

A tour through the Visualization Zoo

@YuriEngelhardt

Visualizar'16 @ MediaLab-Prado

3 October 2016

inspired by:

acmqueue

May 13, 2010

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A Tour through the Visualization Zoo

**A survey of powerful visualization techniques,
from the obvious to the obscure**

**Jeffrey Heer, Michael Bostock, and Vadim Ogievetsky, Stanford
University**

Thanks to advances in sensing, networking, and data management, our society is producing digital information at an astonishing rate. According to one estimate, in 2010 alone we will generate 1,200 exabytes—60 million times the content of

two examples of using a map

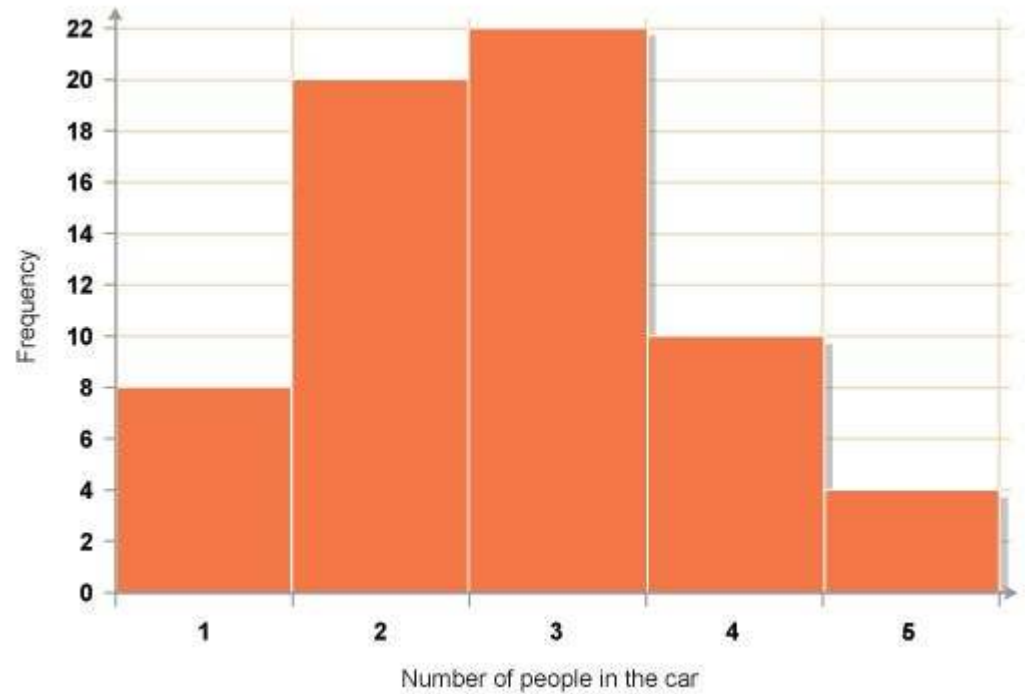
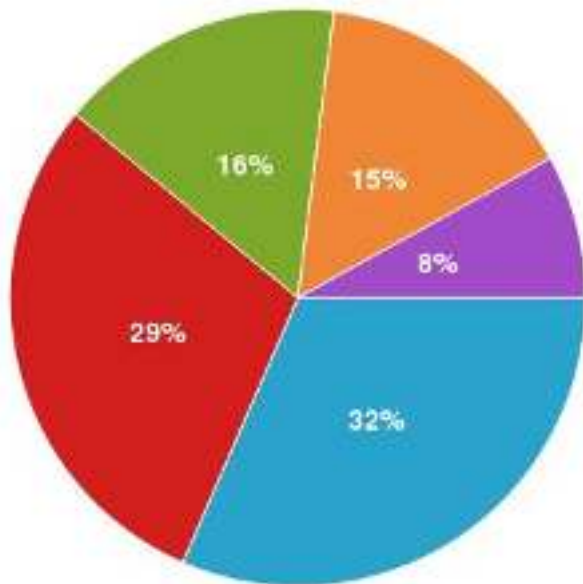
[wind map]

[changes of life expectancy per country]



zoo

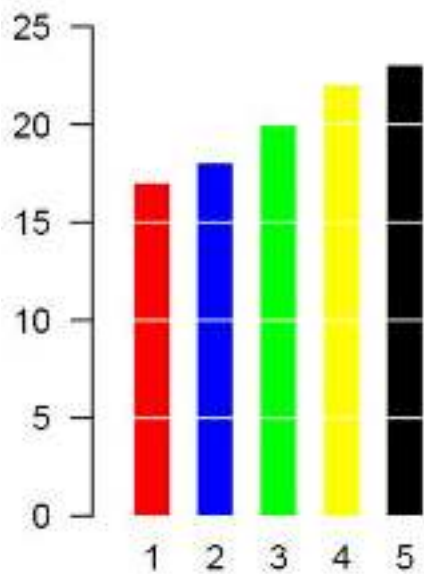
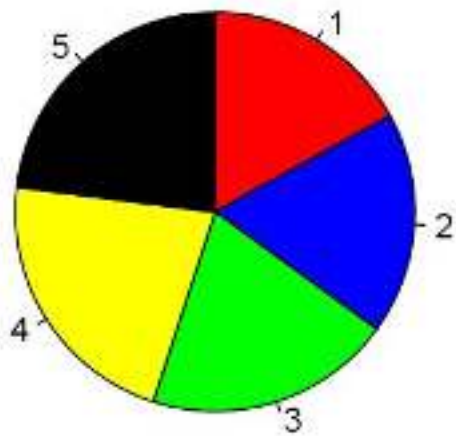




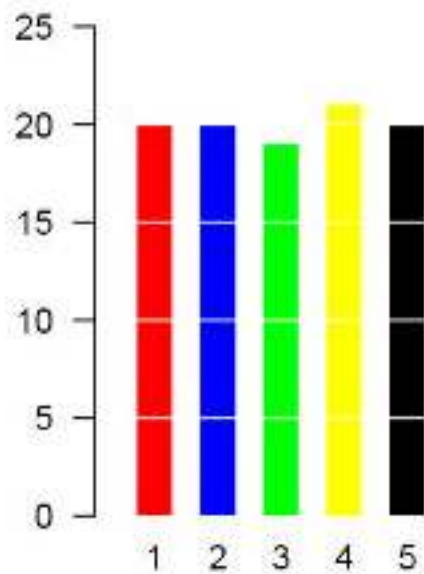
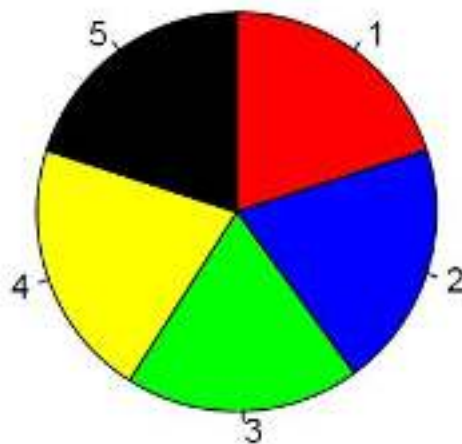


pie chart

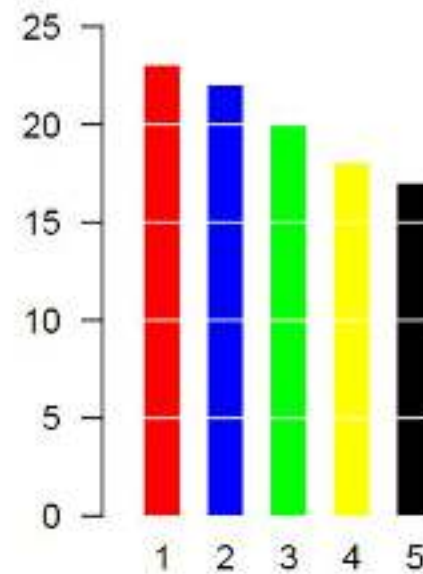
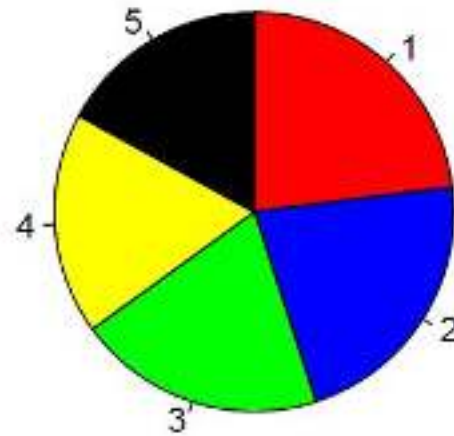
A



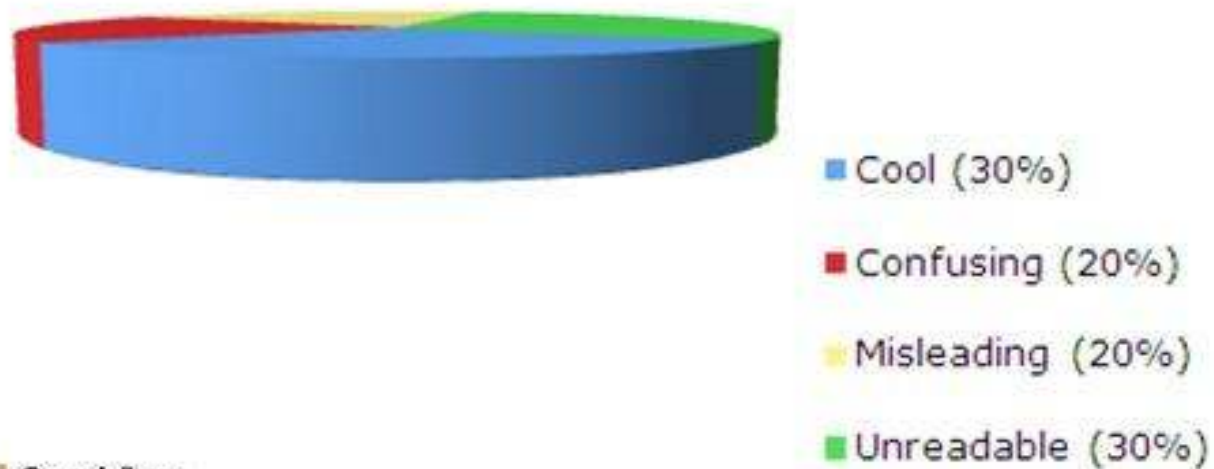
B



C



Perception of 3D pie charts



map

Where We Live...

Unlike many developed countries, the U.S. keeps growing. We are also moving south and west. But compared with China or India, the nation is a vast prairie

80% of the U.S. population lives in a metropolitan area
Populations of top five urban

The entire state of Wyoming (pop. 588,388) has fewer people than the Harrisburg, Pa., metro area

3. Chicago metro area (pop. 9,443,490)

4. Philadelphia metro area (pop. 5,822,300)

1. New York City metro area (pop. 18,747,300)

2. Los Angeles metro area (pop. 17,912,500)

New Jersey is the most densely populated state, with 1,124 people per square mile

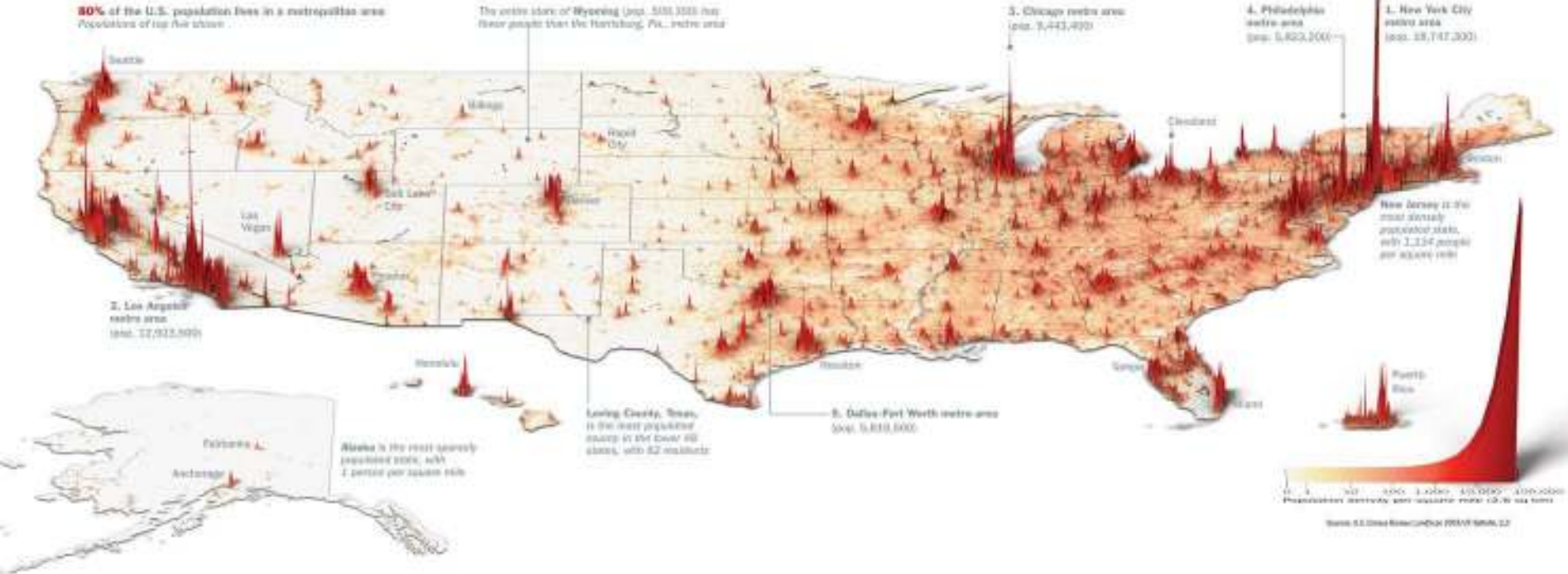
5. Dallas-Fort Worth metro area (pop. 5,810,500)

Alaska is the most sparsely populated state, with 1 person per square mile

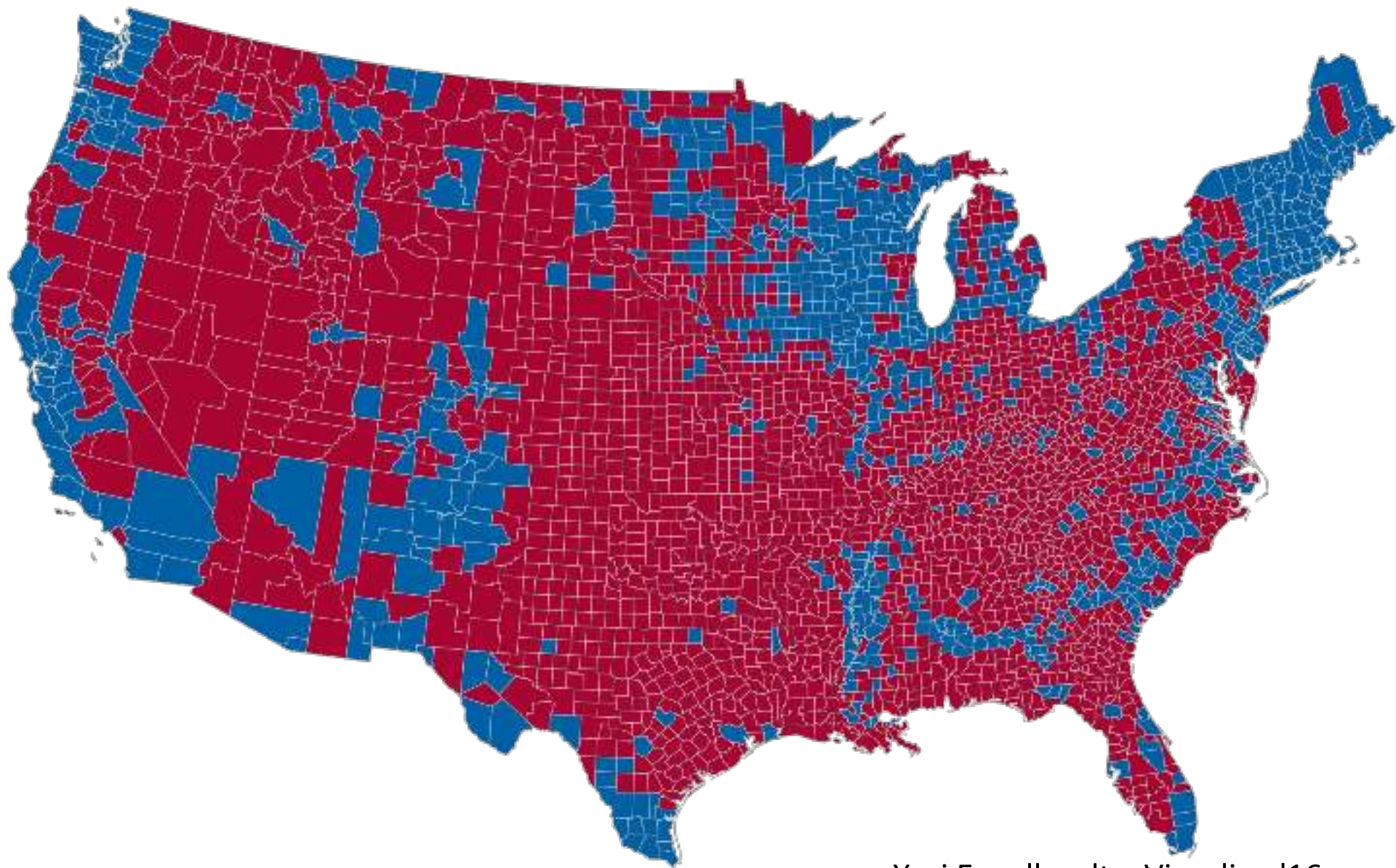
Living County, Texas, is the most populated county in the lower 48 states, with 82 residents

Our families are getting smaller—with one vital exception. Compared with those of Europe and Japan, the U.S. population is younger and more colorful because of the continual arrival of immigrants and their higher-than-average birthrates. Of the 100 million Americans who will join us in the next 37 years, half will be immigrants or their children. In the next few decades, 97% of the world's population growth will occur in the developing world; the U.S. is the largest developed country in the world that is still growing at a healthy clip. That matters, strategically, economically.

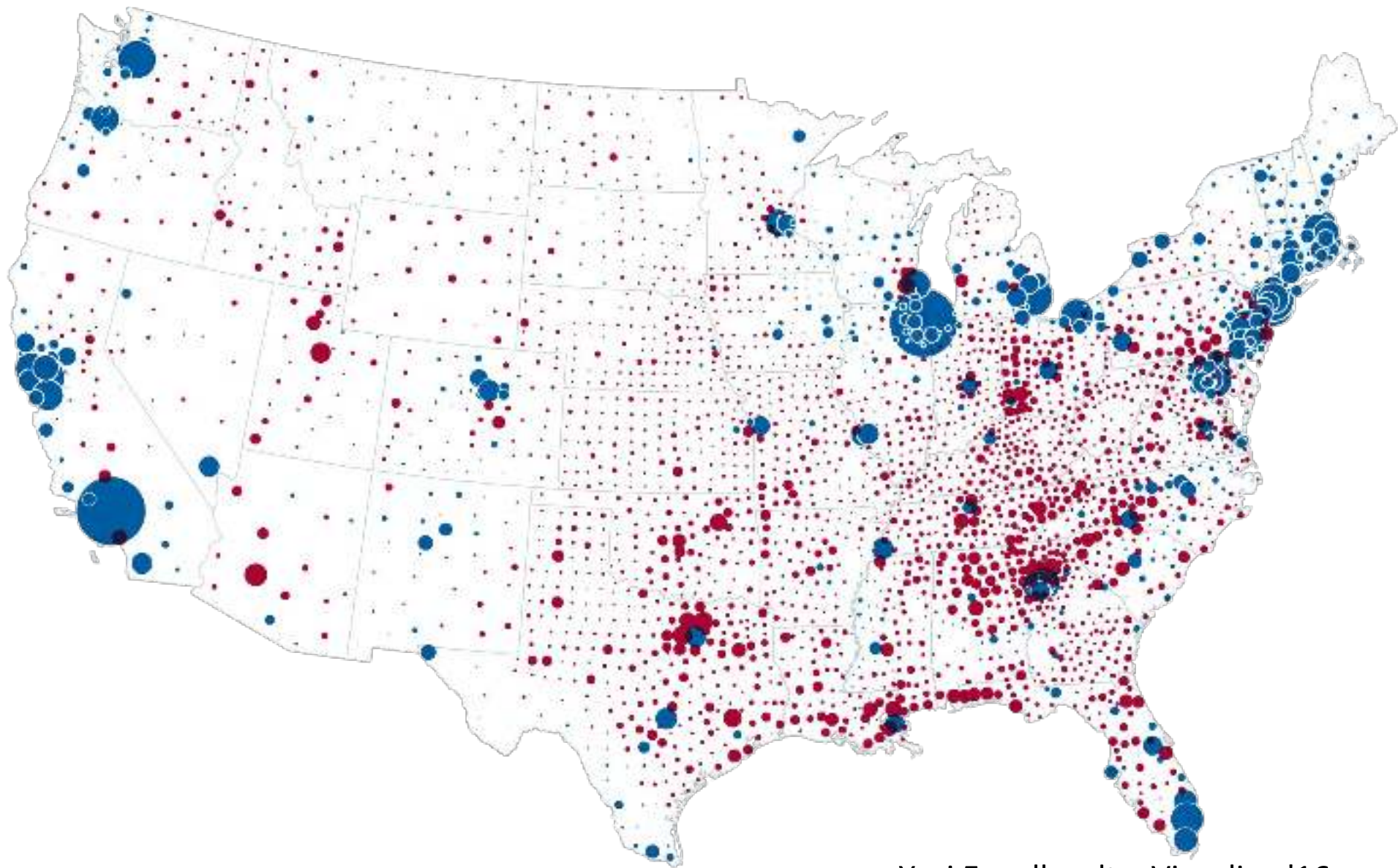
Ala.; Pocomt, Ky.; or Lanesville, N.Y. But they are all probably close to someone's idea of paradise. —by Nancy Mitton



problem of mapping data about
an unevenly distributed population



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Chance of winning

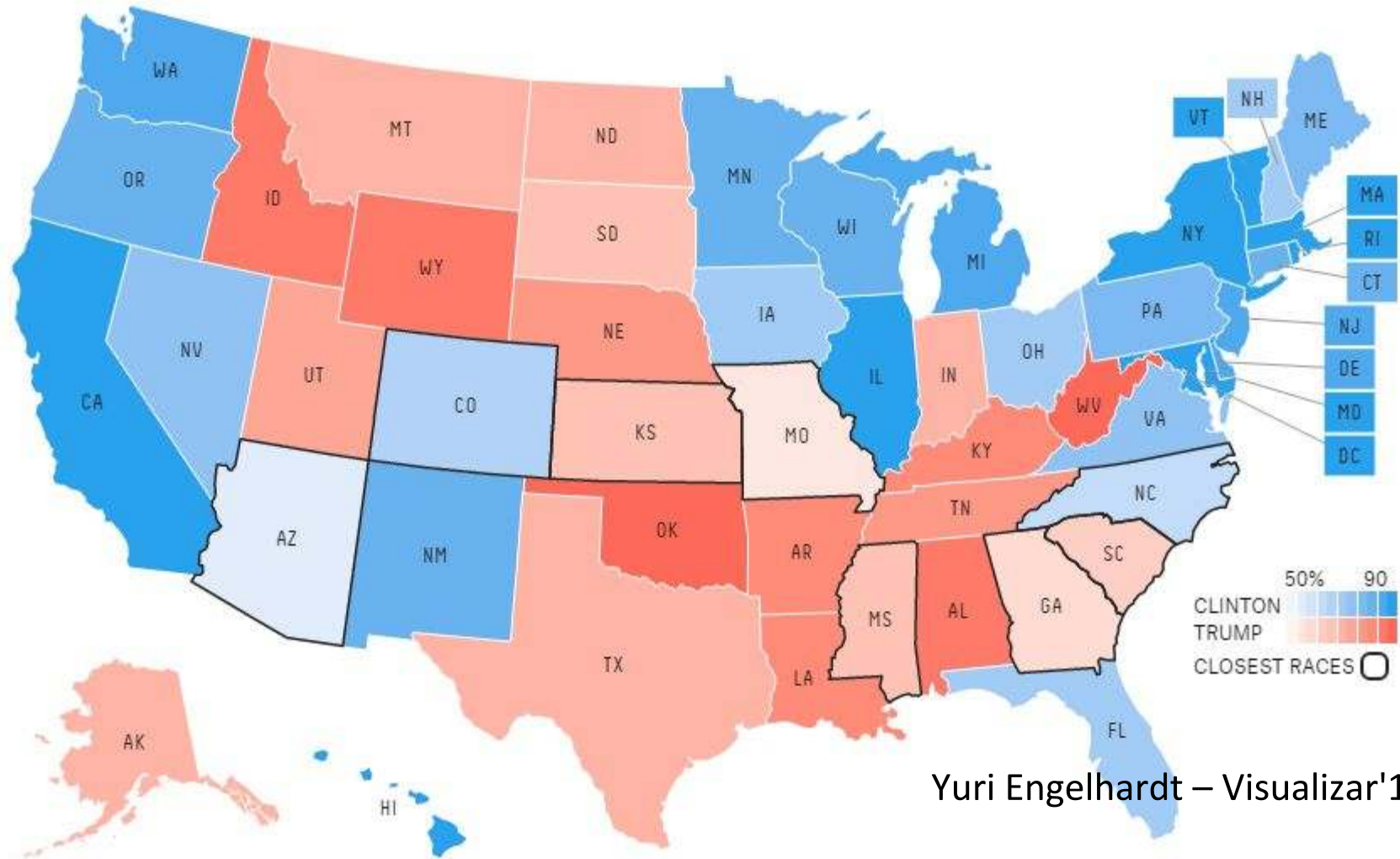


Hillary Clinton

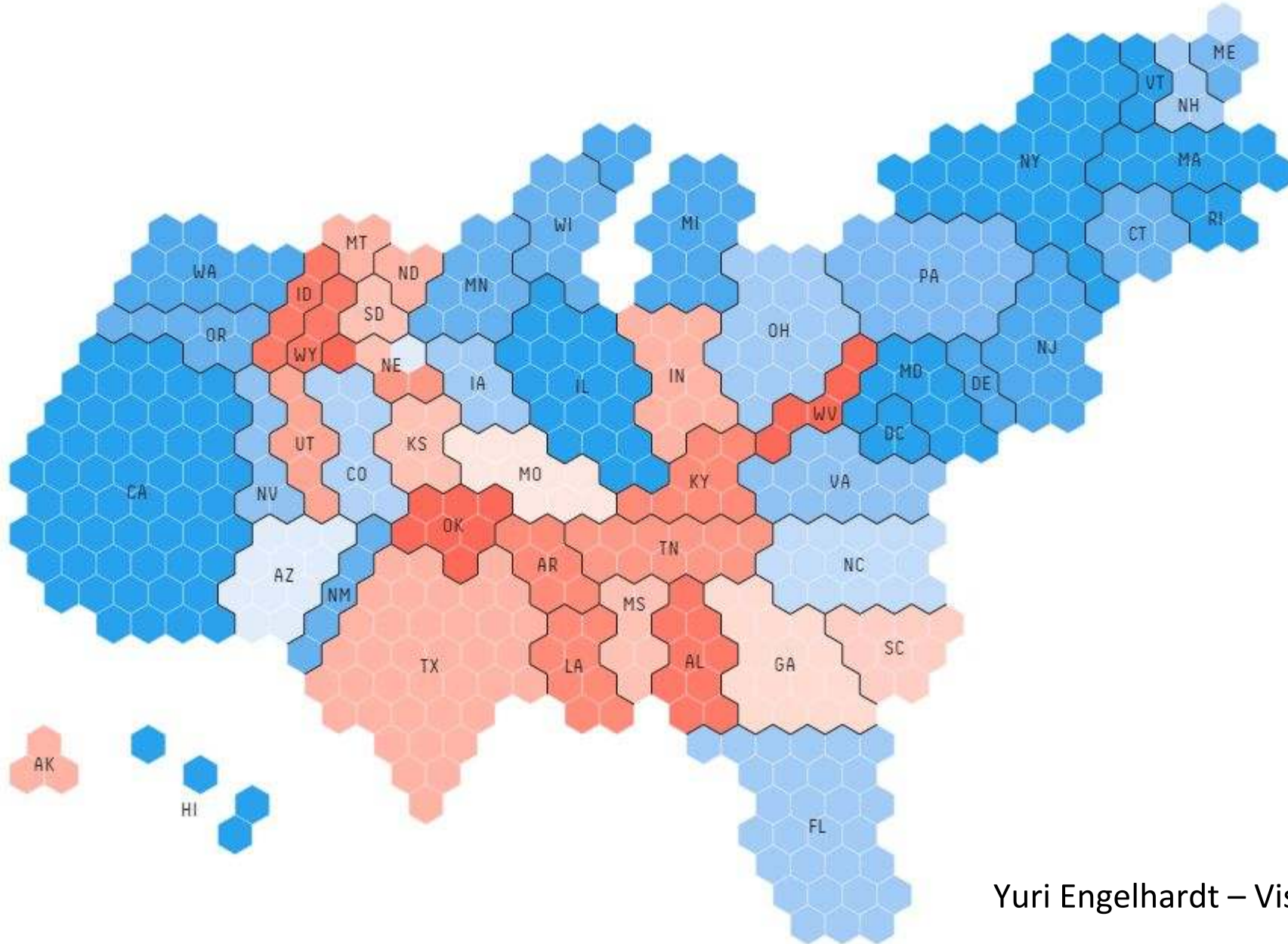
80.3%

Donald Trump

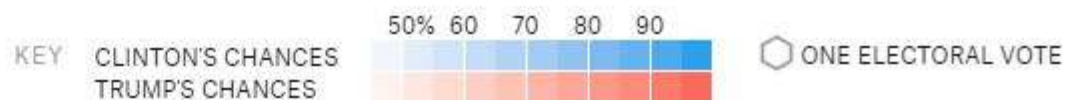
19.7%



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bar chart



Yuri Engelhardt – Visualizar'16

100 Top Dogs



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“floating” bar chart

bar chart consisting of 27 bars that
are all exactly the same size

ESCOLAS ACIMA E ABAIXO DA MÉDIA

RANKING DE ESCOLAS

PARTICIPAÇÃO DAS ESCOLAS

Escolas acima e abaixo da média nacional no Enem 2010

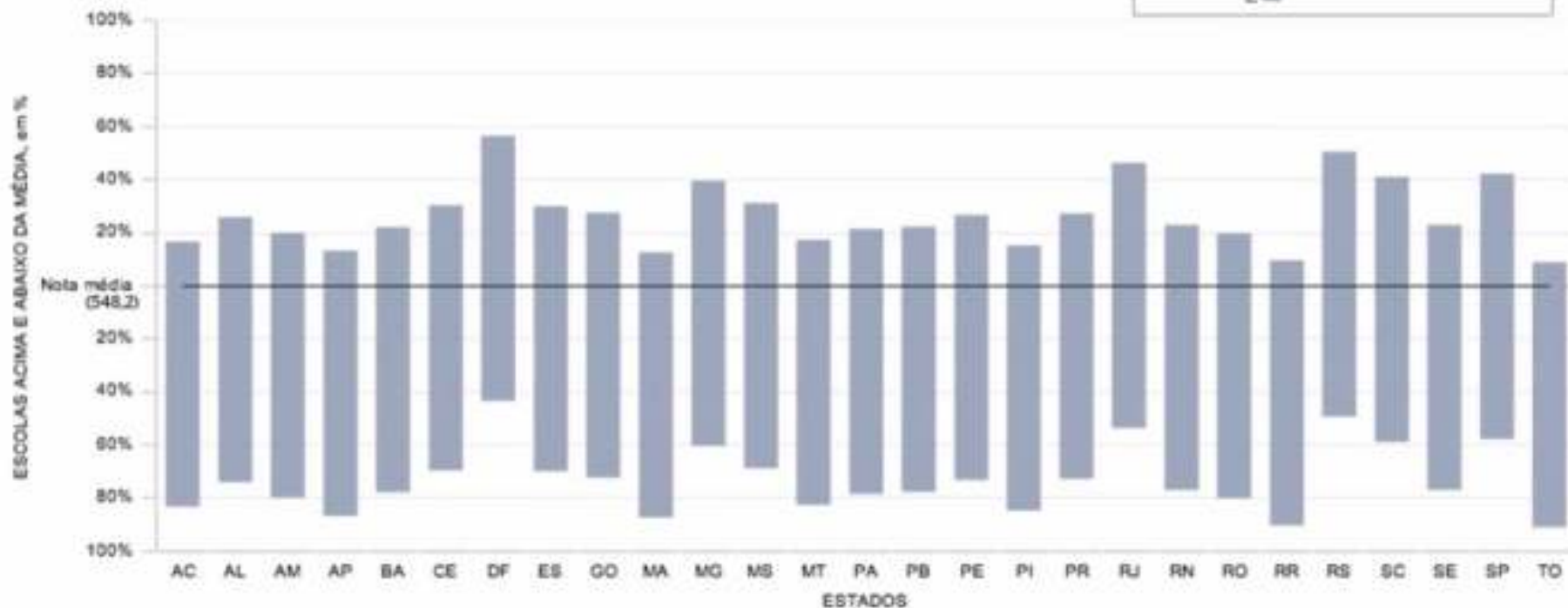
Com qualquer taxa de participação

Redes pública e particular

100%
das
escolas

• % acima da média
• % abaixo da média

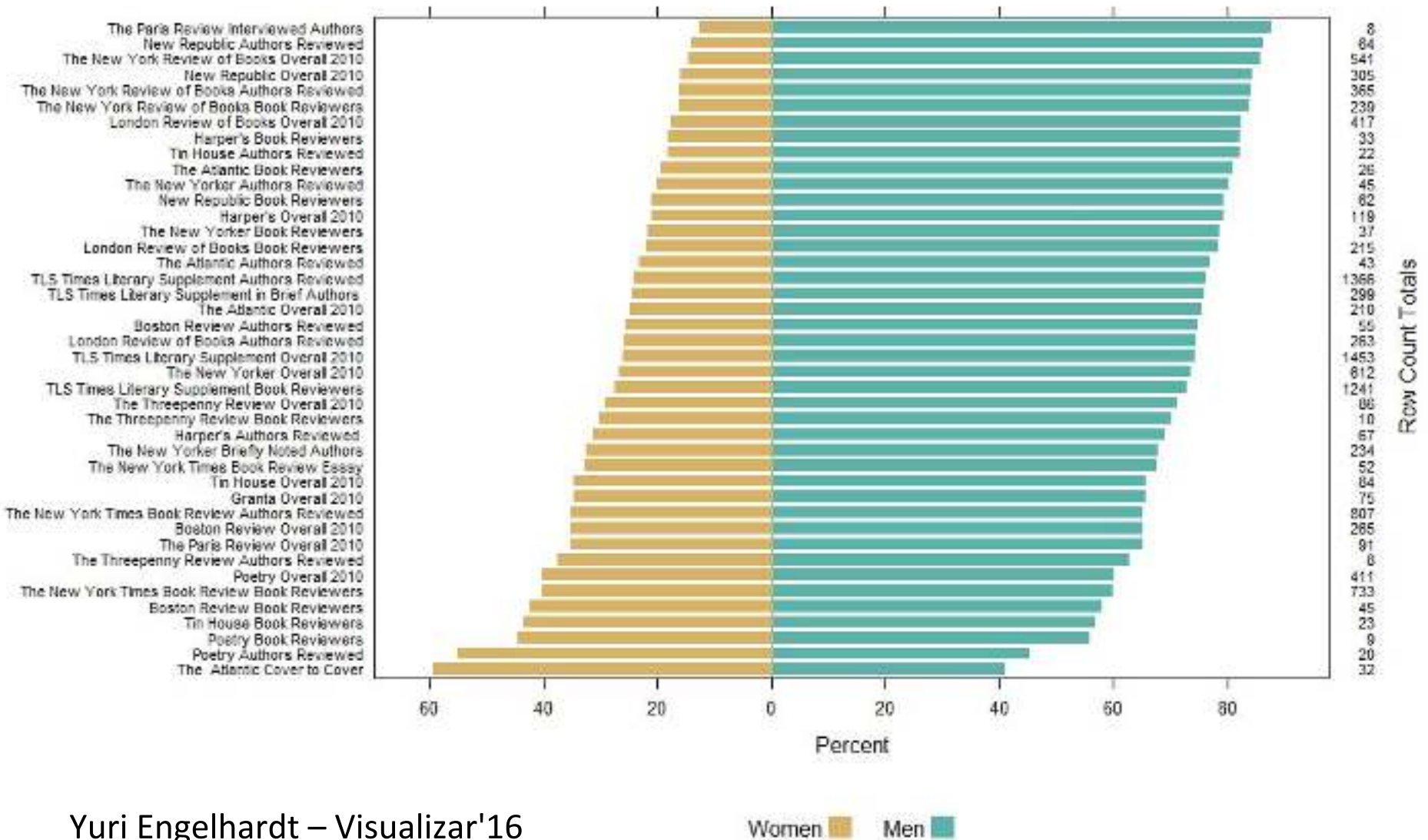
Média

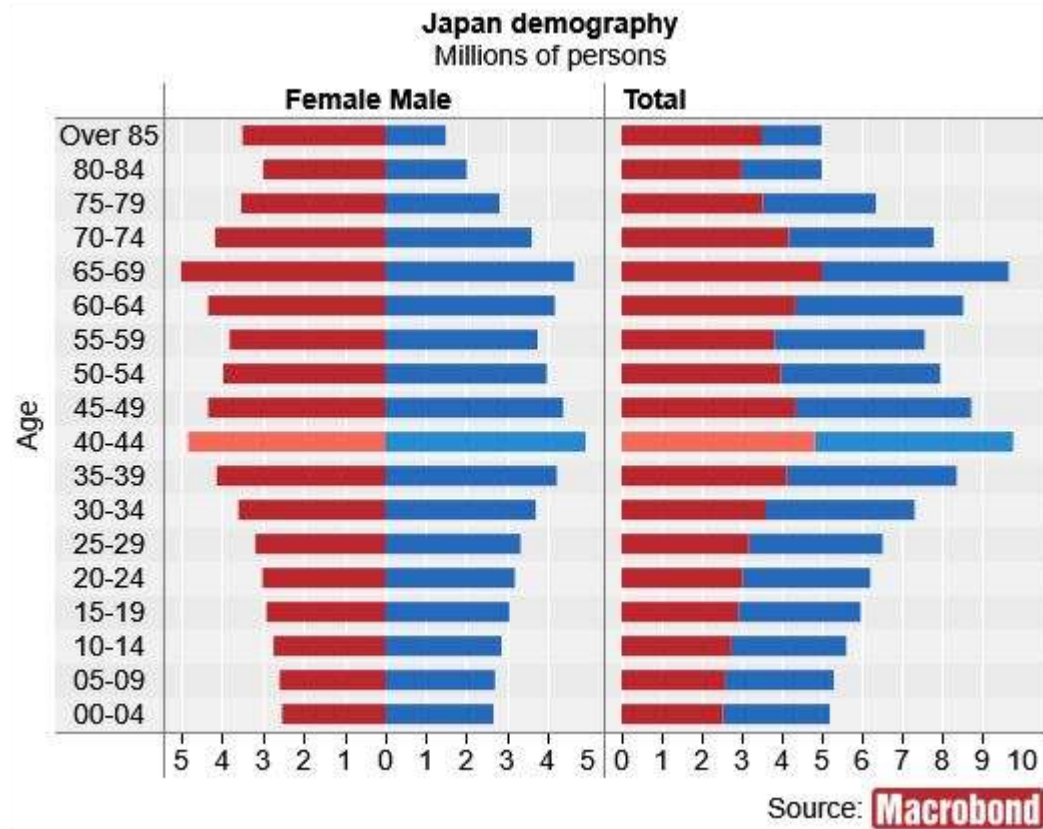


source: Alberto Cairo

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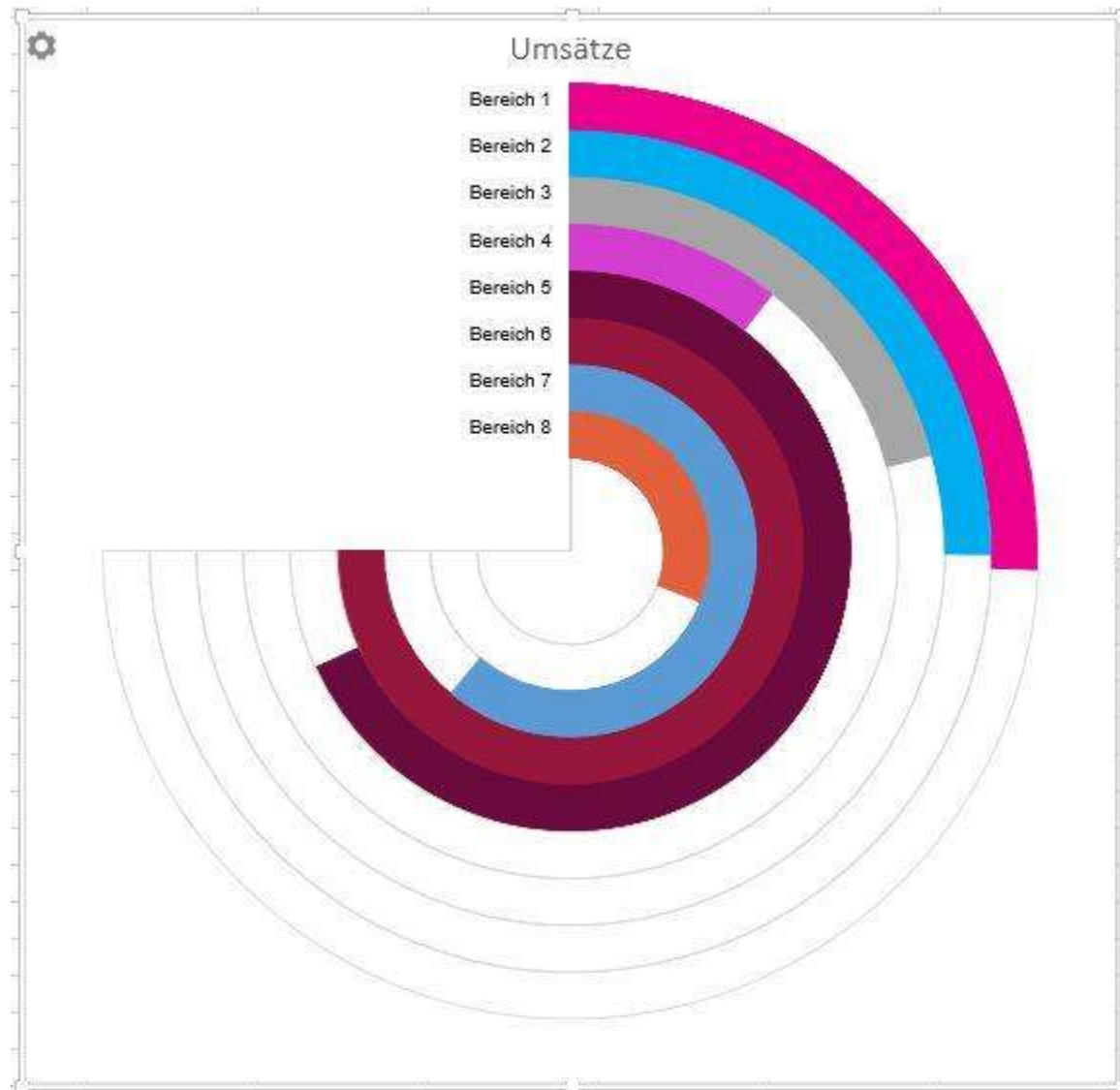
Reviewers by Gender 2010





back-to-back bar chart

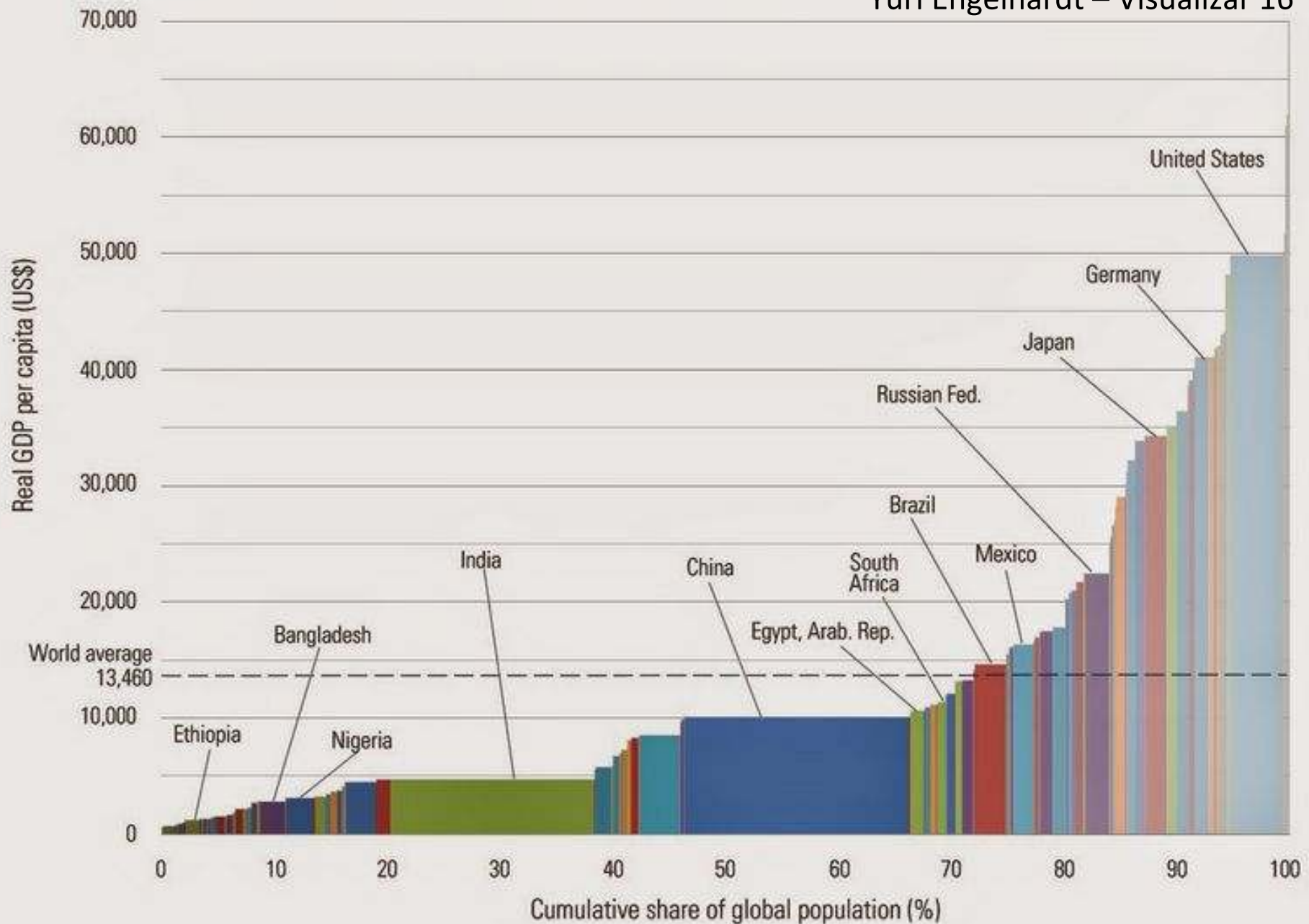
radial bar chart



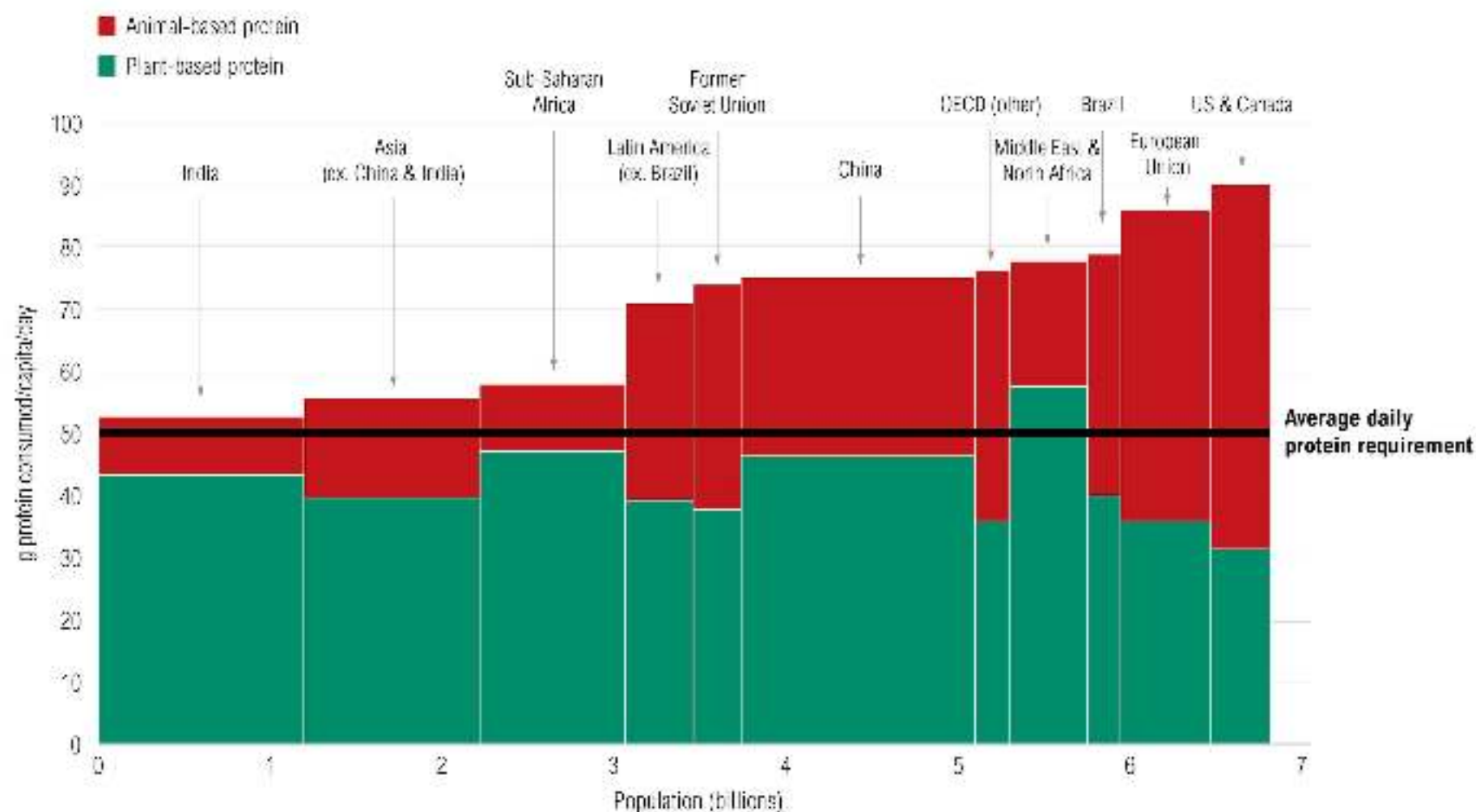
variable width bar chart

FIGURE 7.3 Real GDP Per Capita and Shares of Global Population, ICP 2011

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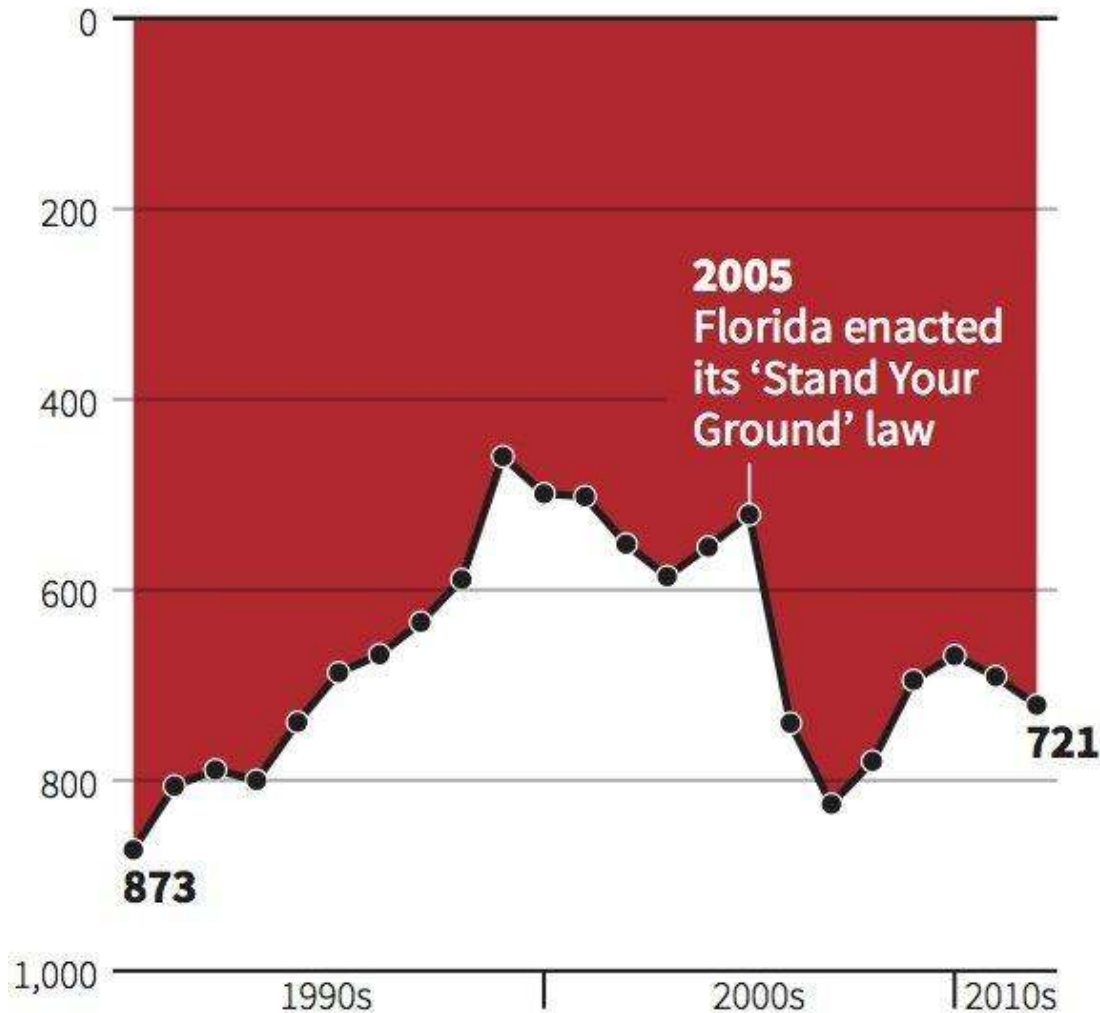
People Are Eating More Protein than They Need—Especially in Wealthy Regions



hanging bar chart

Gun deaths in Florida

Number of murders committed using firearms

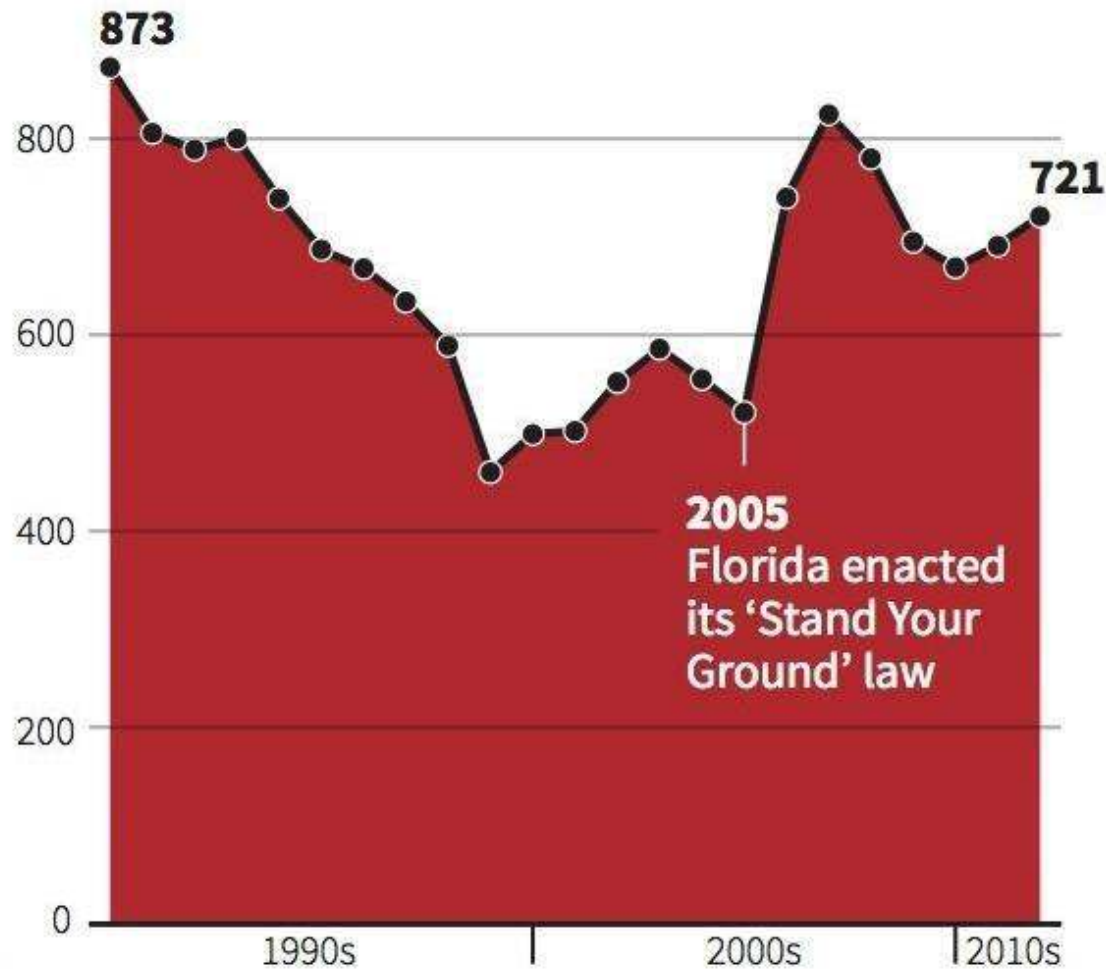


Source: Florida Department of Law Enforcement

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Gun deaths in Florida

Number of murders committed using firearms



Source: Florida Department of Law Enforcement

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[illegible]

Out of Sight, Out of Mind.

ATTACKS VICTIMS NEWS INFO

CHILDREN
175 9.8%

CIVILIAN
535 17.2%

OTHER
2348 73.0%

PAKISTAN

2004

2005

2006

2007

2008

2009

2010

2011

2012

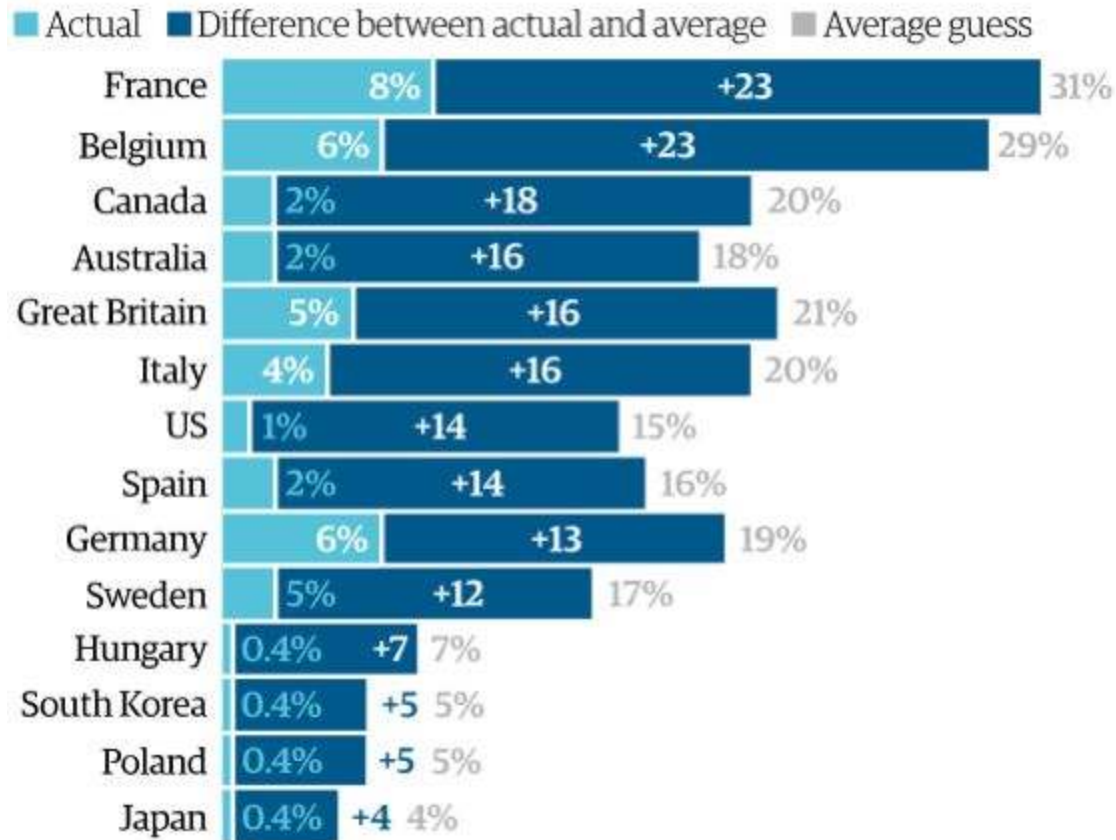
2013

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span chart (dumbbell chart)

data:
two values per item
(on the same dimension)

Out of 100 people How many do you think are Muslim?



GUARDIAN GRAPHIC

SOURCE: IPSOS MORI

Misconceptions About Muslim Population

Out of 100 people, how many do you think are Muslims in your country?

Actual vs. Average Guess



Contraceptive use 1970 - 2015

● 1970 ● 2015

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Africa

8.2

33.4

Asia

28.4

67.8

Europe

64.2

69.2

Latin America & Caribbean

35.8

72.7

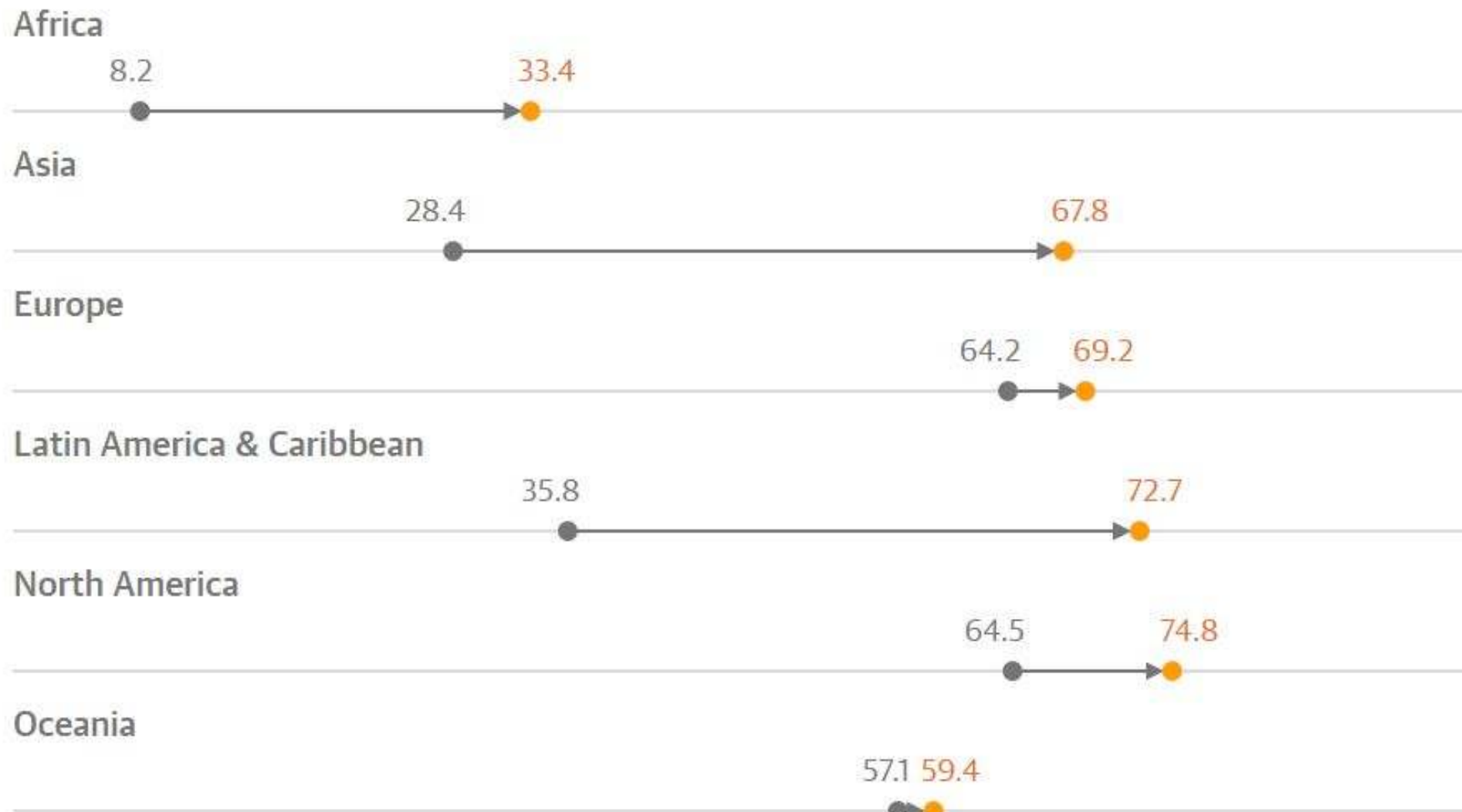
North America

64.5

74.8

Oceania

57.1 59.4



What's Your Pay Gap?

Women earn less than men in 439 of 446 major U.S. occupations, a Wall Street Journal examination of the gender pay gap found.

They earn more than men in seven occupations.

Enter your
occupation here

Women working as

financial managers

earn **64%** of their male counterparts on average.

Gender earnings by occupation

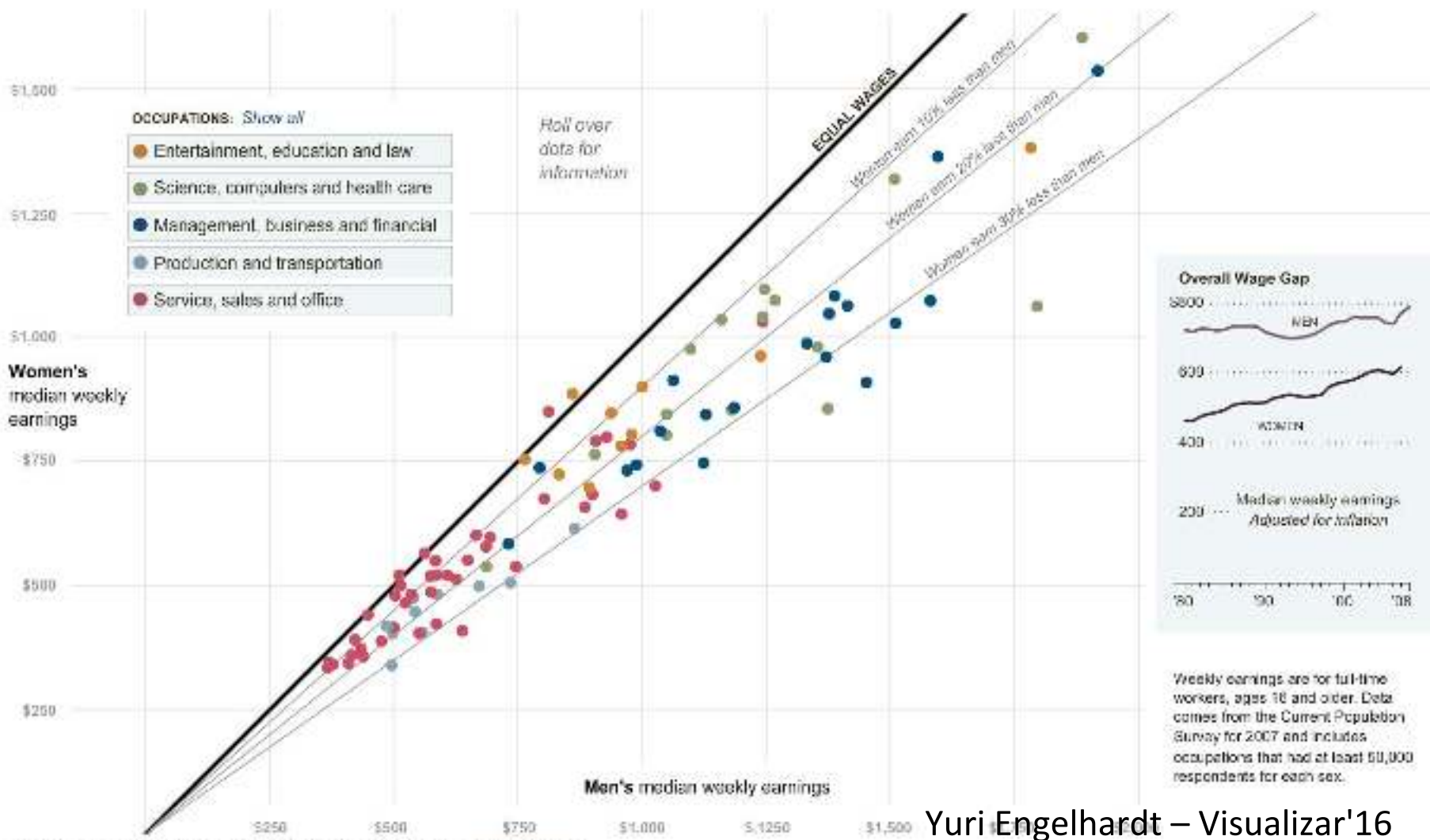
• Men	\$91,074
• Women	\$58,628

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scatter plot

Why Is Her Paycheck Smaller?

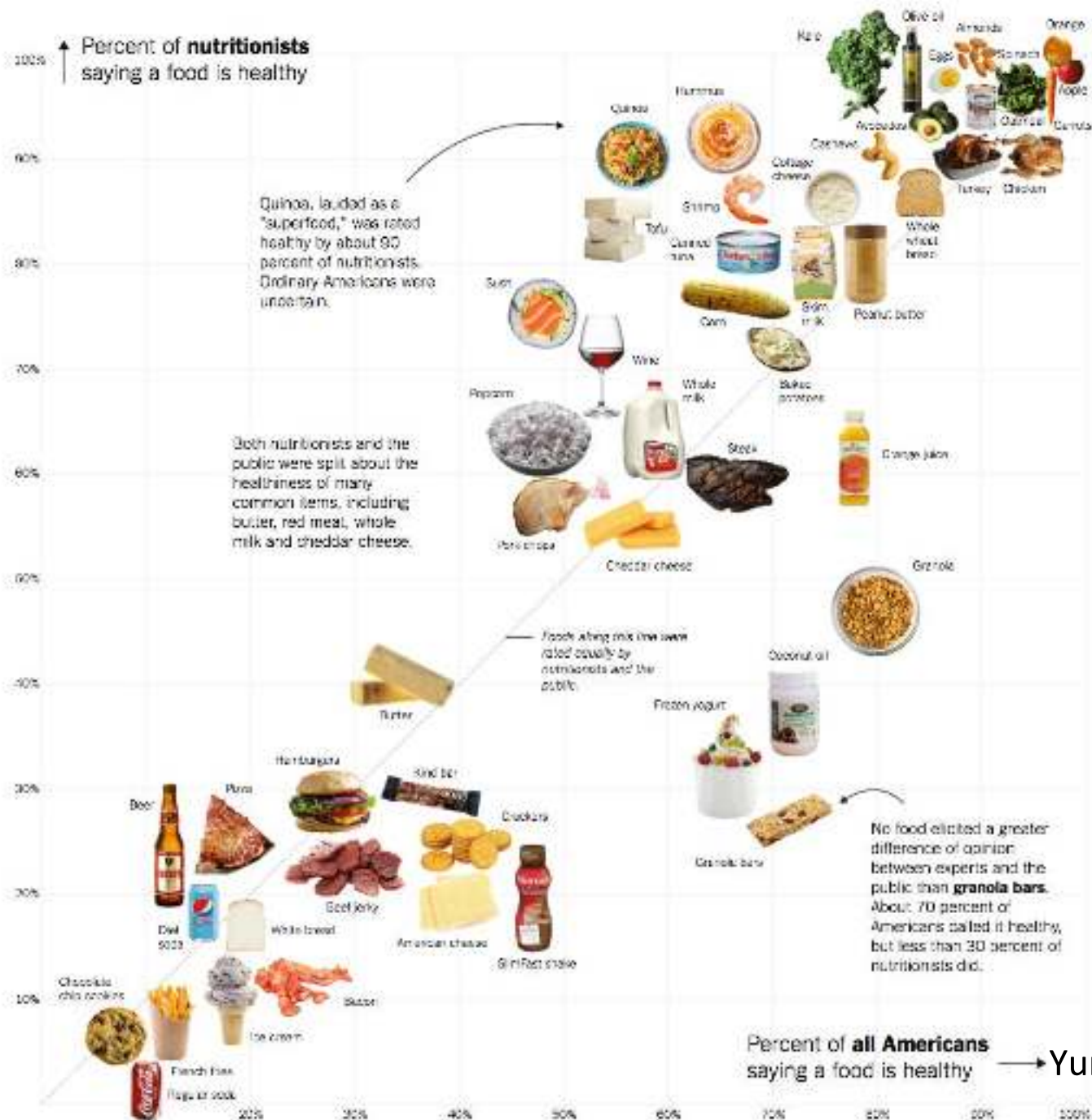
Nearly every occupation has the gap — the seemingly unbridgeable chasm between the size of the paycheck brought home by a woman and the larger one earned by a man doing the same job. Economists cite a few reasons: discrimination as well as personal choices within occupations are two major factors, and part of the gap can be attributed to men having more years of experience and logging more hours.



Hannah Fairfield and Graham Roberts/The New York Times | [Send Feedback](#)

Sources: Bureau of Labor Statistics; Census Bureau

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Race ▾

Sex ▾

30-44 ✕ ▾

Educ. ▾

State ▾




 Show '04

↑ Turnout

2012
 56% voted
 52% Dem.

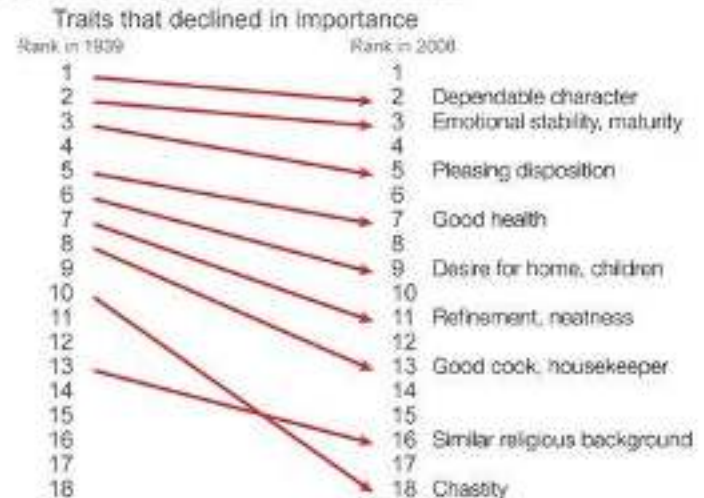
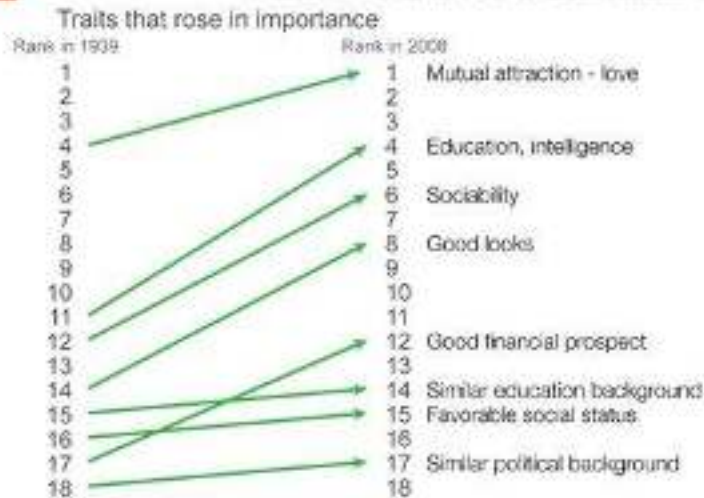
Pct. Dem. →

● White ● Black ● Hispanic ● Asian/Other Each circle represents one demographic group. [Estimates](#) not available for some small groups.

slope chart

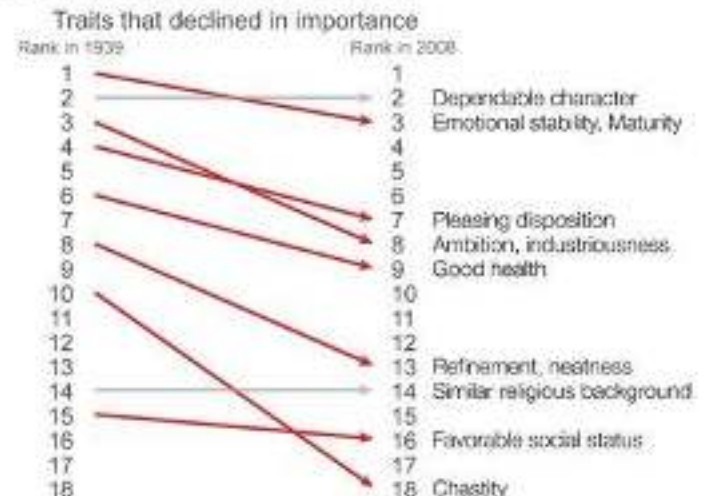
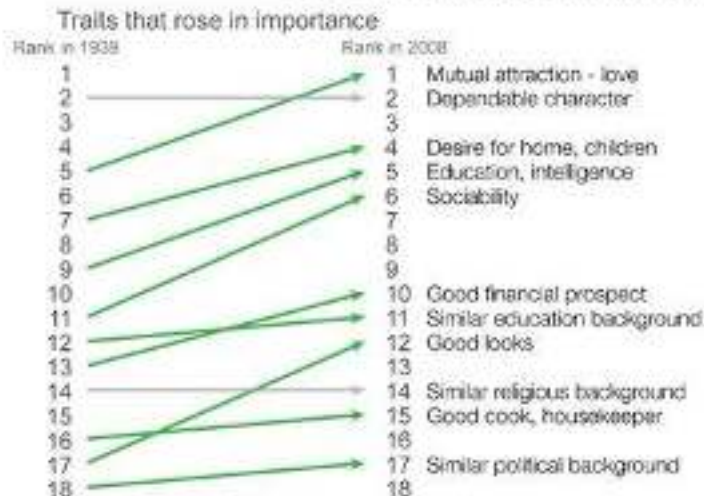
What Women want – 1939 vs 2008

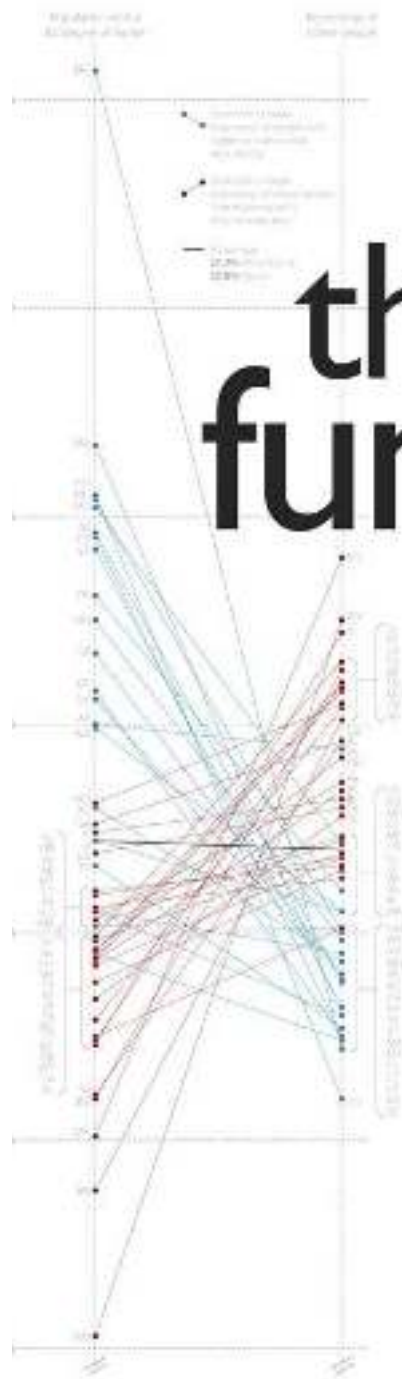
Women were asked to rank the importance of 18 traits in prospective husbands.



What Men want – 1939 vs 2008

Men were asked to rank the importance of 18 traits in prospective wives.





the functional art

**an introduction to
information graphics
and visualization**

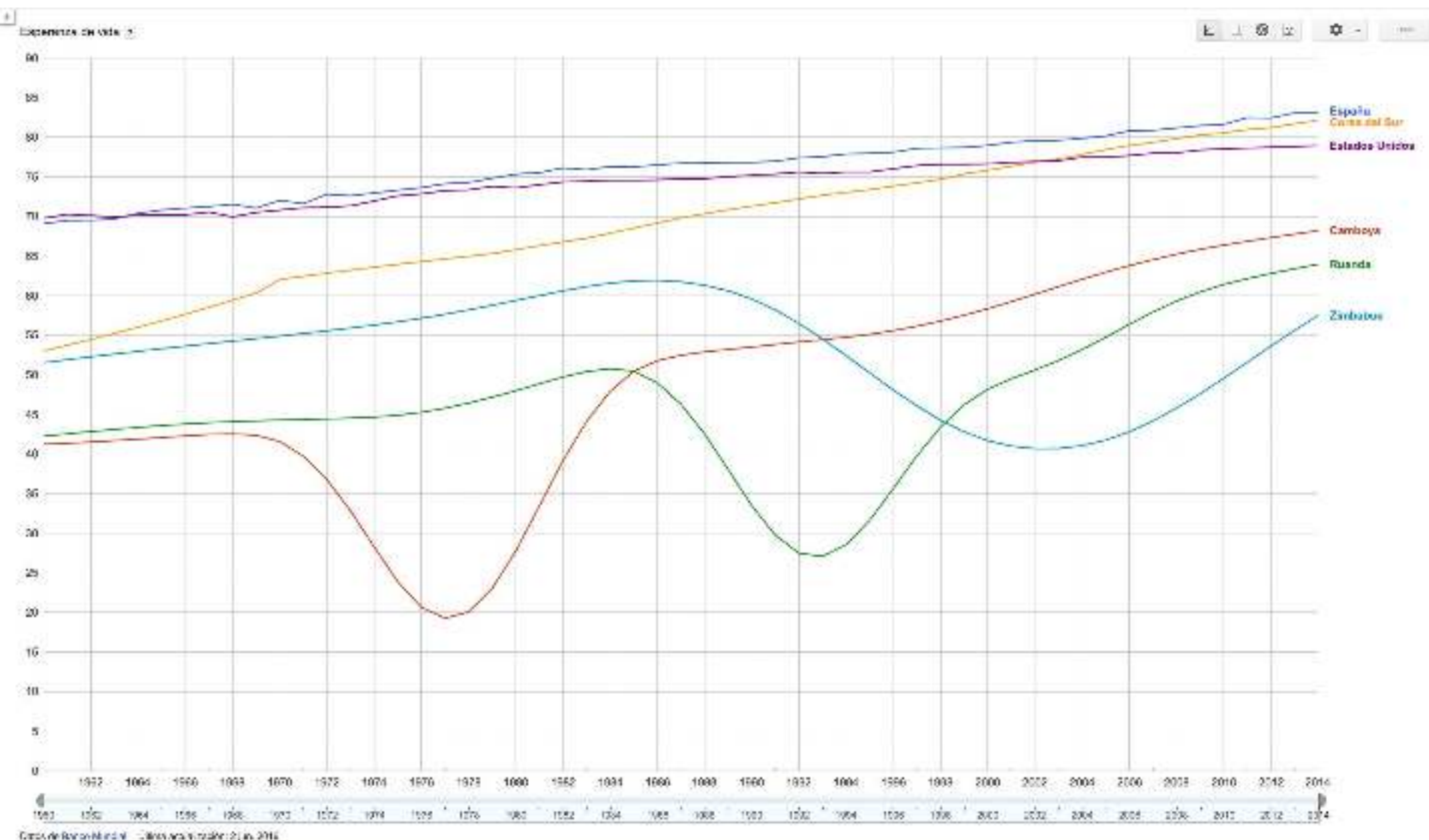
alberto cairo

"Welcome to Alberto's world. Cairo has done it all in the functional Art: theory, practice, examples. And he's done it brilliantly. It is the most comprehensive and sensible book yet on real-world information graphics; we won't need another one for a long time!"

Nigel Holmes

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line chart



data:
values over time
for different items

bump(s) chart

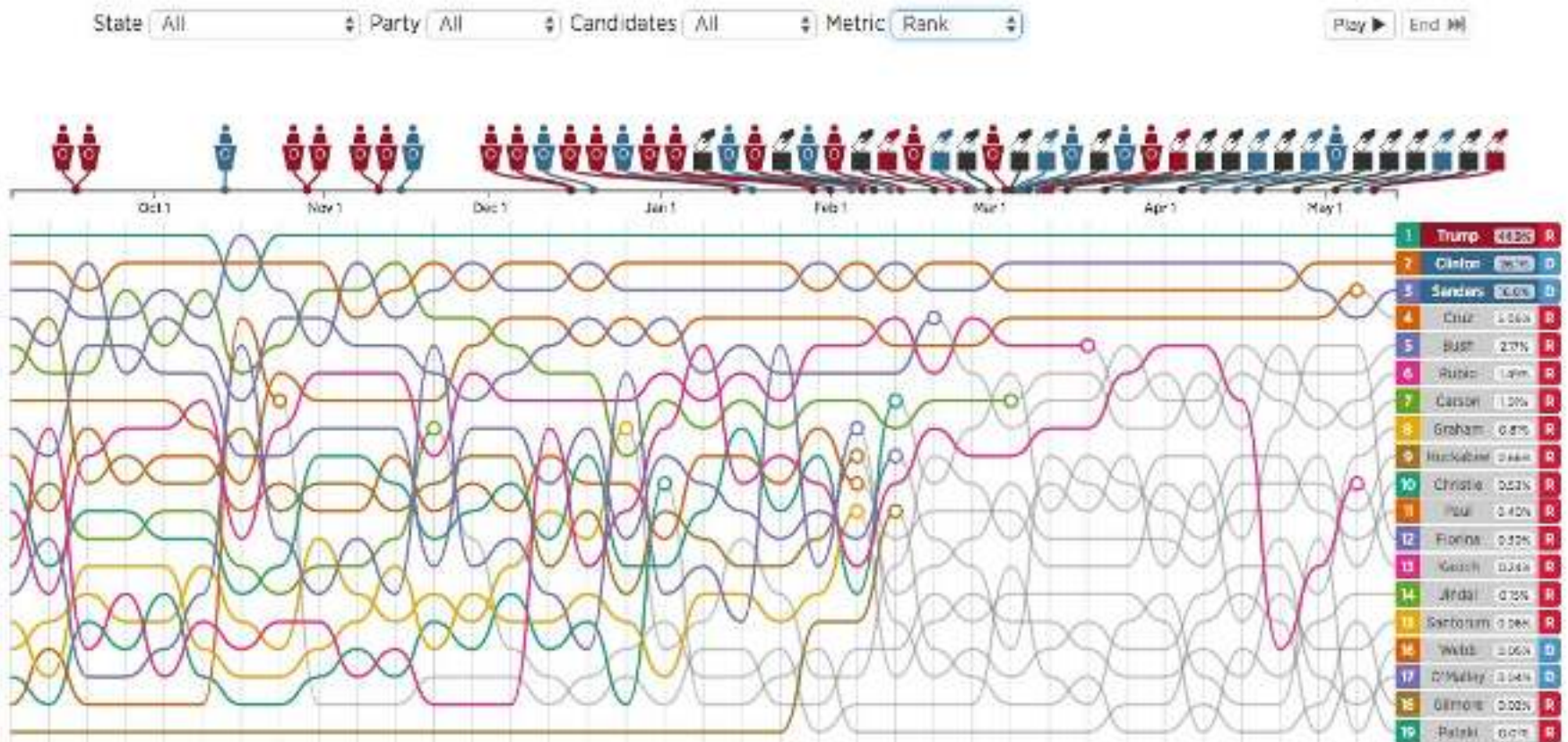
data:
rankings over time
(on the same dimension)

#interactive

Twitter Embed

#Election2016: US Presidential Candidate Twitter Buzz

As the fortunes of the 2016 US presidential candidates rise and fall throughout the campaign, so does the amount of conversation about them on Twitter. Below is an interactive graphic that allows you to take a look back at the amount of buzz each presidential candidate received on Twitter since September. By default, the graphic ranks all candidates using national data, but you can filter by party, state and status of candidacy or order it proportionally.

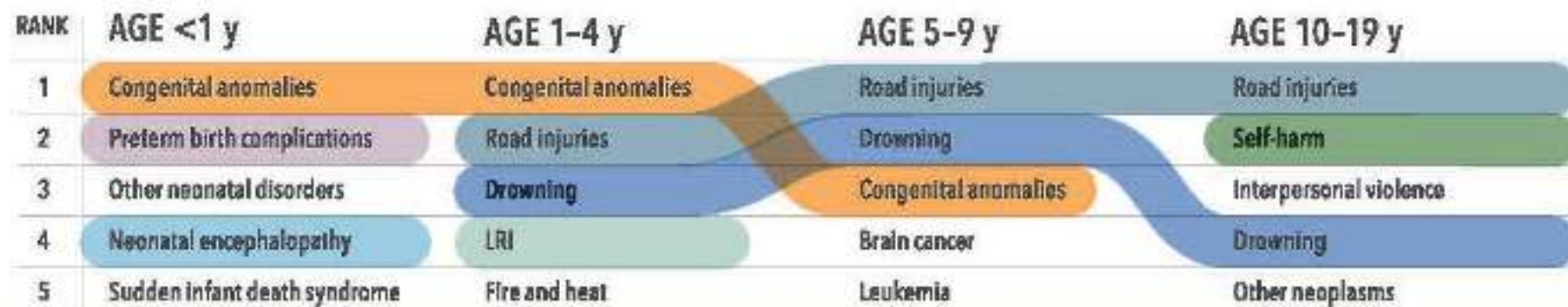


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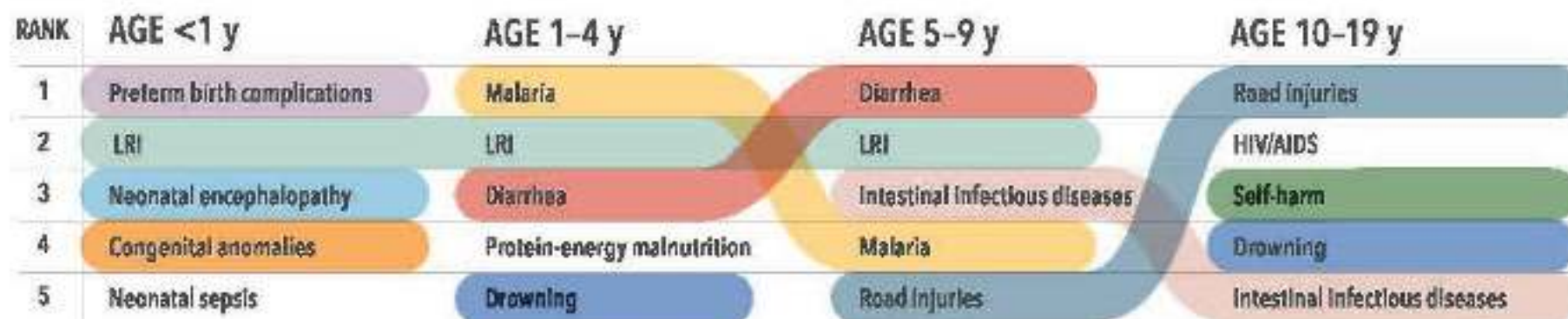
Mortality in Children and Adolescents, 1990–2013

Top 5 Causes of Death by Age Group in Developed and Developing Countries, 2013

DEVELOPED COUNTRIES



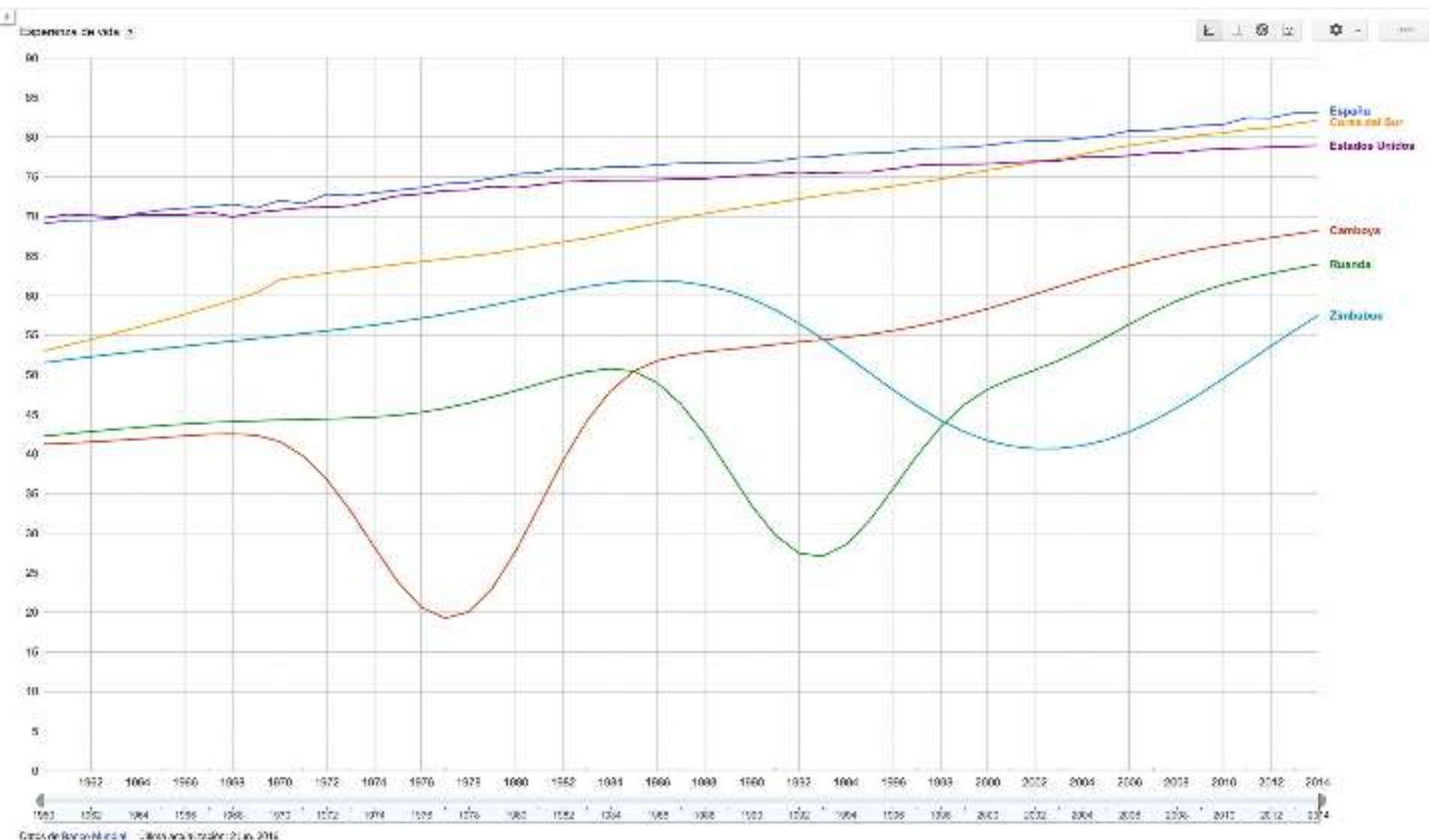
DEVELOPING COUNTRIES

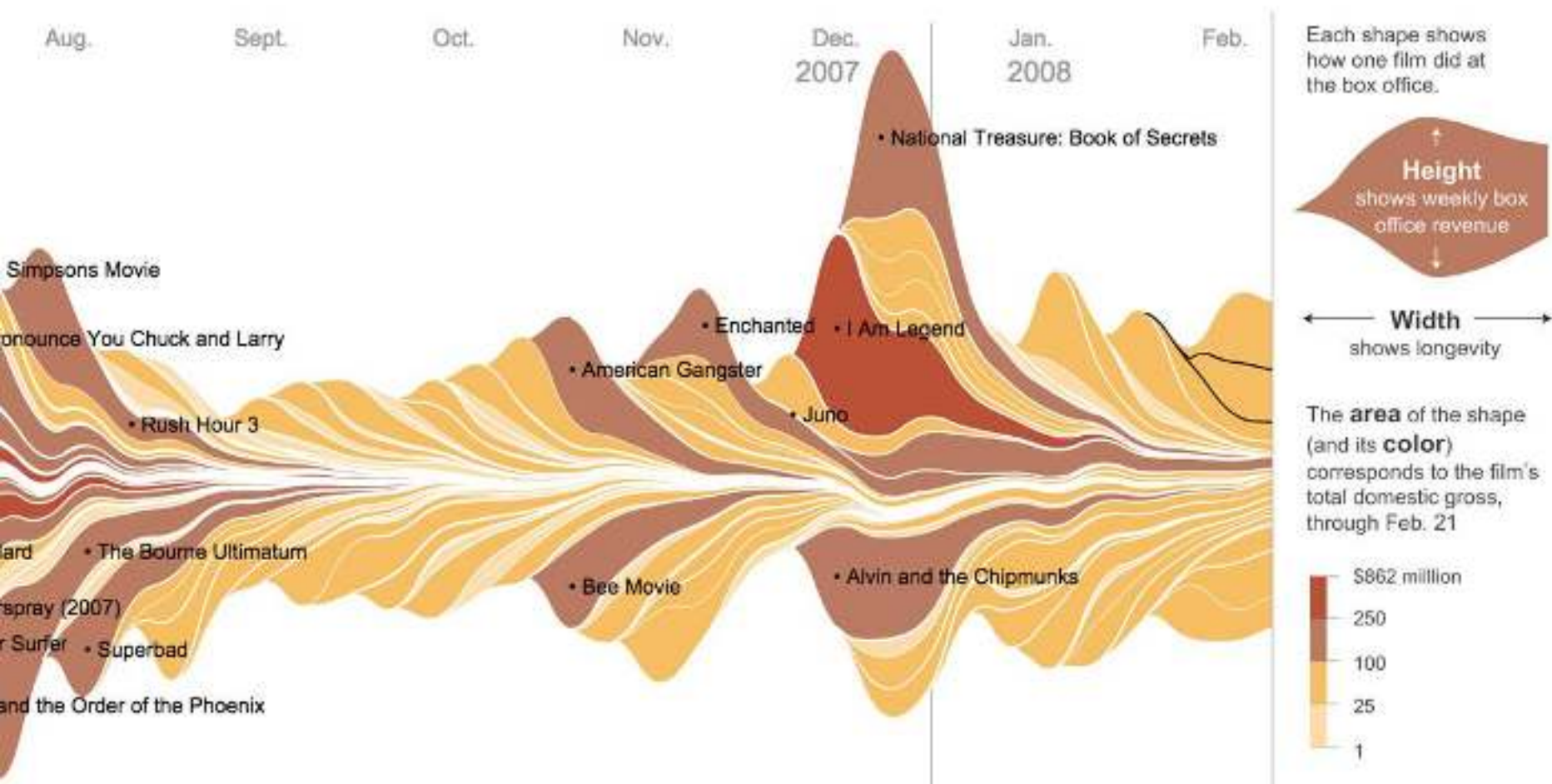


LRI = lower respiratory tract infections

stream graph

data:
values over time
(on the same dimension)

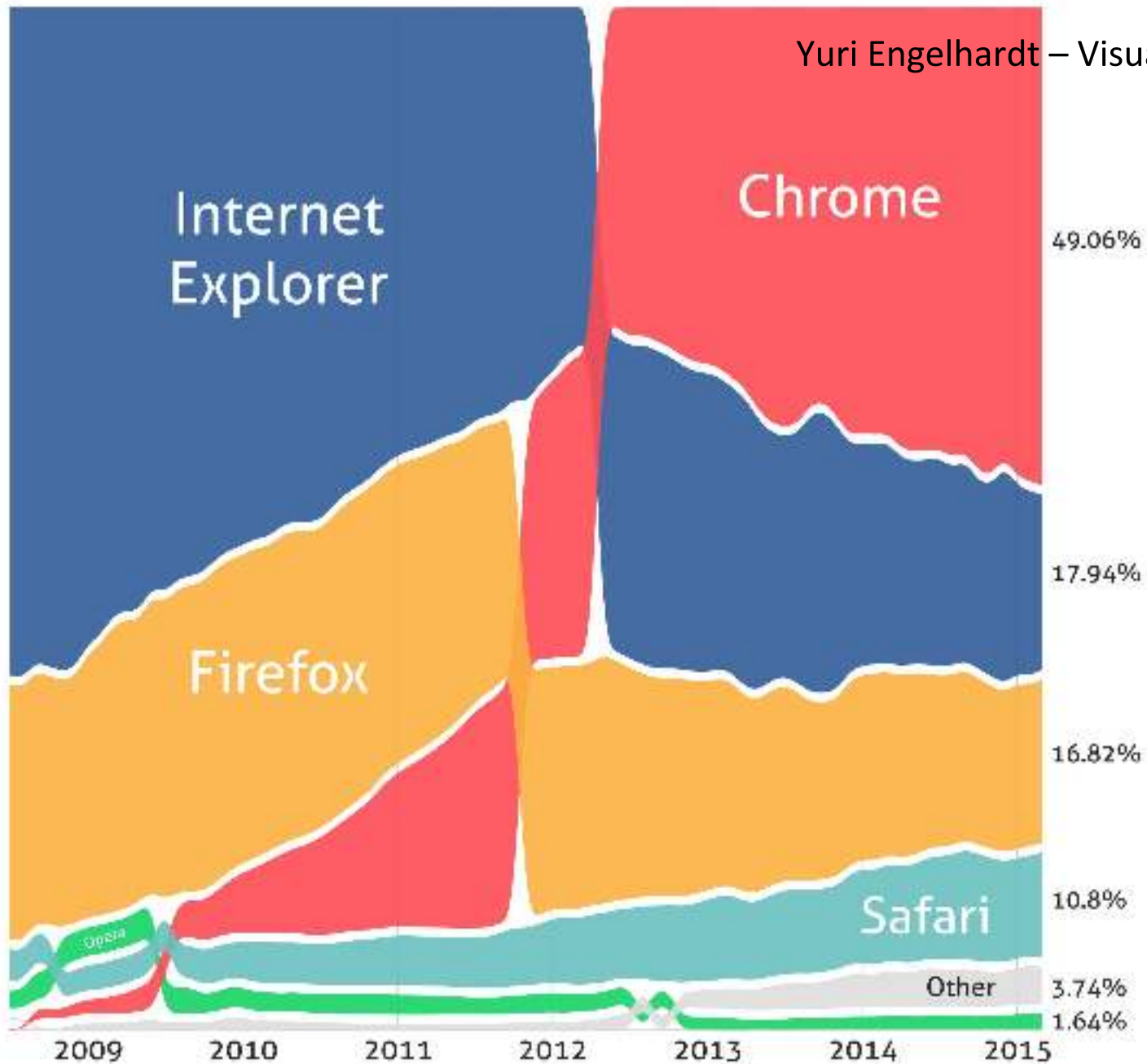




“bump stream graph”

Global Browser Market Share

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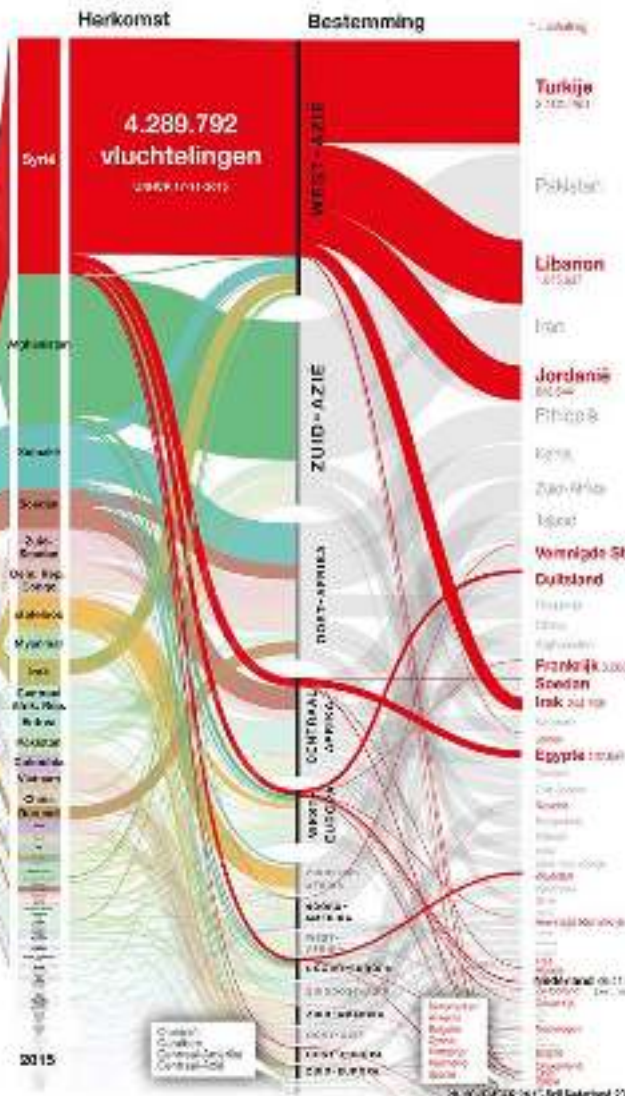
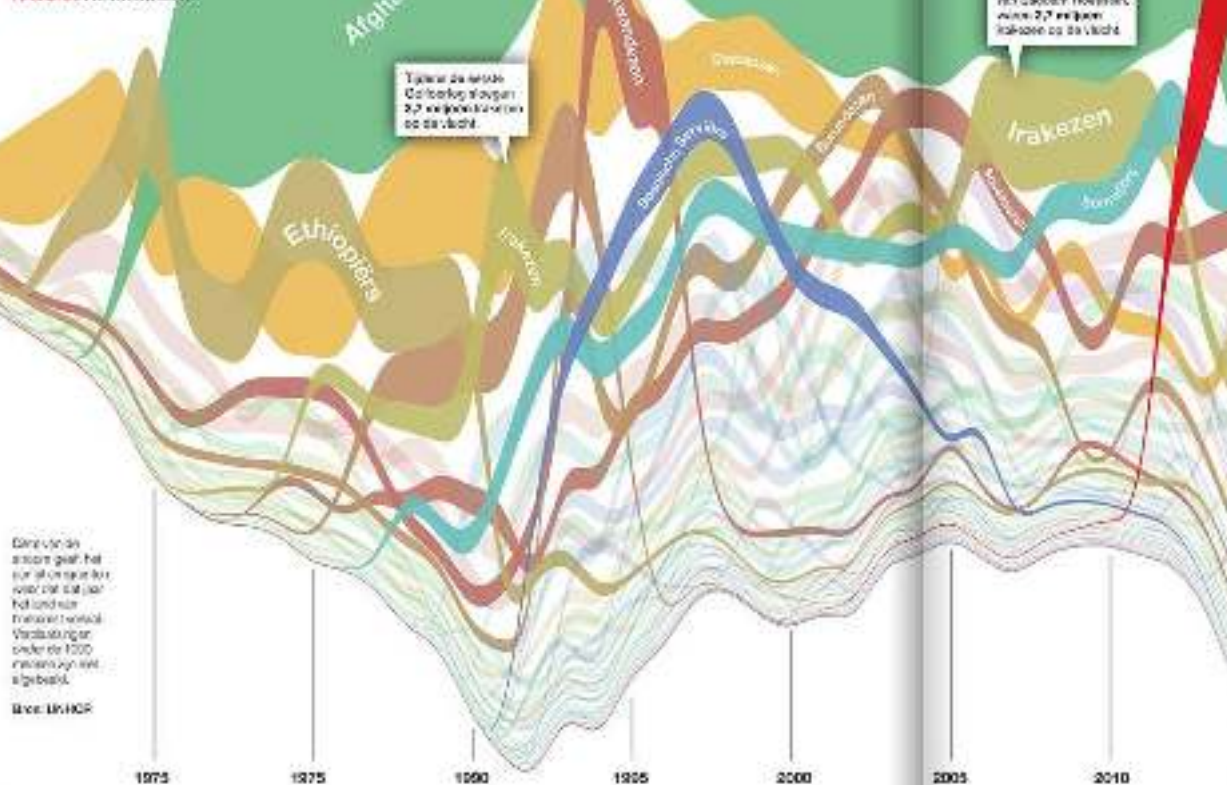


DE CIJFERS

VLUCHTELINGEN-STROOM

ALDORJENEN WERDEN OVER DE WERELD heen gevoerd op de vlucht. Maar nu zijn veel van hen in een vast oord gekomen uit Syrië naar Europa.

Illustratie: HENDRIK BUIS



Sankey diagram

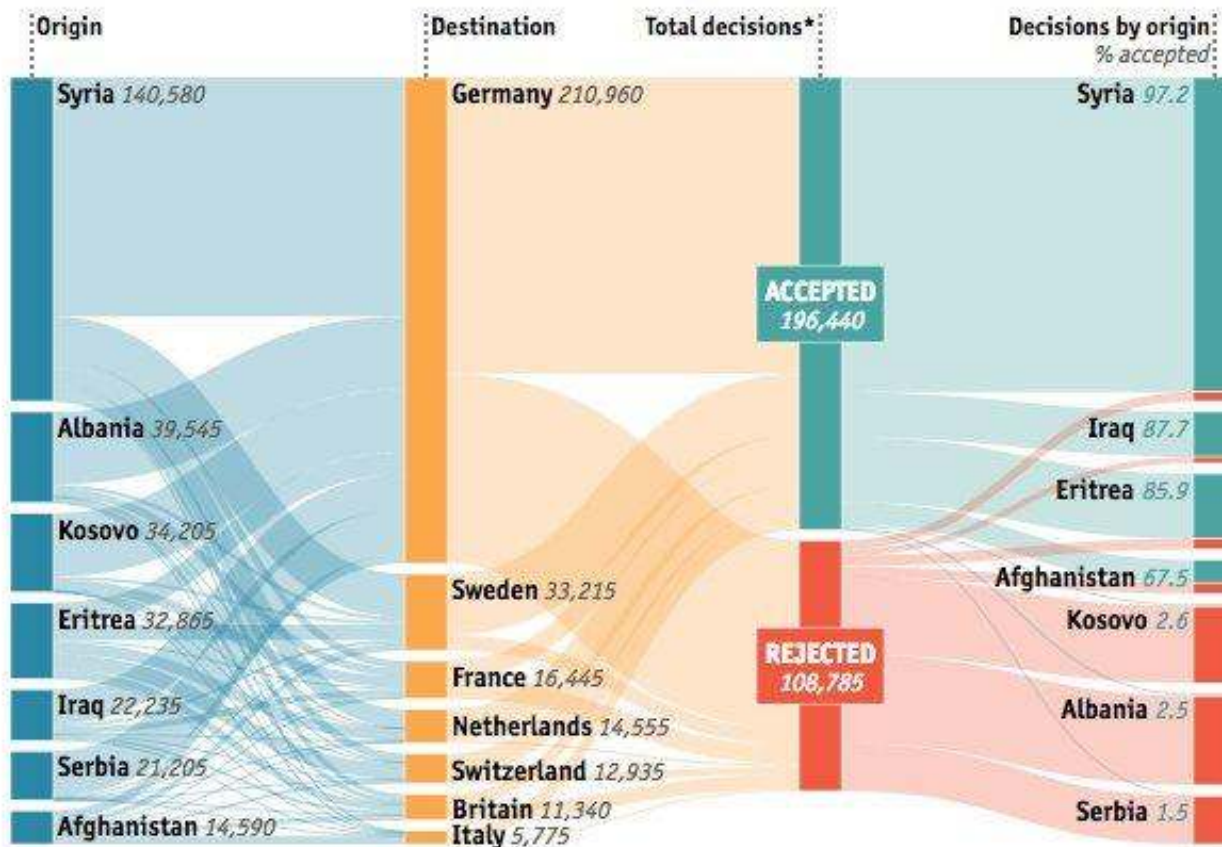
data:
connections or flows
between discrete items

Acceptance decisions

For migrants that successfully reach the country in which they hope to settle, they must file an asylum application with its government. Acceptance depends mostly upon country of origin. European countries have tried to control the influx through border controls and policies designed to discourage asylum seekers from applying.

1 2 **3** 4

European asylum-seeker decisions



Sources: Eurostat; Frontex; *The Economist*

*First-instance decisions only

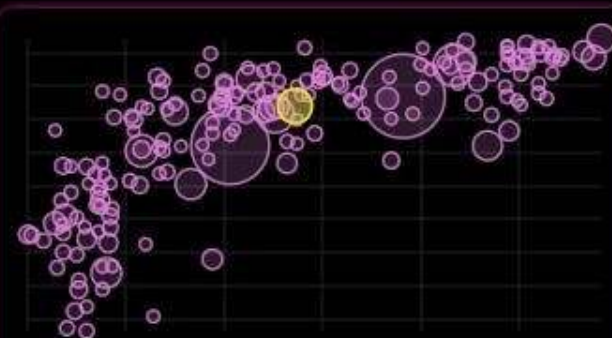
chord diagram

global dependency explorer

search country:



(none)



x: Median age y: Life expect size: Population

bubblechart



GDP (PPP) Literacy (t) Urbanizatio Education - Unemploy

parallel coordinates

country selected: Brazil

exports to

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single axis chart

data:
values over time
for different items

Jessie Richards, Ben Houge and Joshua Rosenstock



Eating the distance

How far did the ingredients travel to get to us?

80
miles



400
miles



7000
miles



21000
miles



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3 October 2016