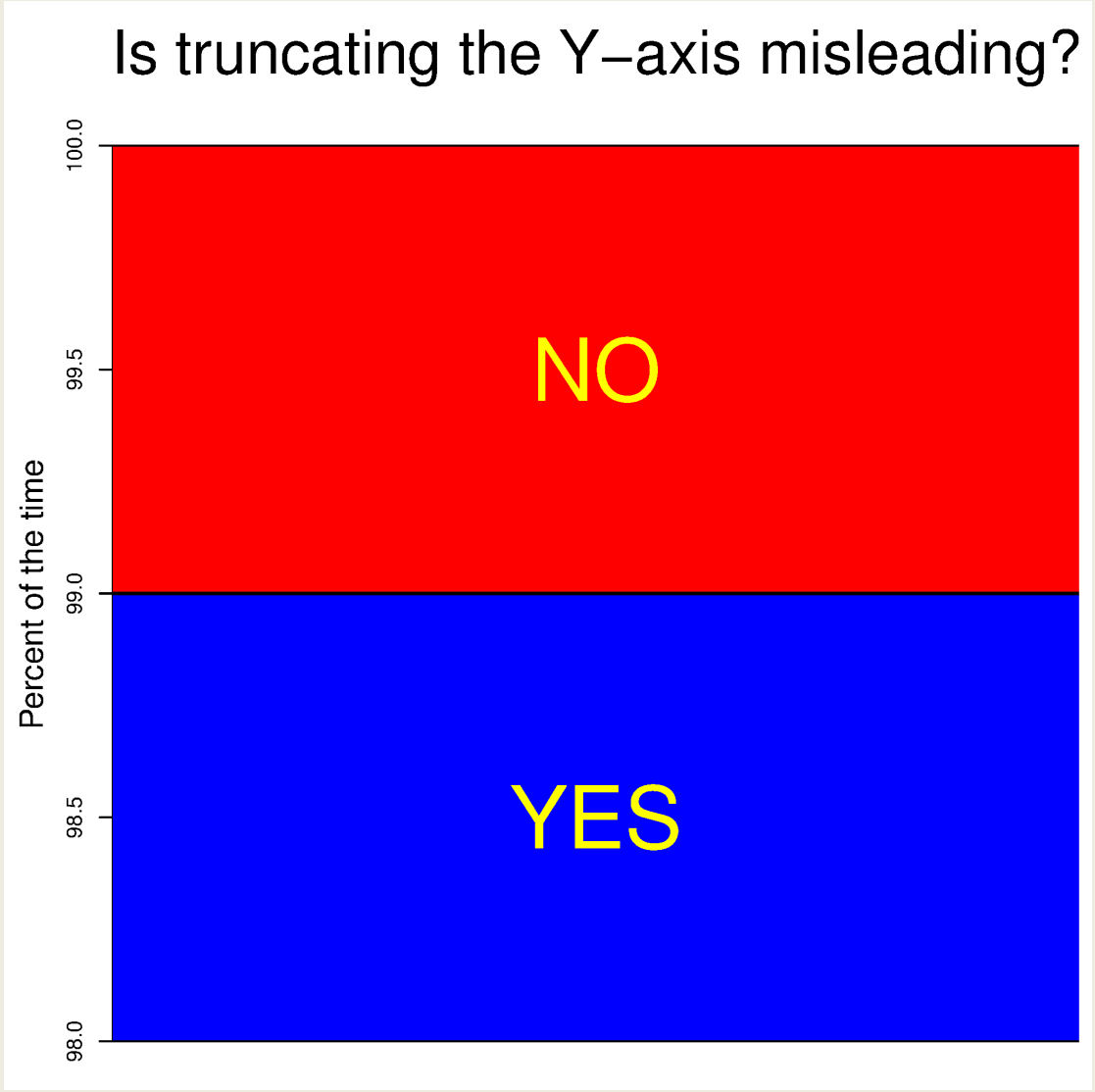
Change over time



Rubric test run

Final project

Replication

Change over time

PaRRRty time!

Rubric test run

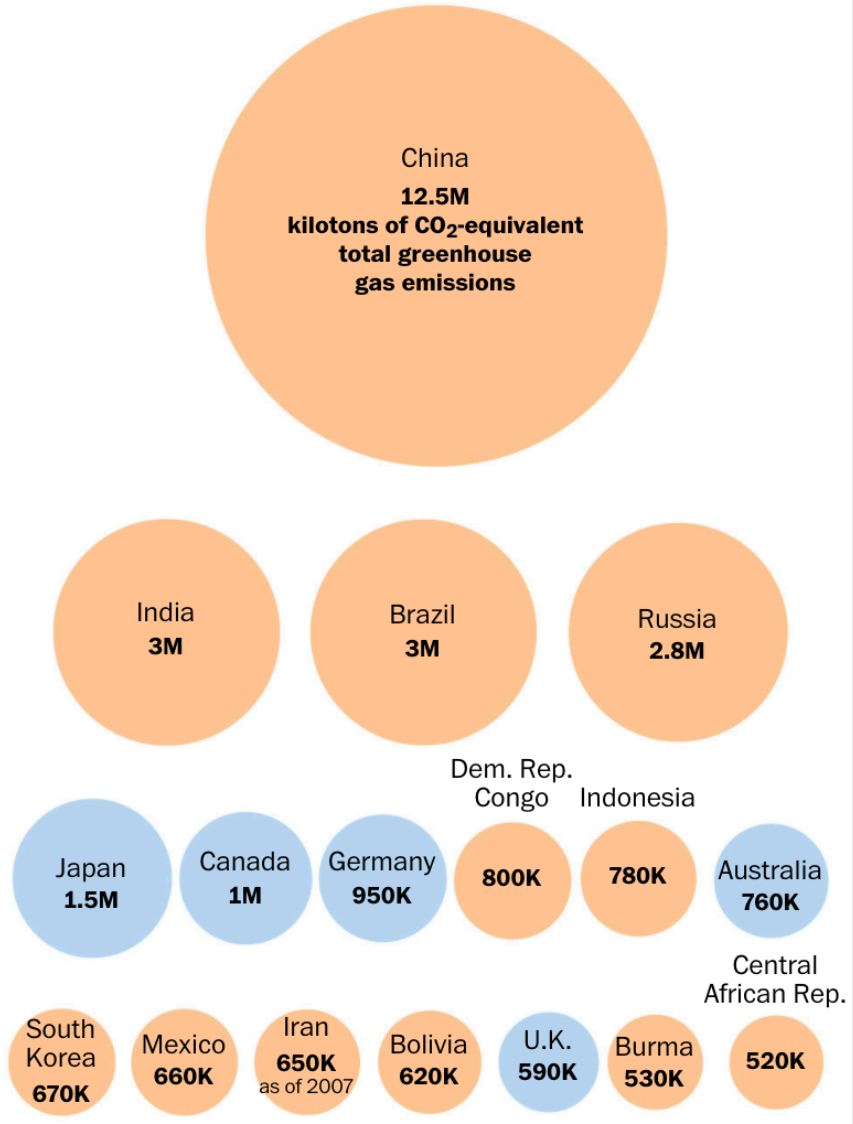
Who's in and who's out of the Paris agreement, by total greenhouse gas emissions

Developed country Developing country

PART OF PARIS AGREEMENT

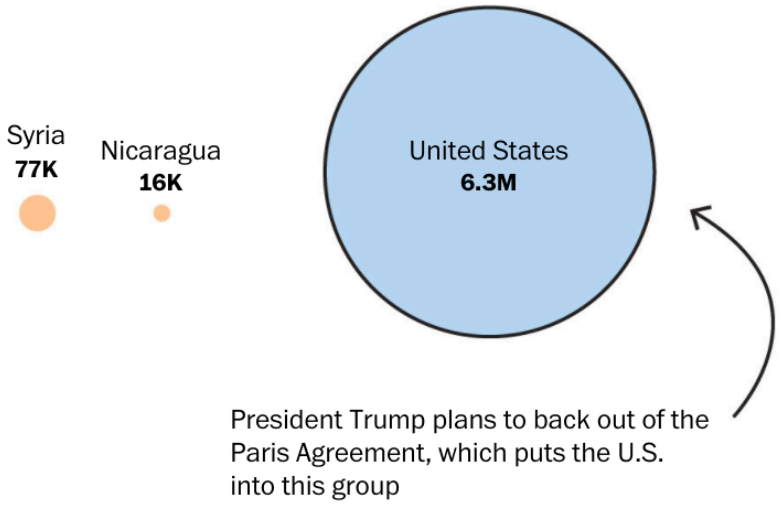
194 parties

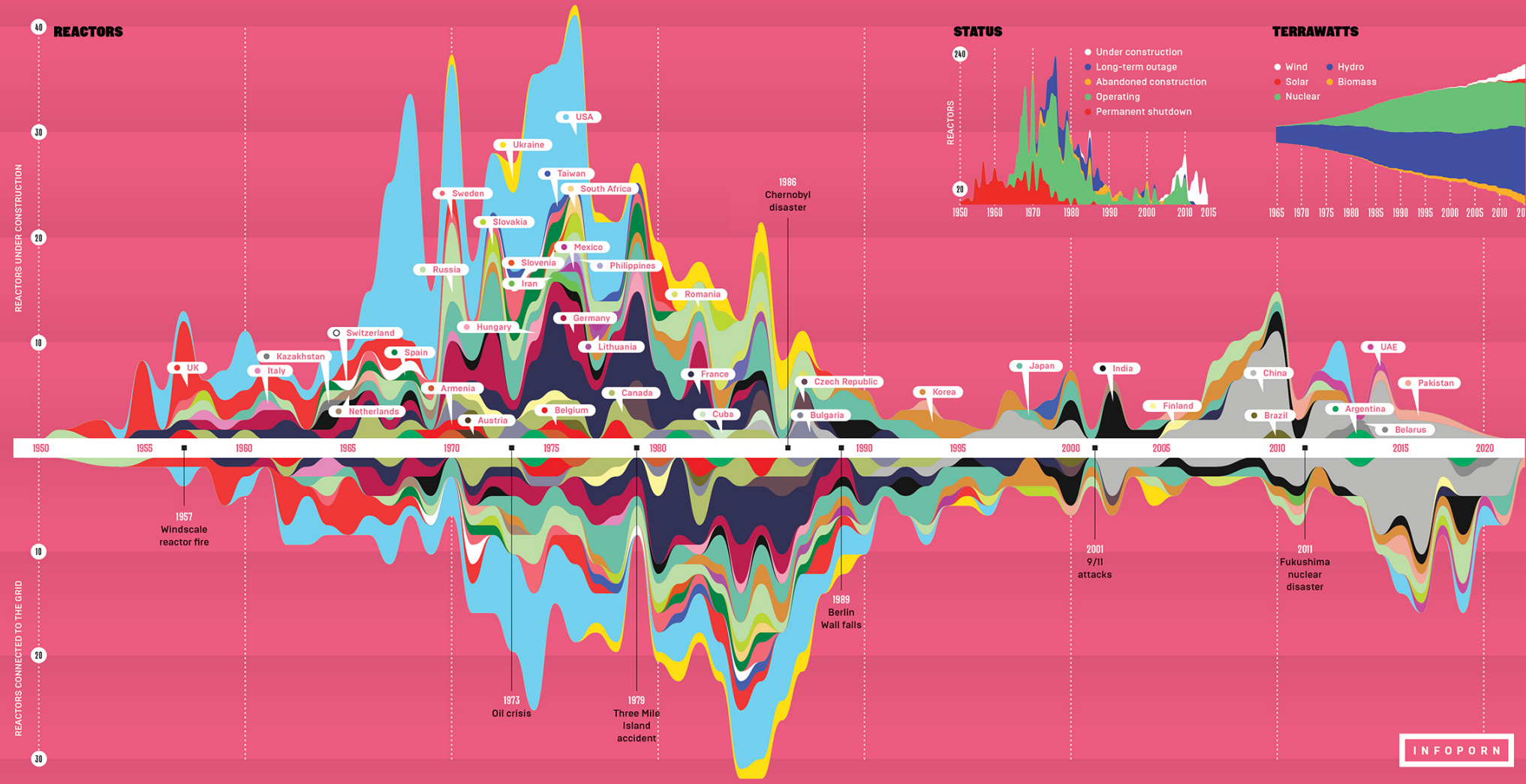
192 countries + E.U. + Palestinian Authority



NOT PART OF AGREEMENT

3 countries





NUCLEAR SLOWDOWN

Atomic reactors are hardly being built – can renewables take their place?

INFOGRAPHIC: VALERIO PELLEGRINI

ACROSS THE WORLD, GOVERNMENTS ARE TURNING their backs on nuclear power and investing instead in renewables. It's not just that fewer nuclear reactors are coming online, the power they produce is dwarfed by the increase in number of new clean-energy power plants. The ten new nuclear reactors built in 2015 added just nine gigawatts of new energy capacity, whereas renewables added 147 gigawatts to global power supplies. "In 2016, only three new reactors started to be built around the world," says Mycle Schneider, co-author of the 2016 *World Nuclear Industry Status Report*, which provided the data for this infographic. "In terms of generating capacity, that's a joke."

One nation ploughing ahead with nuclear power is China. Of the 55 reactors being built globally, 21 are there. Despite this, even its interest in the energy source is subsiding. Between 2013 and 2015, the Chinese government almost doubled its clean-energy spend to $102.9 billion (£82bn), placing it top of the leader board for renewable-energy investment.

Although the last five years have seen a gradual increase in reactors being connected to energy grids, the gap between renewables and nuclear energy only looks set to widen. Nuclear power plants, Schneider says, are extremely costly to build and decommission, and most governments have no plans to replace their ageing plants with new reactors. "It's impossible, even with the current number of reactors under construction, to make up for the reactor closures as they come up," he says. **Matt Reynolds** *thebulletin.org*

KANTAR
Information is Beautiful
Awards

Rubrics in final project

50% = my rubric

50% = your rubric

Your rubric graded separately too

Final project

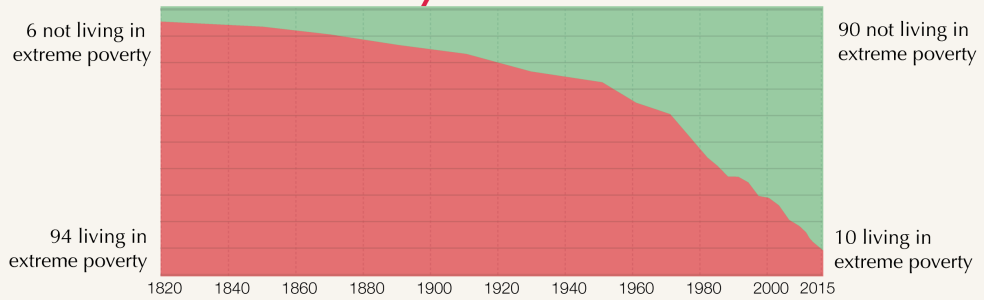
😱 Due in 15 days 😱

oh noes

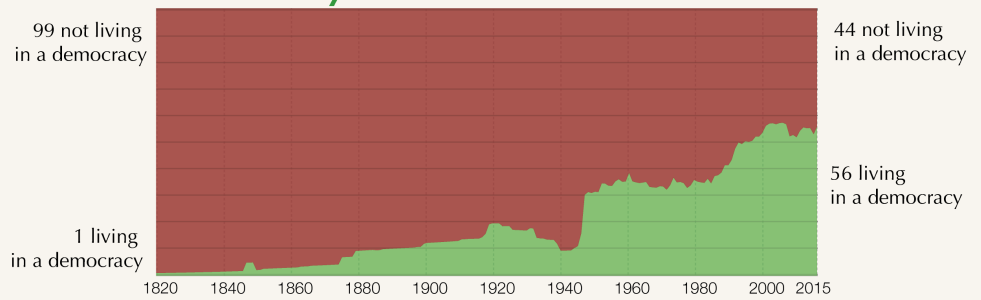
The World as 100 People
over the last two centuries

Our World in Data

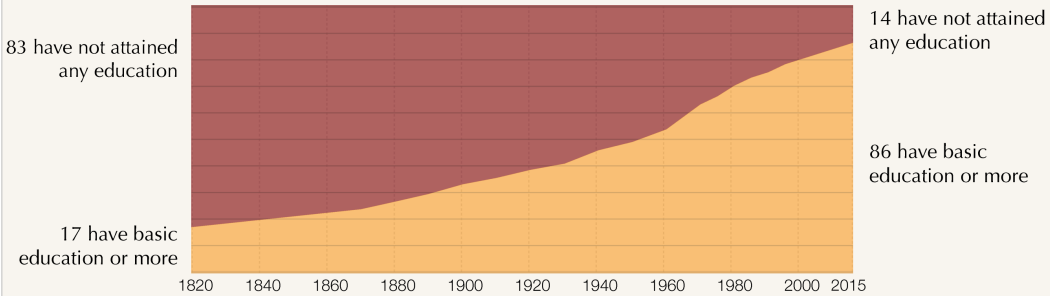
Extreme Poverty



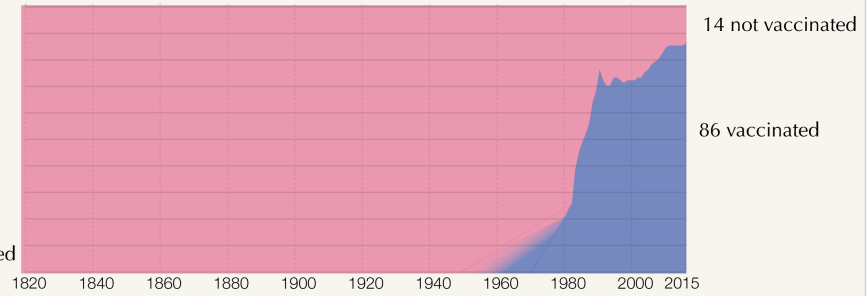
Democracy



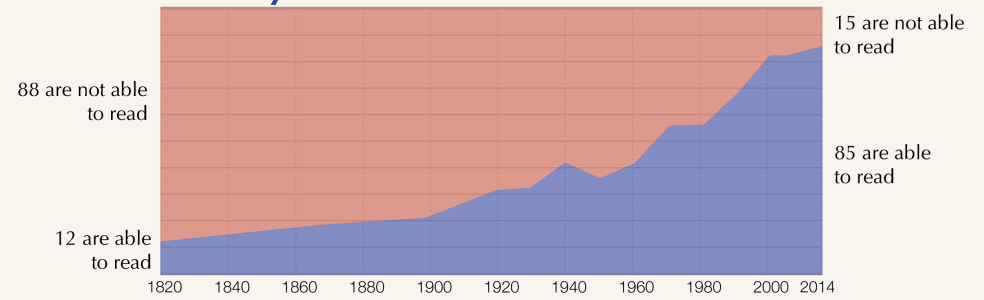
Basic Education



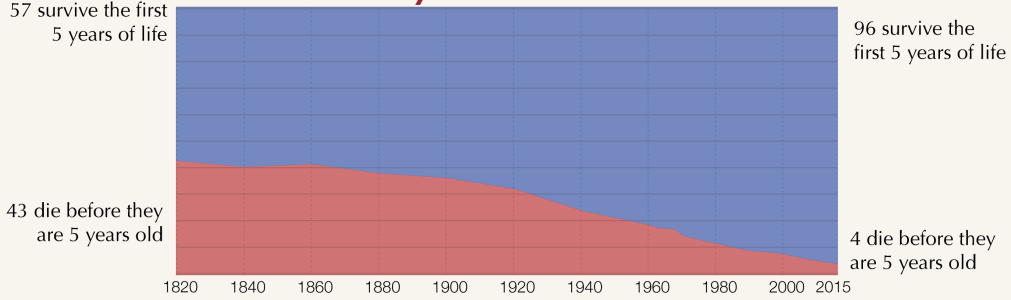
Vaccination against diphtheria, pertussis (whooping cough), and tetanus



Literacy



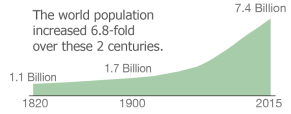
Child Mortality



Data sources:

Extreme Poverty: Bourguignon & Morrison (2002) up to 1970 – World Bank 1981 and later (2015 is a projection).
Vaccination: WHO (Global data are available for 1980 to 2015 – the DPT3 vaccination was licenced in 1949)
Education: OECD for the period 1820 to 1960. IIASA for the time thereafter.
Literacy: OECD for the period 1820 to 1990. UNESCO for 2004 and later.

Democracy: Politiy IV index (own calcluation of global population share)
Colonialism: Wimmer and Min (own calcluation of global population share)
Continent: HYDE database
Child mortality: up to 1960 own caluclations based on Gapminder; World Bank thereafter



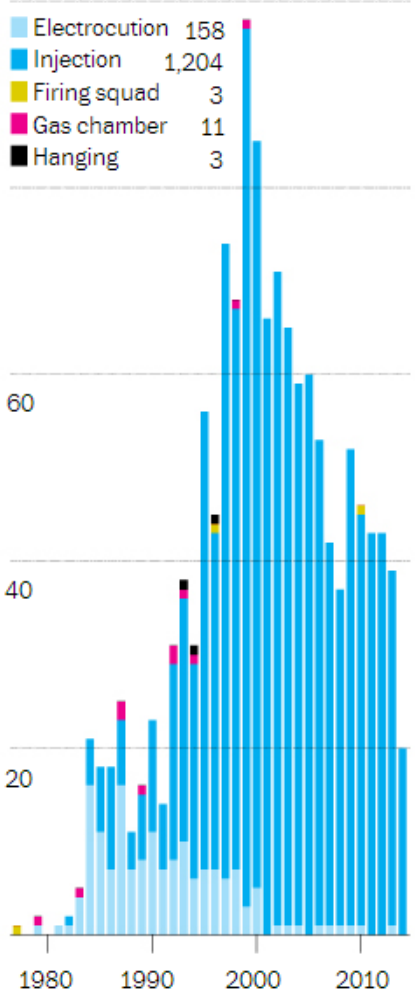
All these visualizations are from OurWorldInData.org an online publication that presents the empirical evidence on how the world is changing.

Licensed under CC-BY-SA by the author Max Roser.

Breaking down U.S. executions

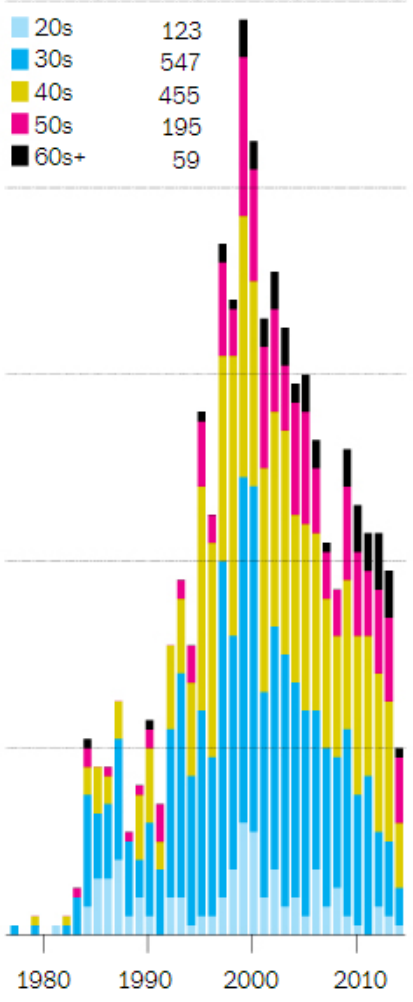
BY METHOD

Most common has been the lethal injection of one, two or three drugs, some of which are in short supply after European drugmakers stopped exports. Many appeals and stays have hinged on whether alternatives are reliable and humane.



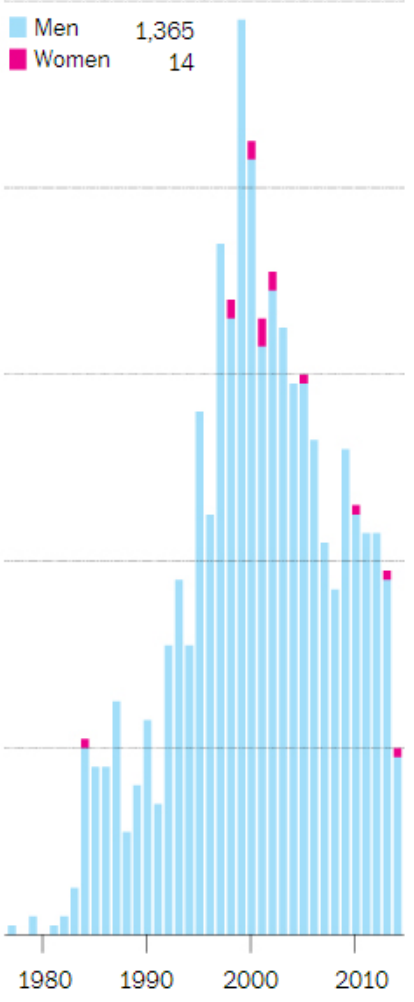
BY AGE

Age at the time of execution has ranged from 22 to 77. Twenty-two people were executed for crimes commited before they were 18. In 2005, the Supreme Court banned executions for crimes committed by juveniles.



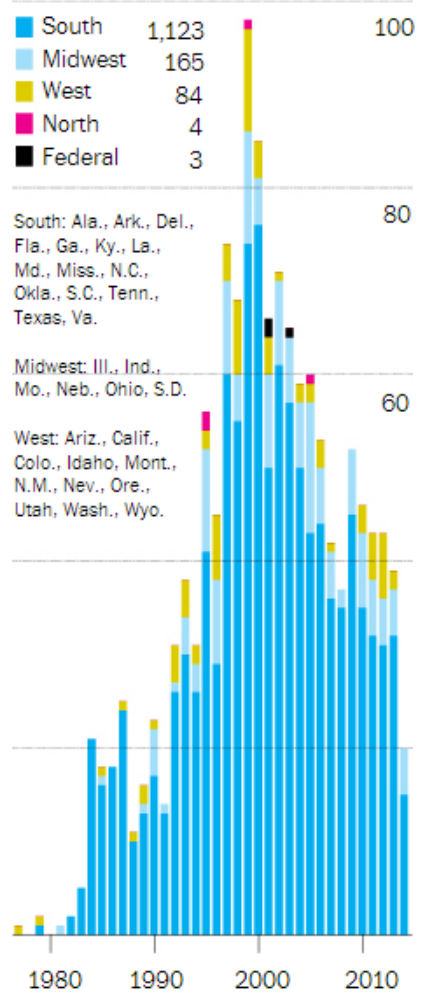
BY GENDER

Three women were executed in 2001, the most since the death penalty was reinstated. All were in Oklahoma: Wanda Jean Allen killed her girlfriend, Marilyn Plantz hired men to kill her husband, Lois Smith killed her son's ex-girlfriend.



BY REGION

Texas (515), Oklahoma (111) and Virginia (110) have accounted for more than half of all U.S. executions. Colorado, Connecticut, New Mexico and Wyoming have executed one person each. The federal government has executed three.



SOURCE: Death Penalty Information Center; Washington Post archives and other published reports; "Death Row USA," by the NAACP Legal Defense and Educational Fund; U.S. Census Bureau.

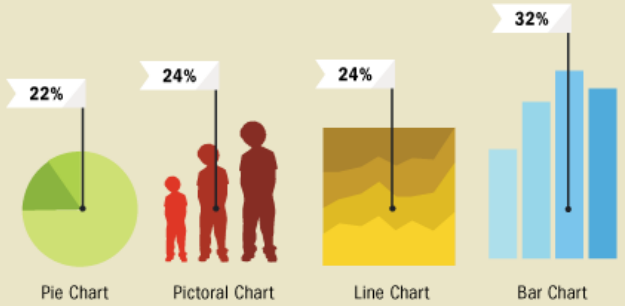
INFOGRAPHIC OF INFOGRAPHICS

Data visualization is a popular new way of sharing research. Here is a look at some of the visual devices, informational elements, and general trends found in the modern day infographic.

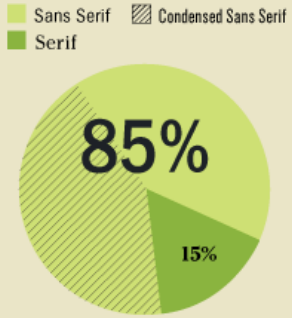
DESIGN

CHART STYLE

Percentage of infographics with the following charts:

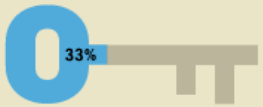


FONT



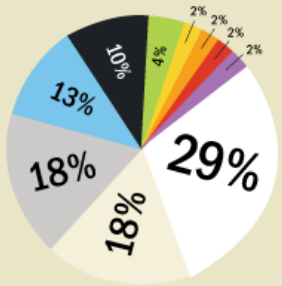
KEY INFO

Percentage of infographics with key:



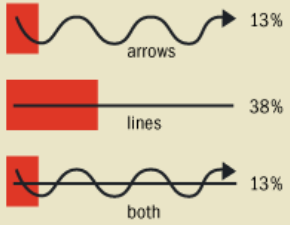
Average number of symbols per key: **5.1**

BASE COLOR



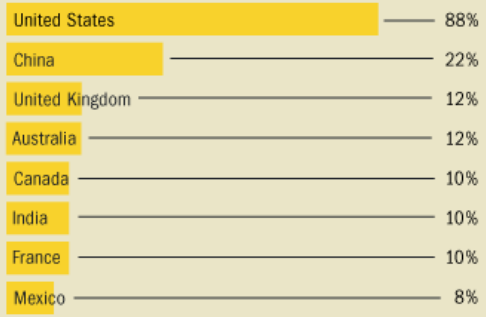
NAVIGATIONAL ICONOGRAPHY

Frequency of arrows & connecting lines in infographics:



CONTENT

COUNTRIES FEATURED



THEME

Relative popularity of different infographic themes:

SECTIONS

CREDITED SOURCES

Average number of sources per infographic: **2.29**

TITLE

Average number of words per infographic title: **4.36**

"RICHEST AND POOREST AMERICAN NEIGH

CONCEPT & DESIGN Ivan Cash **SOURCE** 49 infographics collected at random from www.good.is/infographics

Replication, self-documentation, and sharing data

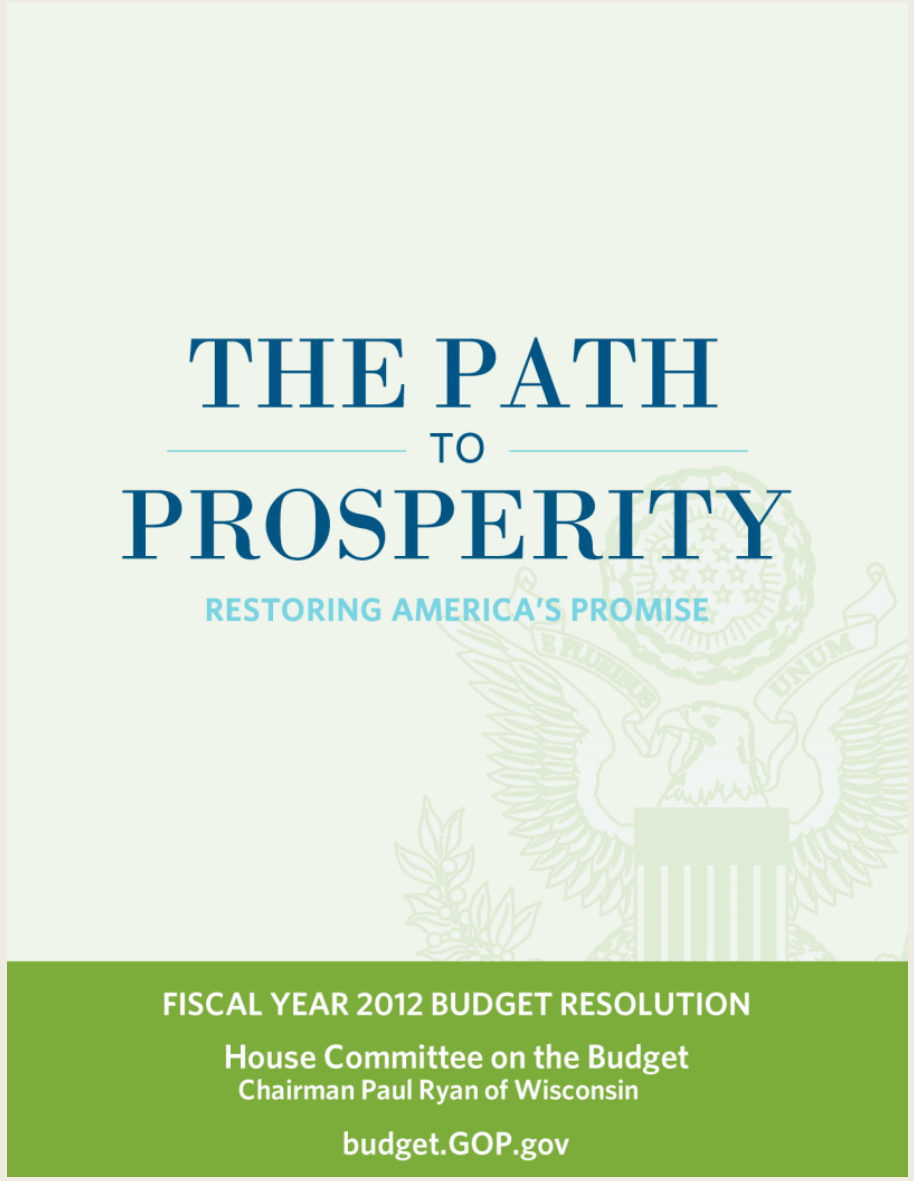
A cautionary tale

Growth in a Time of Debt
Carmen M. Reinhart and Kenneth S. Rogoff
NBER Working Paper No. 15639
January 2010, Revised January 2010
JEL No. E2,E3,E6,F3,F4,N10

ABSTRACT

We study economic growth and inflation at different levels of government and external debt. Our analysis is based on new data on forty-four countries spanning about two hundred years. The dataset incorporates over 3,700 annual observations covering a wide range of political systems, institutions, exchange rate arrangements, and historic circumstances. Our main findings are: First, the relationship between government debt and real GDP growth is weak for debt/GDP ratios below a threshold of 90 percent of GDP. Above 90 percent, median growth rates fall by one percent, and average growth falls considerably more. We find that the threshold for public debt is similar in advanced and emerging economies. Second, emerging markets face lower thresholds for external debt (public and private)—which is usually denominated in a foreign currency. When external debt reaches 60 percent of GDP, annual growth declines by about two percent; for higher levels, growth rates are roughly cut in half. Third, there is no apparent contemporaneous link between inflation and public debt levels for the advanced countries as a group (some countries, such as the United States, have experienced higher inflation when debt/GDP is high). The story is entirely different for emerging markets, where inflation rises sharply as debt increases.

Debt:GDP = 90%+ → −0.1% growth



Finally, Ms. Reinhart and Mr. Rogoff allowed researchers at the University of Massachusetts to look at their original spreadsheet — and the mystery of the irreproducible results was solved. First, they omitted some data; second, they used unusual and highly questionable statistical procedures; and finally, yes, they made an Excel coding error. Correct these oddities and errors, and you get what other researchers have found: some correlation between high debt and slow growth, with no indication of which is causing which, but no sign at all of that 90 percent "threshold."

Table 1. Real GDP Growth as the Level of Government Debt Varies:
Selected Advanced Economies, 1790-2009
(annual percent change)

Country	Period	Central (Federal) government debt/ GDP			
		Below 30 percent	30 to 60 percent	60 to 90 percent	90 percent and above
Australia	1902-2009	3.1	4.1	2.3	4.6
Austria	1880-2009	4.3	3.0	2.3	n.a.
Belgium	1835-2009	3.0	2.6	2.1	3.3
Canada	1925-2009	2.0	4.5	3.0	2.2
Denmark	1880-2009	3.1	1.7	2.4	n.a.
Finland	1913-2009	3.2	3.0	4.3	1.9
France	1880-2009	4.9	2.7	2.8	2.3
Germany	1880-2009	3.6	0.9	n.a.	n.a.
Greece	1884-2009	4.0	***0.3***	***4.8***	2.5
Ireland	1949-2009	4.4	4.5	4.0	2.4
Italy	1880-2009	***5.4***	***4.9***	1.9	0.7
Japan	1885-2009	4.9	3.7	3.9	0.7
Netherlands	1880-2009	4.0	2.8	2.4	2.0
New Zealand	1932-2009	2.5	2.9	3.9	**3.6**
Norway	1880-2009	2.9	4.4	n.a.	n.a.
Portugal	1851-2009	4.8	2.5	1.4	n.a.
Spain	1850-2009	***1.6***	3.3	***1.3***	2.2
Sweden	1880-2009	2.9	2.9	2.7	n.a.
United Kingdom	1830-2009	2.5	2.2	2.1	1.8
United States	1790-2009	4.0	3.4	3.3	***-1.8***
Average		**3.7**	**3.0**	**3.4**	**1.7**
Median		**3.9**	**3.1**	**2.8**	**1.9**
Number of observations = **2,317**		866	654	445	352

Debt:GDP = 90%+ → 2.2% growth

Don’t touch the raw data

But you can use write_csv()

Use self-documenting code

R Markdown!

Ensure code is reproducible

R Markdown!

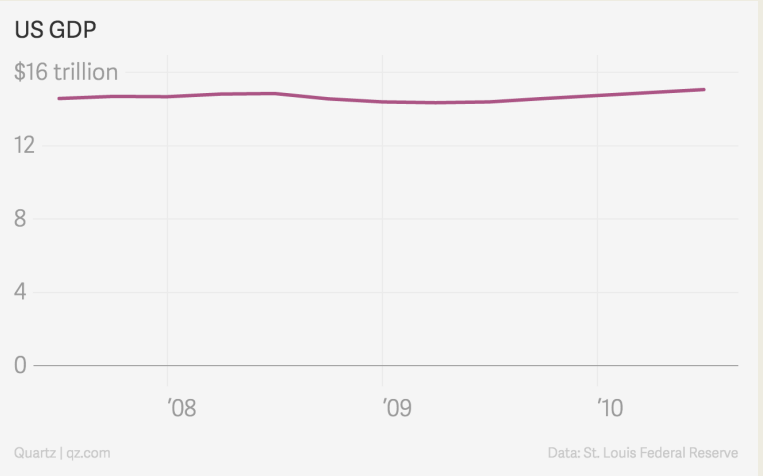
Use open formats

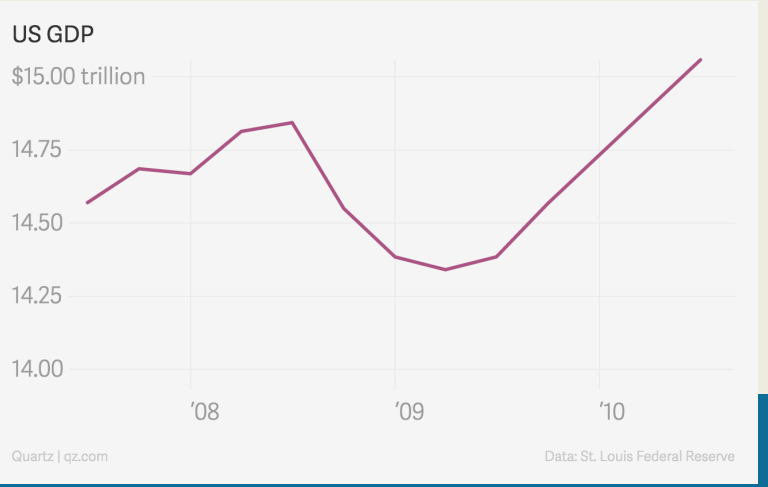
.csv; not .xlsx, .dta, .dat, etc.

Change over time

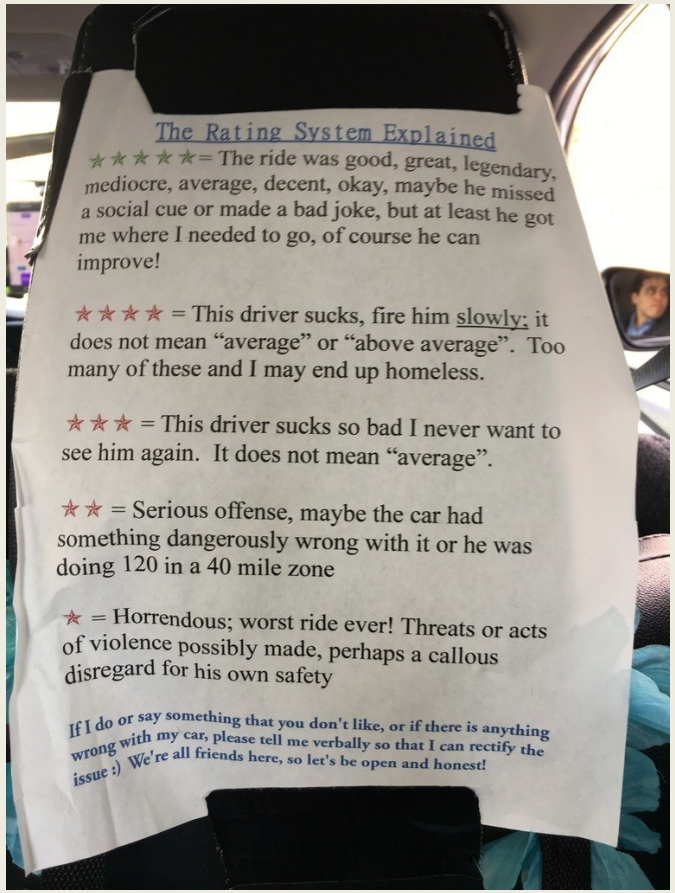
When is it okay to truncate the y-axis?

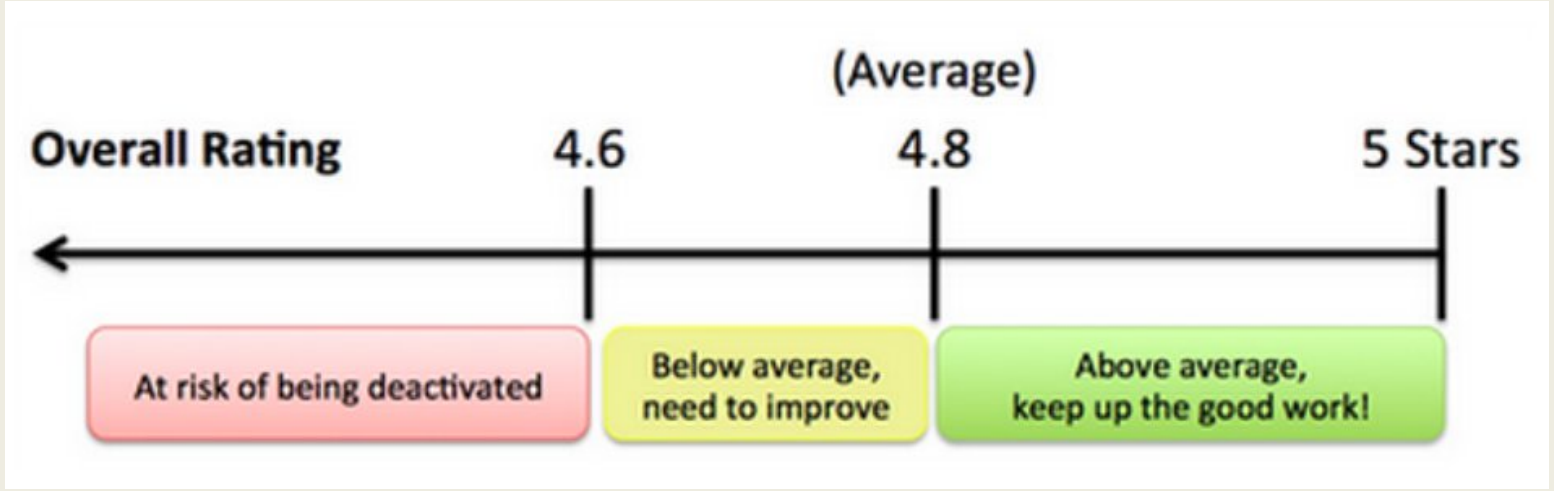
When small movements matter





Scale distortion

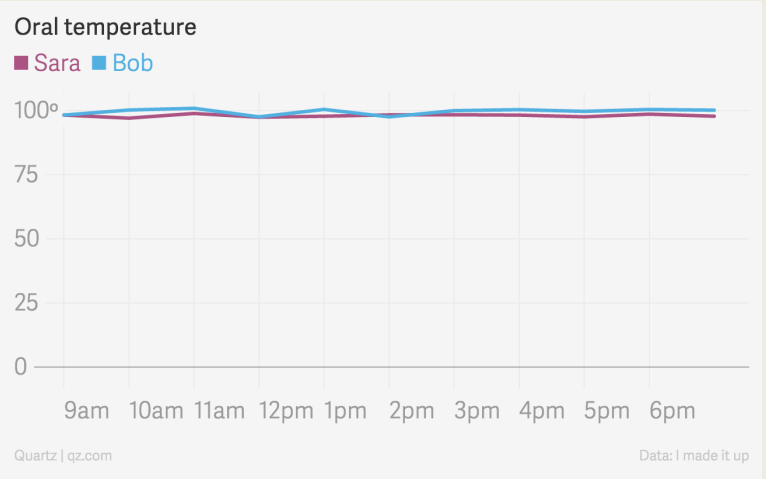


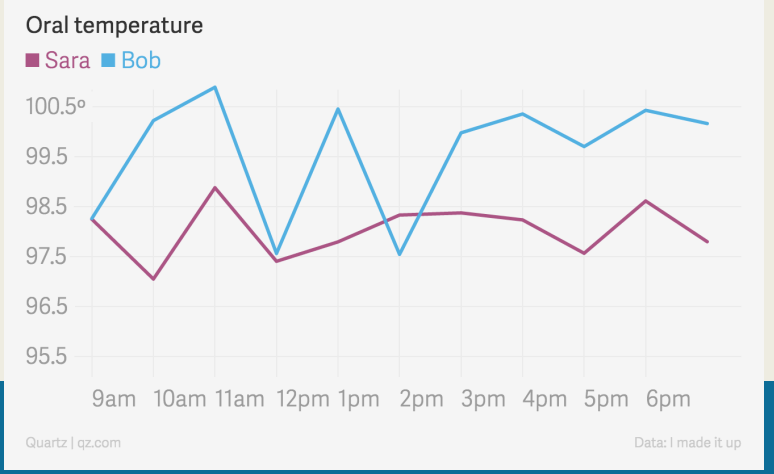


When is it okay to truncate the y-axis?

When small movements matter

When zero values are impossible



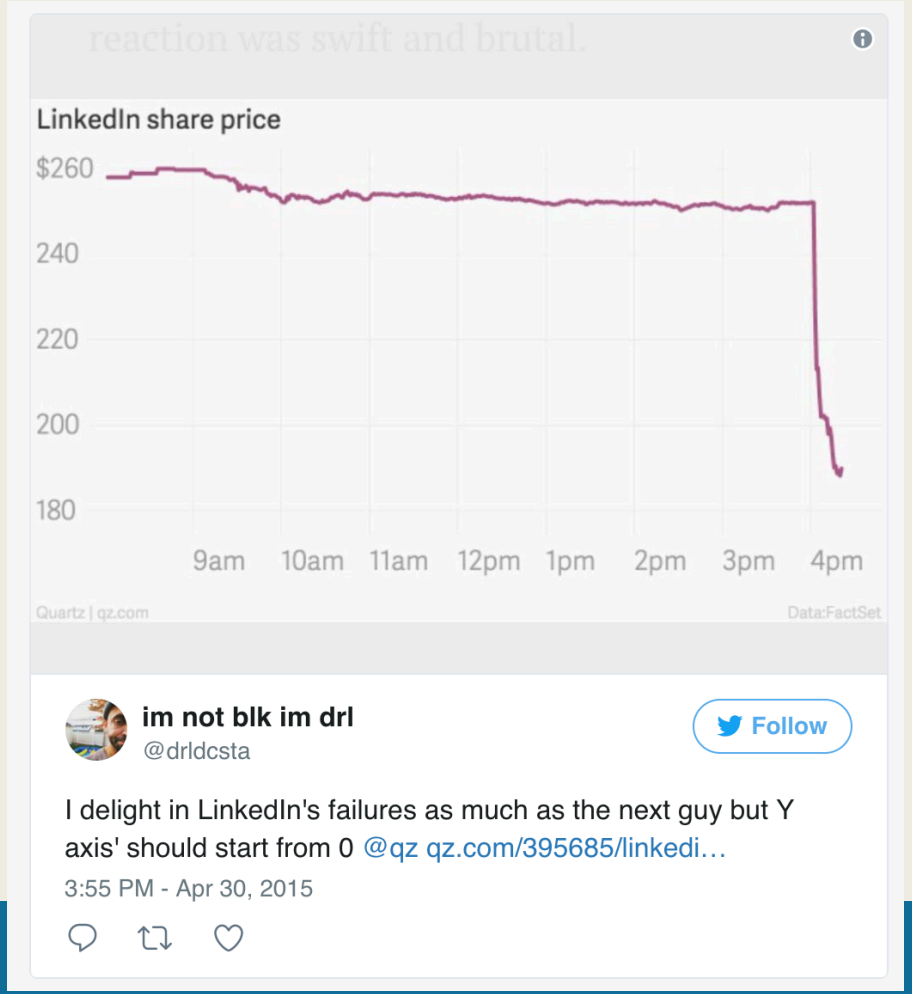


When is it okay to truncate the y-axis?

When small movements matter

When zero values are impossible

When it's normal



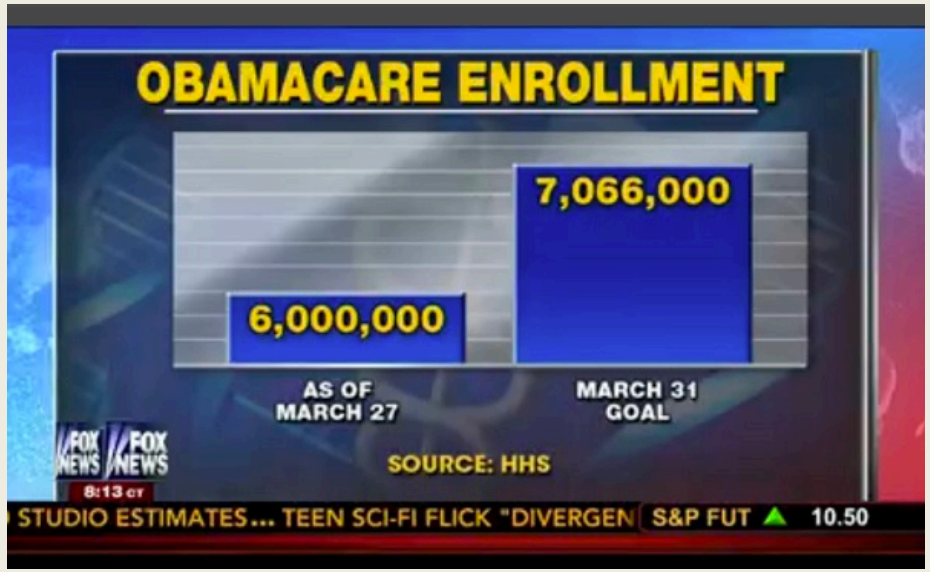
When is it okay to truncate the y-axis?

When small movements matter

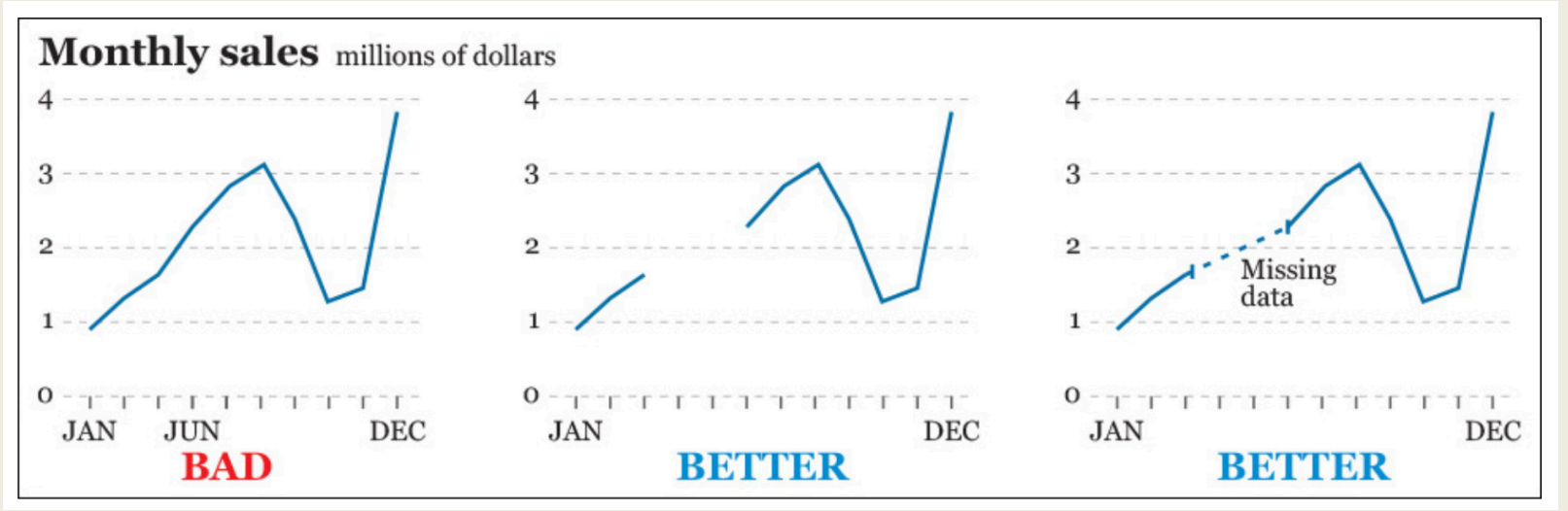
When zero values are impossible

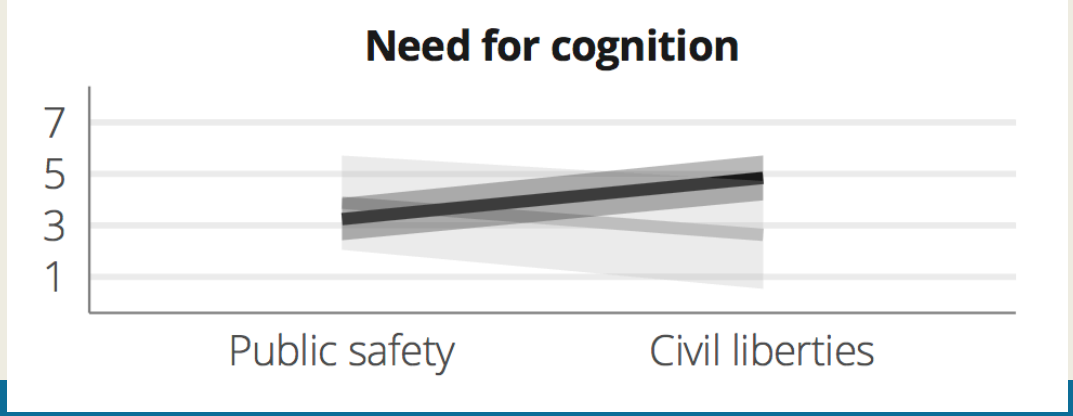
When it's normal

Never on bar charts

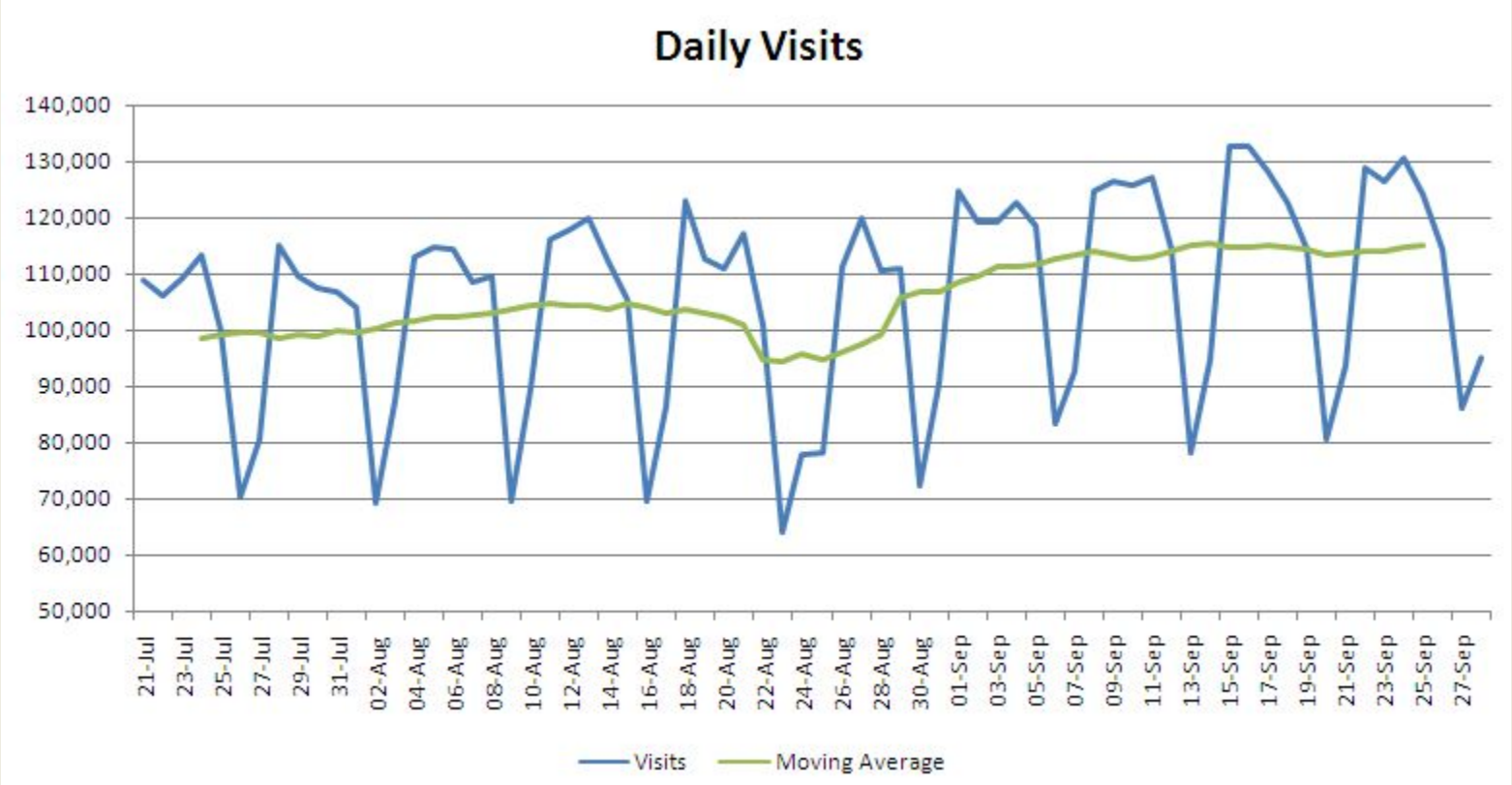


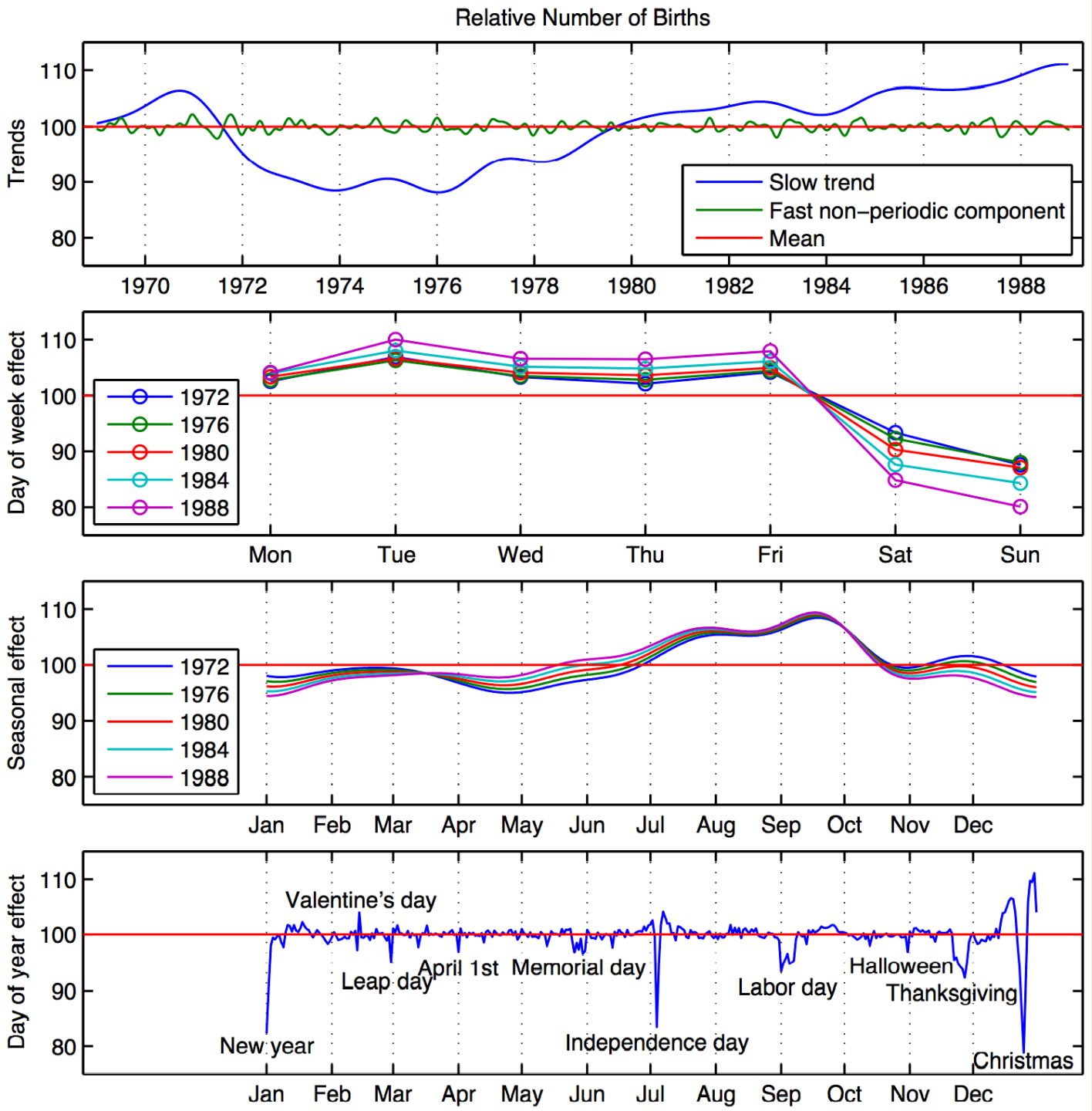
x-axis issues





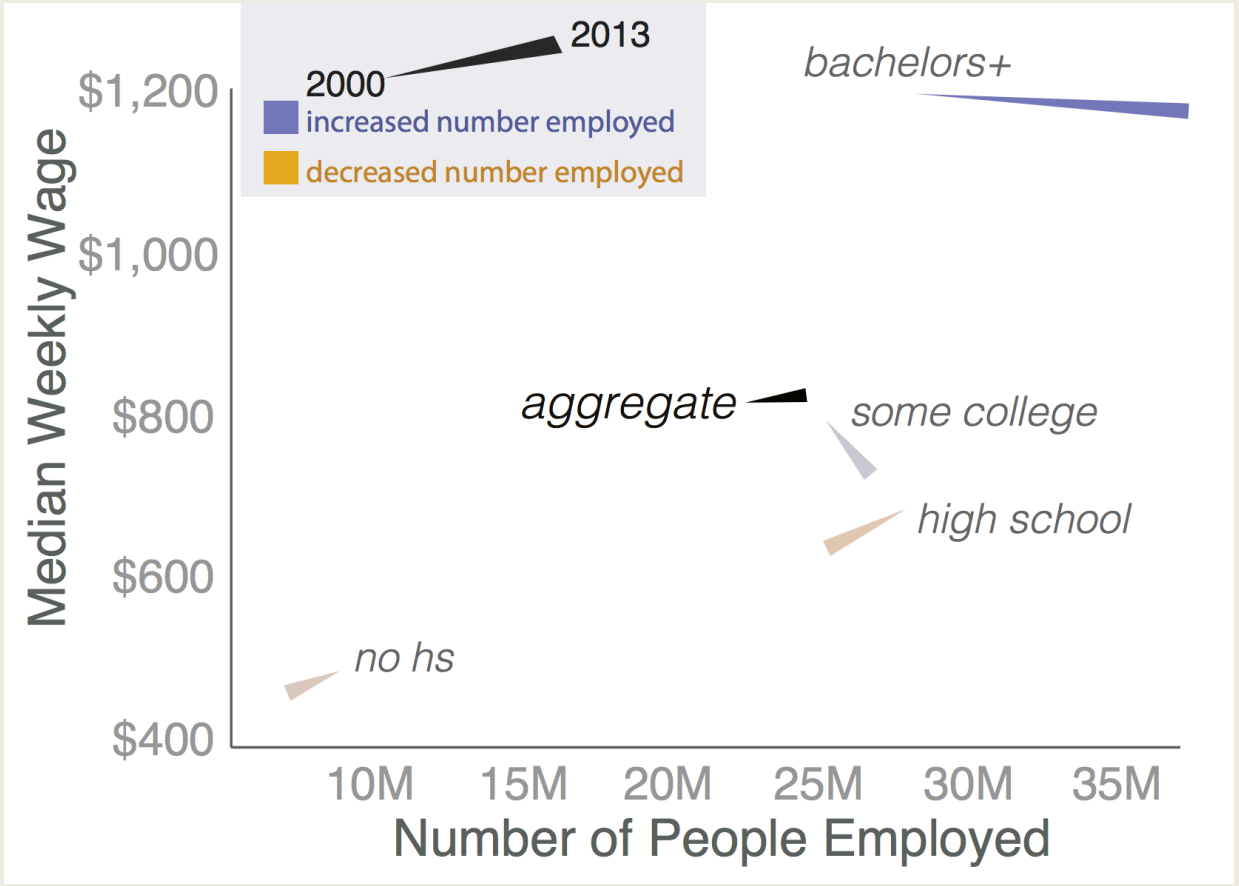
Seasonality



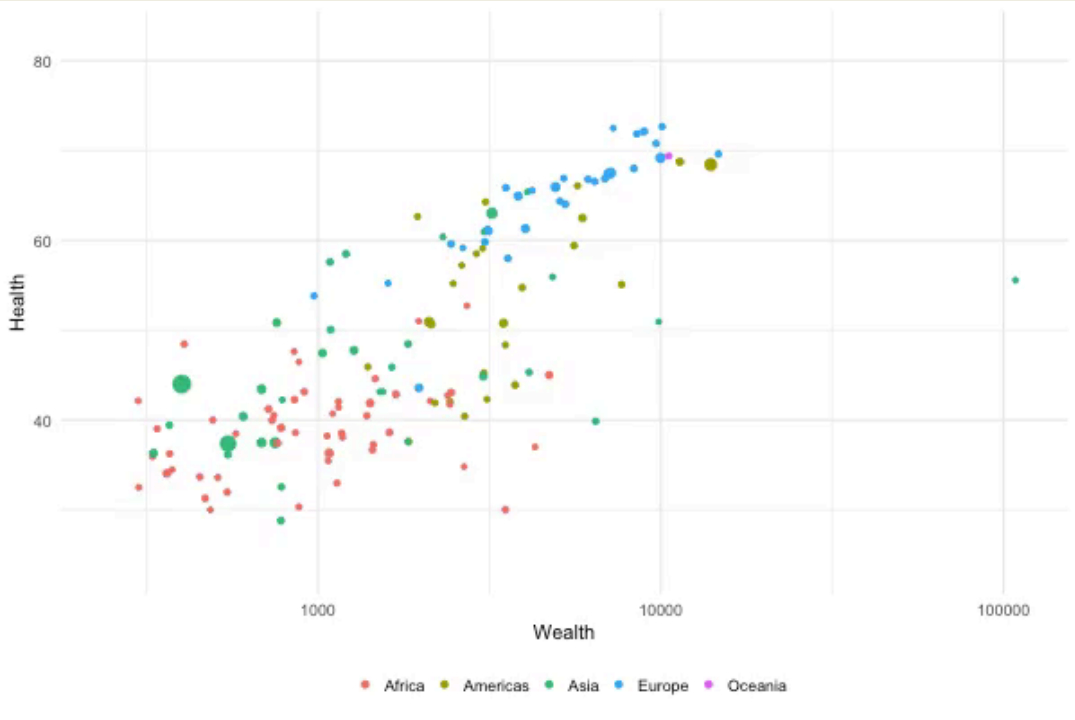

Relative Number of Births
Trends
110
100
90
80
1970
1972
1974
1976
1978
1980
1982
1984
1986
1988
Slow trend
Fast non−periodic component
Mean
Day of week effect
1972
1976
1980
1984
1988
Mon
Tue
Wed
Thu
Fri
Sat
Sun
Seasonal effect
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Day of year effect
Valentine's day
Leap day
April 1st
Memorial day
Labor day
Halloween
Thanksgiving
New year
Independence day
Christmas

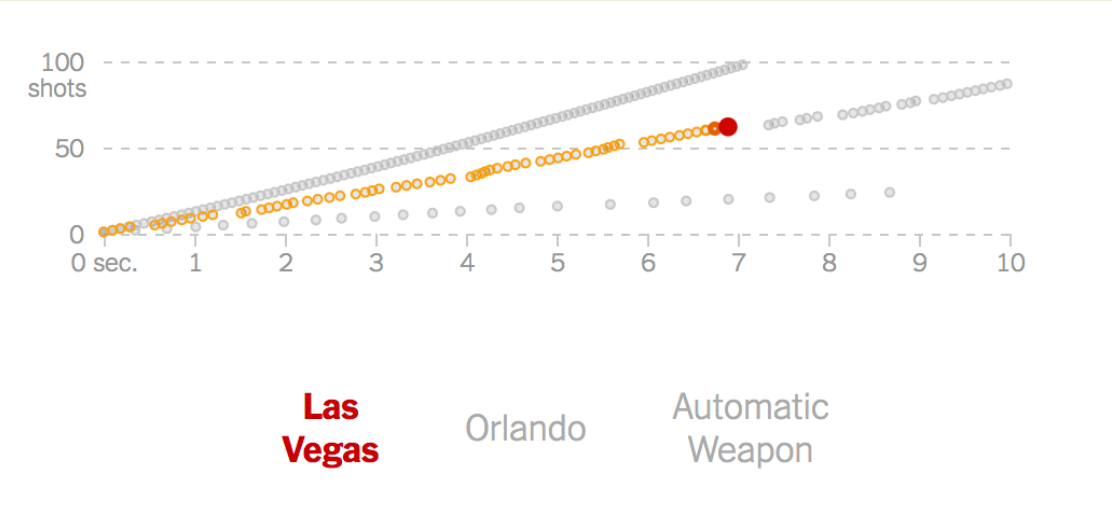
Simpson's Paradox

	Treatment A	Treatment B
Small stones	*Group 1* **93% (81/87)**	*Group 2* 87% (234/270)
Large stones	*Group 3* **73% (192/263)**	*Group 4* 69% (55/80)
Both	78% (273/350)	**83% (289/350)**



Extra dimensions





"Nine Rounds a Second: How the Las Vegas Gunman Outfitted a Rifle to Fire Faster," *New York Times*, October 5, 2017

🎉 PaRRRty time! 🎉

Sarah Bingham

Stephanie Dossena

Alexander Zeller

Natalia Brown

Nathan Eyring

Dan Sisco

Rich Kuchinsky

Konner Glick

Jordan Hunter

Jill Piacitelli

Christopher Law

John Morgan

Whitney Royal

Jacob Fullmer

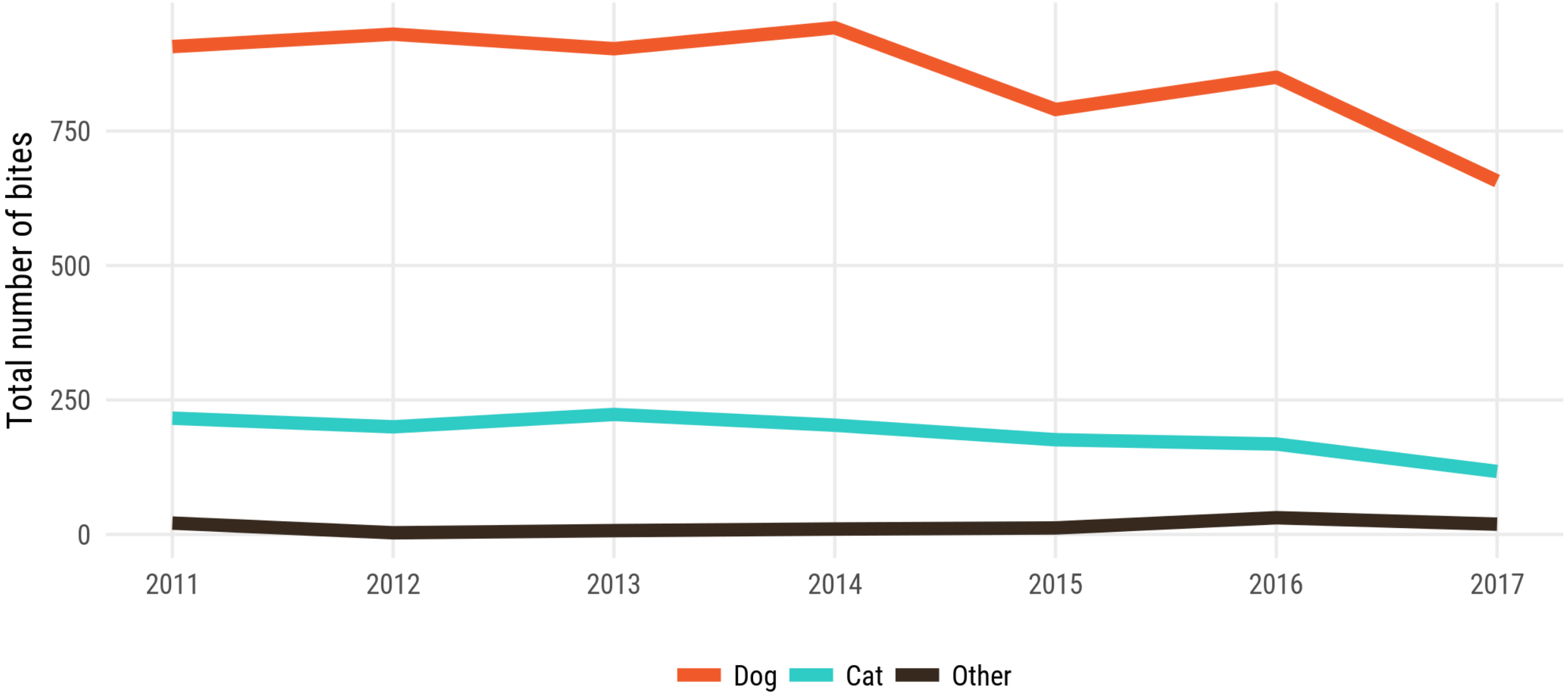
Peter Hall

Victor Obiri

James Sinkovic

Is the Louisville canine rampage over?

Total number of reported animal bites per year



Source: Louisville Metro Department of Public Health and Wellness