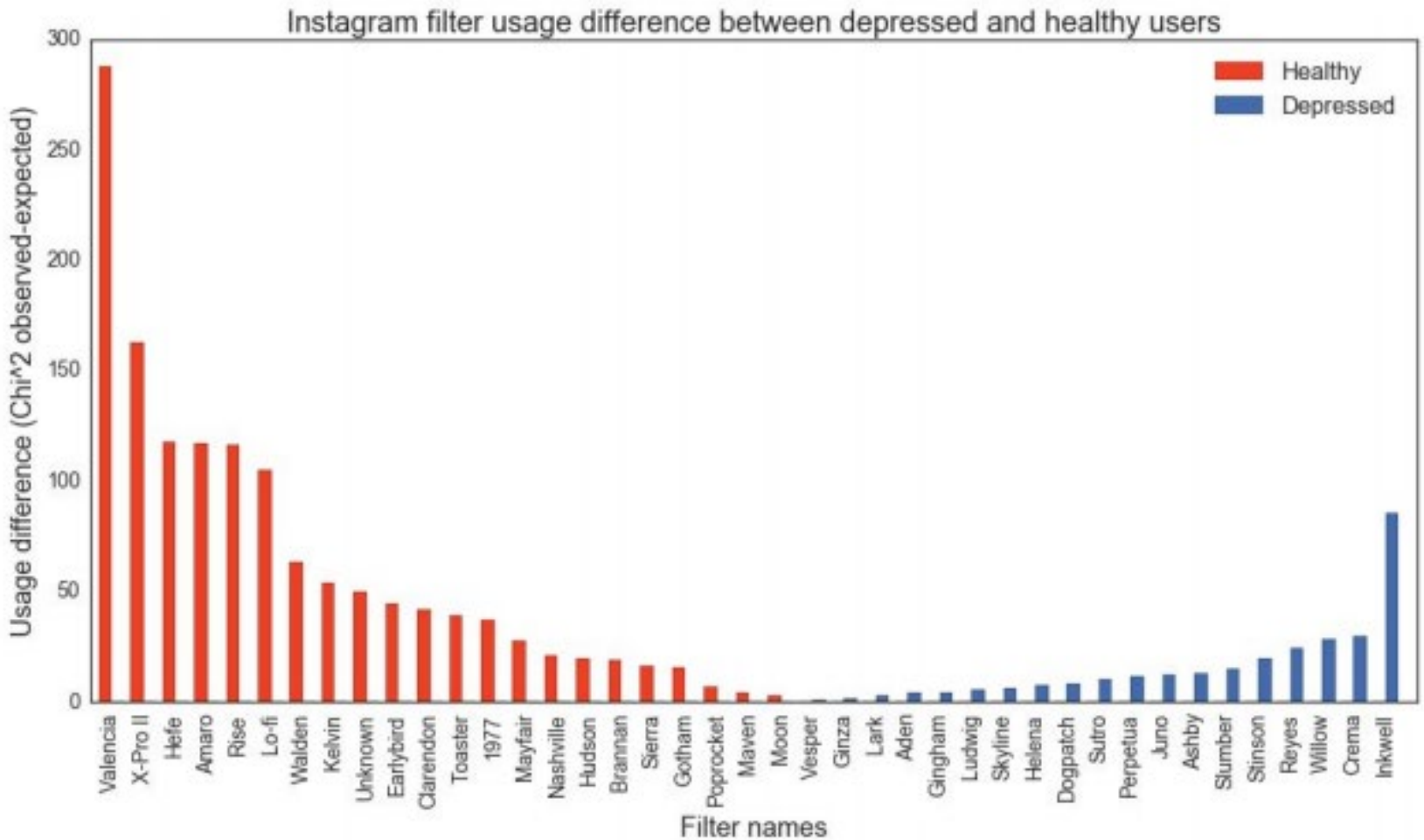
# Less common chart types

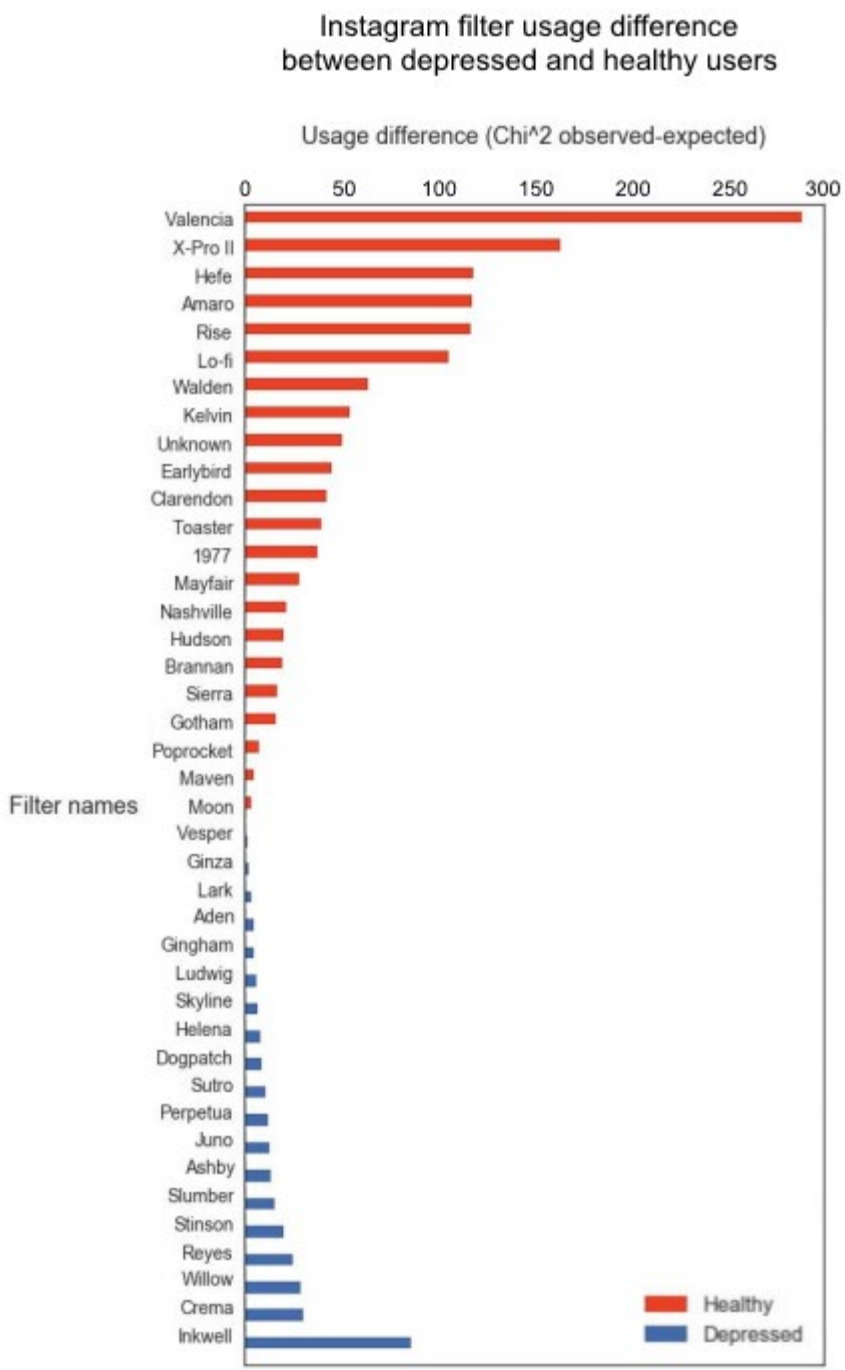
## Slopegraphs




**Soccer** is rapidly growing
in popularity and is now
the **fourth favorite sport** to watch

# Case studies


Instagram filter usage difference between depressed and healthy users
Usage difference (Chi^2 observed-expected)
300
250
200
150
100
50
0
Healthy
Depressed
Valencia
X-Pro II
Hefe
Amaro
Rise
Lo-fi
Walden
Kelvin
Unknown
Earlybird
Clarendon
Toaster
1977
Mayfair
Nashville
Hudson
Brannan
Sierra
Gotham
Poprocket
Maven
Moon
Vesper
Ginza
Lark
Aden
Gingham
Ludwig
Skyline
Helena
Dogpatch
Sutro
Perpetua
Juno
Ashby
Slumber
Stinson
Reyes
Willow
Crema
Inkwell
Filter names


Instagram filter usage difference
between depressed and healthy users
Usage difference (Chi^2 observed-expected)
0
50
100
150
200
250
300
Filter names
Valencia
X-Pro II
Hefe
Amaro
Rise
Lo-fi
Walden
Kelvin
Unknown
Earlybird
Clarendon
Toaster
1977
Mayfair
Nashville
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Sierra
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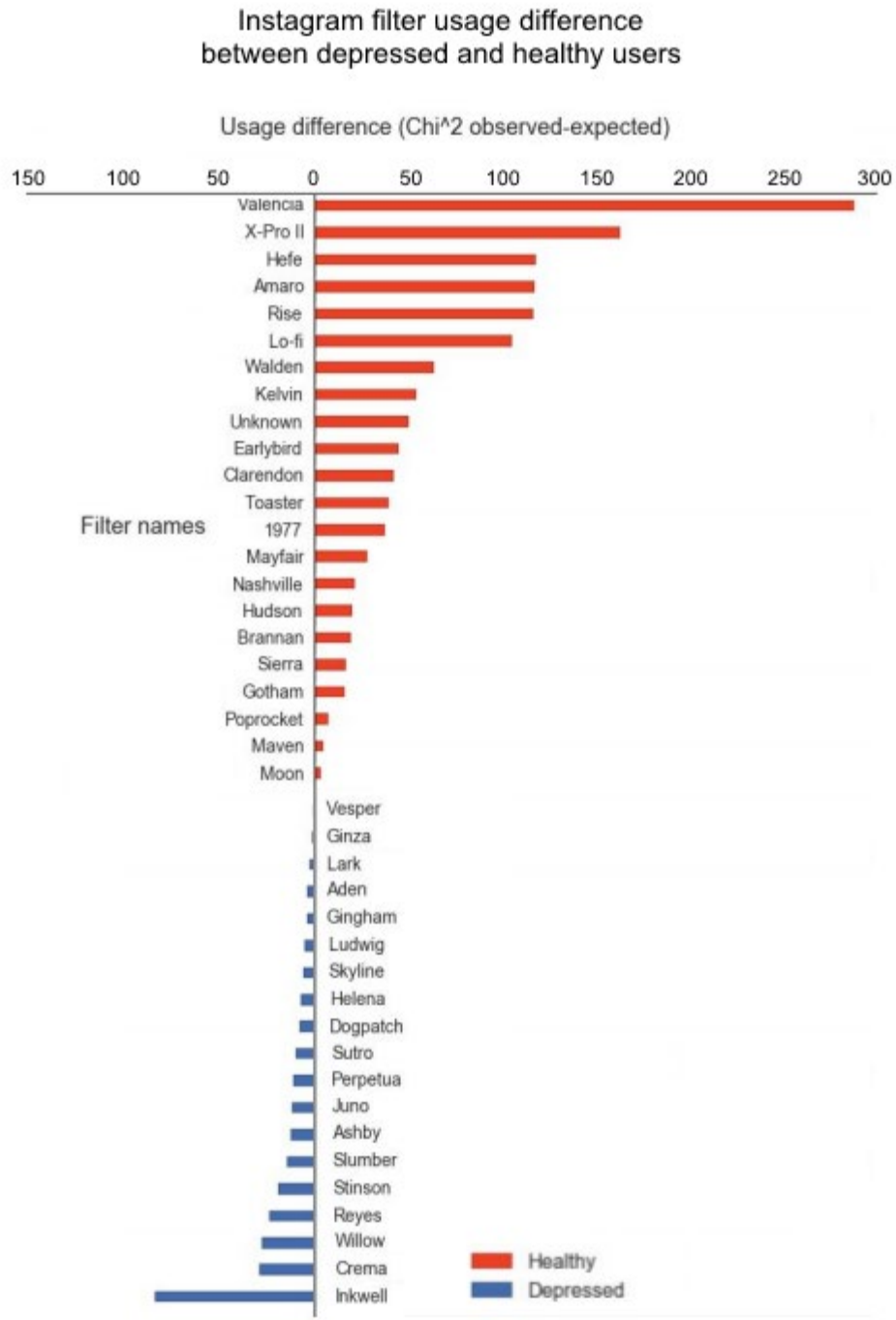
Skyline
Helena
Dogpatch
Sutro
Perpetua
Juno
Ashby
Slumber
Stinson
Reyes
Willow
Crema
Inkwell
Healthy
Depressed


Instagram filter usage difference
between depressed and healthy users
Usage difference (Chi^2 observed-expected)
150
100
50
0
50
100
150
200
250
300
Filter names
Valencia
X-Pro II
Hefe
Amaro
Rise
Lo-fi
Walden
Kelvin
Unknown
Earlybird
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Toaster
1977
Mayfair
Nashville
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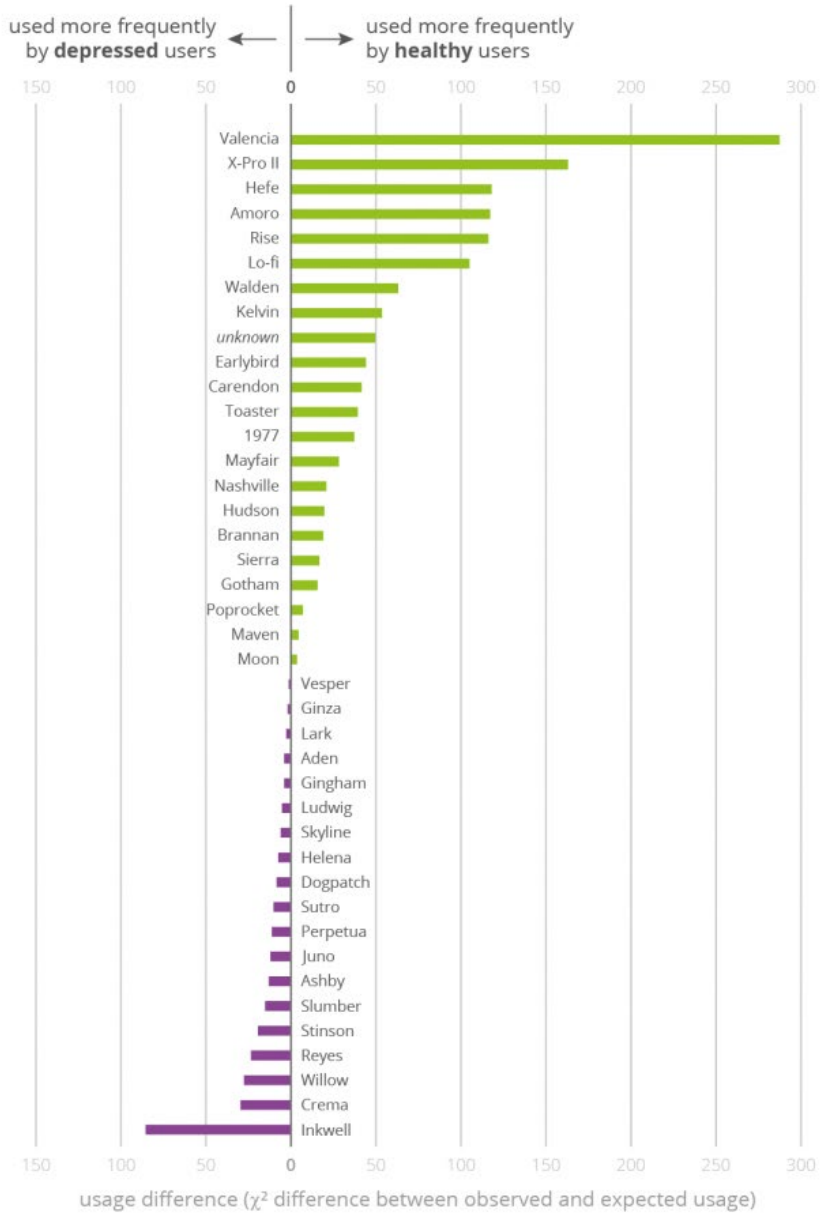
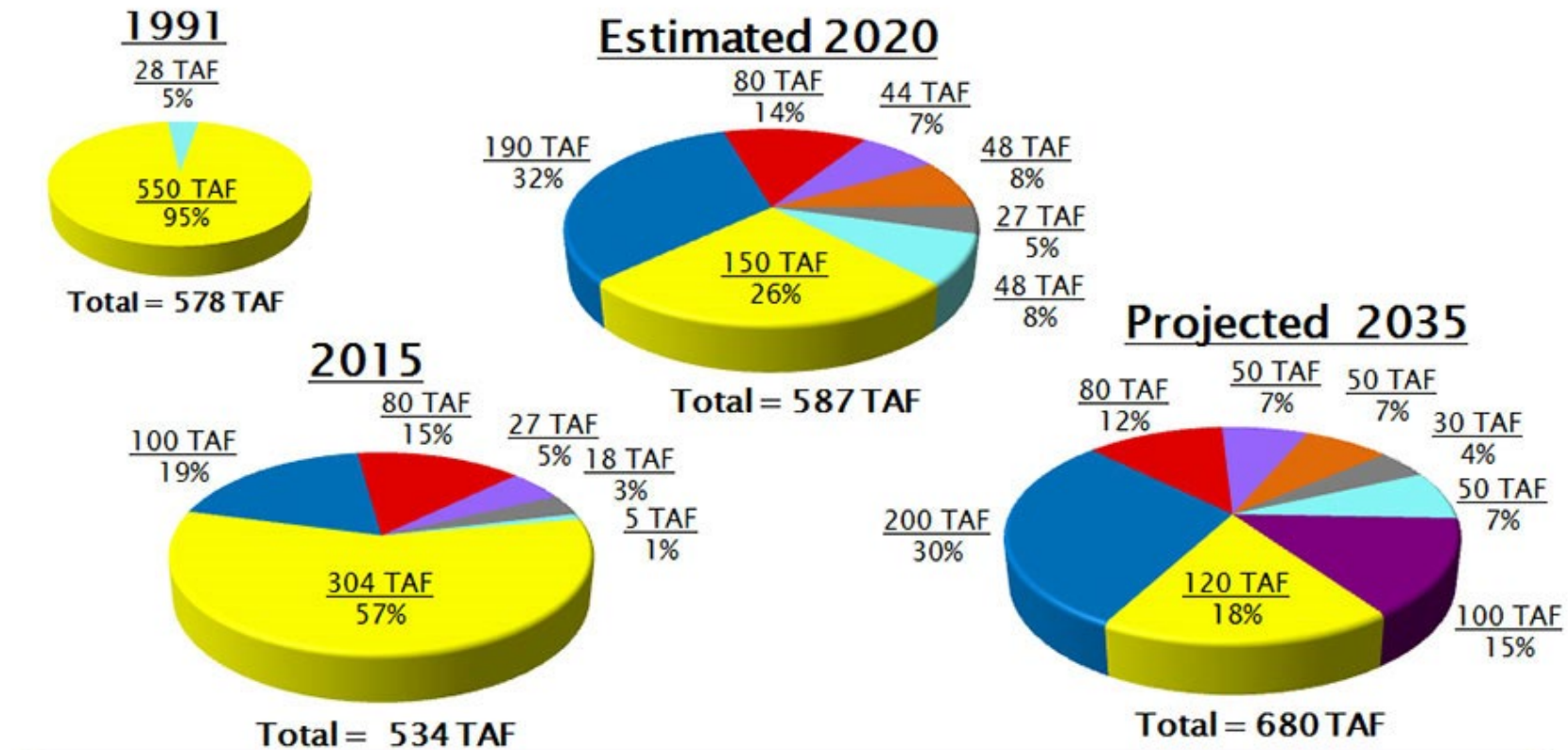
Aden
Gingham
Ludwig
Skyline
Helena
Dogpatch
Sutro
Perpetua
Juno
Ashby
Slumber
Stinson
Reyes
Willow
Crema
Inkwell
Healthy
Depressed

## Instagram filter usage difference between depressed and healthy users*



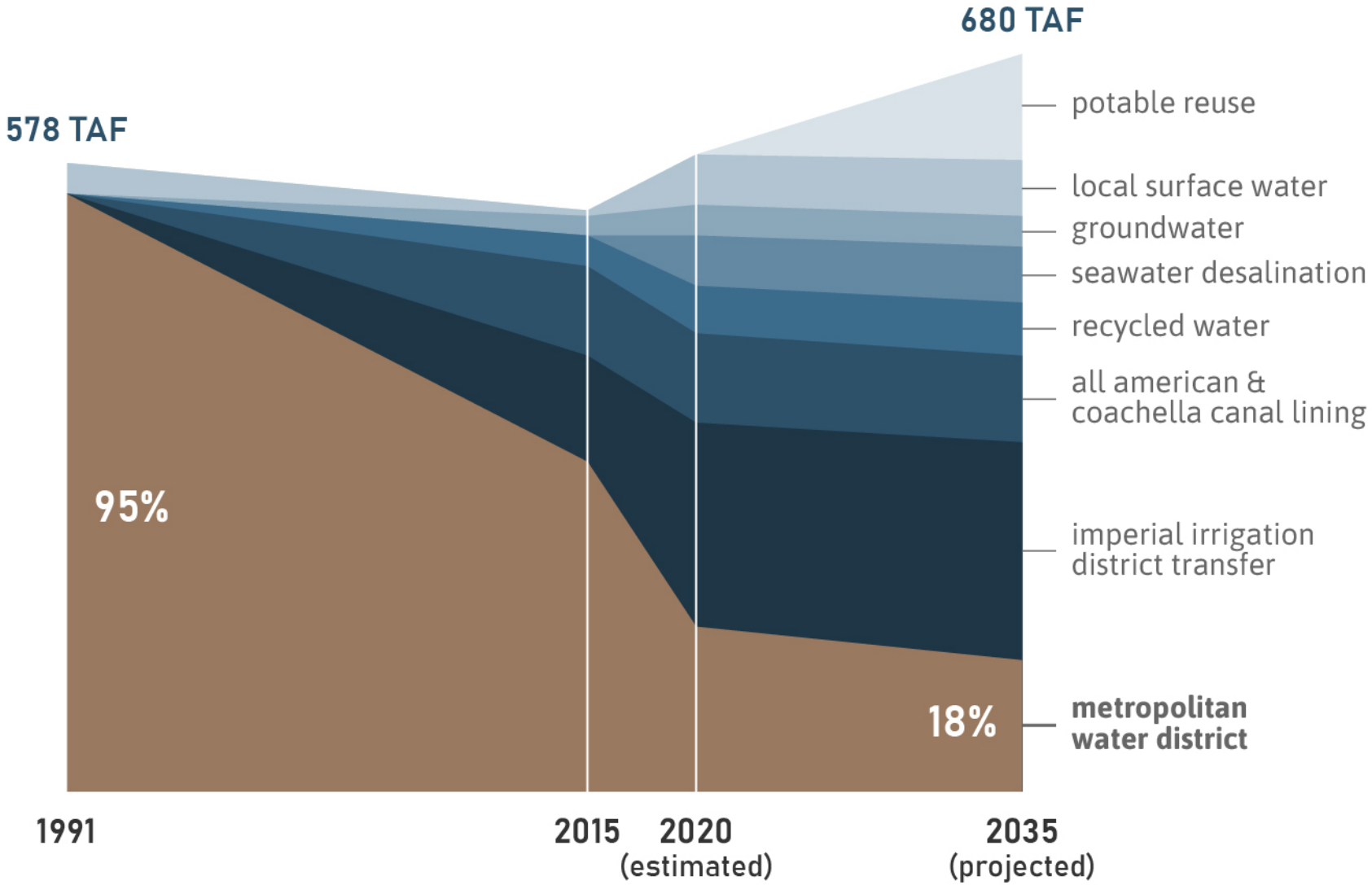

* ***Source:*** *Instagram photos reveal predictive markers of depression, Reece and Danforth, arXiv:1608.03282*

# Increasing San Diego County's Water Supply Reliability through Supply Diversification




TAF=Thousand Acre-Feet

**Supply diversification** will increase
San Diego County's water supply reliability



# Telling a story

# Objective versus subjective data visuals

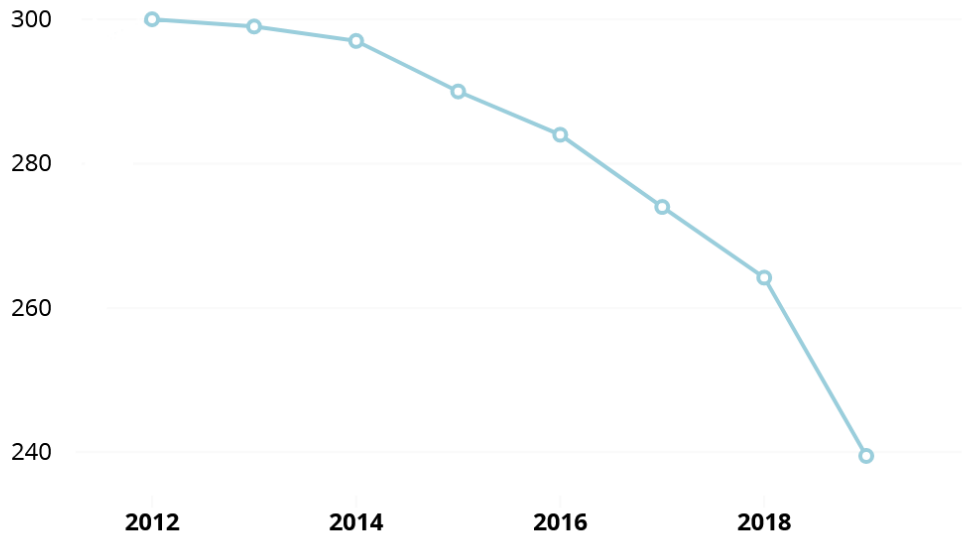
# Which chart do you want?

*(number of cash withdrawals from ATMs)*

*Source: [De Standaard](), 22 December 2020*

close

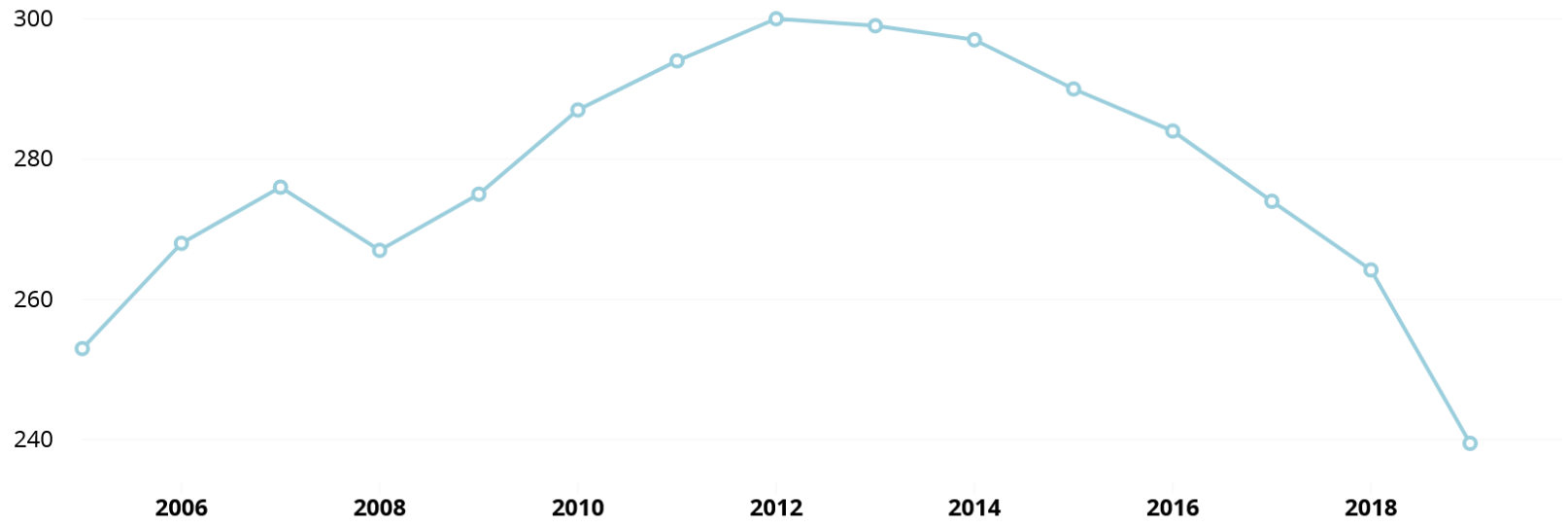
## CASH WITHDRAWALS




*Febelfin-Enquête / Vademecum T10.5*

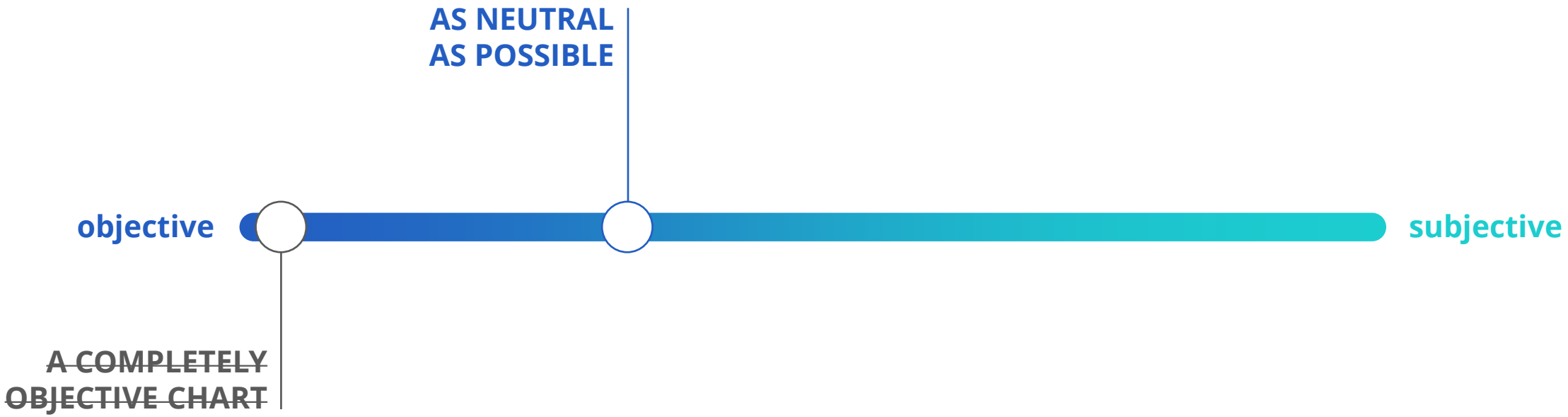
close

## CASH WITHDRAWALS

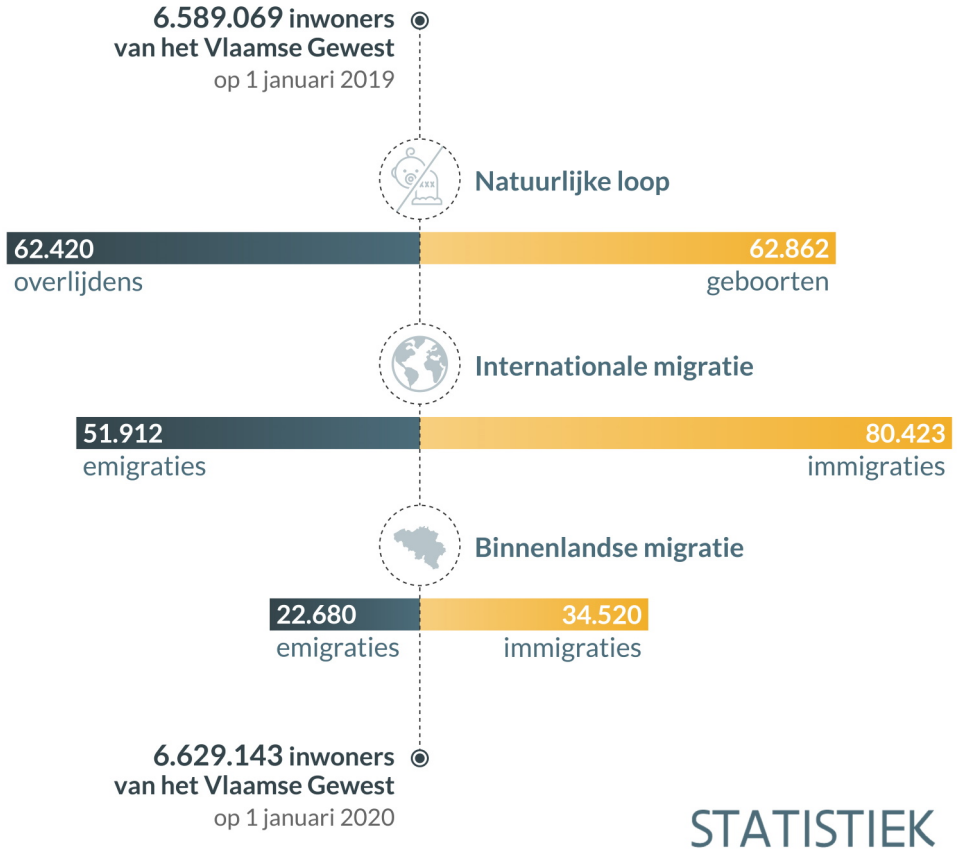



*Febelfin-Enquête / Vademecum T10.5*

# Which chart do you want?



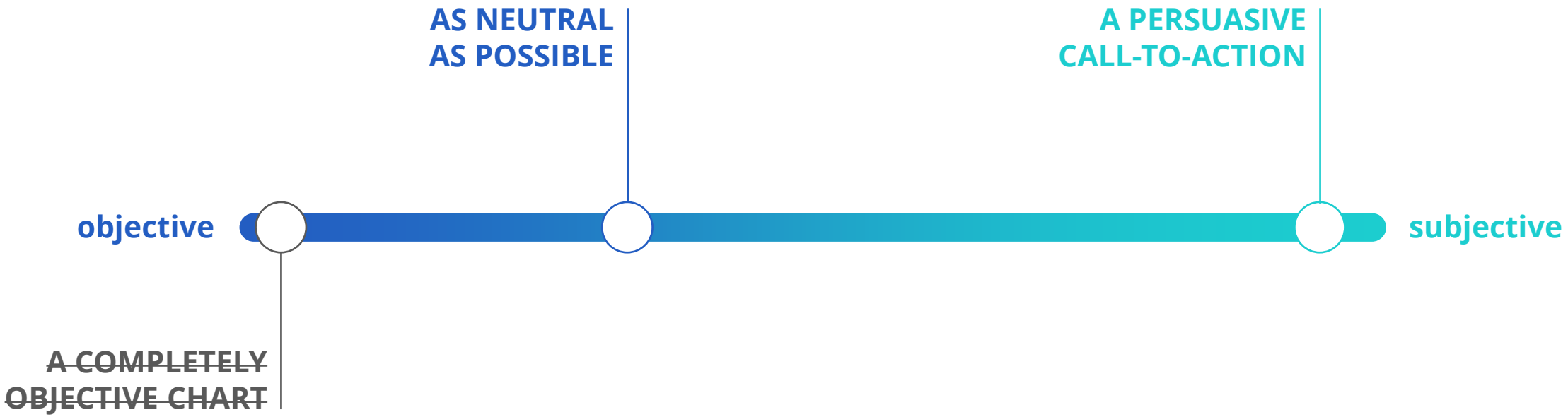
# Het afgelopen jaar groeide de Vlaamse bevolking met 40.000 inwoners




**Bron:** Statbel, bewerking Statistiek Vlaanderen

STATISTIEK VLAANDEREN

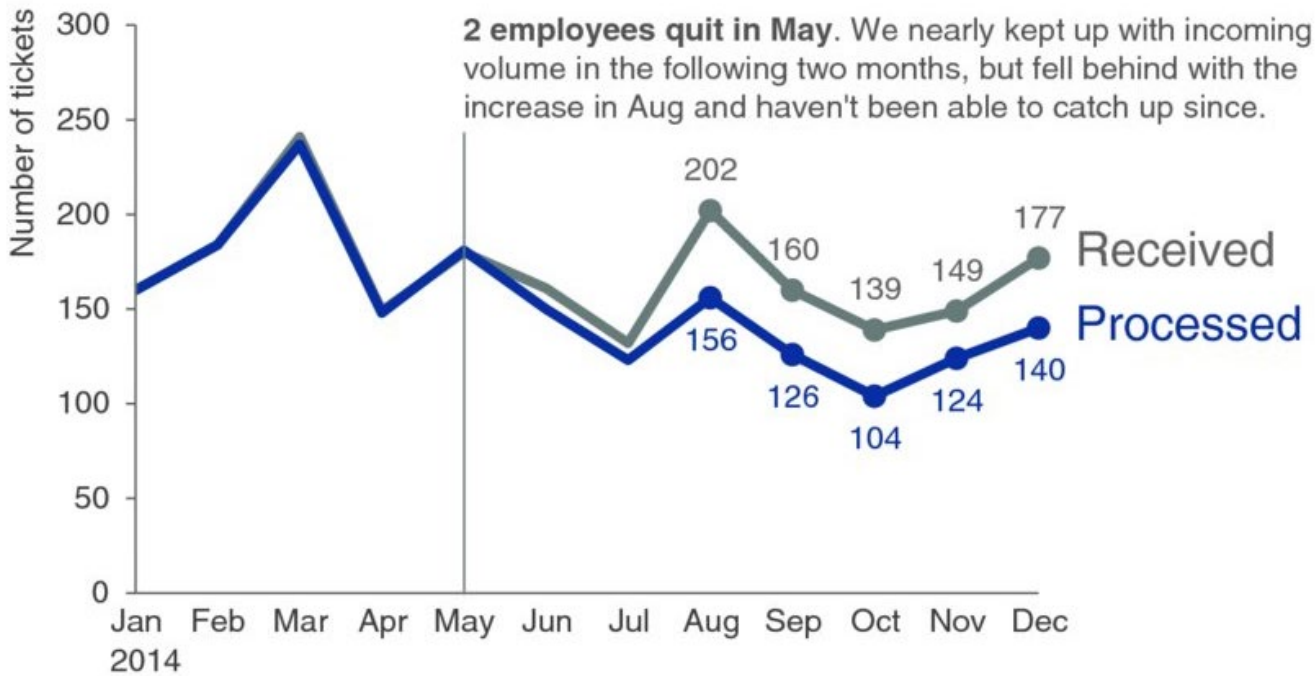
# Which chart do you want?



# Please approve the hire of 2 FTEs

to backfill those who quit in the past year

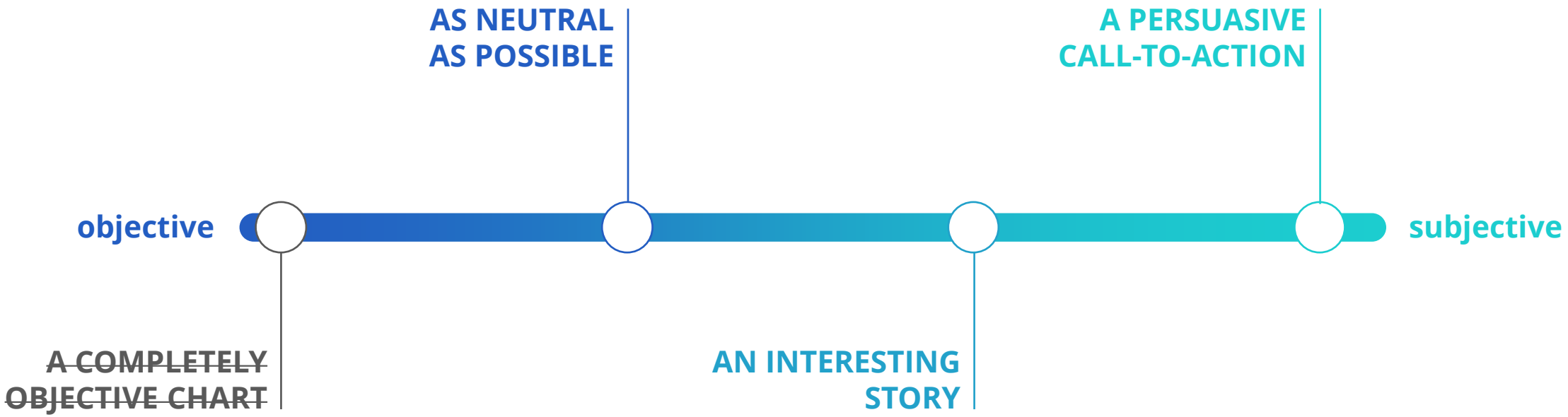
## Ticket volume over time

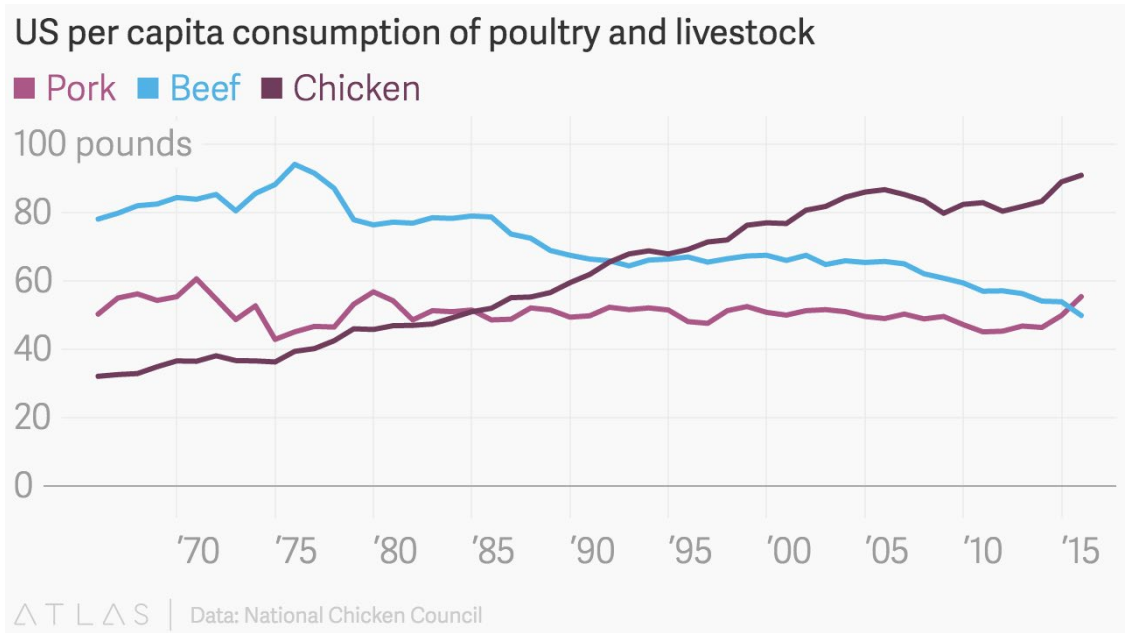


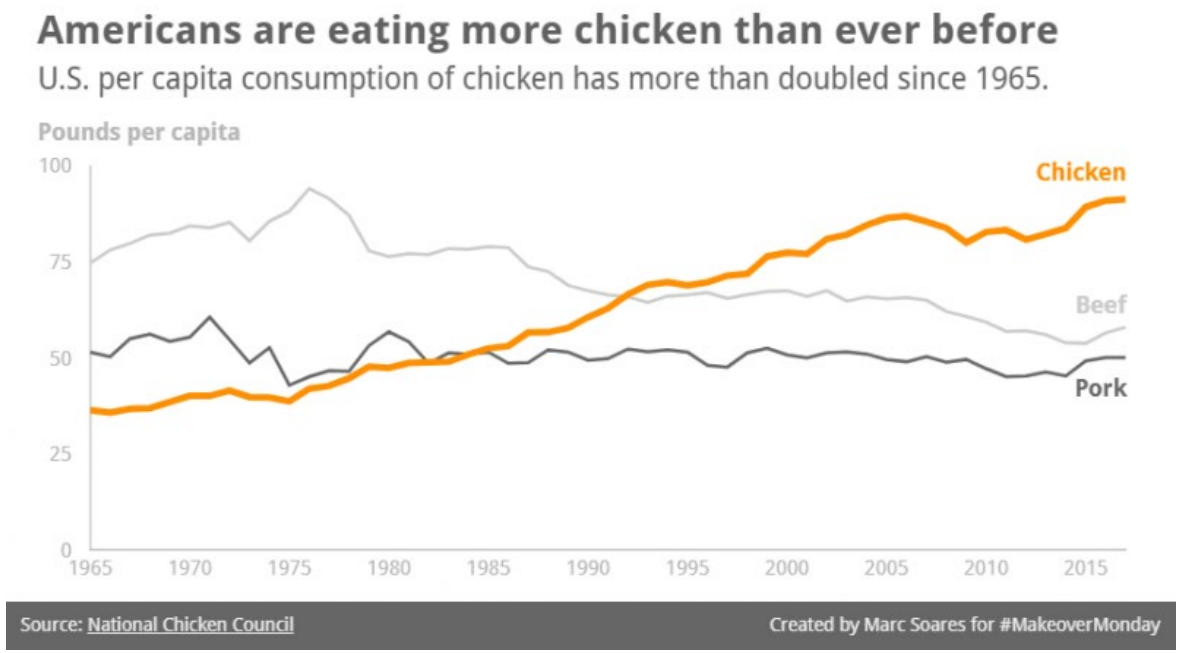

**2 employees quit in May**. We nearly kept up with incoming volume in the following two months, but fell behind with the increase in Aug and haven't been able to catch up since.

Data source: XYZ Dashboard, as of 12/31/2014 I A detailed analysis on tickets processed per person and time to resolve issues was undertaken to inform this request and can be provided if needed.

# Which chart do you want?

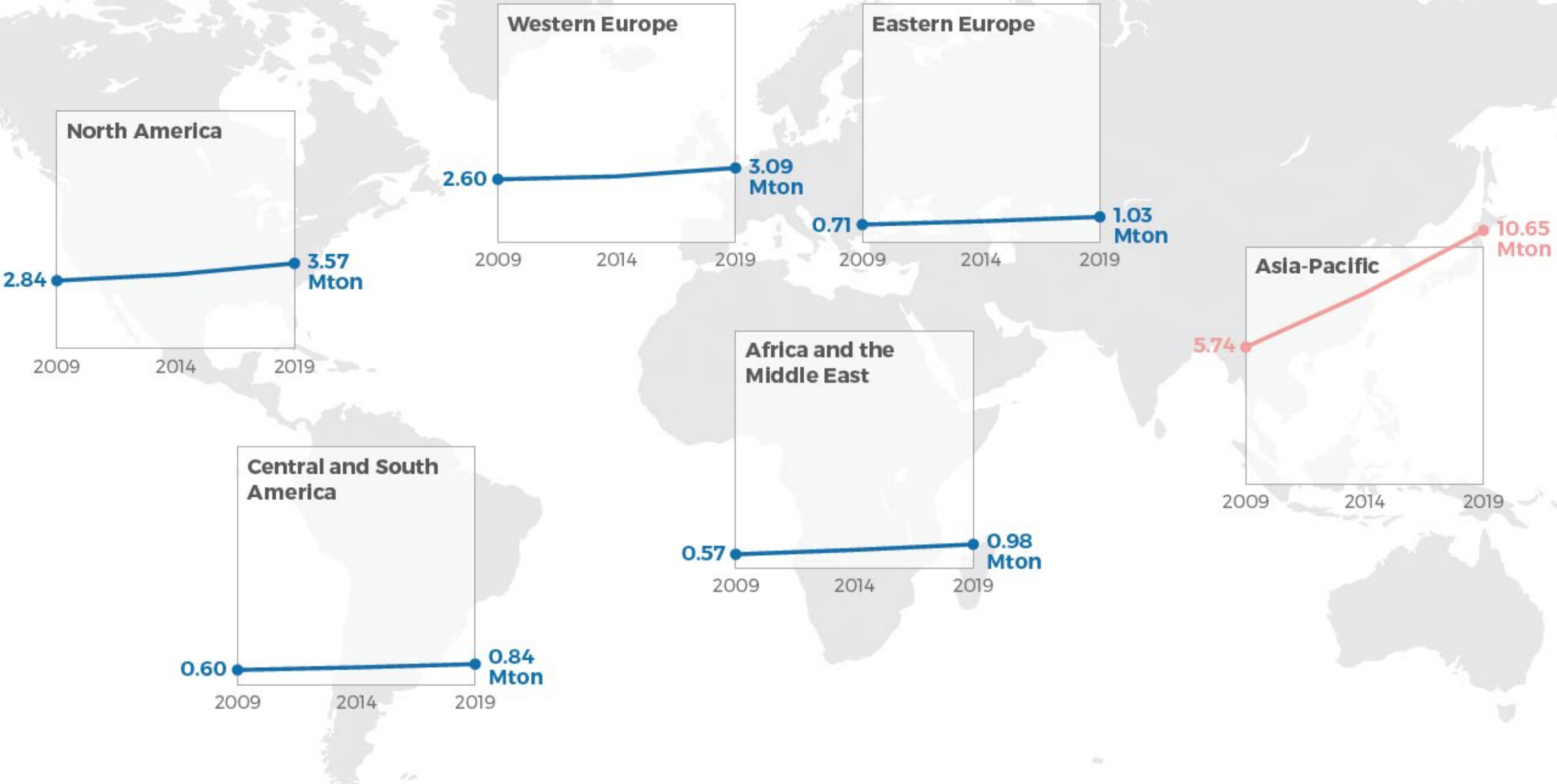





*makeovermonday.co.uk*

# Asia-Pacific will continue to be the biggest demand region



# Cecil Powell
## Facts

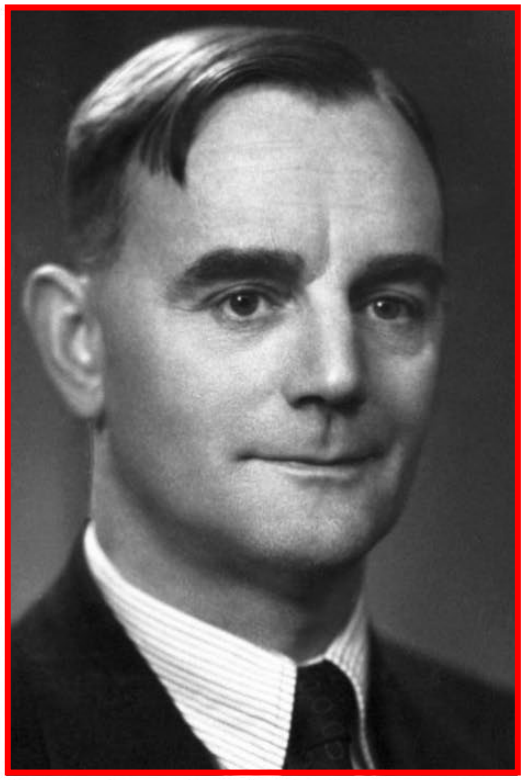


Photo from the Nobel Foundation archive.

Cecil Frank Powell
The Nobel Prize in Physics 1950

Born: 5 December 1903 Tonbridge, United Kingdom

Died: 9 August 1969, Italy

Affiliation at the time of the award: Bristol University, United Kingdom

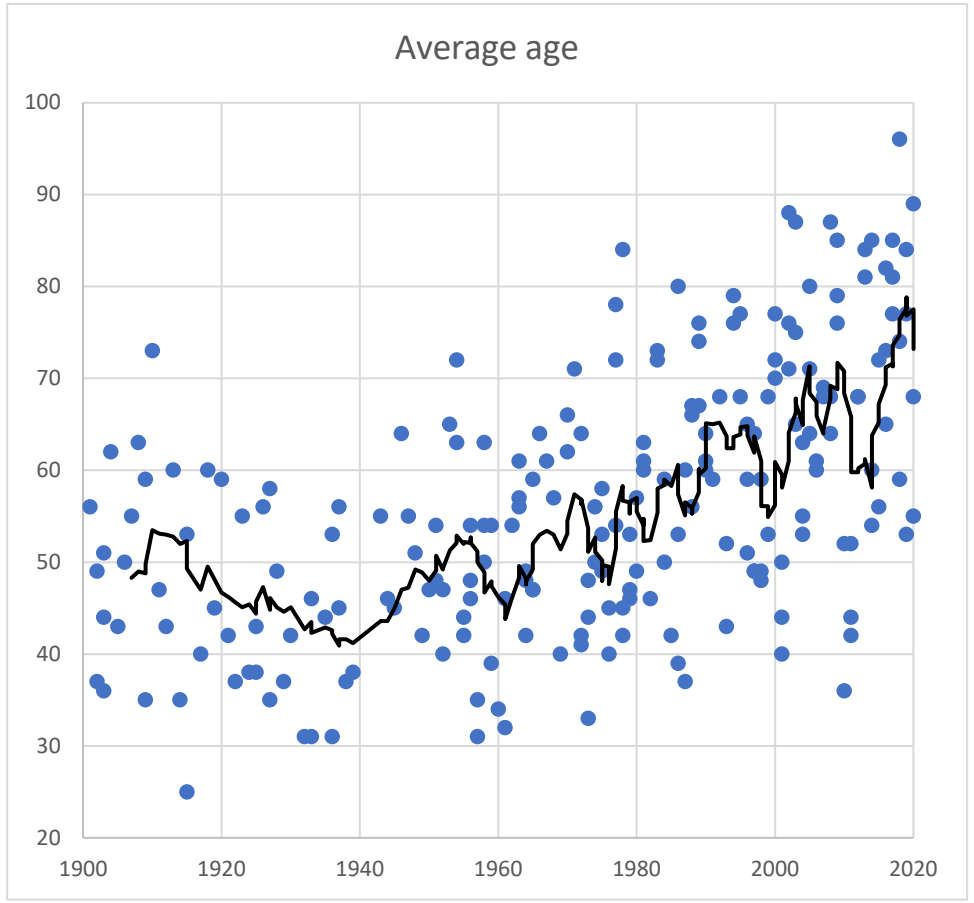
Prize motivation: "for his development of the photogr method of studying nuclear processes and his discove regarding mesons made with this method."

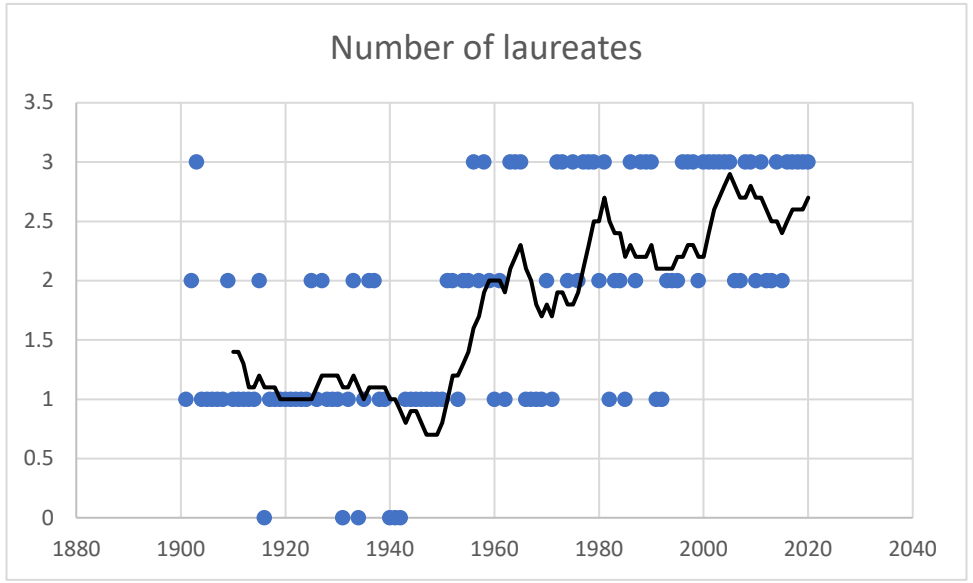
Prize share: 1/1

*full name*
*year of award*
*date of birth*
*place of birth*
*date of death*
*prize share*
*picture*
*--*
*gender*

| | A | B | C | D | E | F | G | H | I | J | K | L | M | N |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | firstname | surname | born | died | gender | year | category | share | name_of_university | city_of_university | country_of_university | born_month | age | age_get_prize |
| 2 | Wilhelm Conrad | Röntgen | DE | DE | male | 1901 | physics | 1 | Munich University | Munich | Germany | Mar | 78 | 56 |
| 3 | Hendrik A. | Lorentz | NL | NL | male | 1902 | physics | 2 | Leiden University | Leiden | the Netherlands | Jul | 75 | 49 |
| 4 | Pieter | Zeeman | NL | NL | male | 1902 | physics | 2 | Amsterdam University | Amsterdam | the Netherlands | May | 78 | 37 |
| 5 | Henri | Becquerel | FR | FR | male | 1903 | physics | 2 | École Polytechnique | Paris | France | Dec | 56 | 51 |
| 6 | Pierre | Curie | FR | FR | male | 1903 | physics | 4 | École municipale de physique et de chimie inc | Paris | France | May | 47 | 44 |
| 7 | Marie | Curie | PL | FR | female | 1903 | physics | 4 | | | | Nov | 67 | 36 |
| 9 | Lord | Rayleigh | GB | GB | male | 1904 | physics | 1 | Royal Institution of Great Britain | London | United Kingdom | Nov | 77 | 62 |
| 10 | Philipp | Lenard | SK | DE | male | 1905 | physics | 1 | Kiel University | Kiel | Germany | Jun | 85 | 43 |
| 11 | J.J. | Thomson | GB | GB | male | 1906 | physics | 1 | University of Cambridge | Cambridge | United Kingdom | Dec | 84 | 50 |
| 12 | Albert A. | Michelson | PL | US | male | 1907 | physics | 1 | University of Chicago | Chicago IL | USA | Dec | 79 | 55 |
| 13 | Gabriel | Lippmann | LU | | male | 1908 | physics | 1 | Sorbonne University | Paris | France | Aug | 76 | 63 |
| 14 | Guglielmo | Marconi | IT | IT | male | 1909 | physics | 2 | Marconi Wireless Telegraph Co. Ltd. | London | United Kingdom | Apr | 63 | 35 |
| 15 | Ferdinand | Braun | DE | US | male | 1909 | physics | 2 | Strasbourg University | Strasbourg | Germany (now France) | Jun | 68 | 59 |
| 16 | Johannes Diderik | van der Waals | NL | NL | male | 1910 | physics | 1 | Amsterdam University | Amsterdam | the Netherlands | Nov | 86 | 73 |
| 17 | Wilhelm | Wien | RU | DE | male | 1911 | physics | 1 | Würzburg University | Würzburg | Germany | Jan | 64 | 47 |
| 18 | Gustaf | Dalén | SE | SE | male | 1912 | physics | 1 | Swedish Gas-Accumulator Co. | Lidingö Stockholm | Sweden | Nov | 68 | 43 |
| 19 | Heike | Kamerlingh Onnes | NL | NL | male | 1913 | physics | 1 | Leiden University | Leiden | the Netherlands | Sep | 73 | 60 |
| 20 | Max | von Laue | DE | DE | male | 1914 | physics | 1 | Frankfurt-on-the-Main University | Frankfurt-on-the-Main | Germany | Oct | 81 | 35 |
| 21 | William | Bragg | GB | GB | male | 1915 | physics | 2 | University College | London | United Kingdom | Jul | 80 | 53 |
| 22 | Lawrence | Bragg | AU | GB | male | 1915 | physics | 2 | Victoria University | Manchester | United Kingdom | Mar | 81 | 25 |
| 23 | Charles Glover | Barkla | GB | GB | male | 1917 | physics | 1 | Edinburgh University | Edinburgh | United Kingdom | Jun | 67 | 40 |
| 24 | Max | Planck | DE | DE | male | 1918 | physics | 1 | Berlin University | Berlin | Germany | Apr | 89 | 60 |
| 25 | Johannes | Stark | DE | DE | male | 1919 | physics | 1 | Greifswald University | Greifswald | Germany | Apr | 83 | 45 |
| 26 | Charles Edouard | Guillaume | CH | FR | male | 1920 | physics | 1 | Bureau International des Poids et Mesures (In | Sèvres | France | Feb | 77 | 59 |
| 27 | Albert | Einstein | DE | US | male | 1921 | physics | 1 | Kaiser-Wilhelm-Institut (now Max-Planck-Inst | Berlin | Germany | Mar | 76 | 42 |
| 28 | Niels | Bohr | DK | DK | male | 1922 | physics | 1 | Copenhagen University | Copenhagen | Denmark | Oct | 77 | 37 |
| 29 | Robert A. | Millikan | US | US | male | 1923 | physics | 1 | California Institute of Technology (Caltech) | Pasadena CA | USA | Mar | 85 | 55 |
| 30 | Manne | Siegbahn | SE | SE | male | 1924 | physics | 1 | Uppsala University | Uppsala | Sweden | Dec | 92 | 38 |
| 31 | James | Franck | DE | DE | male | 1925 | physics | 2 | Goettingen University | Göttingen | Germany | Aug | 82 | 43 |
| 32 | Gustav | Hertz | DE | DE | male | 1925 | physics | 2 | Halle University | Halle | Germany | Jul | 88 | 38 |
| 33 | Jean Baptiste | Perrin | FR | US | male | 1926 | physics | 1 | Sorbonne University | Paris | France | Sep | 72 | 56 |
| 34 | Arthur H. | Compton | US | US | male | 1927 | physics | 2 | University of Chicago | Chicago IL | USA | Sep | 70 | 35 |
| 35 | C.T.R. | Wilson | GB | GB | male | 1927 | physics | 2 | University of Cambridge | Cambridge | United Kingdom | Feb | 90 | 58 |
| 36 | Owen Willans | Richardson | GB | GB | male | 1928 | physics | 1 | London University | London | United Kingdom | Apr | 80 | 49 |
| 37 | Louis | de Broglie | FR | FR | male | 1929 | physics | 1 | Sorbonne University Institut Henri Poincaré | Paris | France | Aug | 95 | 37 |
| 38 | Sir Chandrasekhara Venkata | Raman | IN | IN | male | 1930 | physics | 1 | Calcutta University | Calcutta | India | Nov | 82 | 42 |
| 39 | Werner | Heisenberg | DE | DE | male | 1932 | physics | 1 | Leipzig University | Leipzig | Germany | Dec | 75 | 31 |
| 40 | Erwin | Schrödinger | AT | AT | male | 1933 | physics | 2 | Berlin University | Berlin | Germany | Aug | 74 | 46 |
| 41 | Paul A.M. | Dirac | GB | US | male | 1933 | physics | 2 | University of Cambridge | Cambridge | United Kingdom | Aug | 82 | 31 |
| 42 | James | Chadwick | GB | GB | male | 1935 | physics | 1 | Liverpool University | Liverpool | United Kingdom | Oct | 83 | 44 |

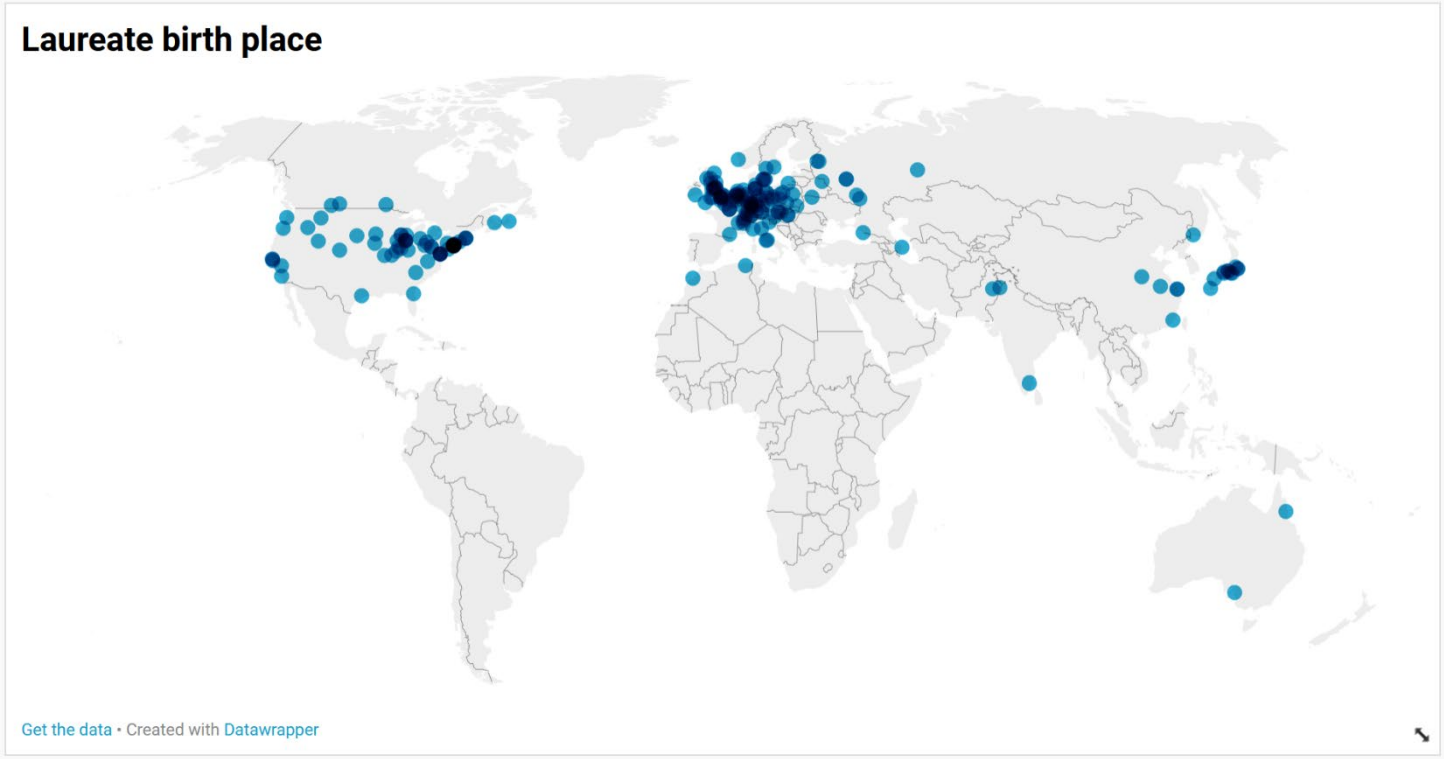
https://datasetsearch.research.google.com/




## gender balance

| | |
|---|---|
| M | 212 |
| F | 4 |



# The Nobel Prize in Physics

*114 years, 108 prizes, 198 laureates*

**25** YOUNGEST LAUREATE

William Lawrence Bragg
1915

**88** OLDEST LAUREATE

Raymond Davis Jr.
2002

**2** HIGHEST NUMBER OF PRIZES WON

John Bardeen
1956, 1972

**Laureates' gender**

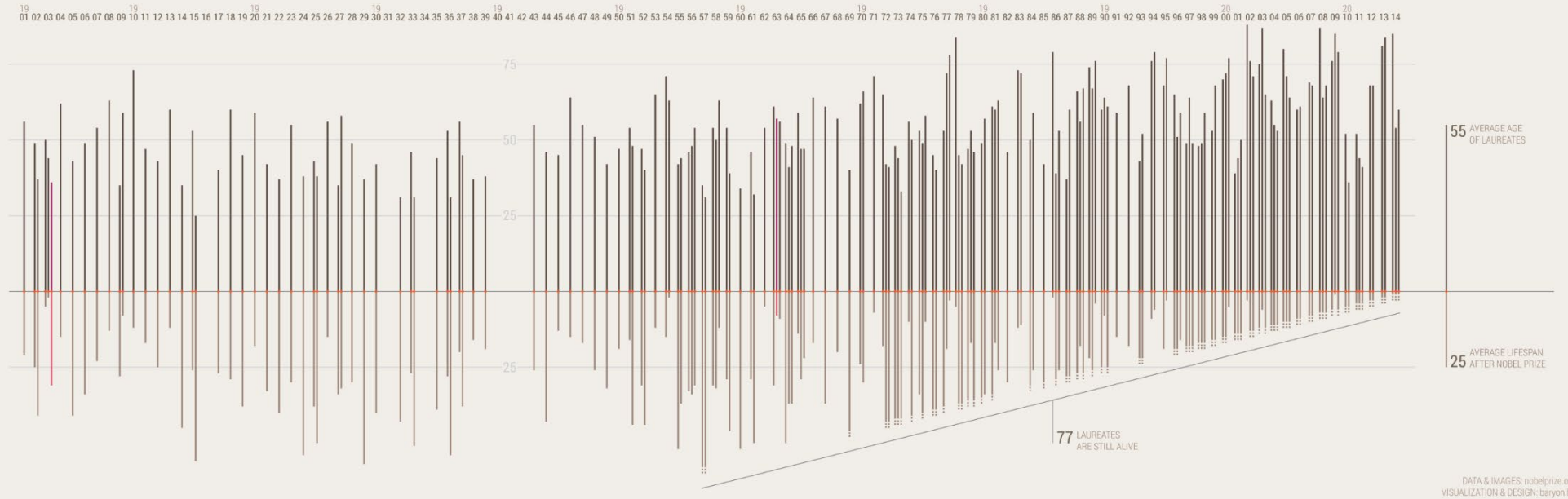
MALE — 196
FEMALE • 2

Marie Skłodowska-Curie
1903

Maria Goeppert-Mayer
1963

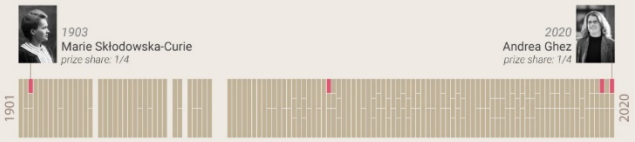
**Most successful research domains**

| | |
|---|---|
| PARTICLE PHYSICS | 34 |
| ATOMIC PHYSICS | 28 |
| CONDENSED MATTER | 28 |
| INSTRUMENTATION | 20 |
| NUCLEAR PHYSICS | 17 |
| ELECTROMAGNETISM | 14 |
| ASTROPHYSICS | 13 |
| QUANTUM MECHANICS | 11 |
| OPTICAL PHYSICS | 10 |
| SUPERCONDUCTIVITY | 9 |
| SUPERFLUIDITY | 8 |
| ELECTRODYNAMICS | 8 |
| SEMICONDUCTORS | 8 |

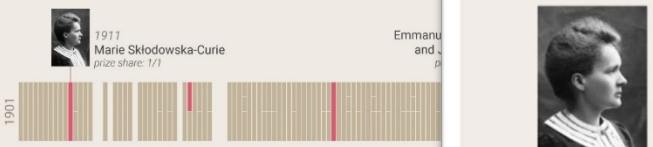



DATA & IMAGES: nobelprize.org
VISUALIZATION & DESIGN: baryon.be

**Medicine**
210 men, 12 women (5.4%)

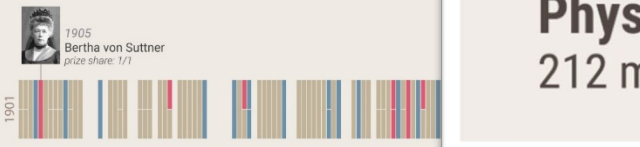



**Physics**
212 men, 4 women (1.9%)

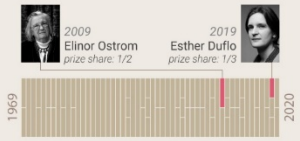



**Chemistry**
179 men, 7 women (3.8%)

**Literature**
101 men, 16 women (13.7%)




**Peace**
90 men, 28 organisations, 17 women (12.6%)



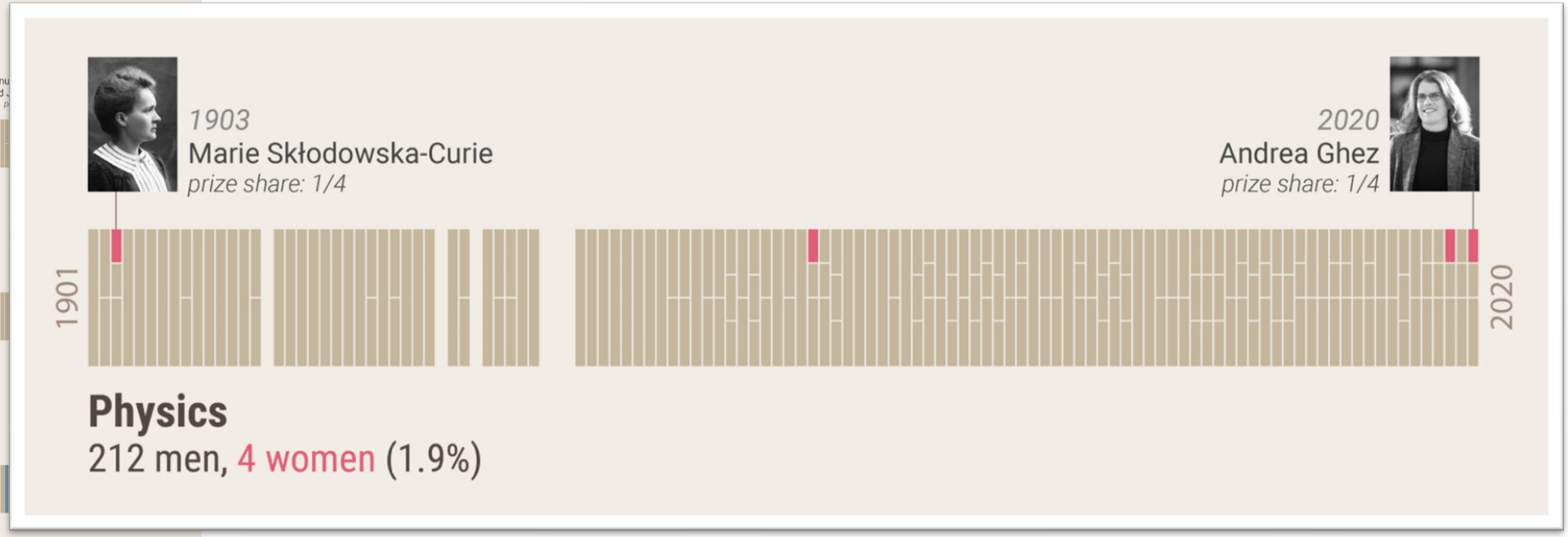

**Economics**
84 men, 2 women (2.3%)

## Women of the Nobel Prize

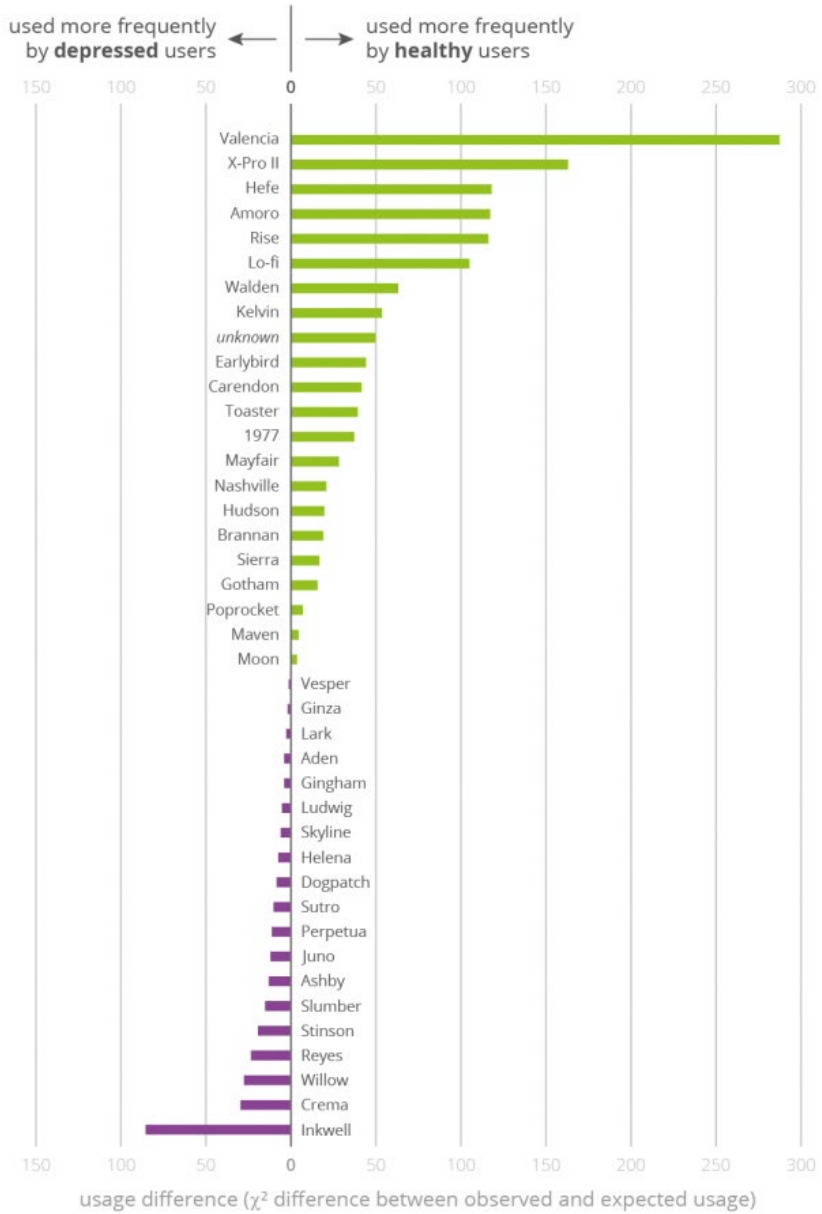
The Nobel Prize exists since 1901. In those 120 years, the Prize was awarded 876 times to a man, but only 58 times to a woman. 2009 was a record year, with 5 women winning a Prize.

In 2020, 4 women received the Prize: Andrea Ghez won the Physics Prize for the discovery of a super-massive compact object at the centre of our galaxy, Emmanuelle Charpentier and Jennifer Doudna the Chemistry Prize for the development of a method for genome editing (CRISPR), and Louise Glück won the Nobel Prize in Literature.

**Source:** nobelprize.org
**Infographic design:** Koen Van den Eeckhout (@koen_vde | www.baryon.be)

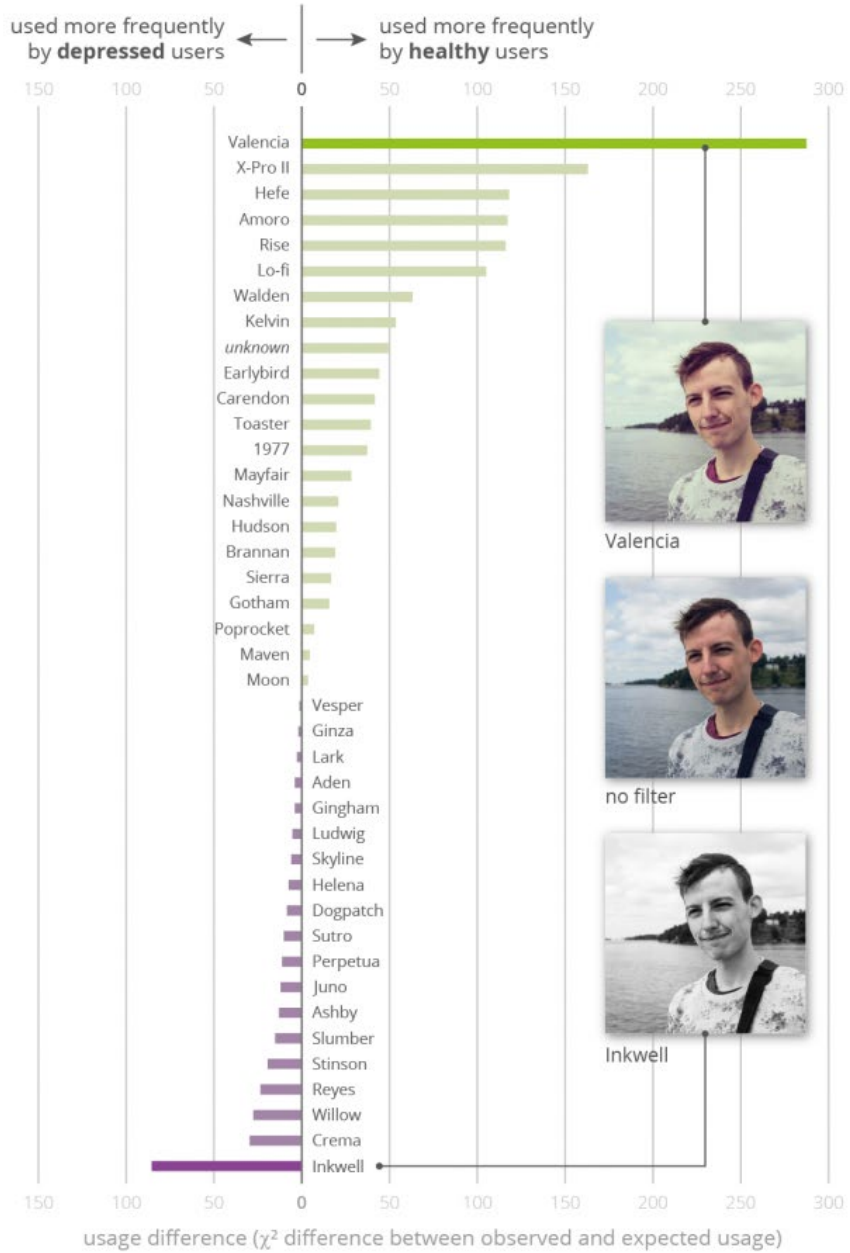


## Instagram filter usage difference between depressed and healthy users*

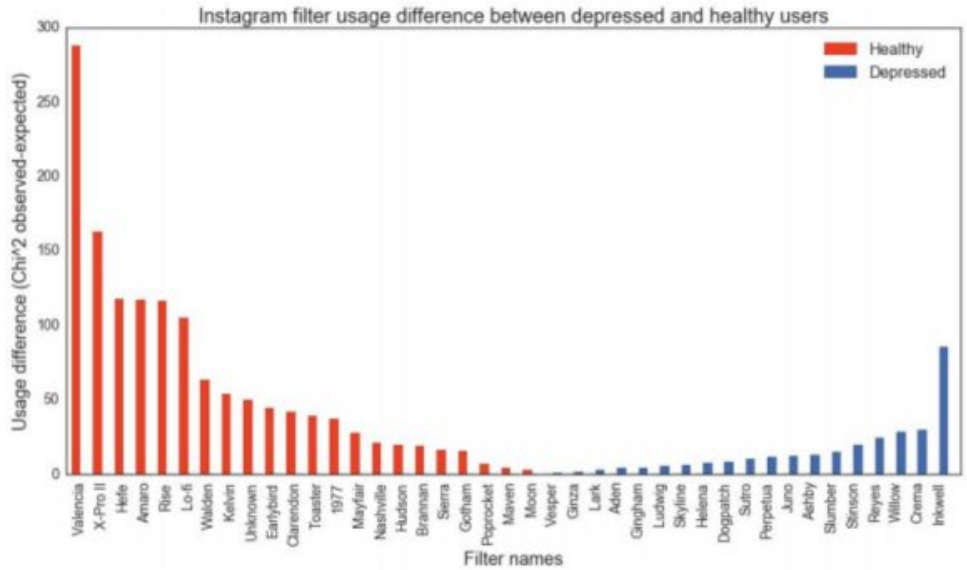



* ***Source:*** *Instagram photos reveal predictive markers of depression, Reece and Danforth, arXiv:1608.03282*

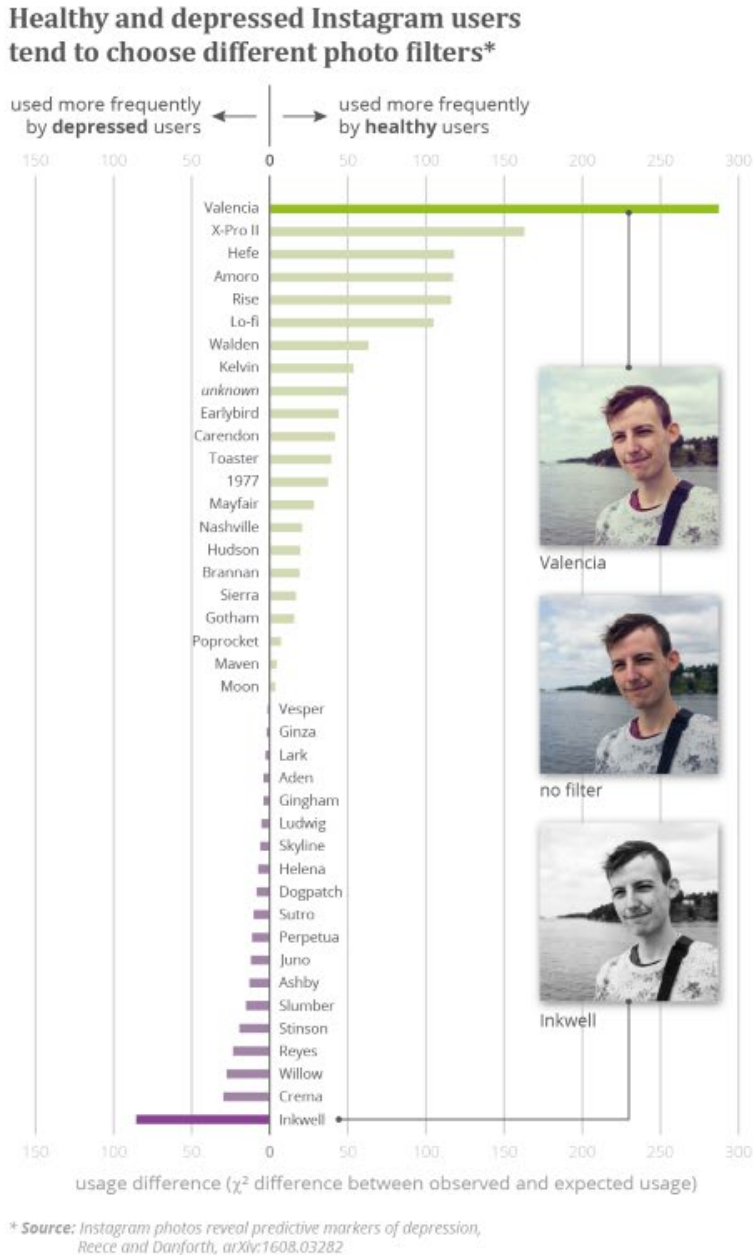
## Healthy and depressed Instagram users tend to choose different photo filters*




* ***Source:*** *Instagram photos reveal predictive markers of depression, Reece and Danforth, arXiv:1608.03282*




ORIGINAL




IMPROVED

# Telling a story

provide context

make careful color choices

look for interesting outliers

be selective

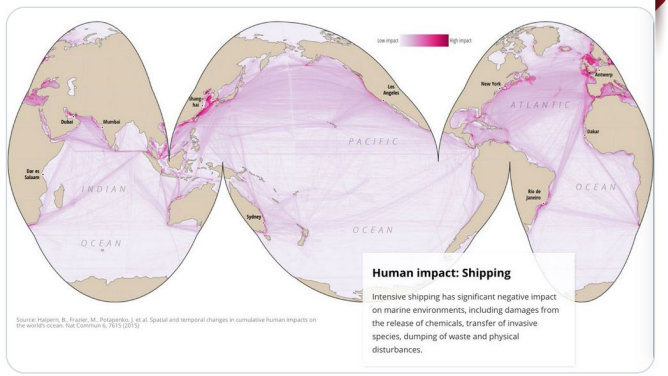
use helpful annotations

# Inspiration

# Twitter

RECOMMENDED

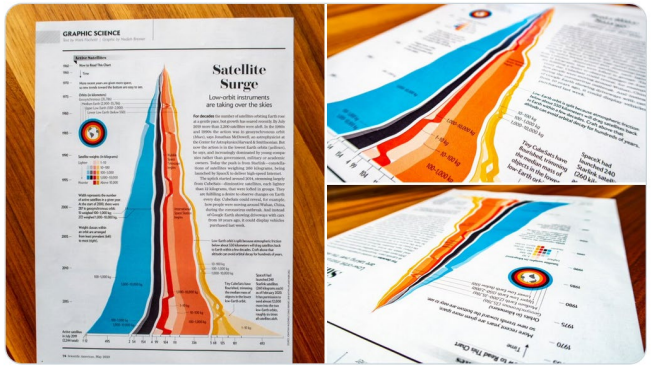
**Maarten Lambrechts** @maartenzam · 23 mei
Als antwoord op @pickover
From a work in progress




5

**Nadieh Bremer** @NadiehBremer · 15 u
New!! 🎉 I've created a streamgraph-meets-bump-chart #dataviz to show the rise & sudden surge in the no. of satellites orbiting Earth for @sciam 🛰️

Huge thanks to @ChristiansenJen for the feedback + layout + sending me 2 issues when my store in NL didn't get them due to covid-19



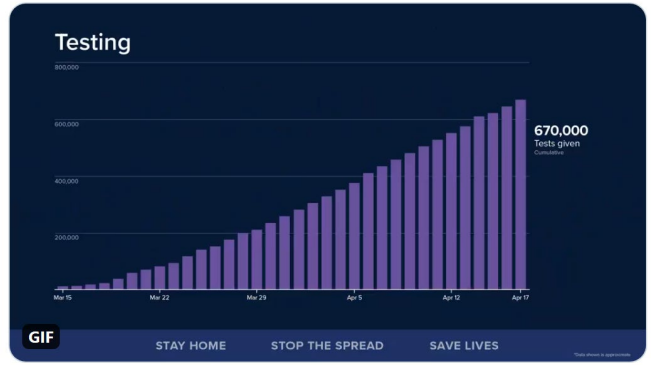

7 40 368

Vastgemaakte Tweet

**Giorgia Lupi** @giorgialupi · 30 apr.
We ❤️@NYGovCuomo 's daily briefings. That's why at @pentagram we humbly tried to make his charts even more effective and human.

We talked to @FastCompany about it: fastcompany.com/90498405/andre...

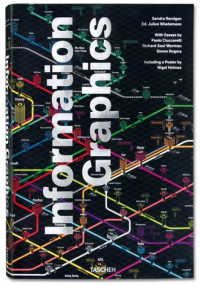
But also check out the full project here: drive.google.com/file/d/1tS-BDR...




13 160 441

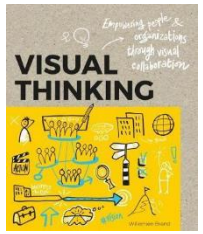
Full **Dataviz World Leaders** list at: twitter.com/Koen_VdE/lists

# Books




## Information graphics

Taschen



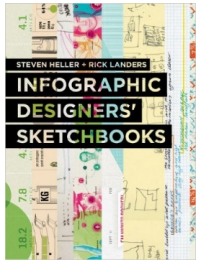

## Visual thinking

Willemien Brand

RECOMMENDED

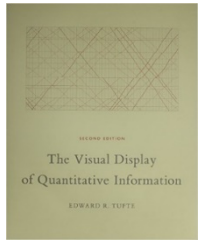
## Visual journalism

Gestalten




## Infographic designers' sketchbooks

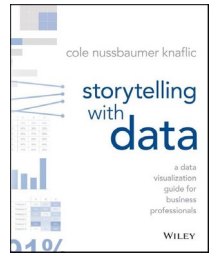
Steven Heller, Rick Landers




## The visual display of quantitative information

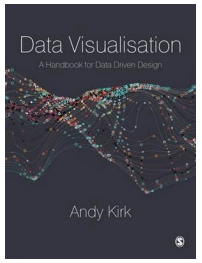
Edward R. Tufte

RECOMMENDED




## Storytelling with data

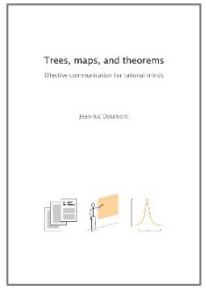
Cole Nussbaumer Knaflic




## Data visualisation

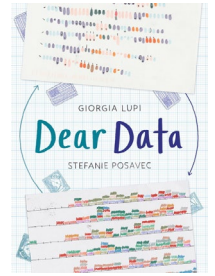
Andy Kirk

RECOMMENDED




## Trees, maps and theorems

Jean-Luc Doumont

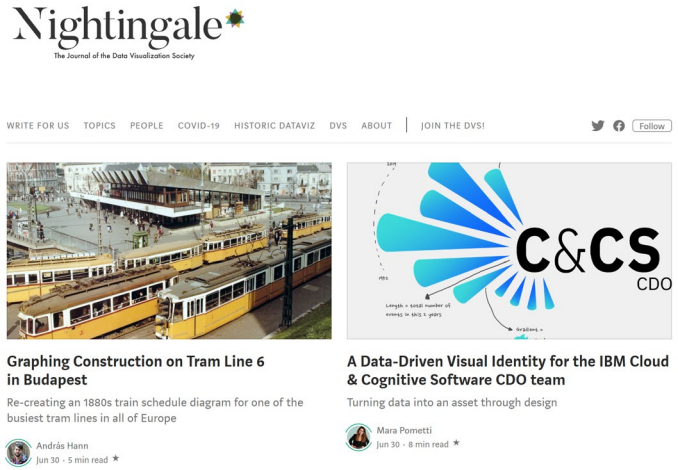



## Dear data

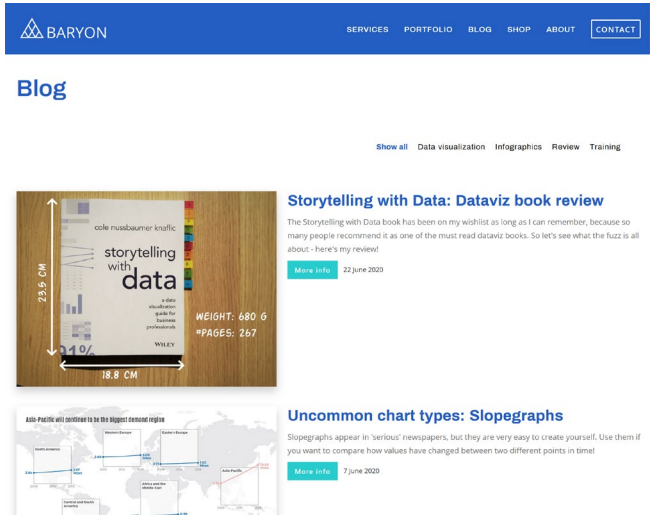
Stefanie Posavec, Giorgia Lupi

# Blogs

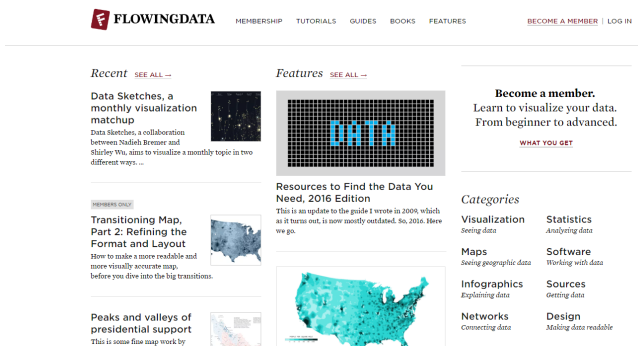
[Visualising Data]



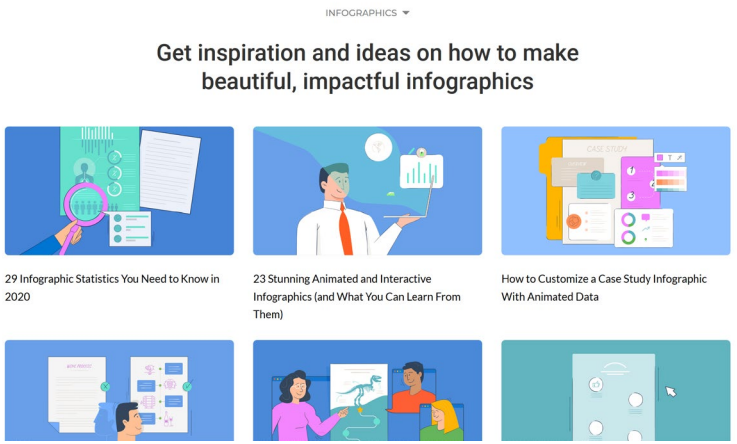

[Nightingale]



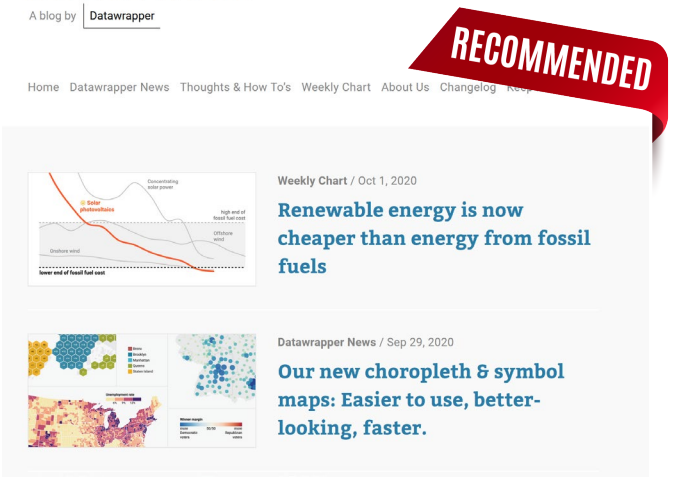

[Baryon blog]




[Flowing Data]




[Visme blog]

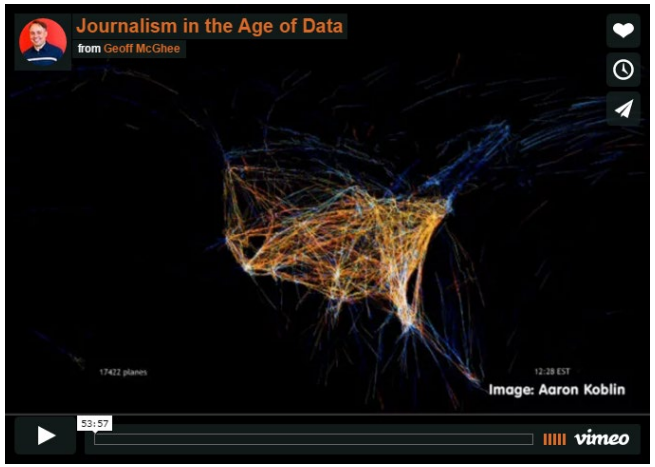



[Chartable]

# Videos

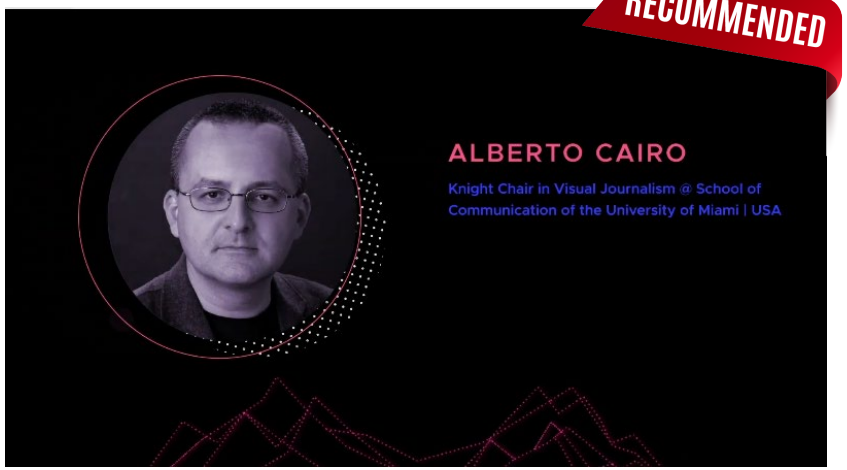
The beauty of data visualization
David McCandless

https://youtu.be/5Zg-C8AAIGg




Journalism in the age of data
Geoff McGhee

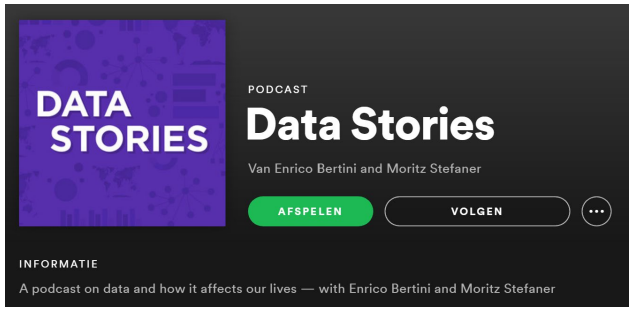
datajournalism.stanford.edu




Datafest online 2020
53 different talks

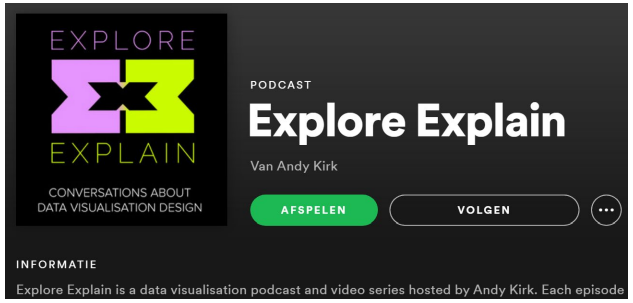
https://www.youtube.com/playlist?list=PLad95_ux5CXnpkUTzXNhz1b8GCgbi_J9L

# Podcasts

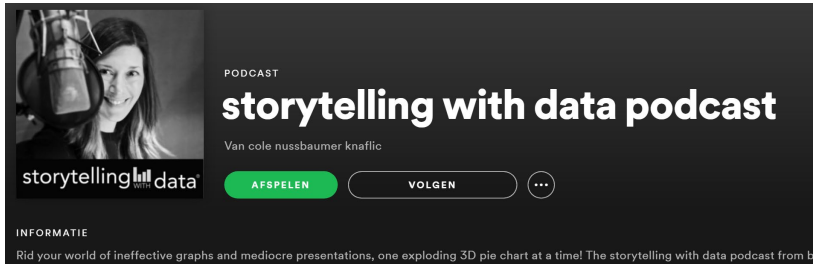



[Data Stories]

[Datasaurus Rex]




[Explore Explain]




[Storytelling with data]

# Q&A

## Thank you for joining!

*Koen Van den Eeckhout – koen@baryon.be - @koen_vde*