

A tour through the Visualization Zoo

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Visualizar'16 @ MediaLab-Prado
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inspired by:



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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]

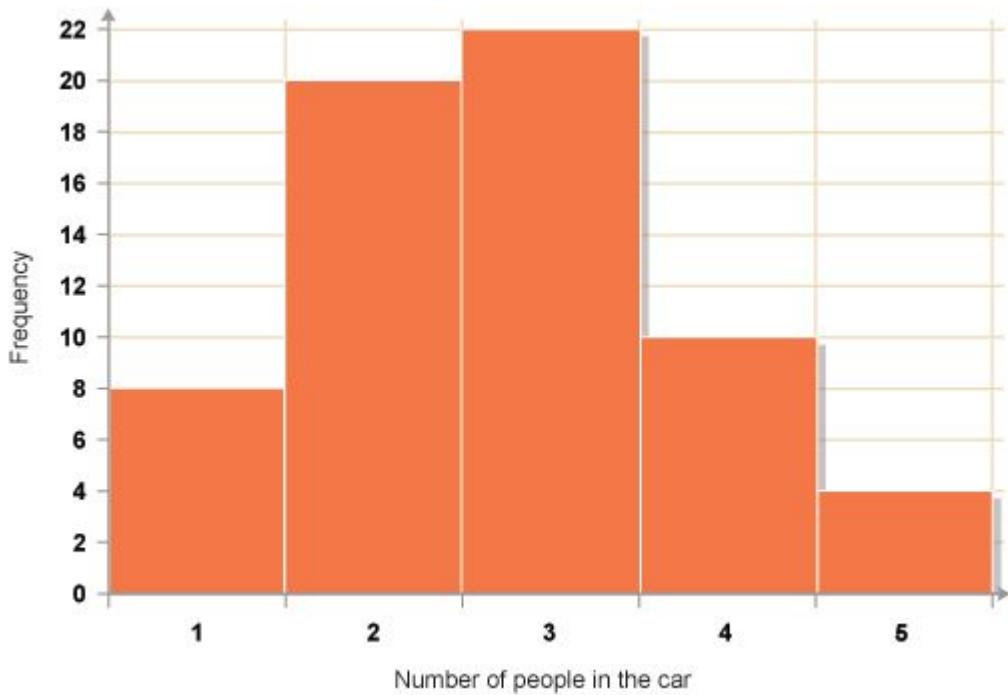
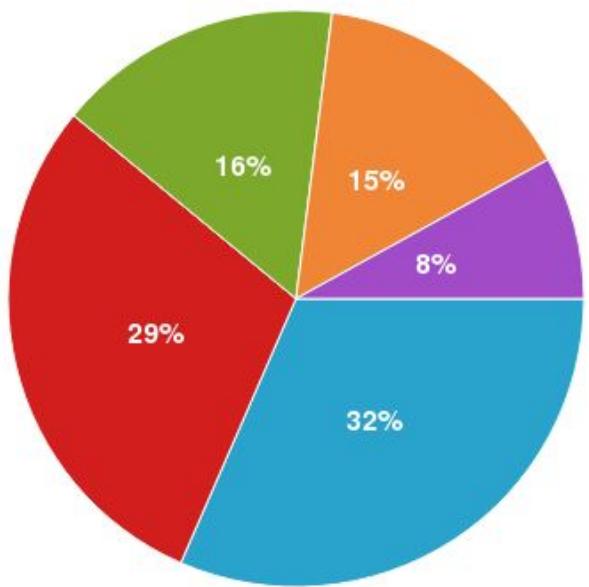


ZOO

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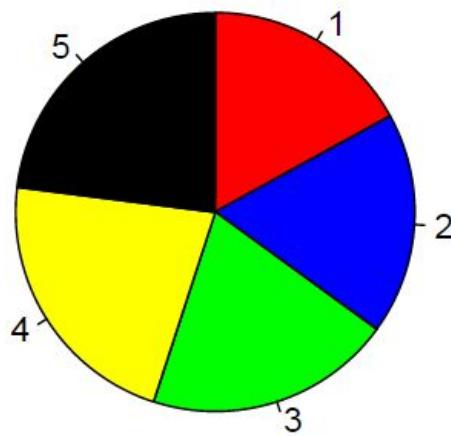
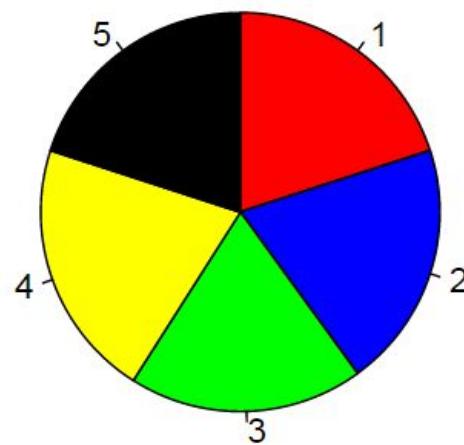
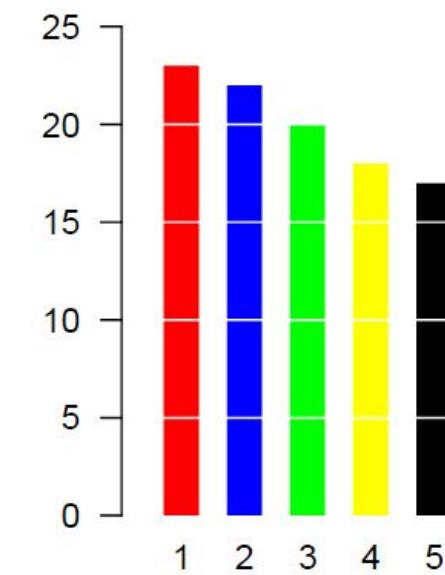
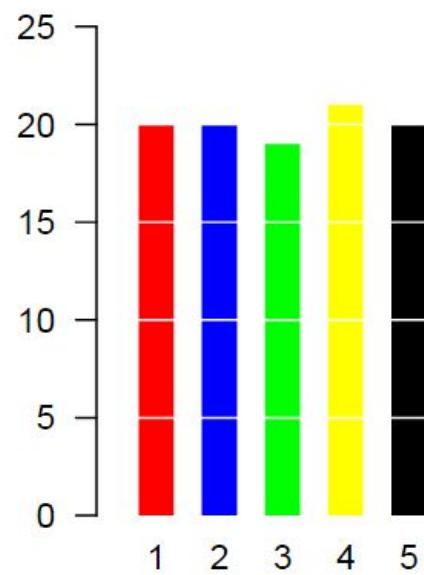
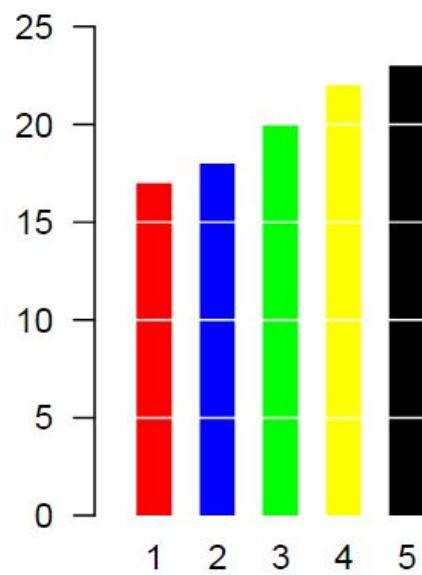
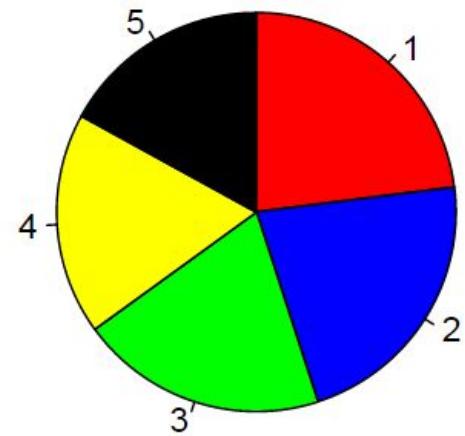


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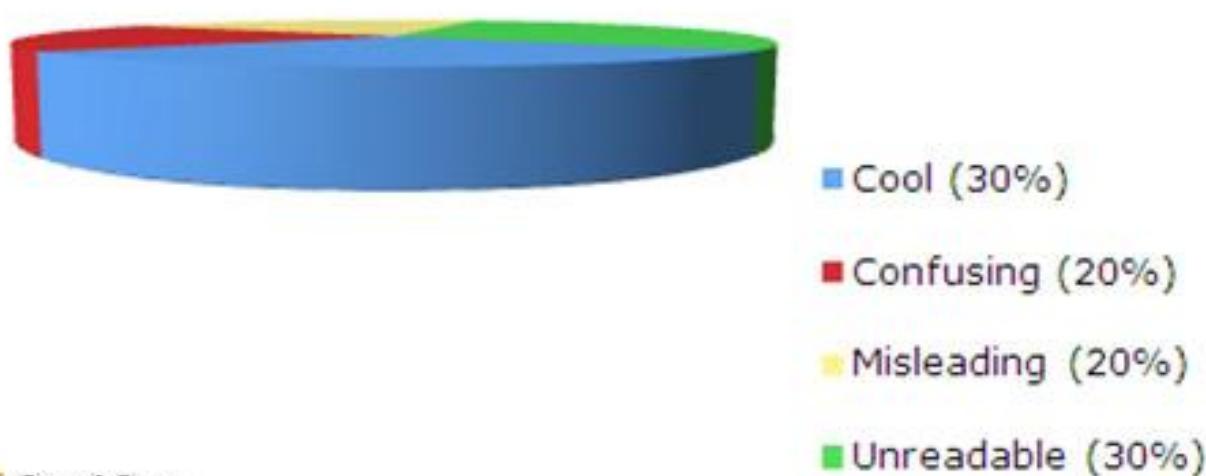




pie chart

A**B****C**

Perception of 3D pie charts

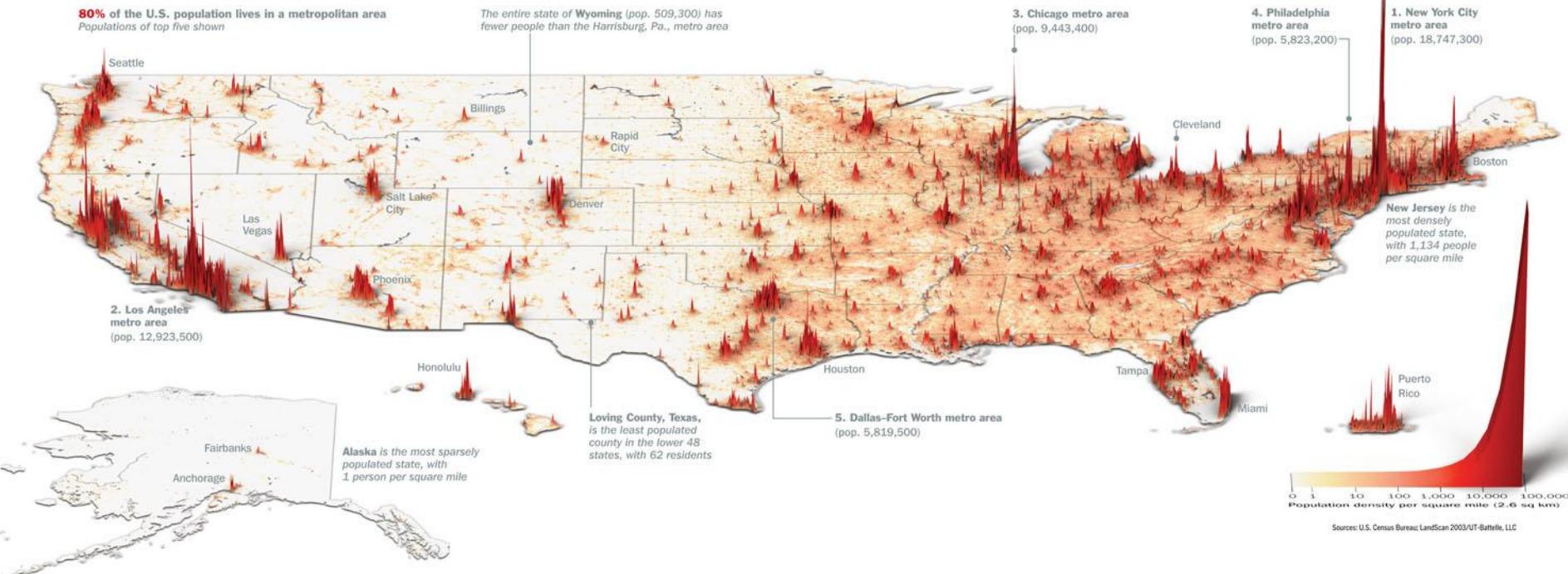


GraphJam

map

Where We Live...

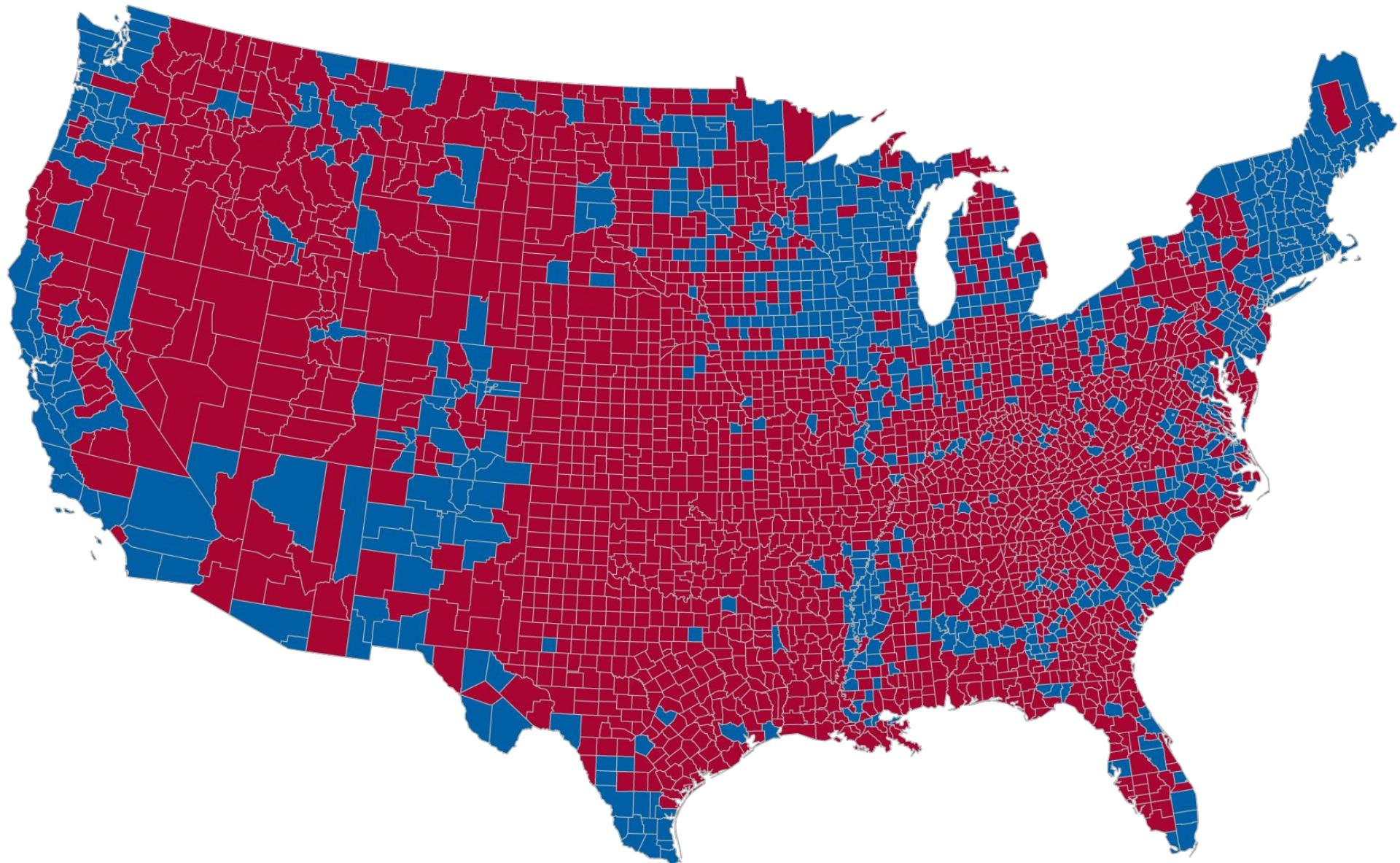
Unlike many developed countries, the U.S. keeps growing. We are also moving south and west. But compared with China or India, the nation is a vast prairie



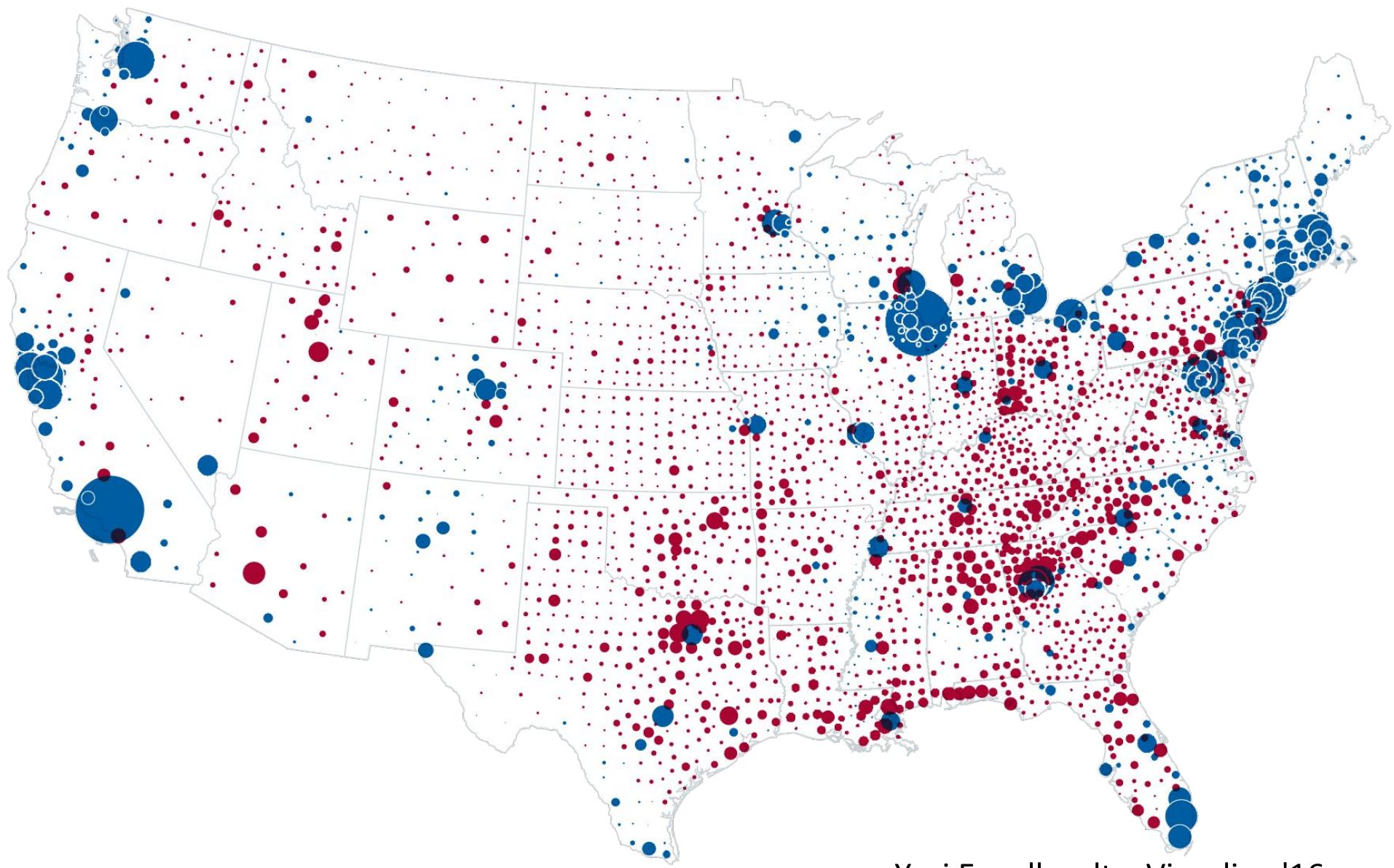
Our families are getting smaller—with one vital exception. Compared with those of Europe and Japan, the U.S. population is younger and more colorful because of the continued arrival of immigrants and their higher-than-average birthrates. Of the 100 million Americans who will join us in the next 37 years, 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, economical-

Ala.; Possum Trot, Ky.; or Lonelyville, N.Y. But they are all probably close to someone's idea of paradise. —By Nancy Gibbs

problem of mapping data about
an unevenly distributed population

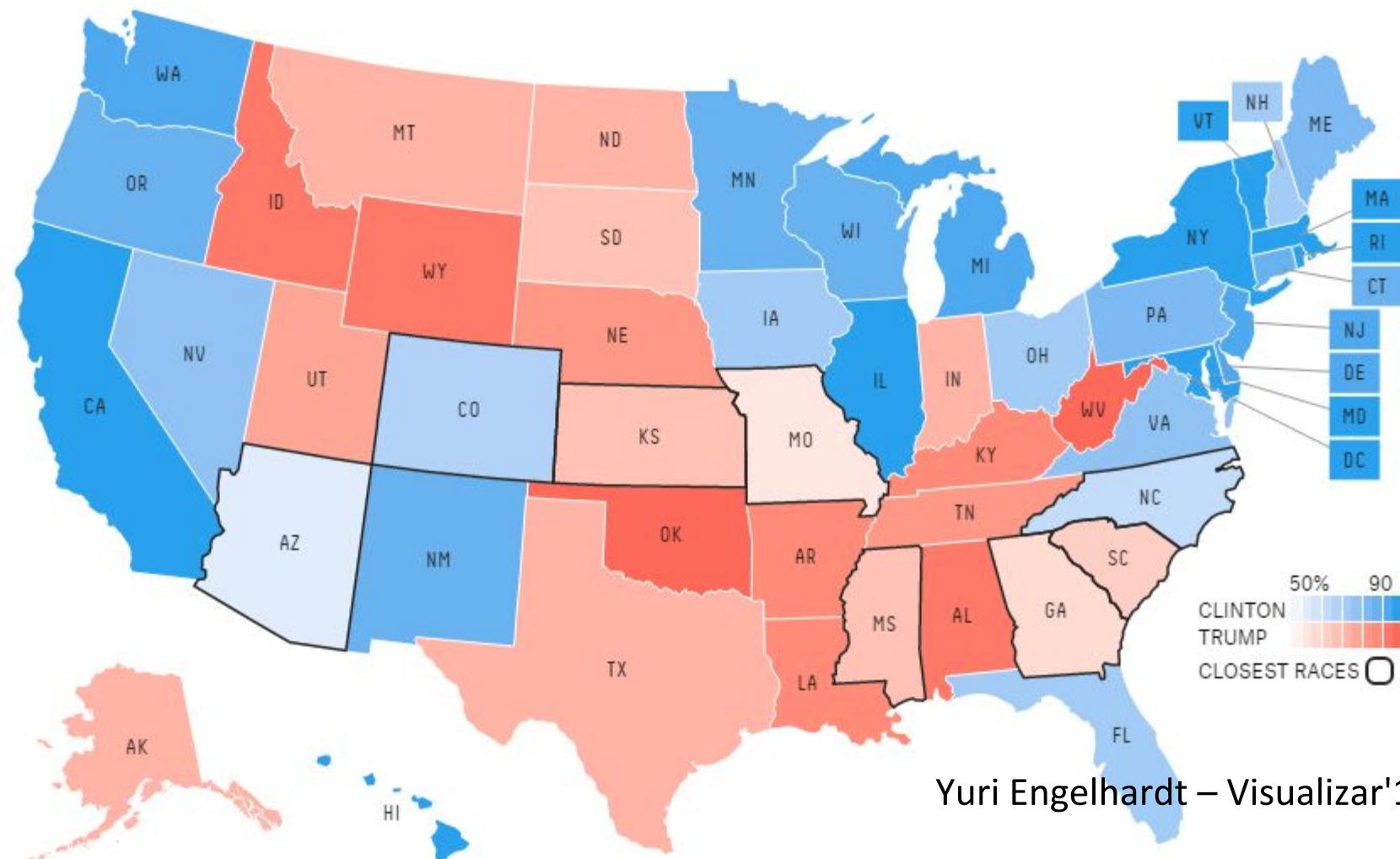


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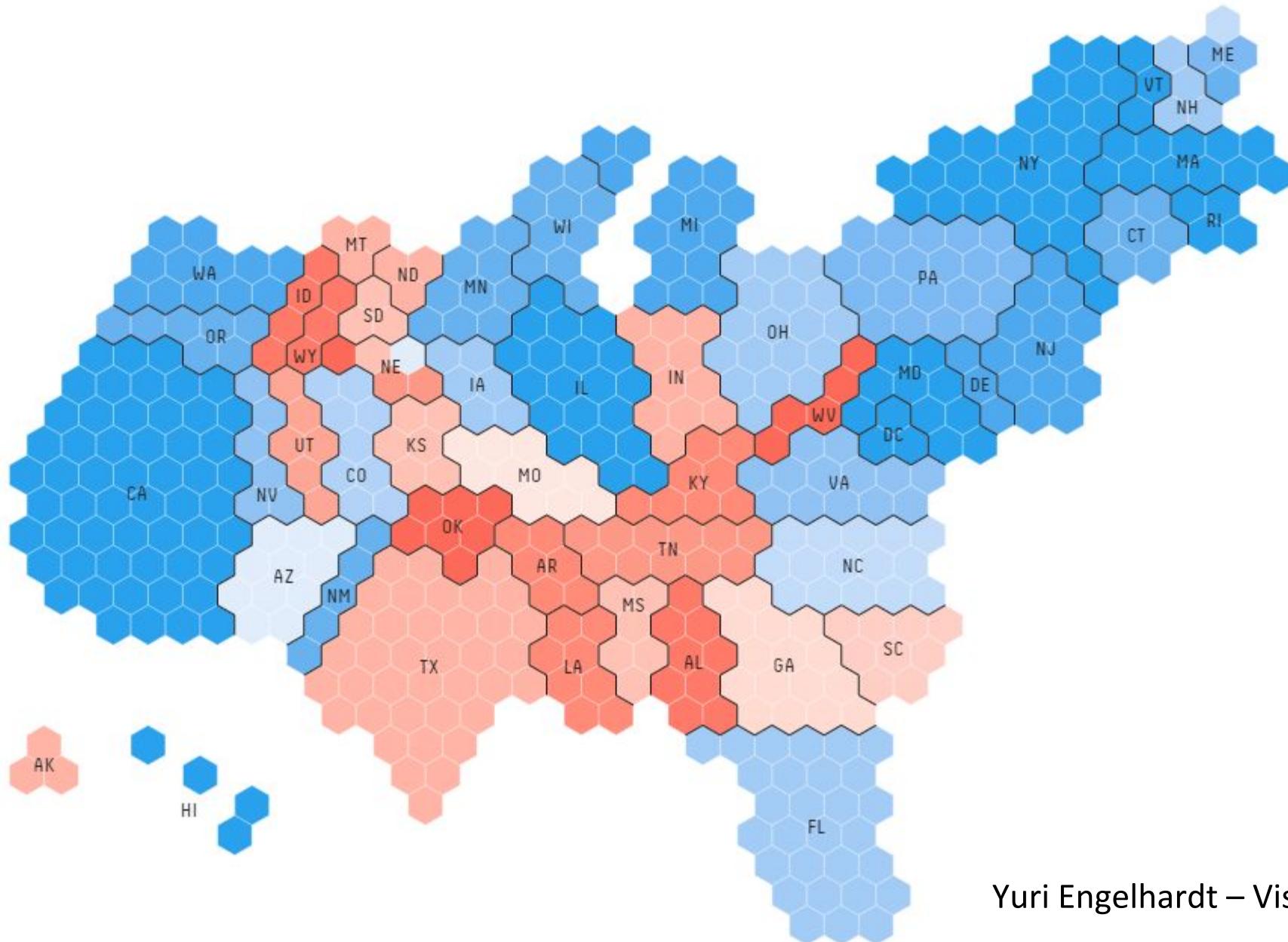


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Chance of winning

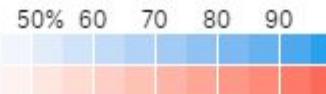


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KEY
CLINTON'S CHANCES
TRUMP'S CHANCES



ONE ELECTORAL VOTE

bar chart



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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

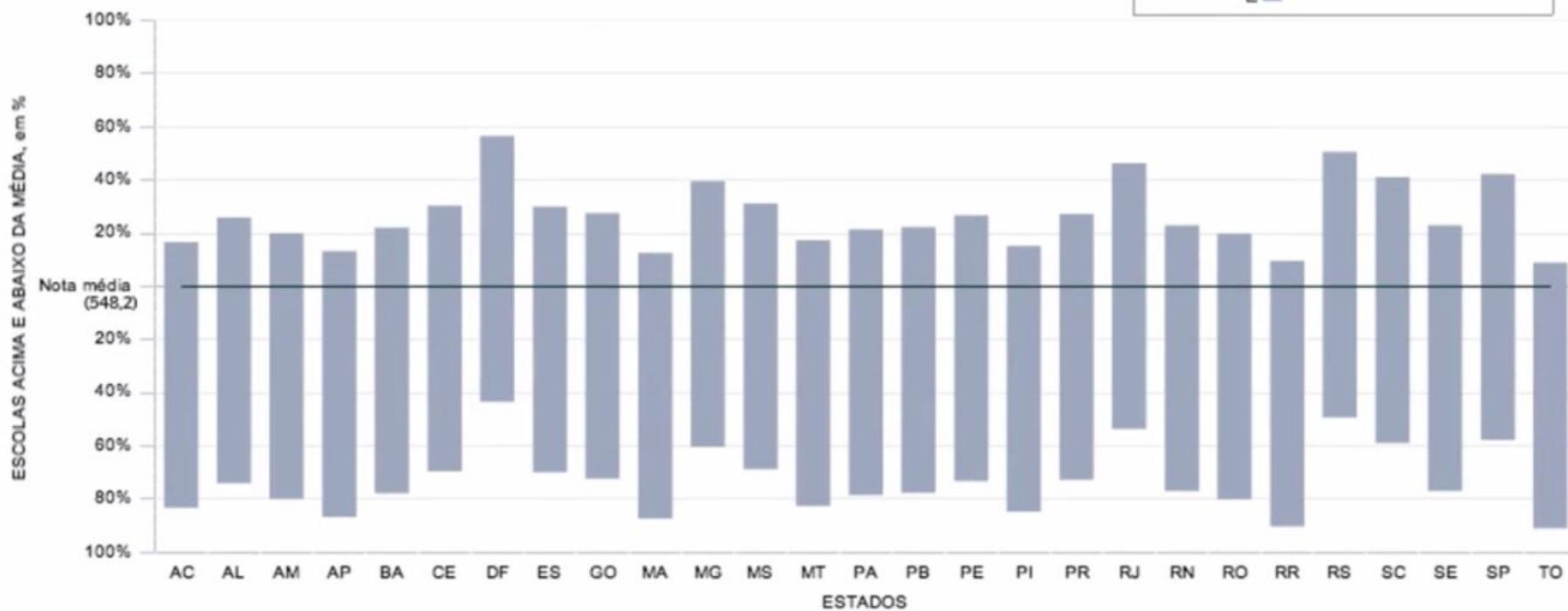
Redes pública e particular

100% das escolas

• % acima da média

• % abaixo da média

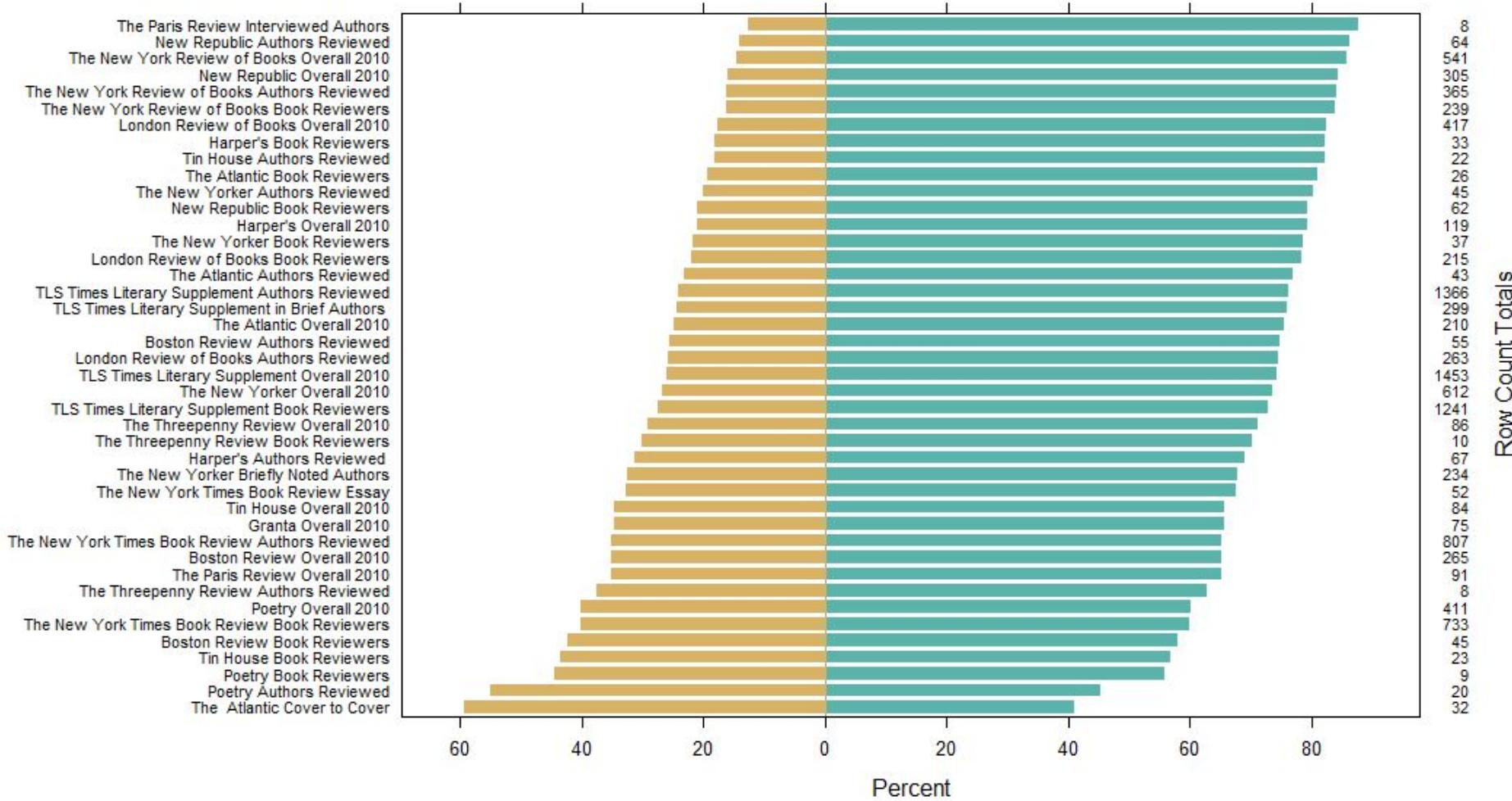
Média

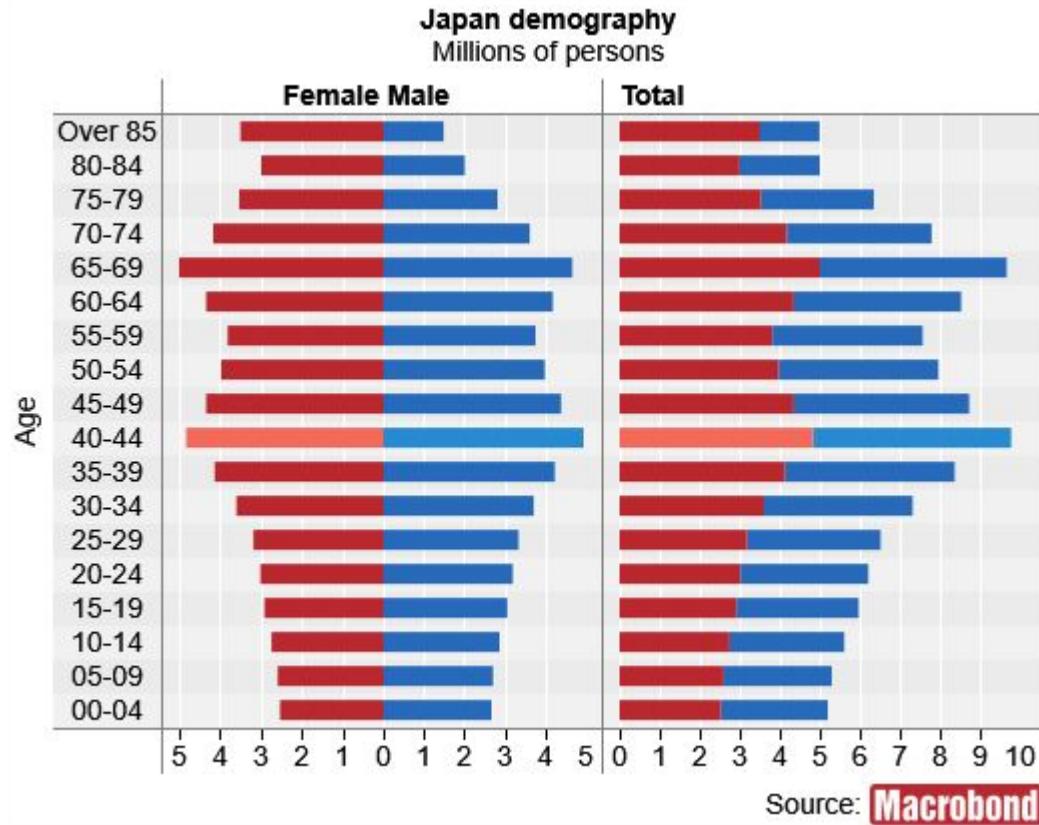


source: Alberto Cairo

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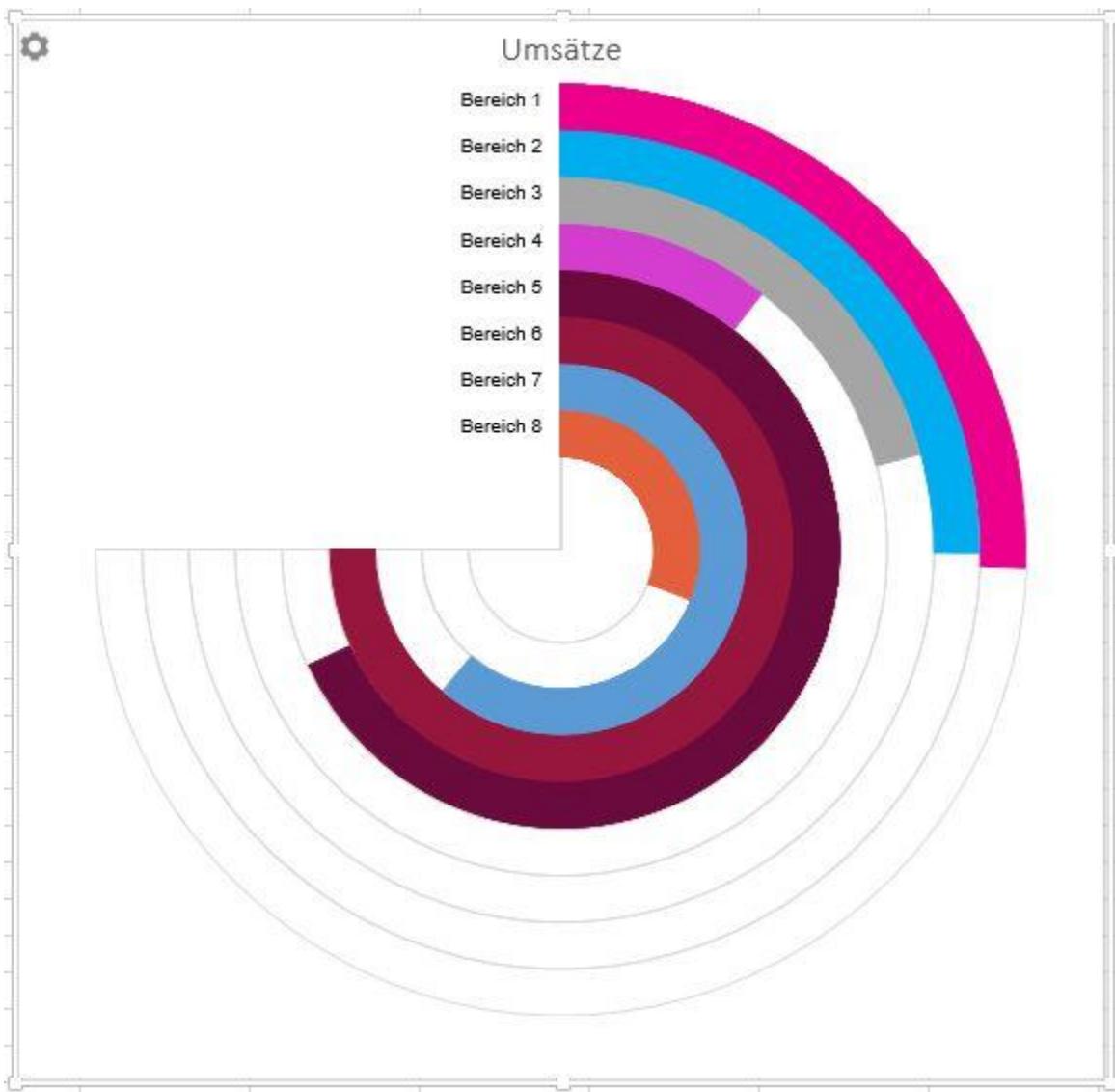
Reviewers by Gender 2010





back-to-back bar chart

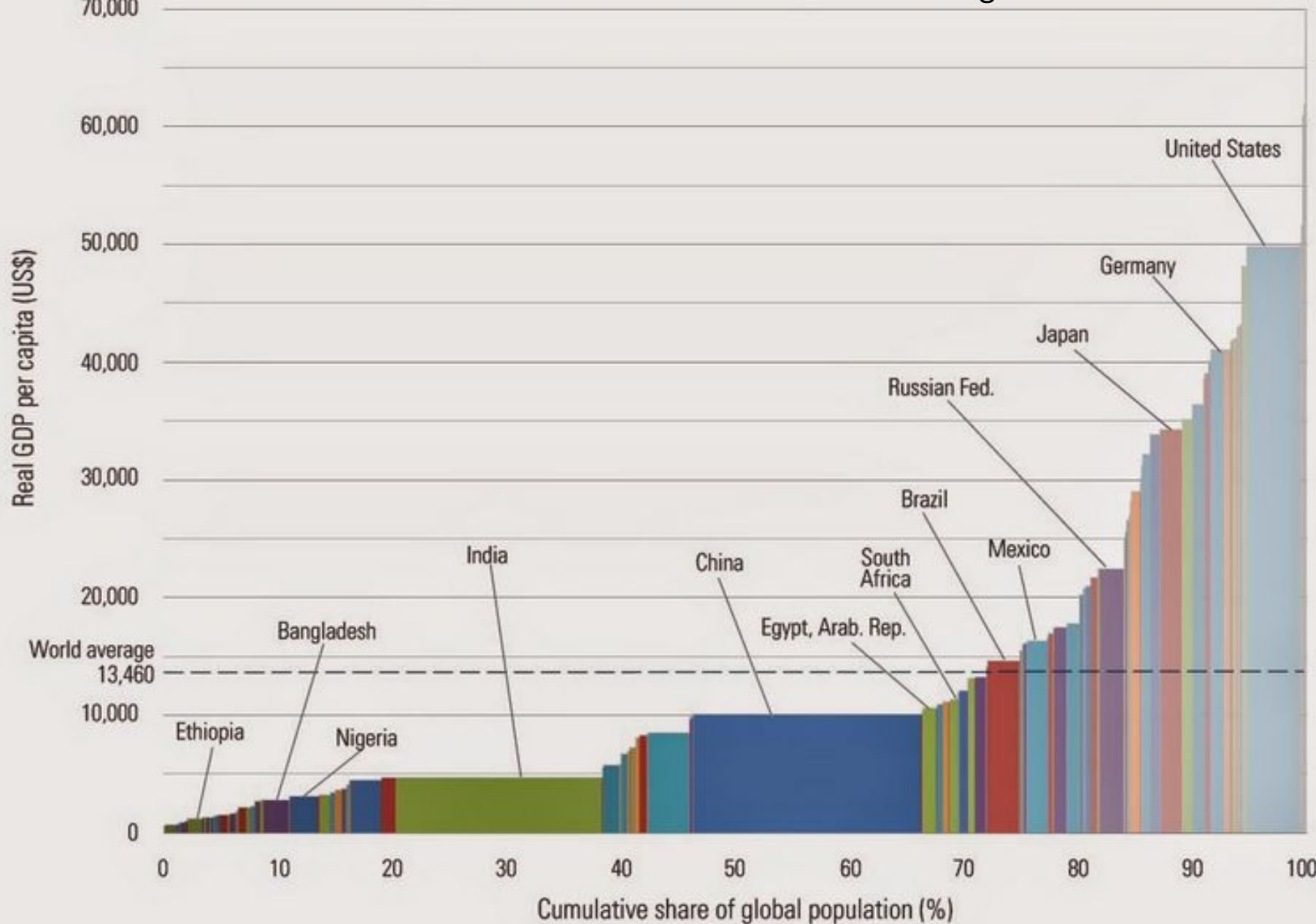
radial bar chart



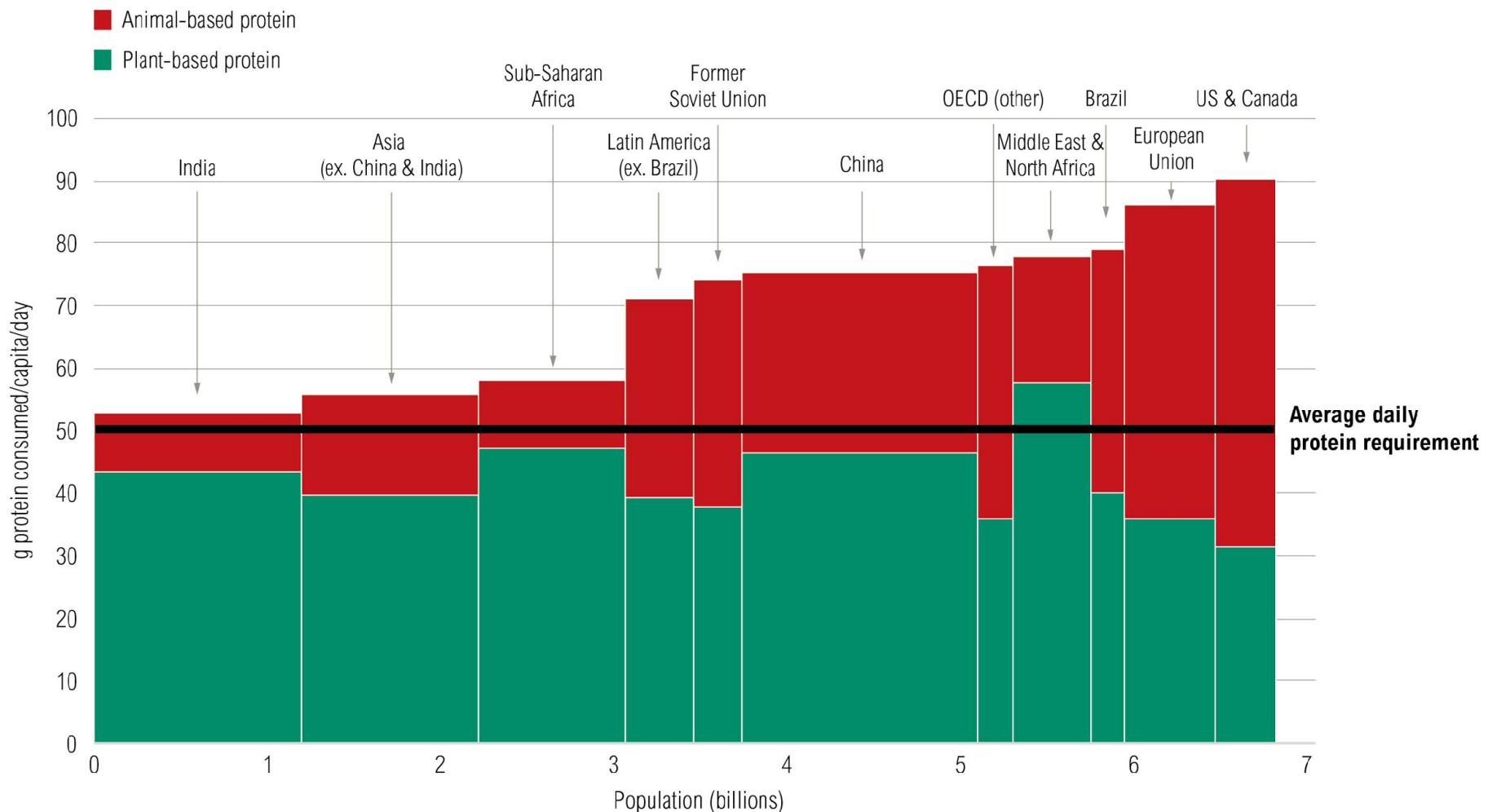
variable width bar chart

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

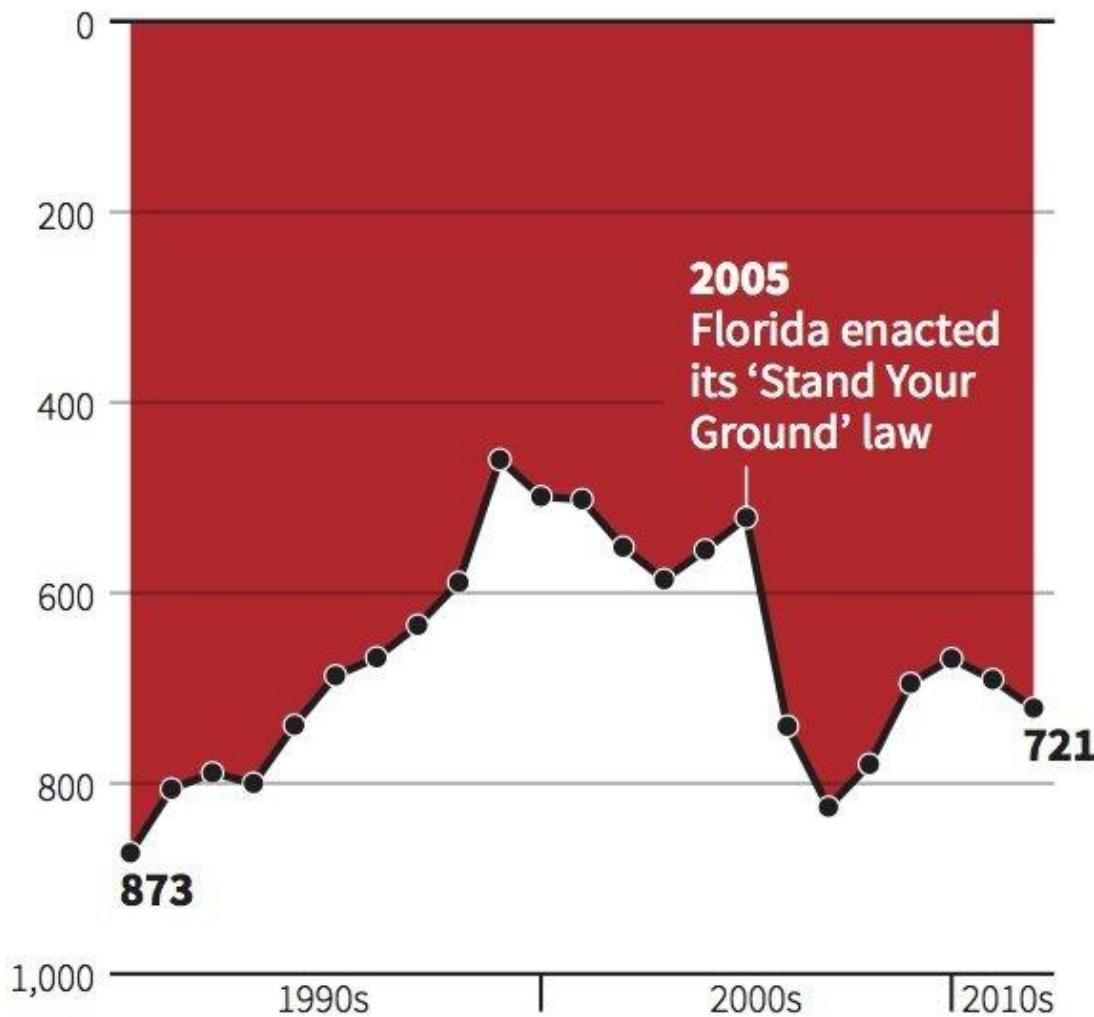


hanging bar chart

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Gun deaths in Florida

Number of murders committed using firearms



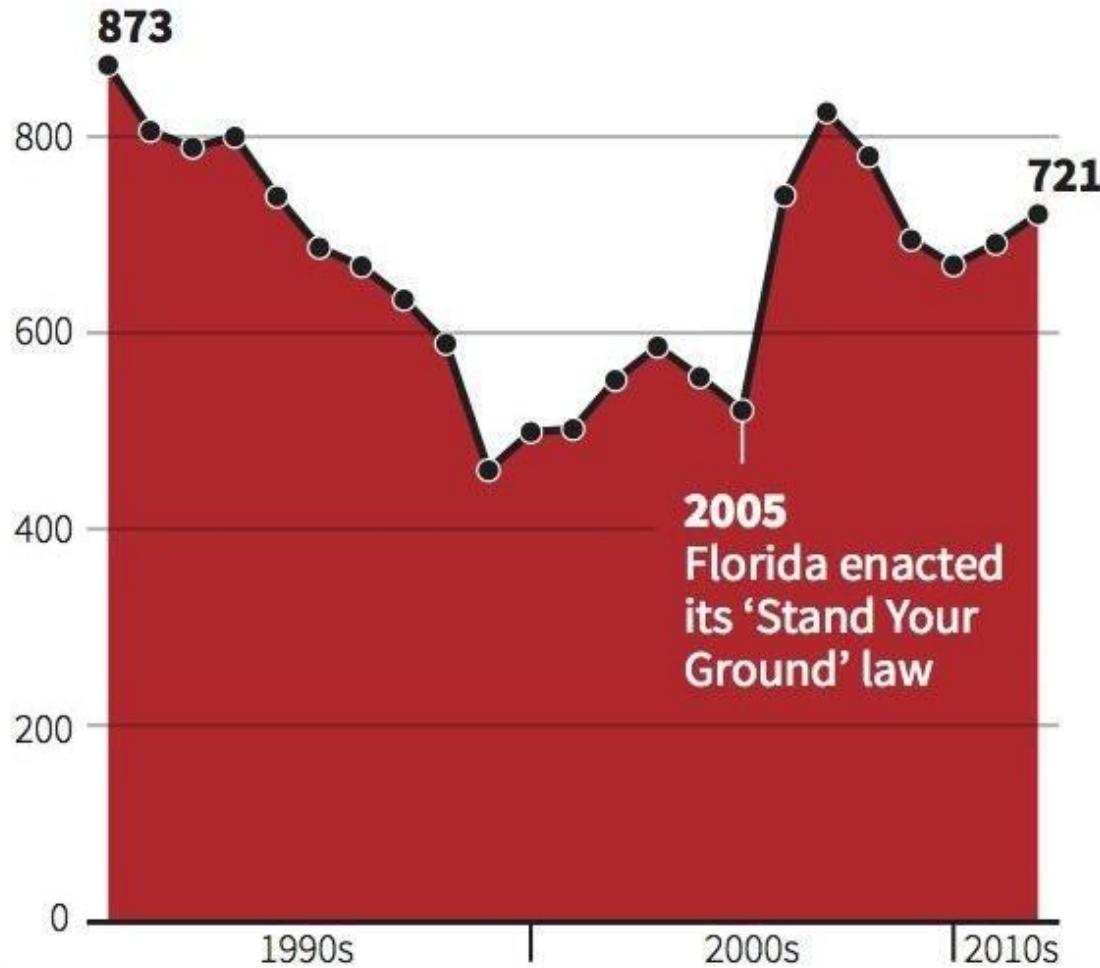
2005
Florida enacted
its 'Stand Your
Ground' law

Source: Florida Department of Law Enforcement

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Gun deaths in Florida

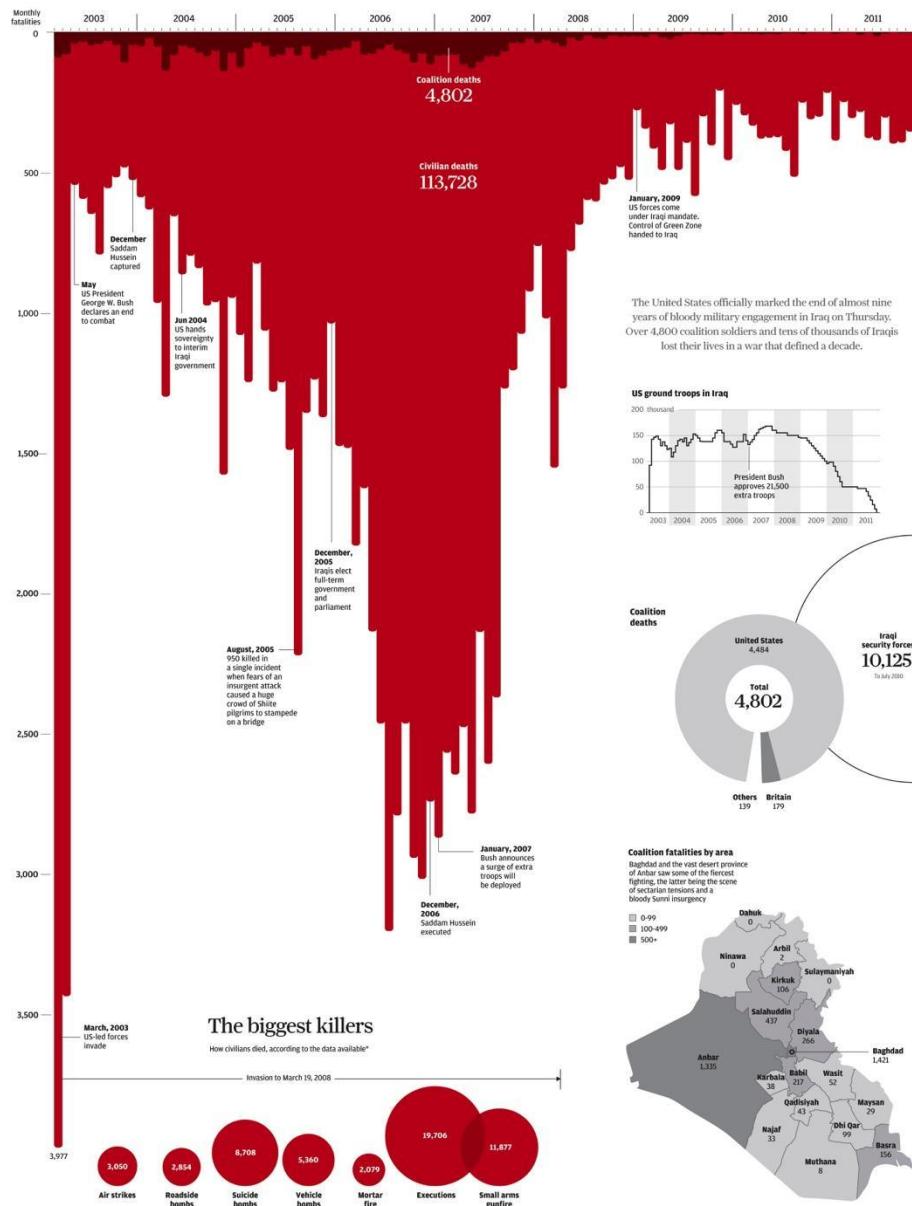
Number of murders committed using firearms



Source: Florida Department of Law Enforcement

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Iraq's bloody toll

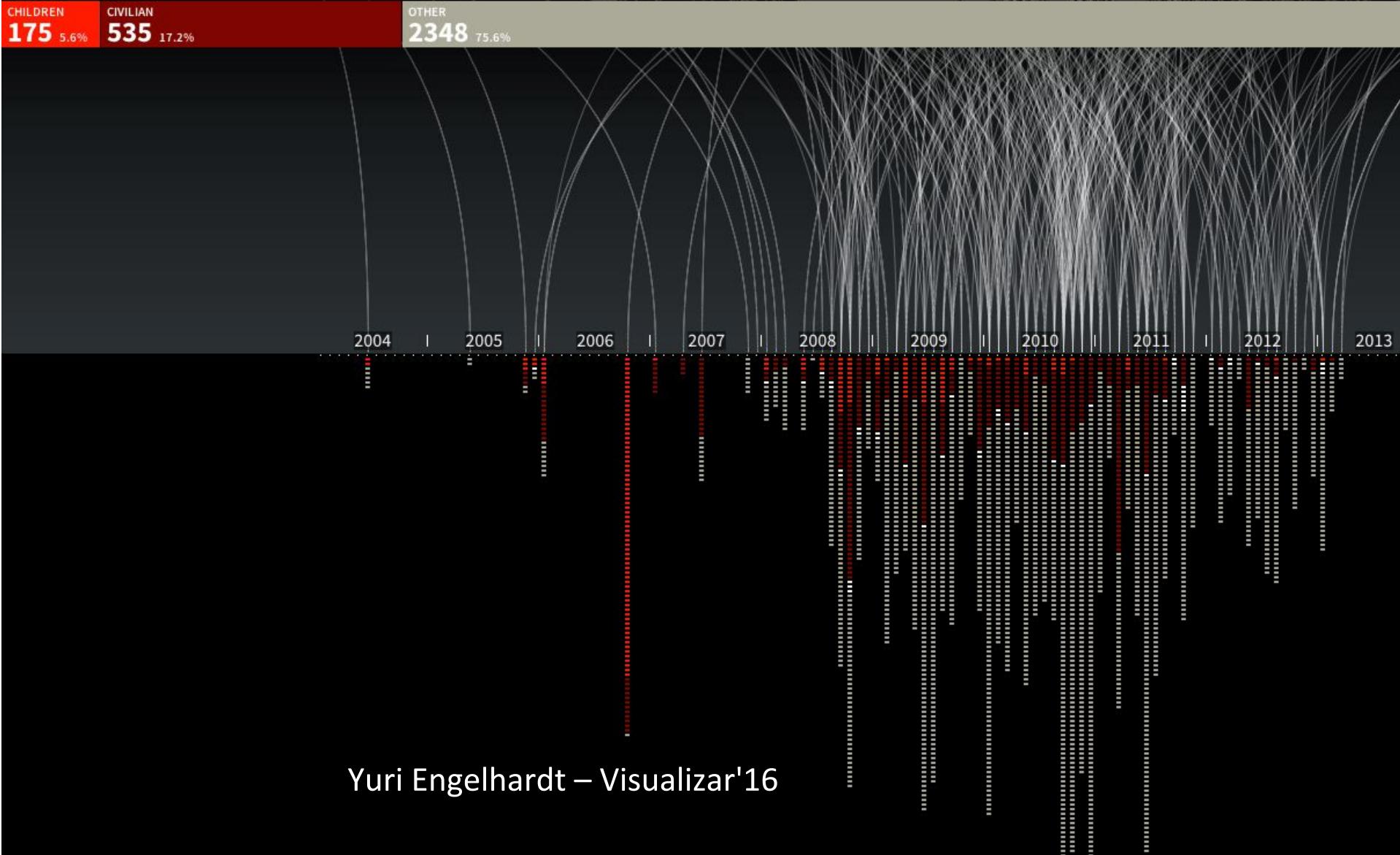


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Out of Sight, Out of Mind.

ATTACKS VICTIMS NEWS INFO

PAKISTAN

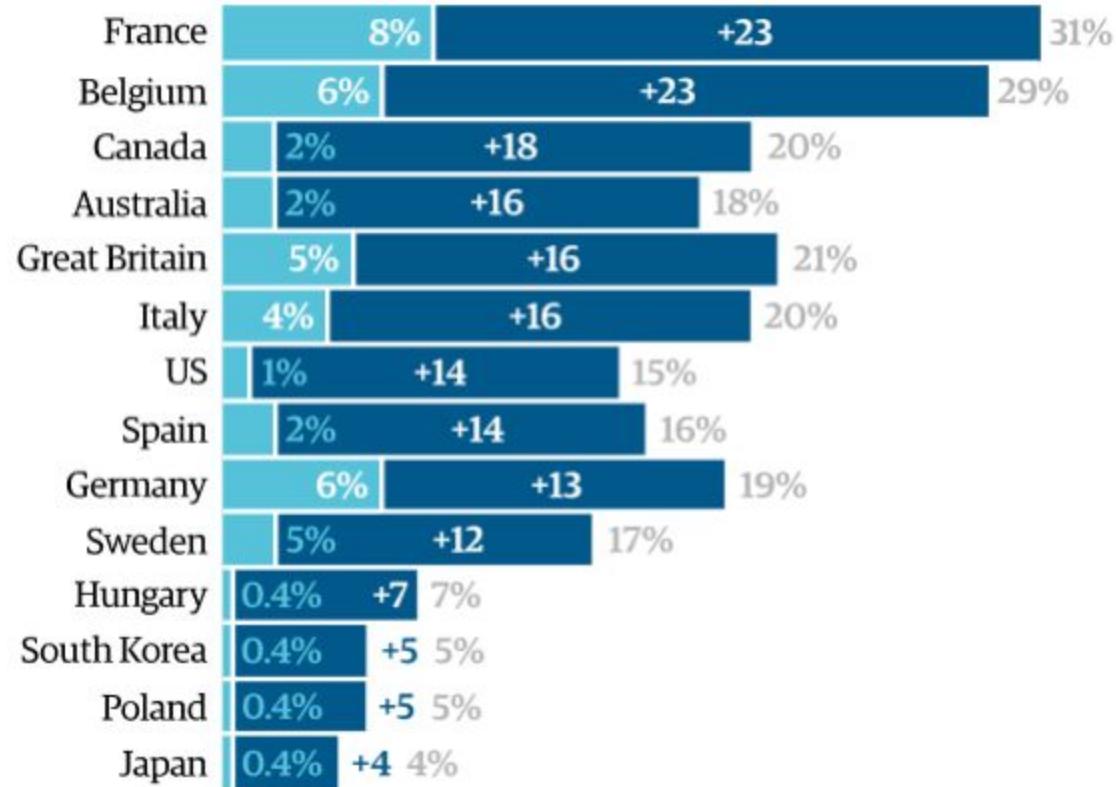


span chart (dumbbell chart)

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

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

■ Actual ■ Difference between actual and average ■ Average guess



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
profession here

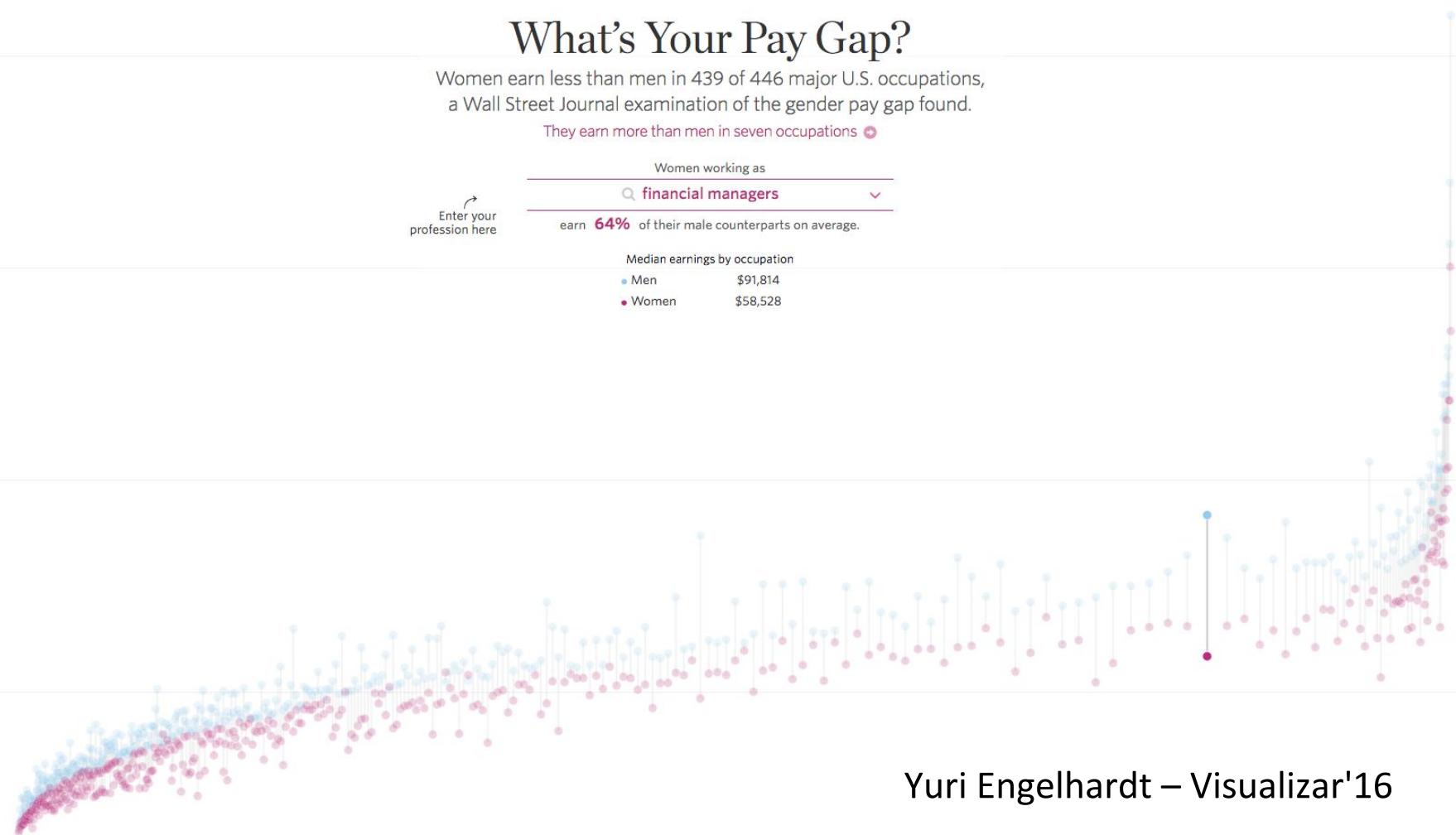
Women working as

financial managers

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

Median earnings by occupation

Men	\$91,814
Women	\$58,528

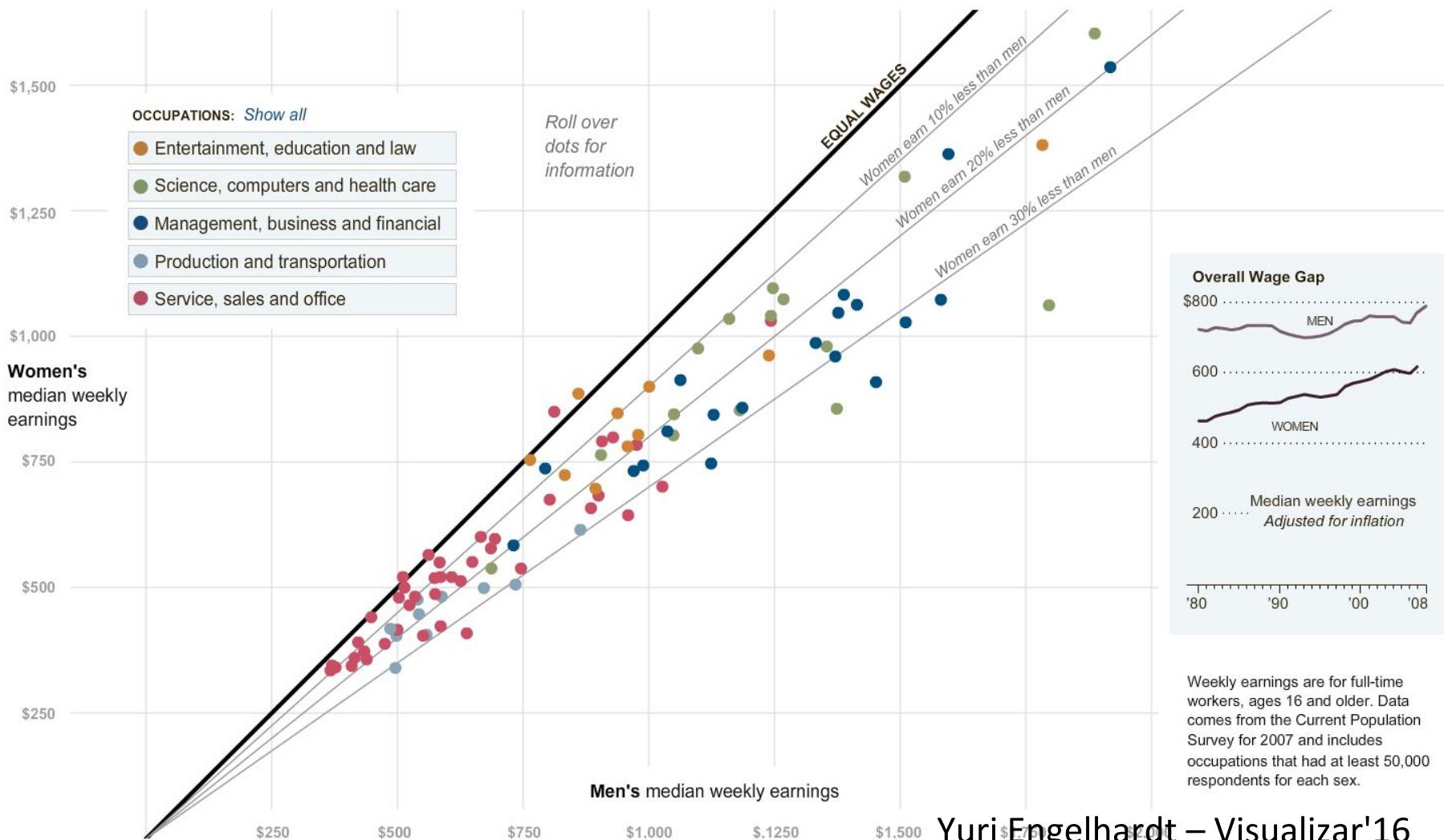


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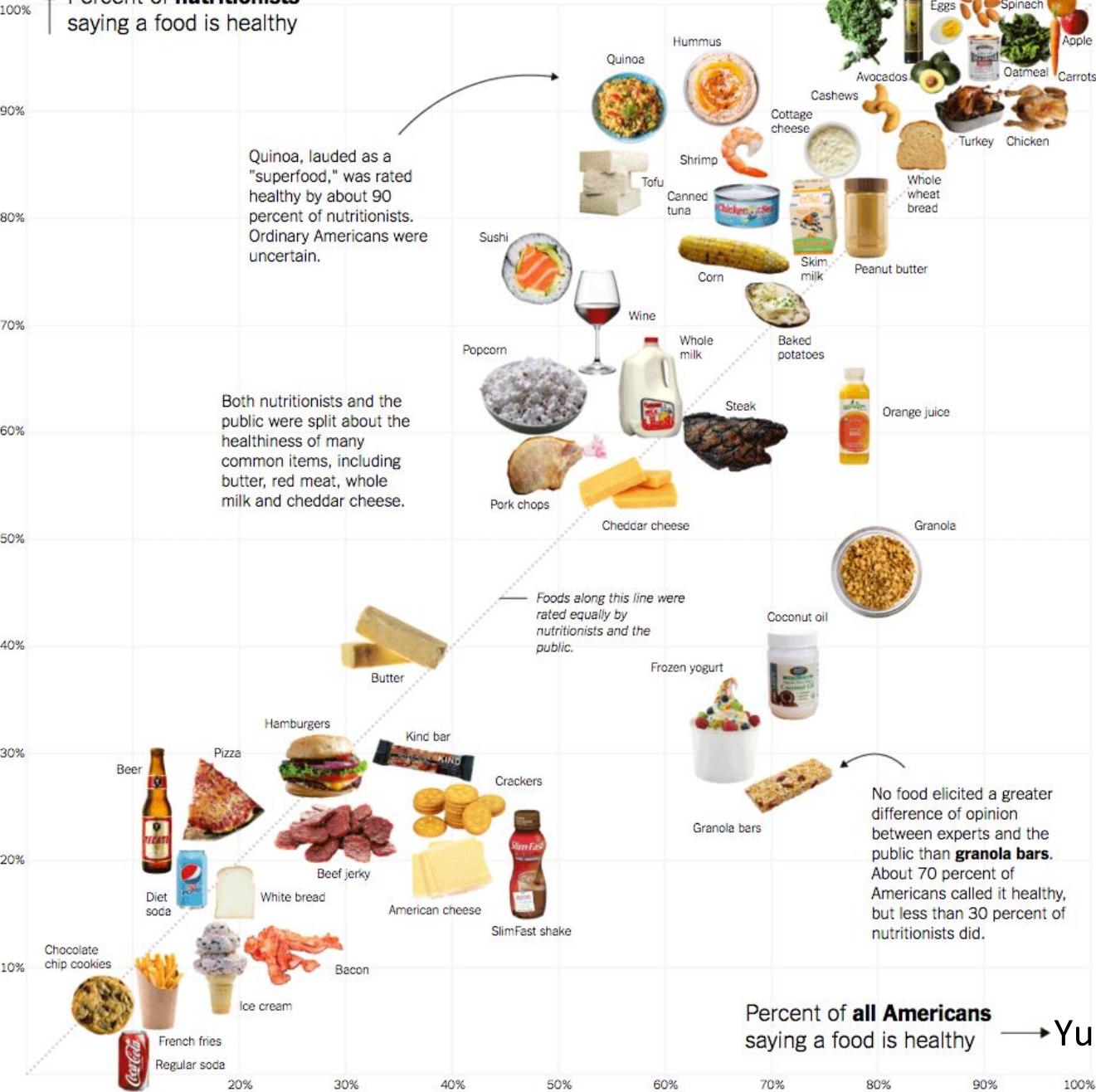
scatter plot

Why Is Her Paycheck Smaller?

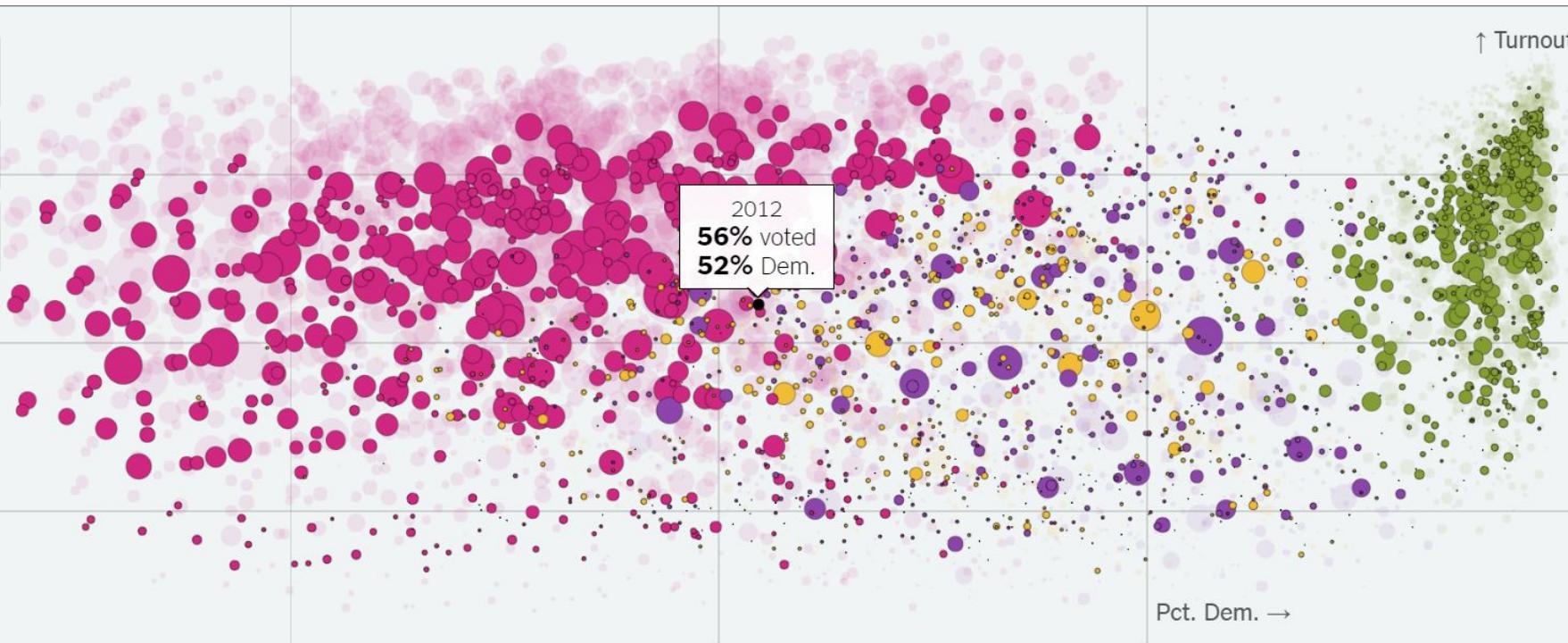
Nearly every occupation has the gap — the seemingly unbridgeable chasm between the size of the paycheck brought home by a woman and the larger one earned by a man doing the same job. Economists cite a few reasons: discrimination as well as personal choices within occupations are two major factors, and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



↑ Percent of **nutritionists**
saying a food is healthy



↑ Turnout

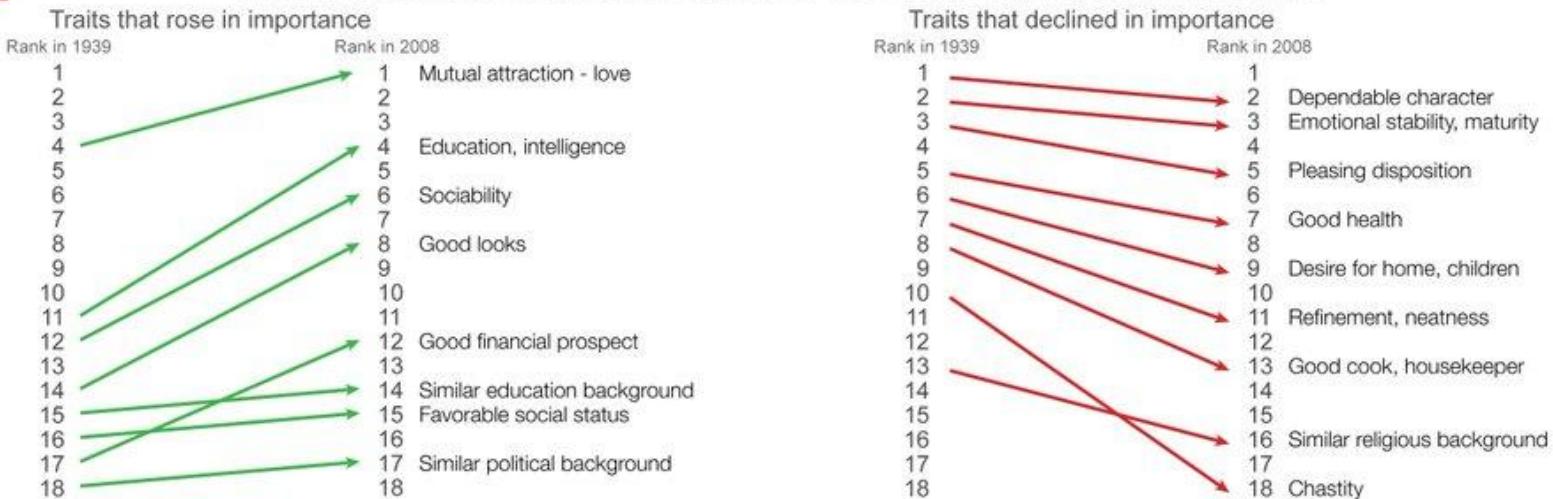
Show
'04

slope chart

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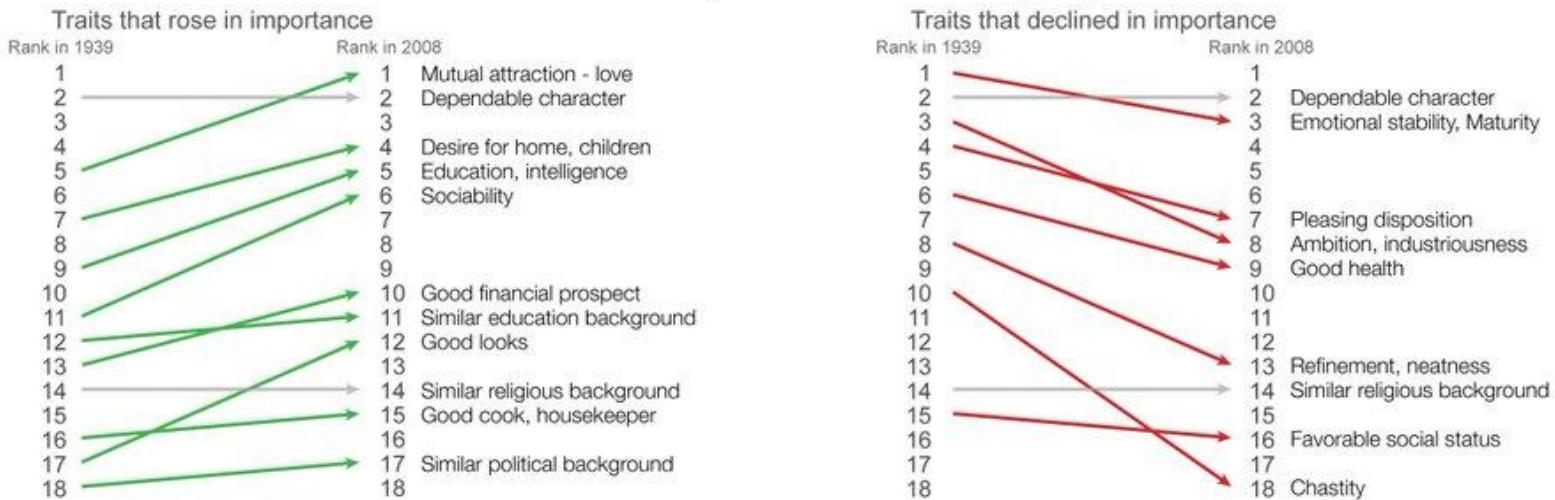
What Women want – 1939 vs 2008

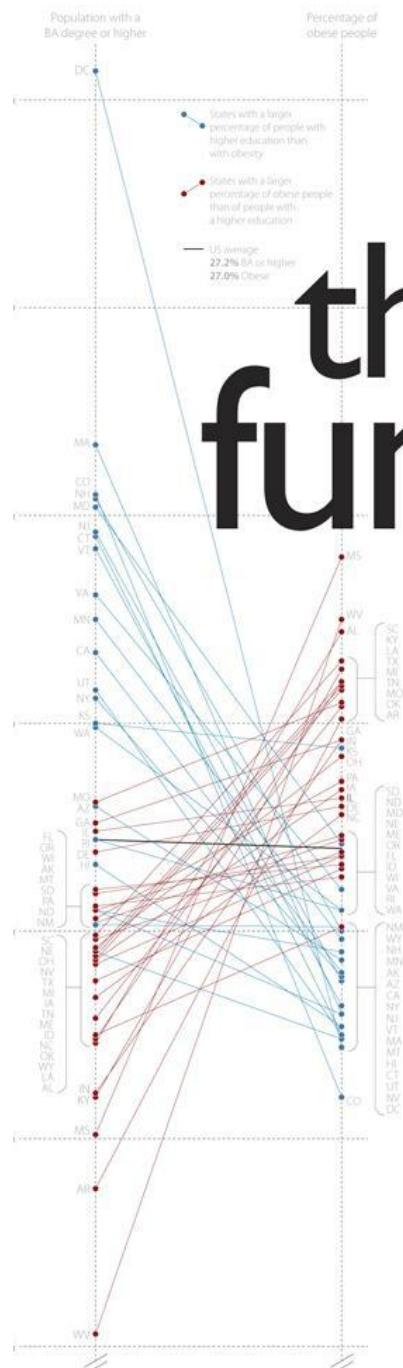
Women were asked to rank the importance of 18 traits in prospective husbands.



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**

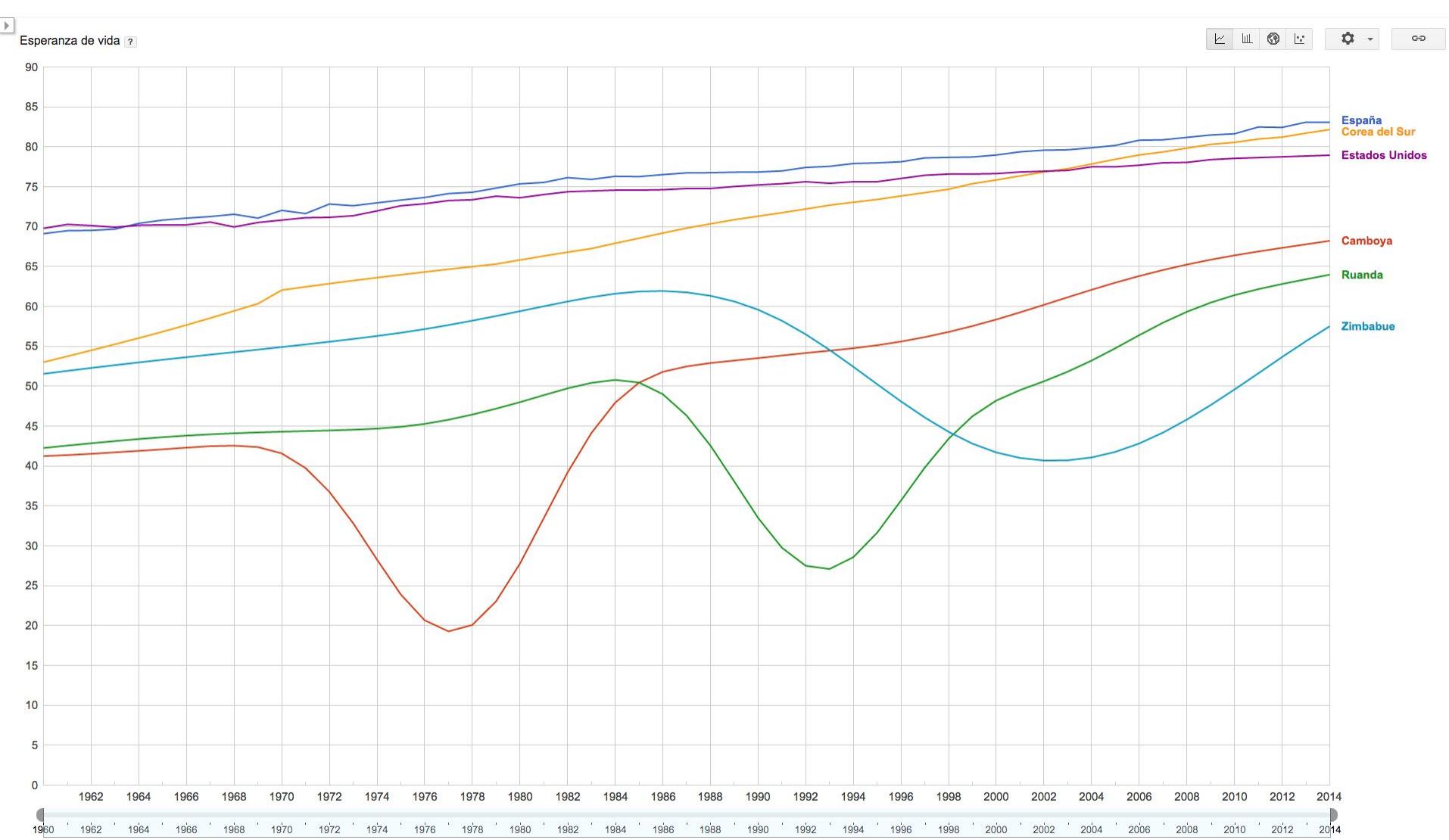
alberto cairo

"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



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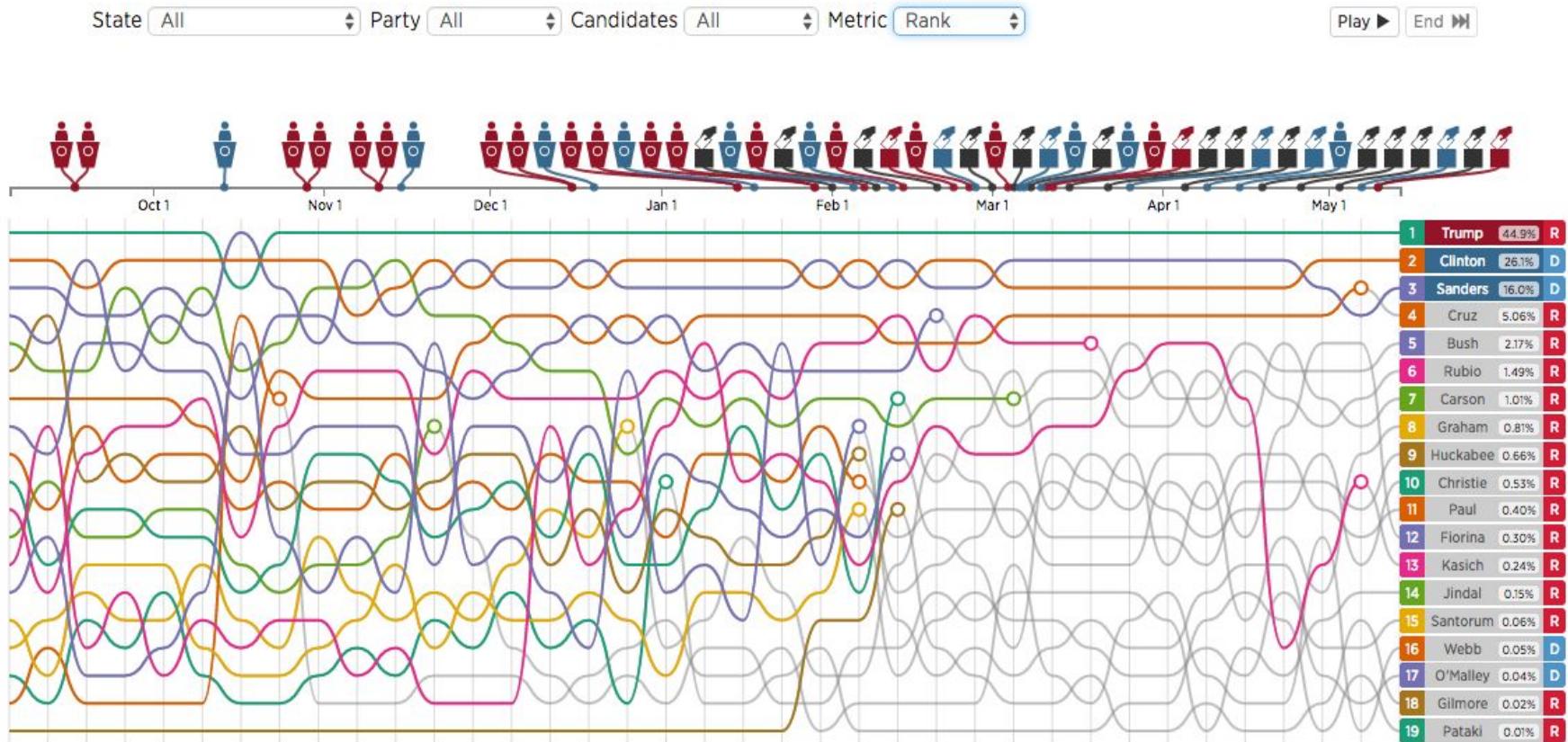
data:
values over time
for different items

bump(s) chart

data:
rankings over time
(on the same dimension)

#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

RANK	AGE <1 y	AGE 1-4 y	AGE 5-9 y	AGE 10-19 y
1	Congenital anomalies	Congenital anomalies	Road injuries	Road injuries
2	Preterm birth complications	Road injuries	Drowning	Self-harm
3	Other neonatal disorders	Drowning	Congenital anomalies	Interpersonal violence
4	Neonatal encephalopathy	LRI	Brain cancer	Drowning
5	Sudden infant death syndrome	Fire and heat	Leukemia	Other neoplasms

DEVELOPING COUNTRIES

RANK	AGE <1 y	AGE 1-4 y	AGE 5-9 y	AGE 10-19 y
1	Preterm birth complications	Malaria	Diarrhea	Road injuries
2	LRI	LRI	LRI	HIV/AIDS
3	Neonatal encephalopathy	Diarrhea	Intestinal infectious diseases	Self-harm
4	Congenital anomalies	Protein-energy malnutrition	Malaria	Drowning
5	Neonatal sepsis	Drowning	Road injuries	Intestinal Infectious diseases

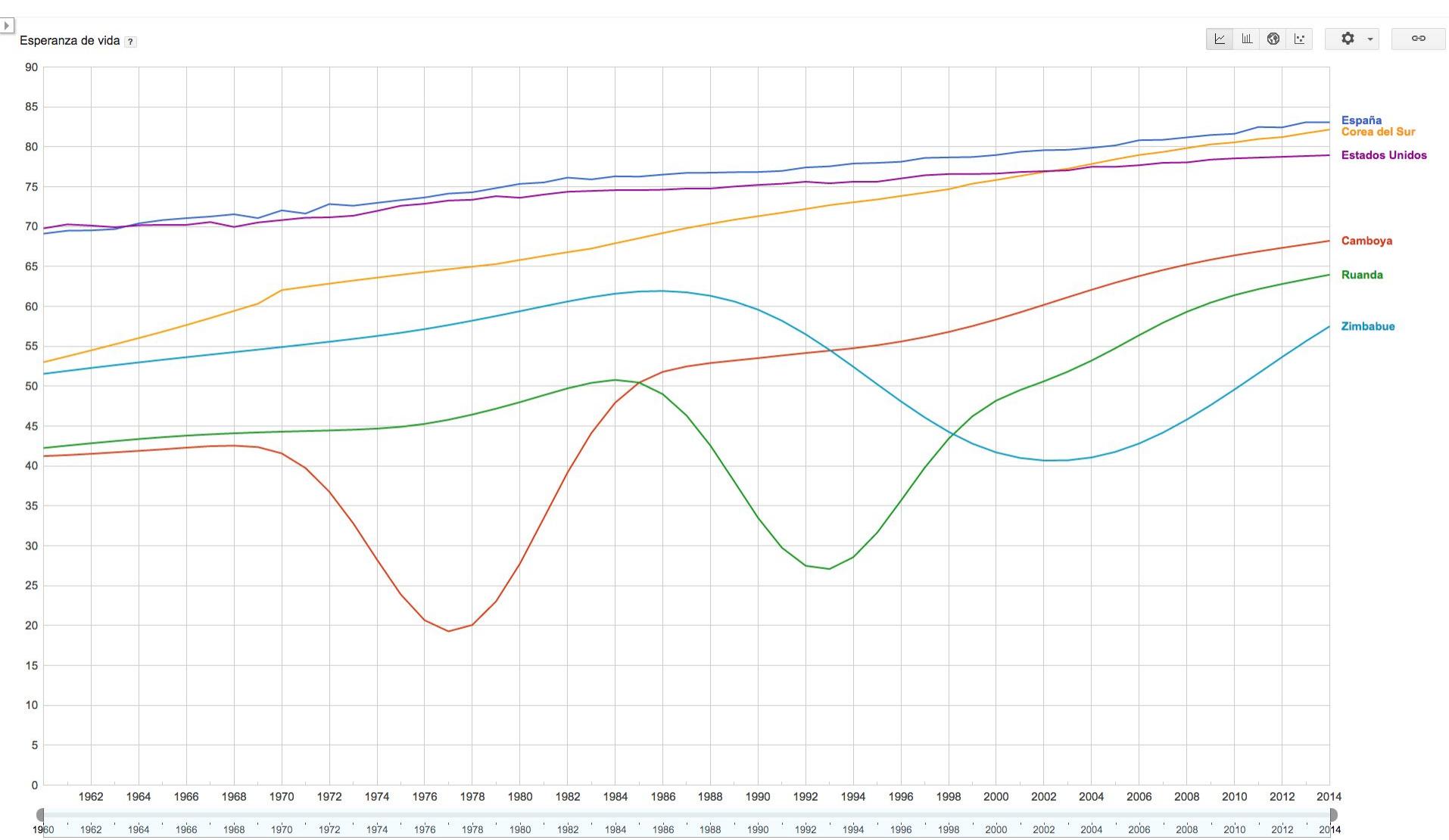
LRI—lower respiratory tract infections

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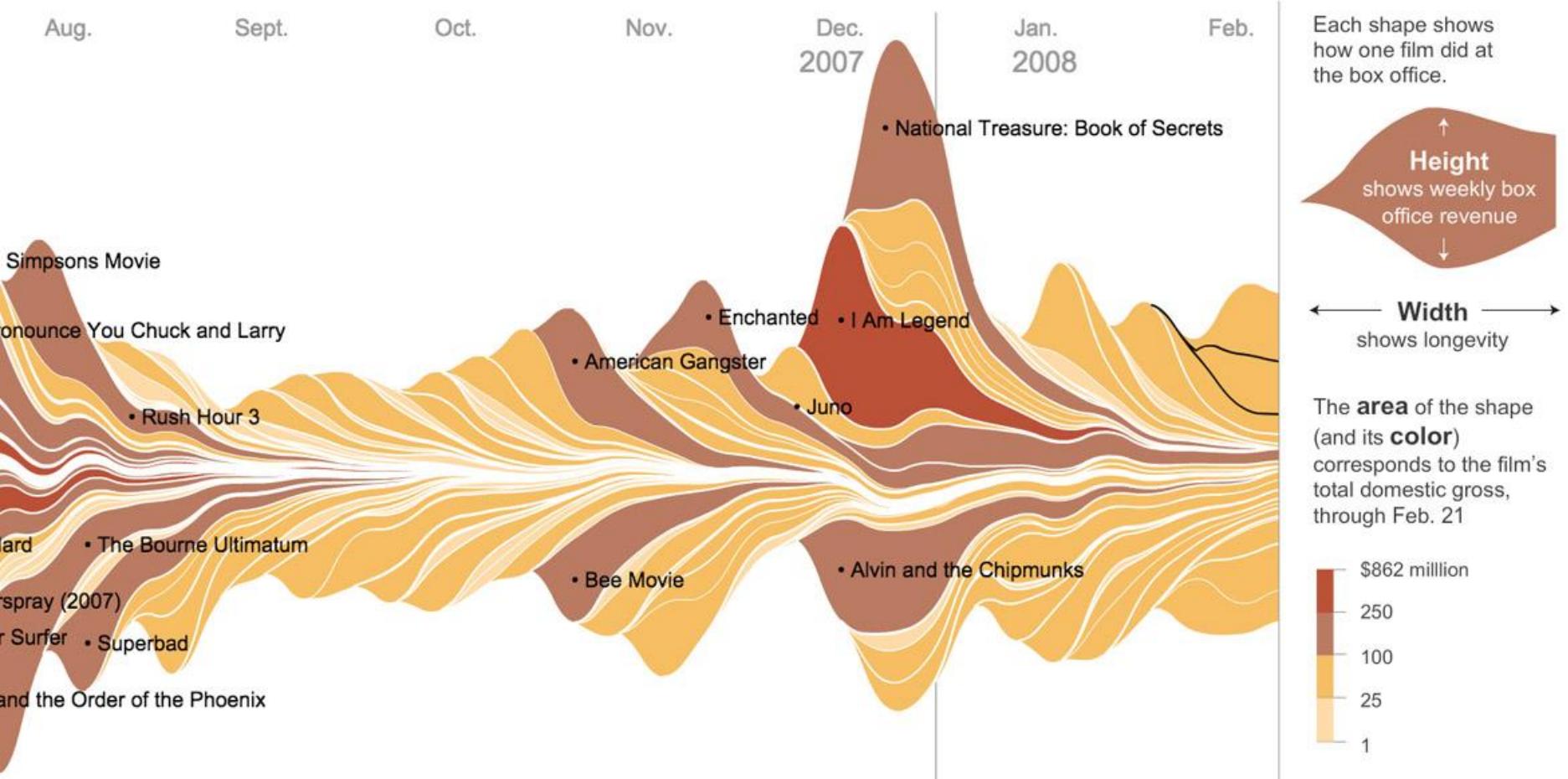
stream graph

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data:
values over time
(on the same dimension)

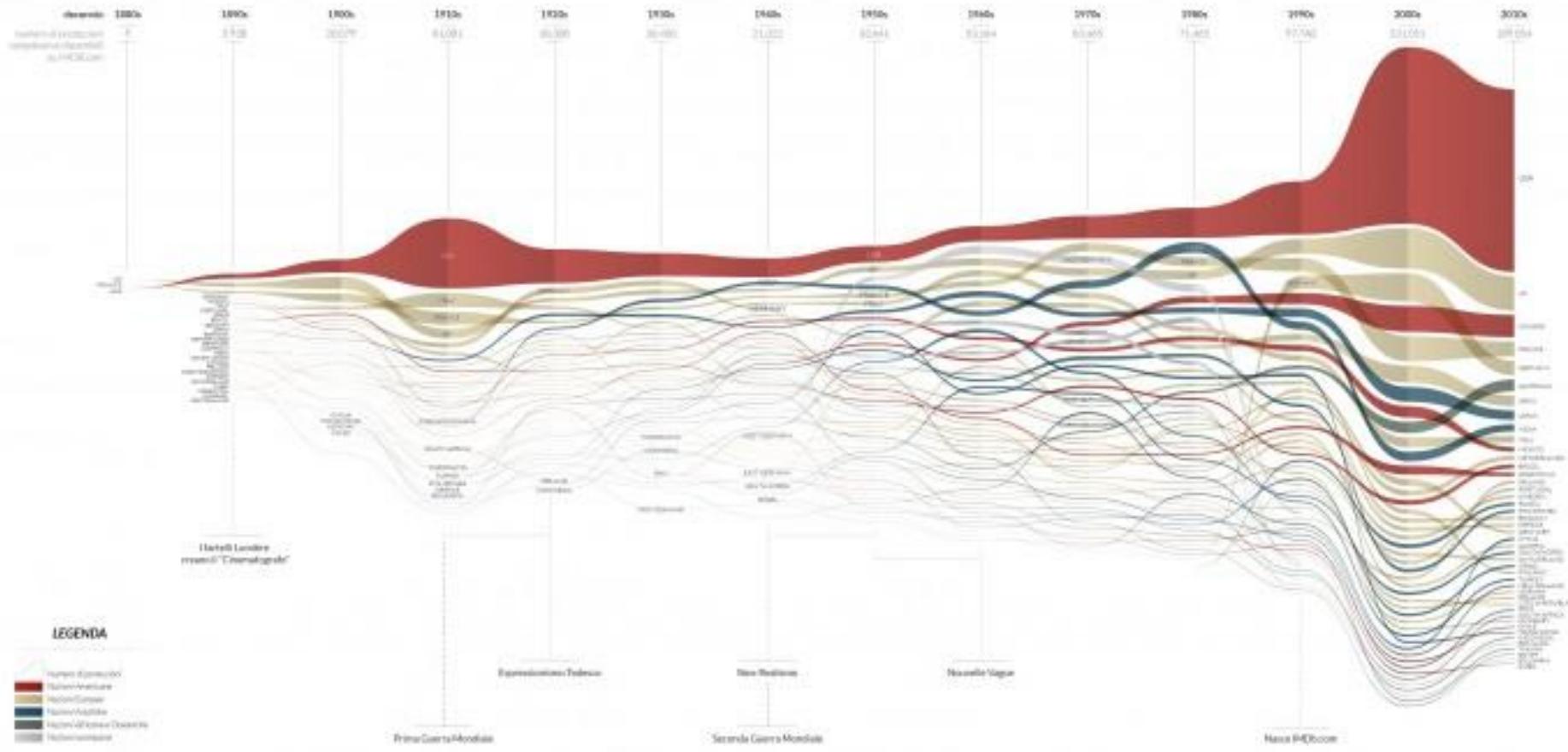


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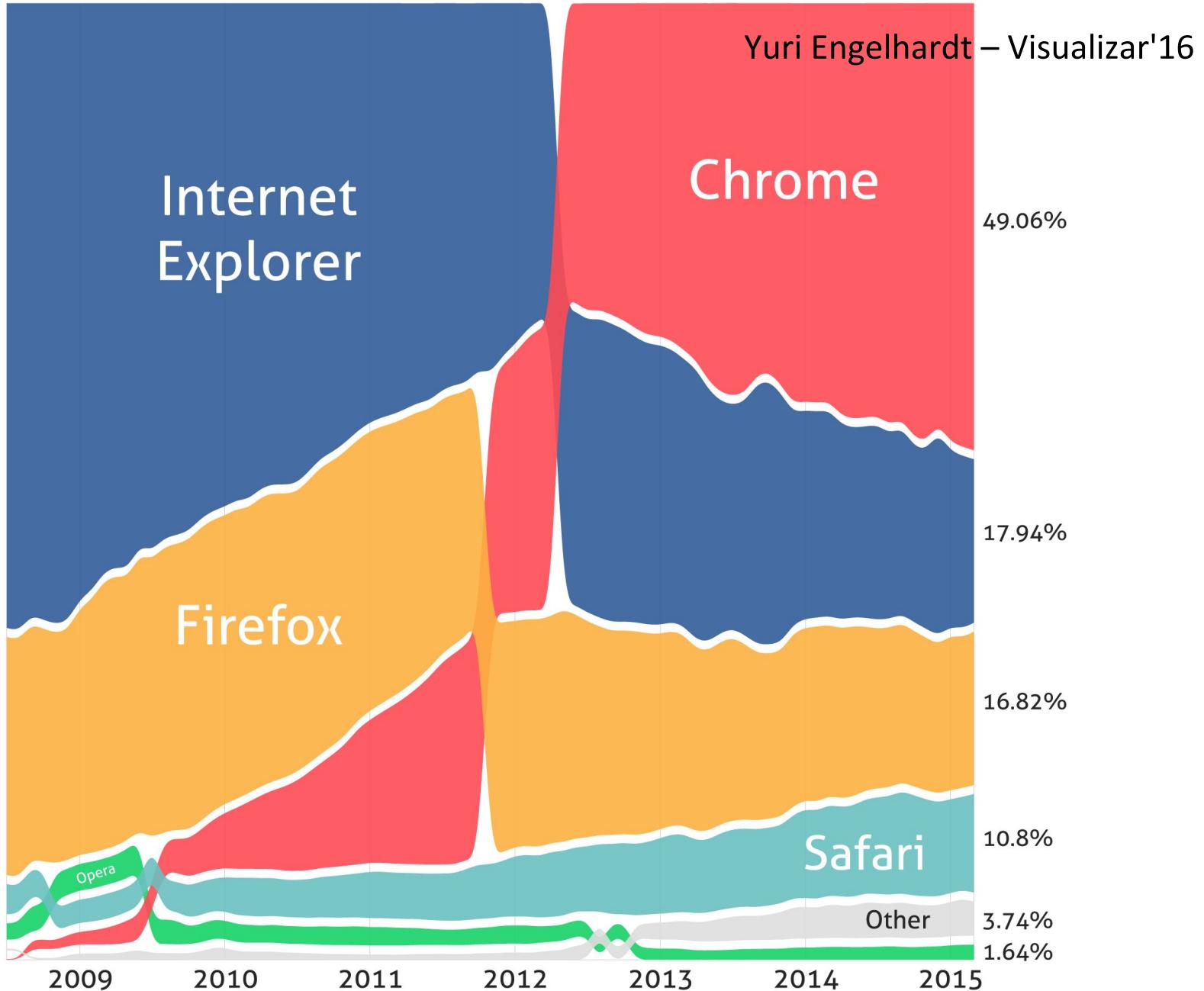
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“bump stream graph”



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Global Browser Market Share

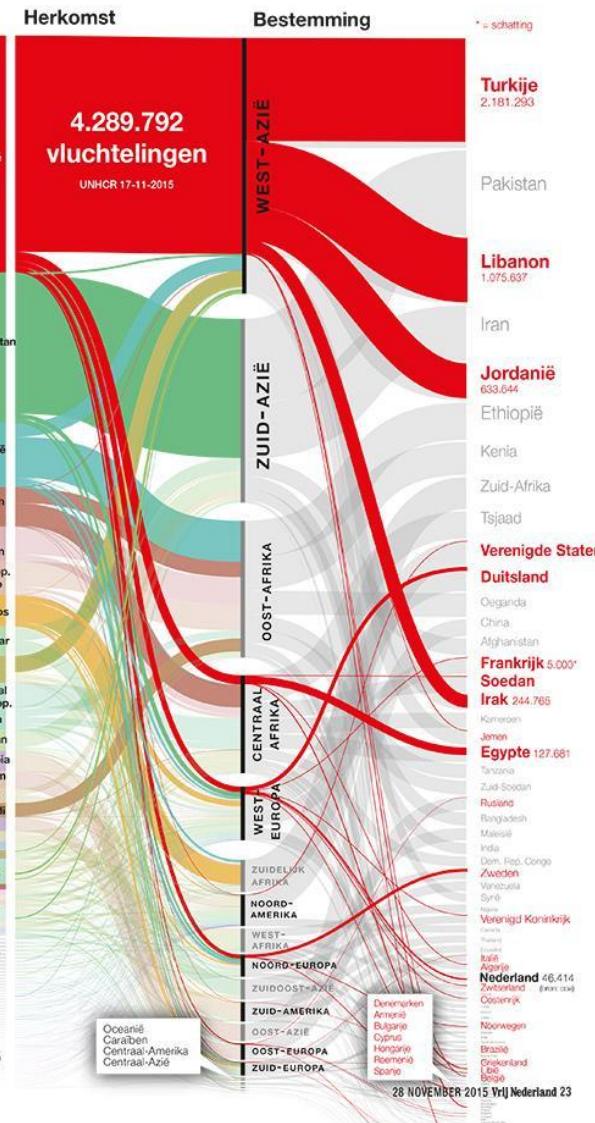
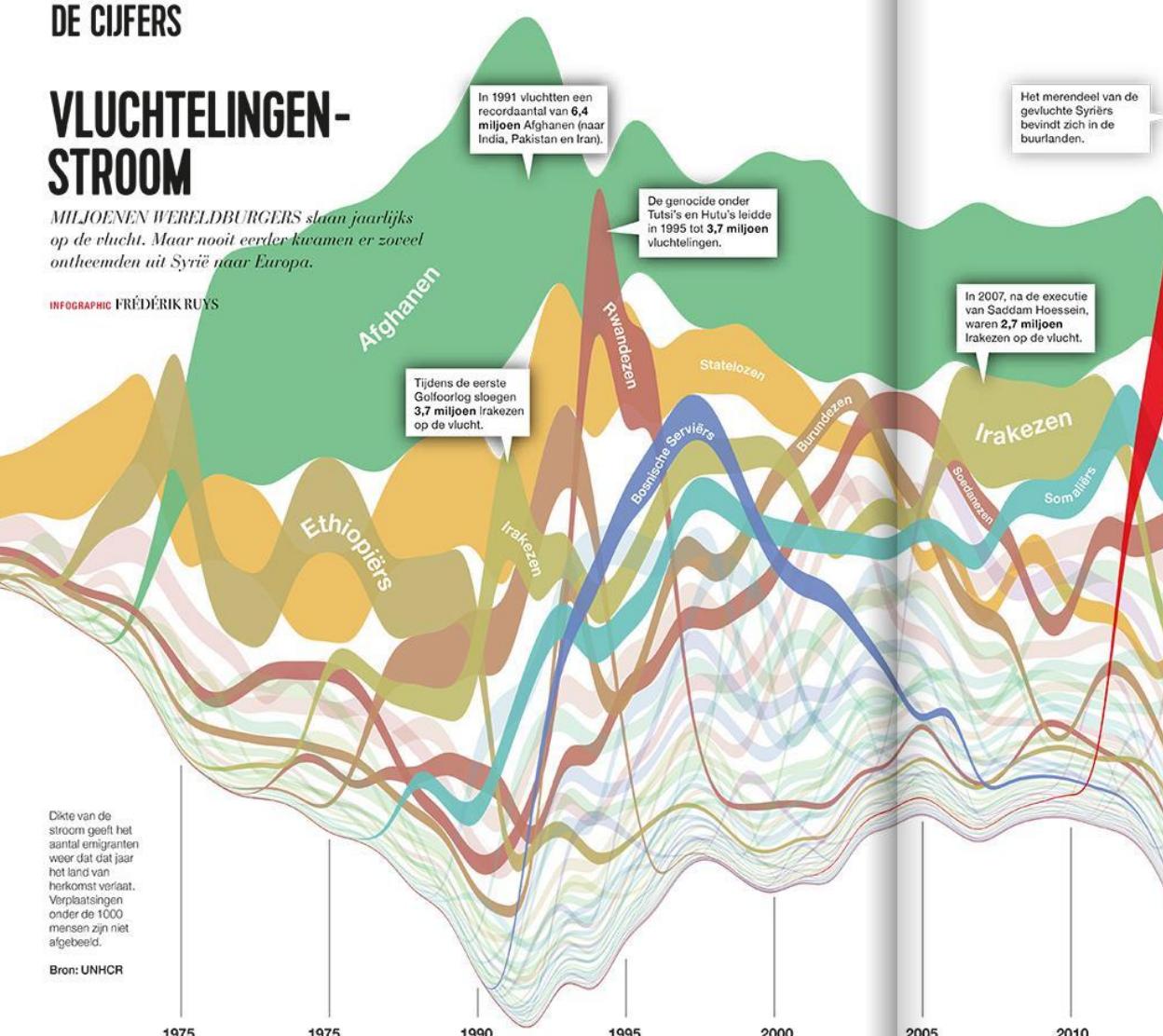


DE CIJFERS

VLUCHTELINGEN-STROOM

MILJOENEN WERELDBURGERS slaan jaarlijks op de vlucht. Maar nooit eerder kwamen er zoveel ontheemden uit Syrië naar Europa.

INFOGRAPHIC FRÉDÉRIK RUY'S



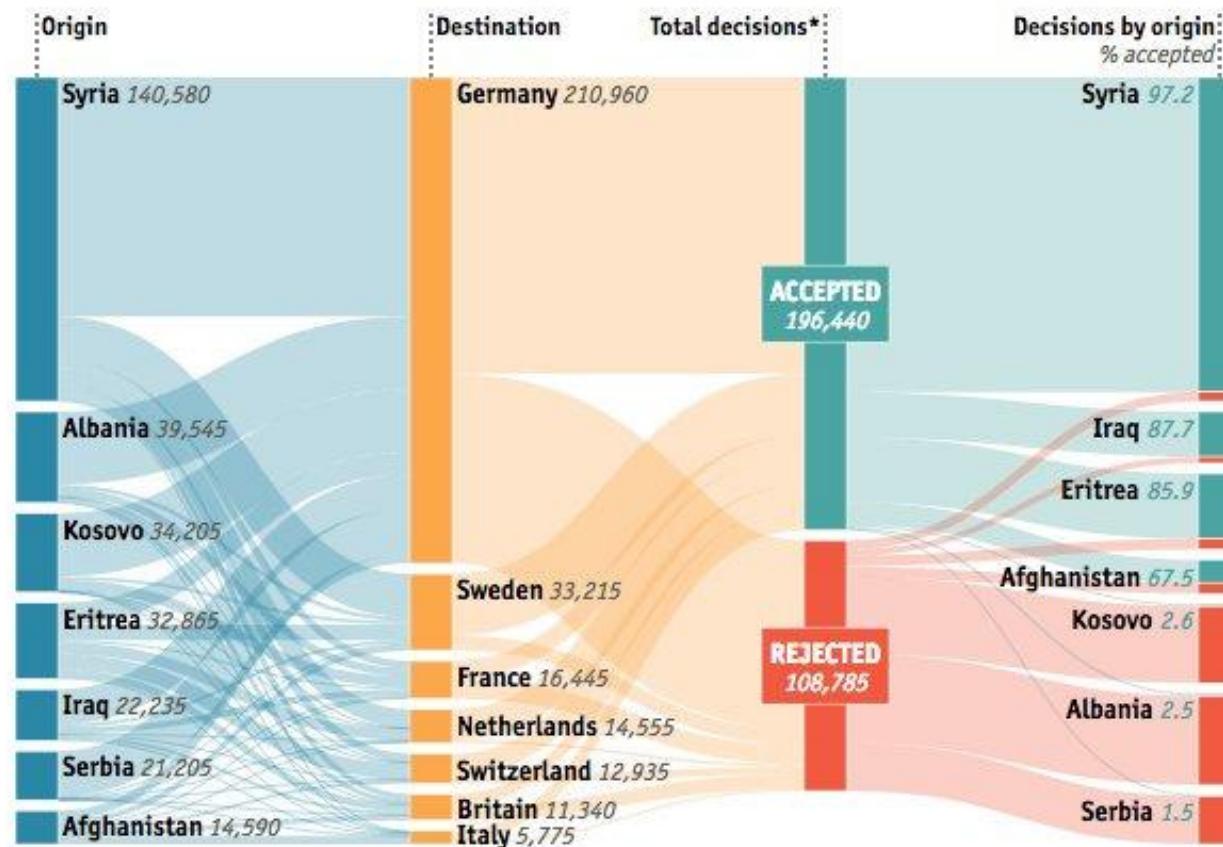
Sankey diagram

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data:
connections or flows
between discrete items

Acceptance decisions

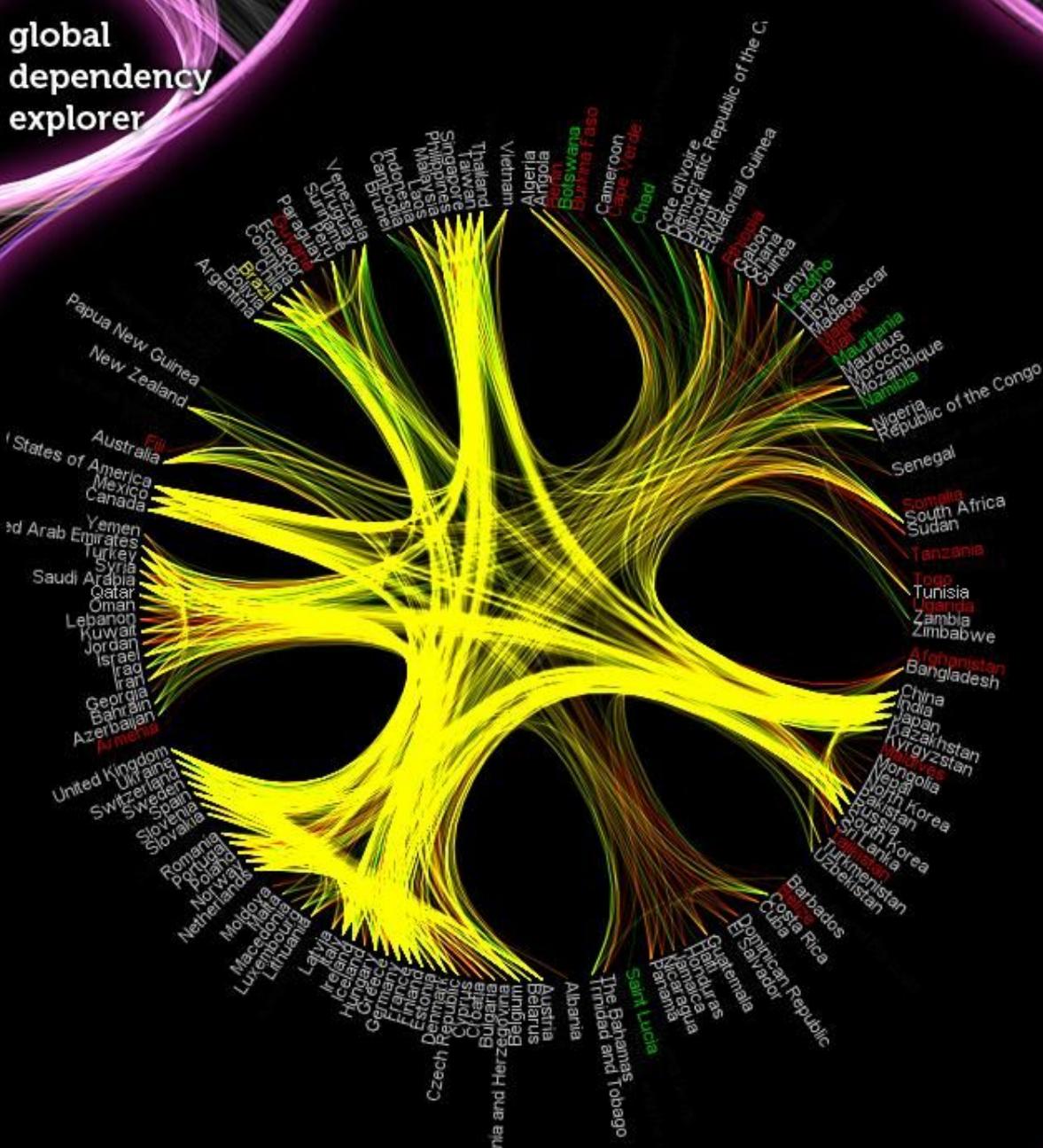
For migrants that successfully reach the country in which they hope to settle, they must file an asylum application with its government. Acceptance depends mostly upon country of origin. European countries have tried to control the influx through border controls and policies designed to discourage asylum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

European asylum-seeker decisions

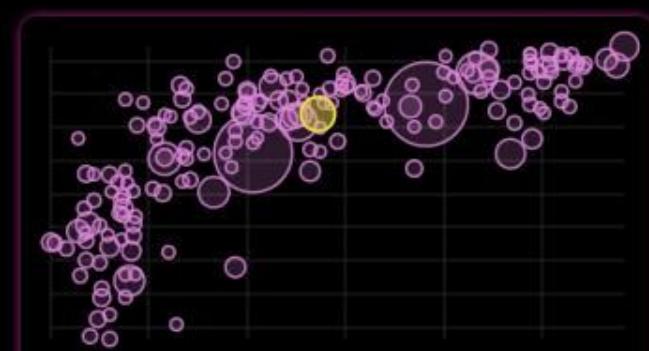
chord diagram

global dependency explorer

search country:



(none) ▾



bubblechart



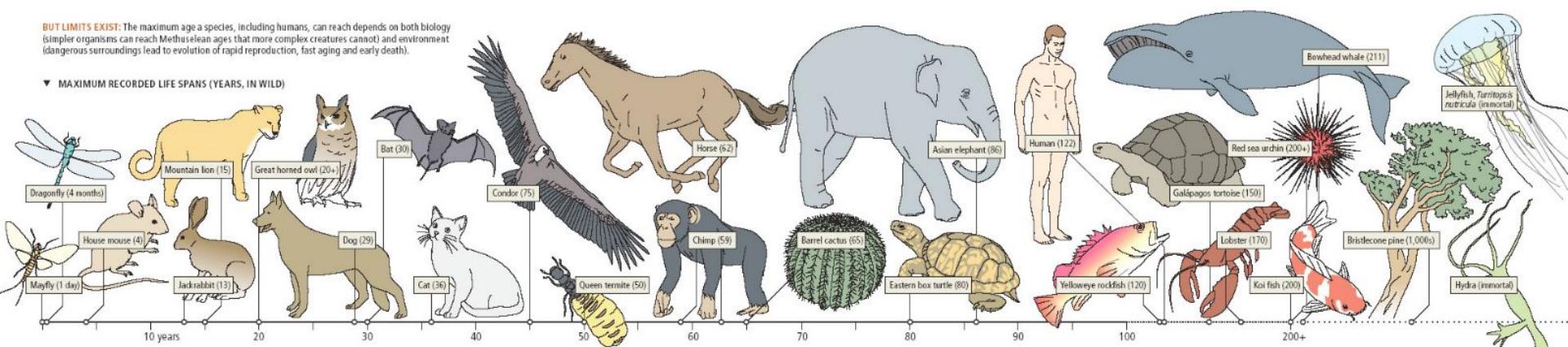
parallel coordinates

single axis chart

data:
values over time
for different items

BUT LIMITS EXIST: The maximum age a species, including humans, can reach depends on both biology (simpler organisms can reach Methusalean ages that more complex creatures cannot) and environment (dangerous surroundings lead to evolution of rapid reproduction, fast aging and early death).

▼ MAXIMUM RECORDED LIFE SPANS (YEARS, IN WILD)



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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@YuriEngelhardt
Visualizar'16 @ MediaLab-Prado
3 October 2016