What makes a good visualization?

Part 2

What makes a great visualization?

No substantive issues

No perceptual issues

Honesty + good judgment

Good aesthetics

Kieran Healy, *Data Visualization: A Practical Introduction*

Common perceptual issues

Angles and bars

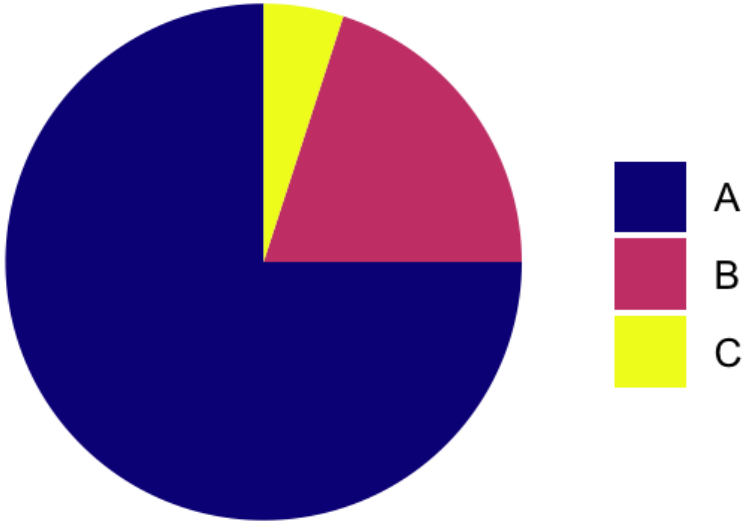
Bars and truncated axes

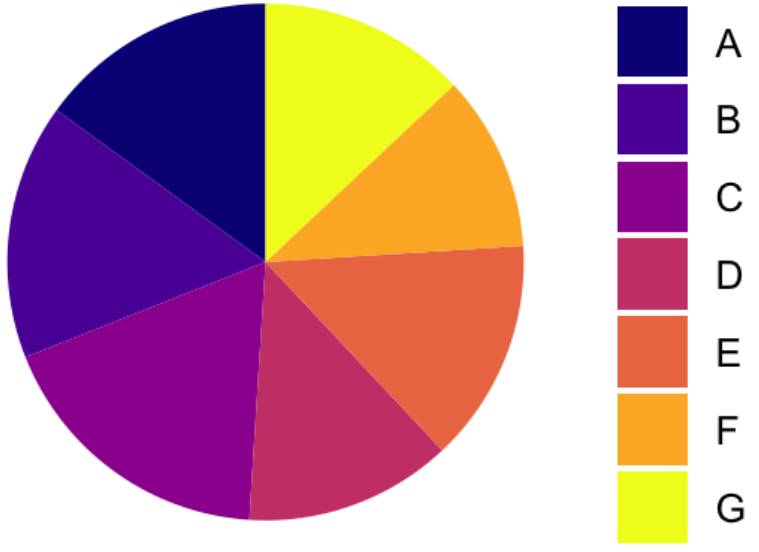
Dual y-axes

Pie charts

Perceptual issues with angle and fill space

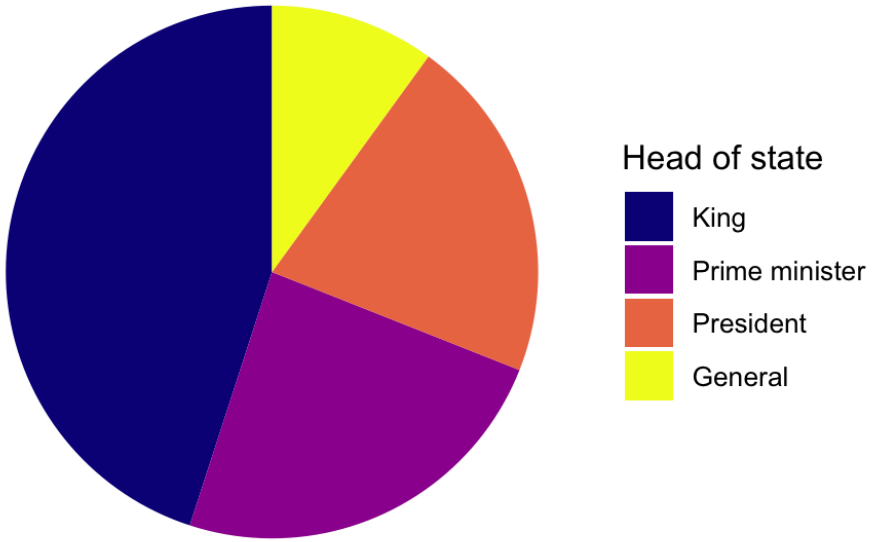
Only okay(ish) if there are a few easily distinguishable categories

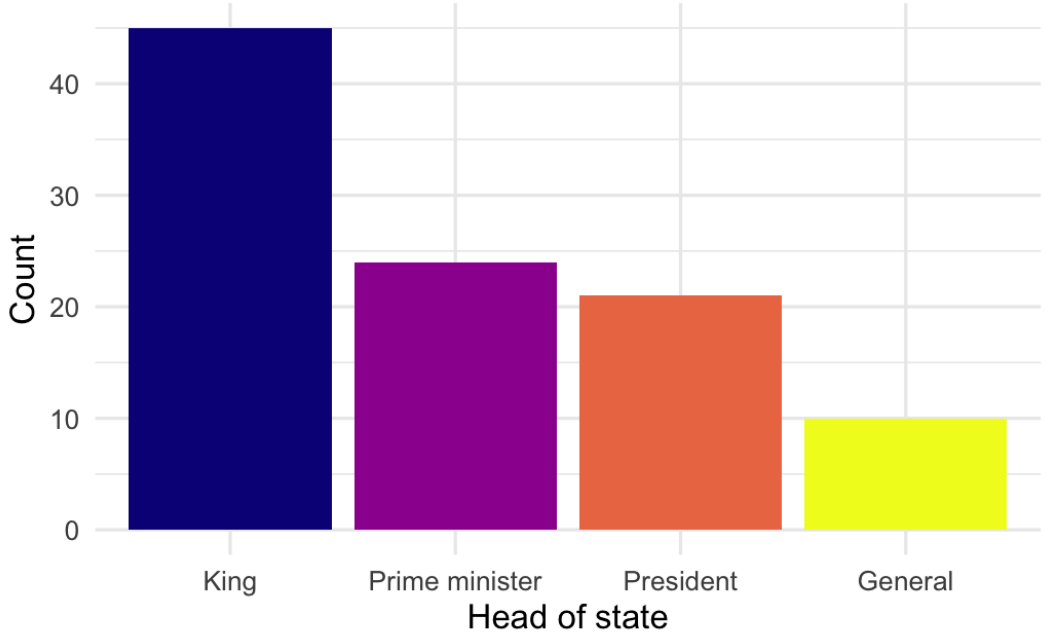




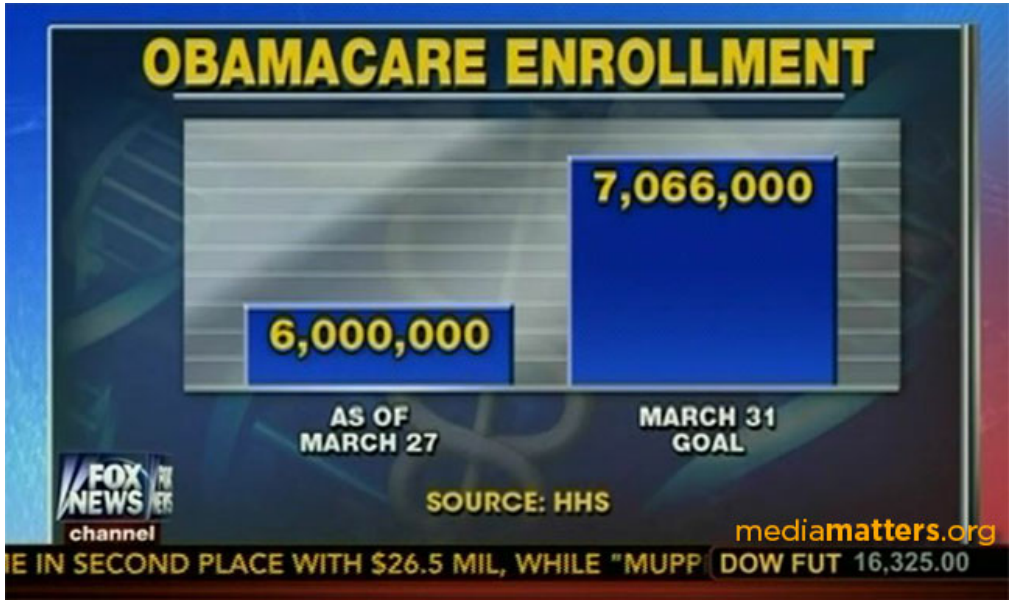
Yay bar plots!

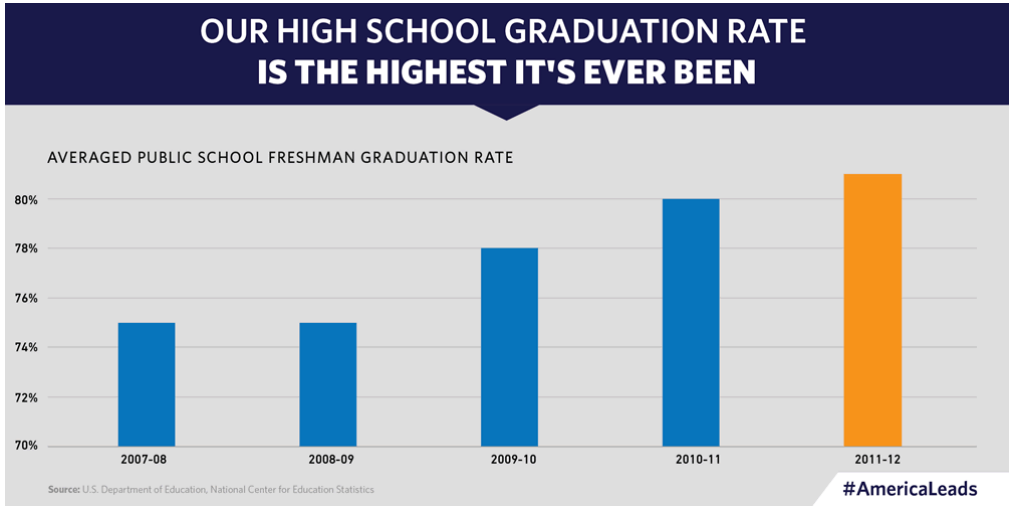
We are a lot better at visualizing line lengths than angles and areas





Oh no bar plots!





Start at zero

The entire line length matters,
so don't truncate it!

Always start at 0 *with bar charts*

(Or don't use bars)

Truncation is fine sometimes!

It is actually more legal to truncate the y-axis than you might think!

Just not with bars!

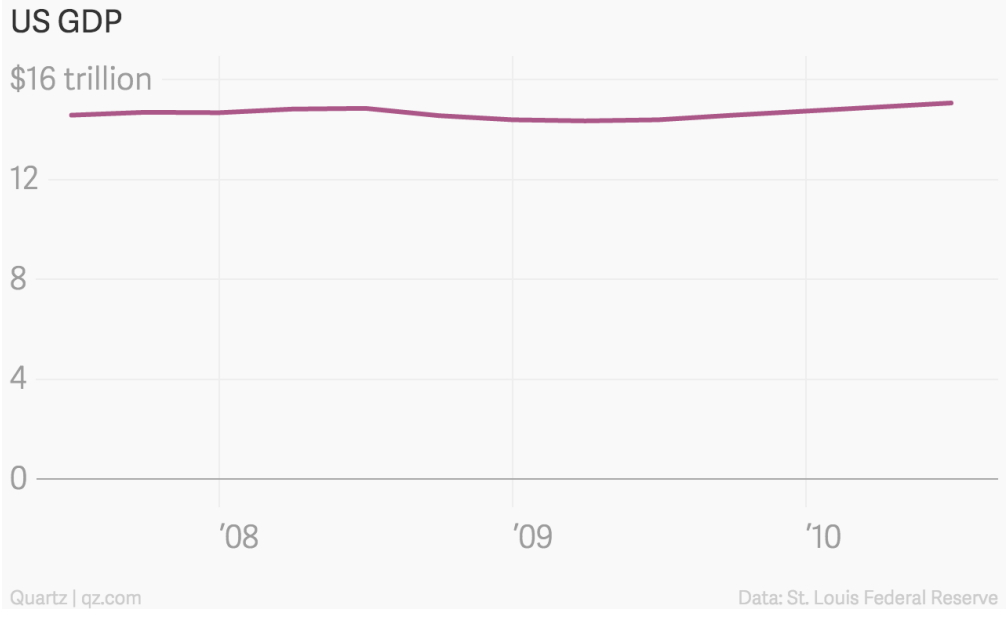
When small movements matter

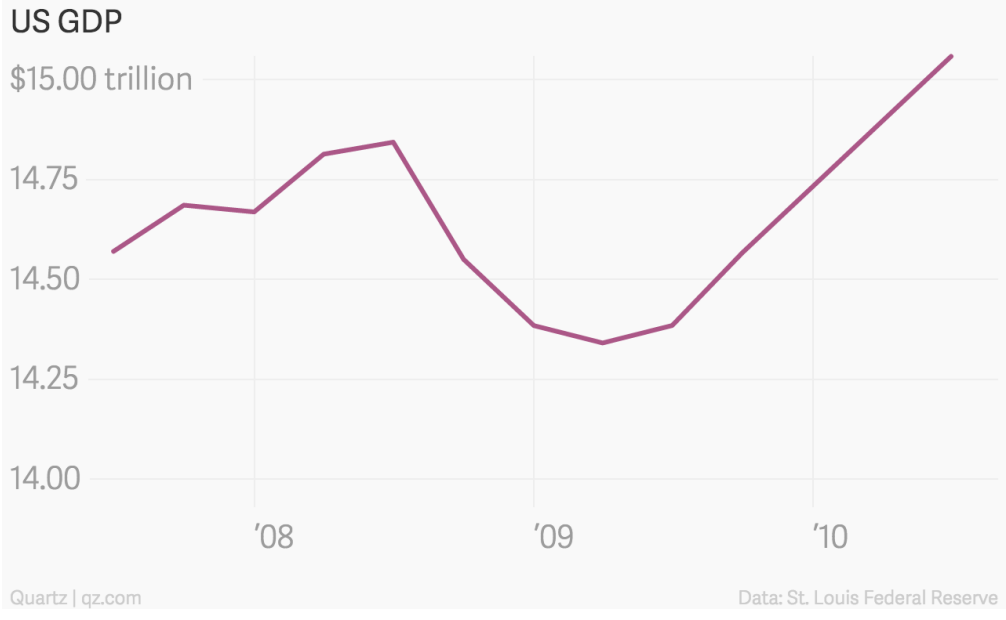
When the scale itself is distorted

When zero values are impossible

When is it okay to truncate?

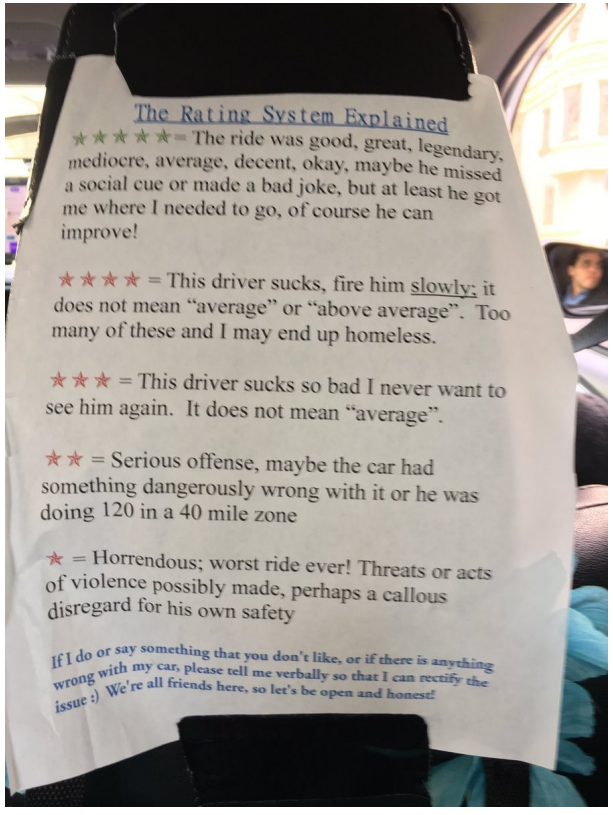
When small movements matter

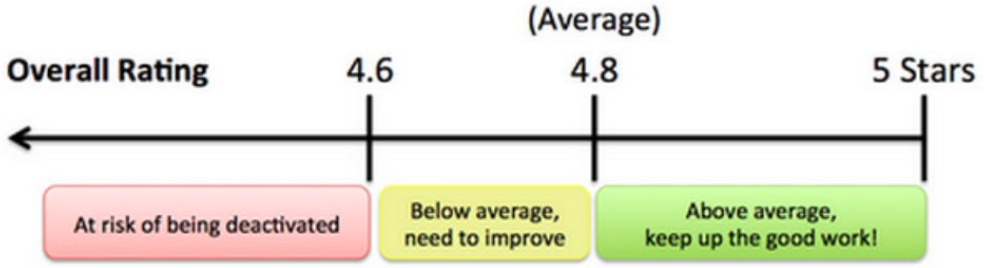




When is it okay to truncate?

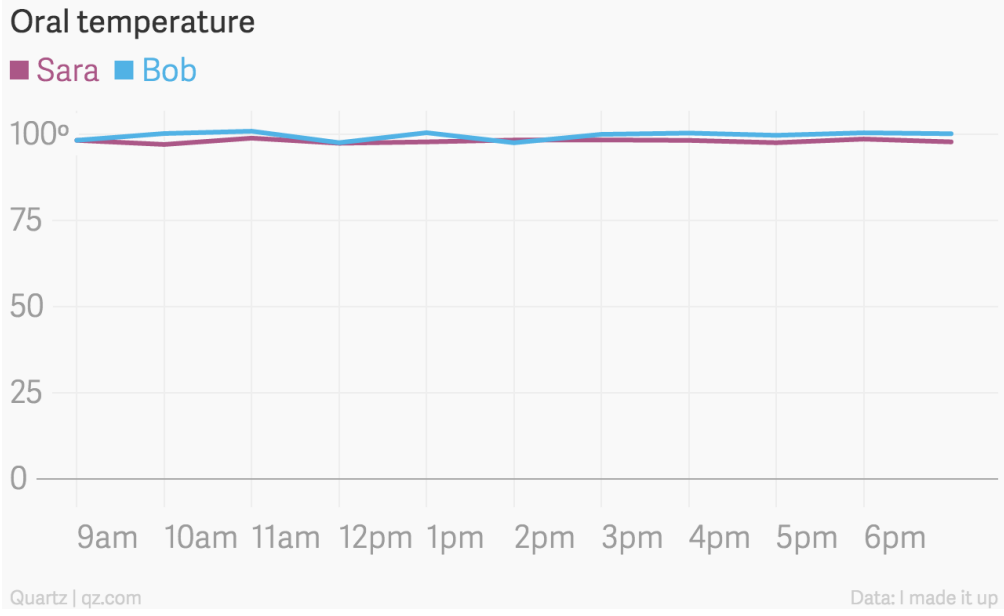
When the scale itself is distorted

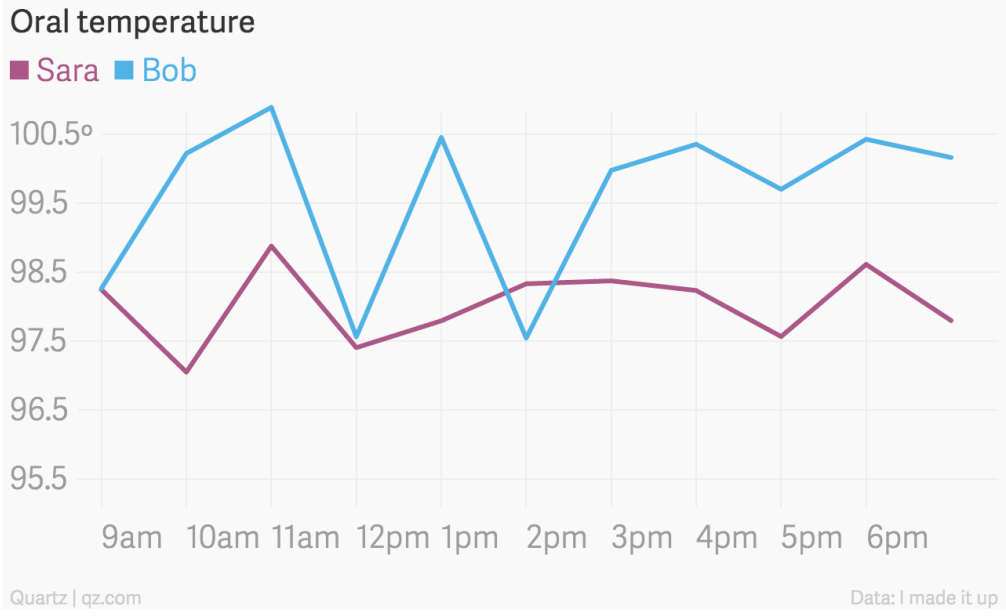




When is it okay to truncate?

When zero values are impossible



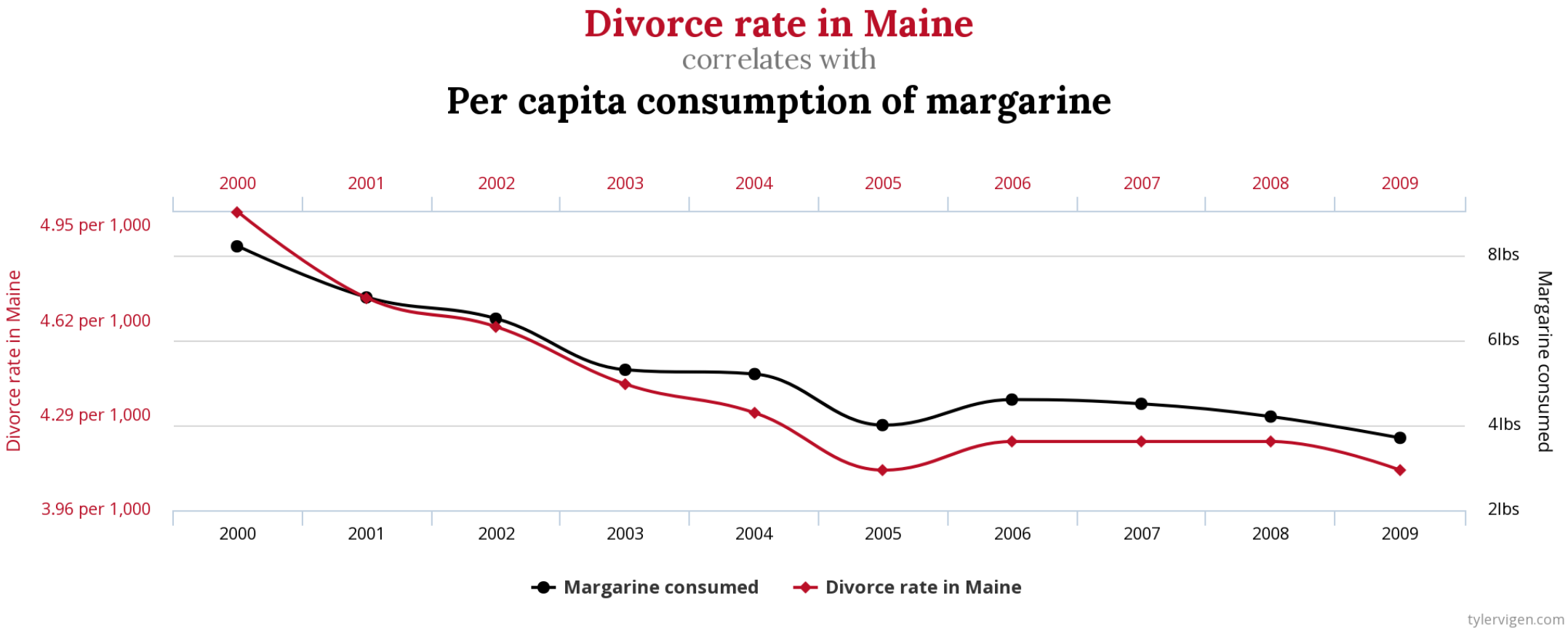


Why not use double y-axes?

You have to choose where the y-axes start and stop, which means...

...you can force the two trends to line up however you want!

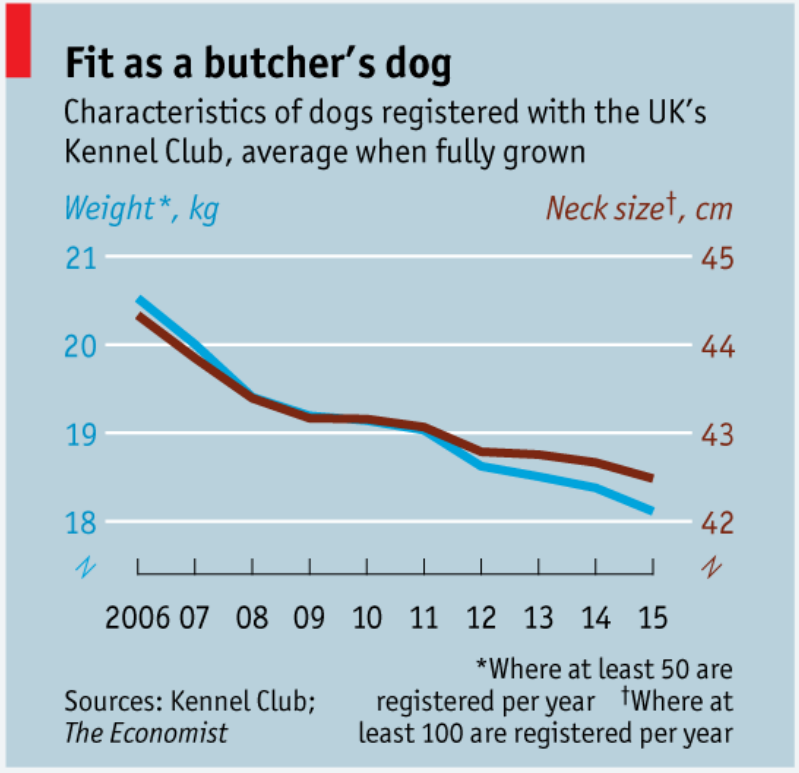
Stop eating margarine!



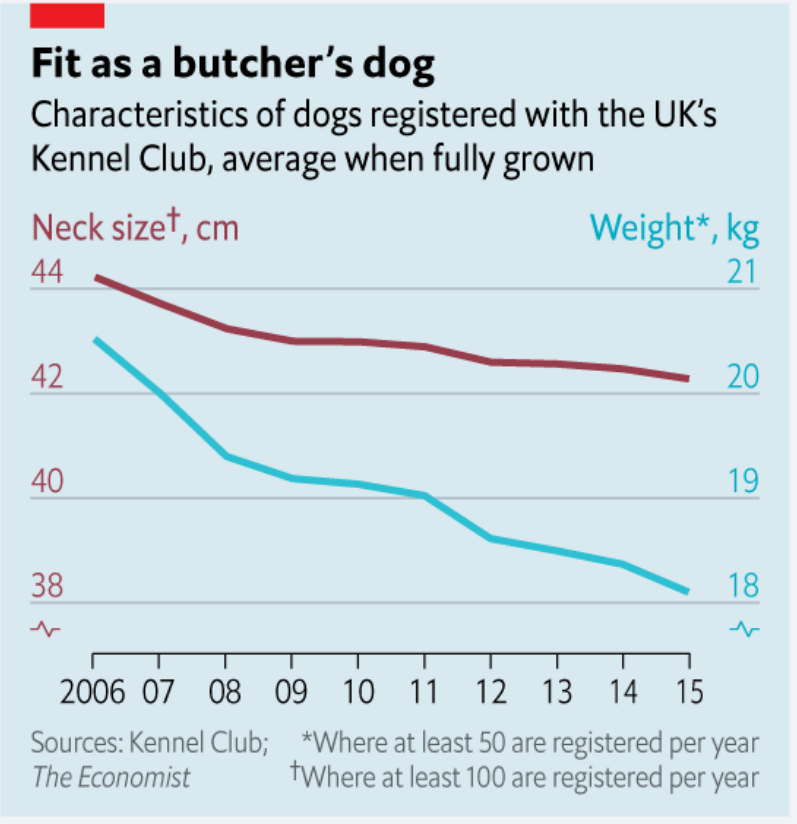
Source: Tyler Vigen's spurious correlations

It even happens in *The Economist!*

Original

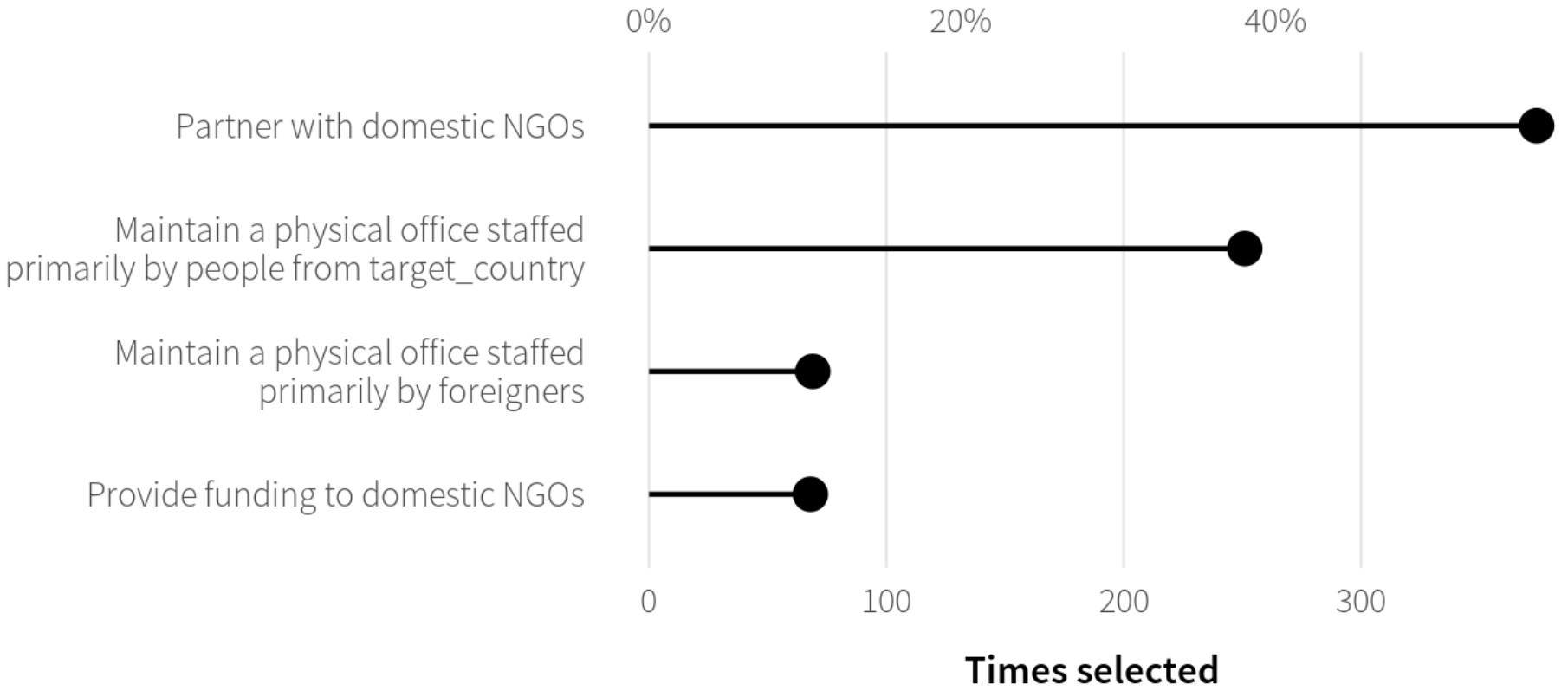


Better

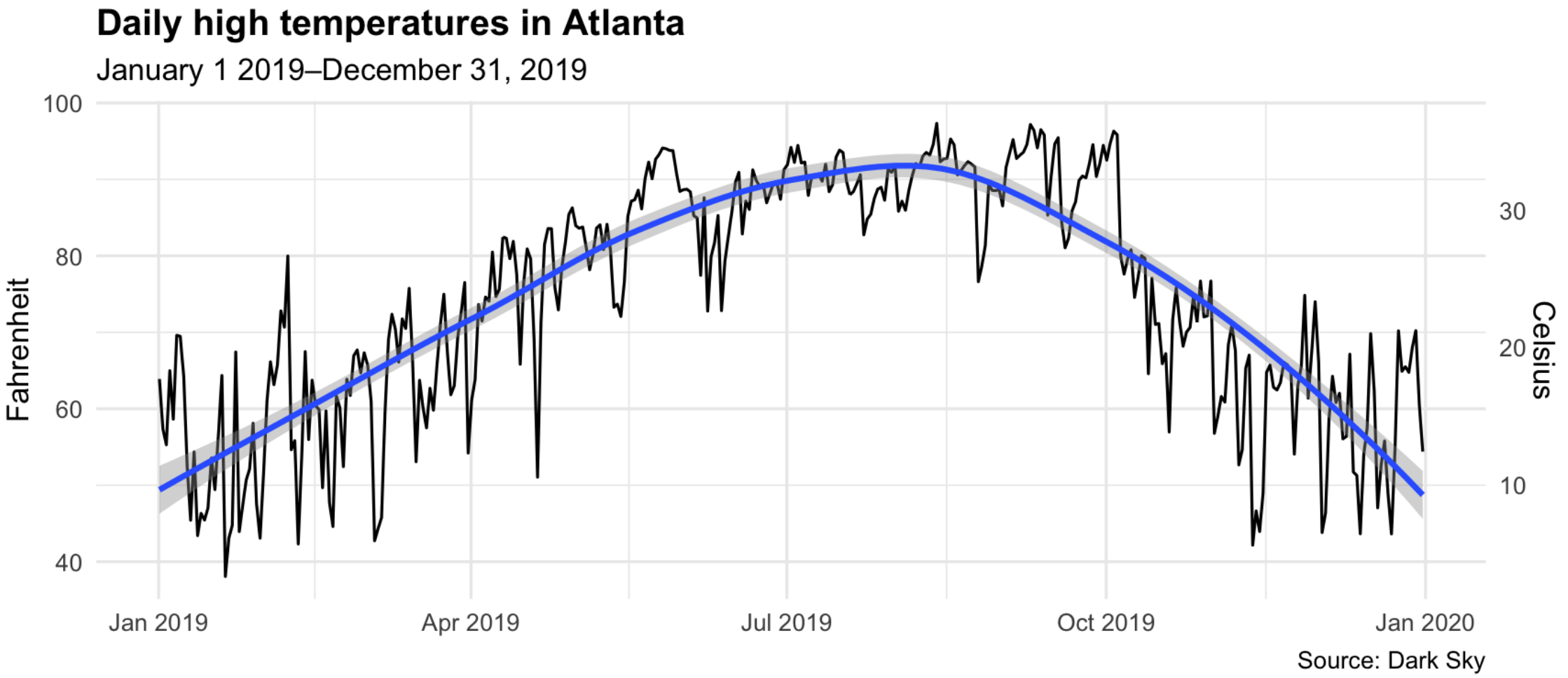


When is it legal?

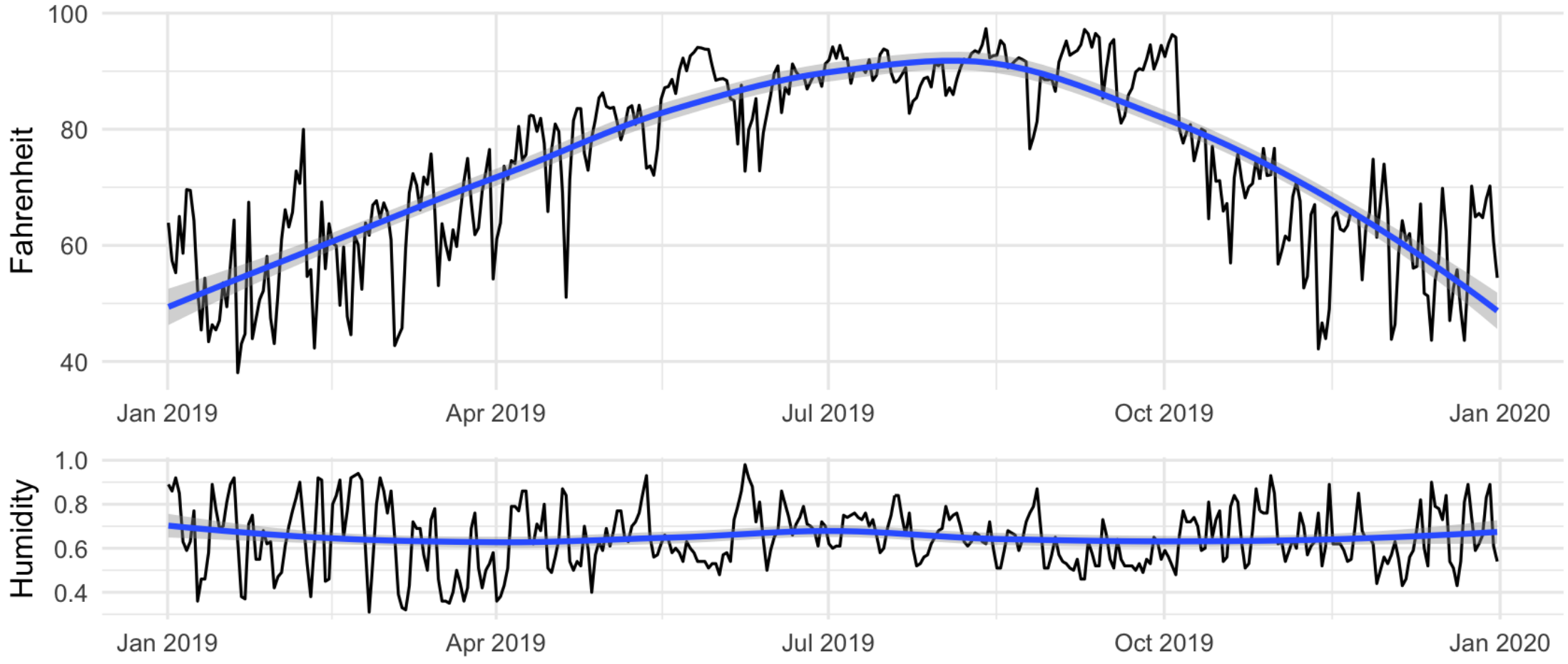
When the two axes measure the same thing



When is it legal?



Alternative: Use multiple plots



Honesty and good judgment

No automatic or easy way to test this

Every visualization tells a story.
Use data that emphasizes that story.

Care about the audience and their needs

What makes a great visualization?

No substantive issues

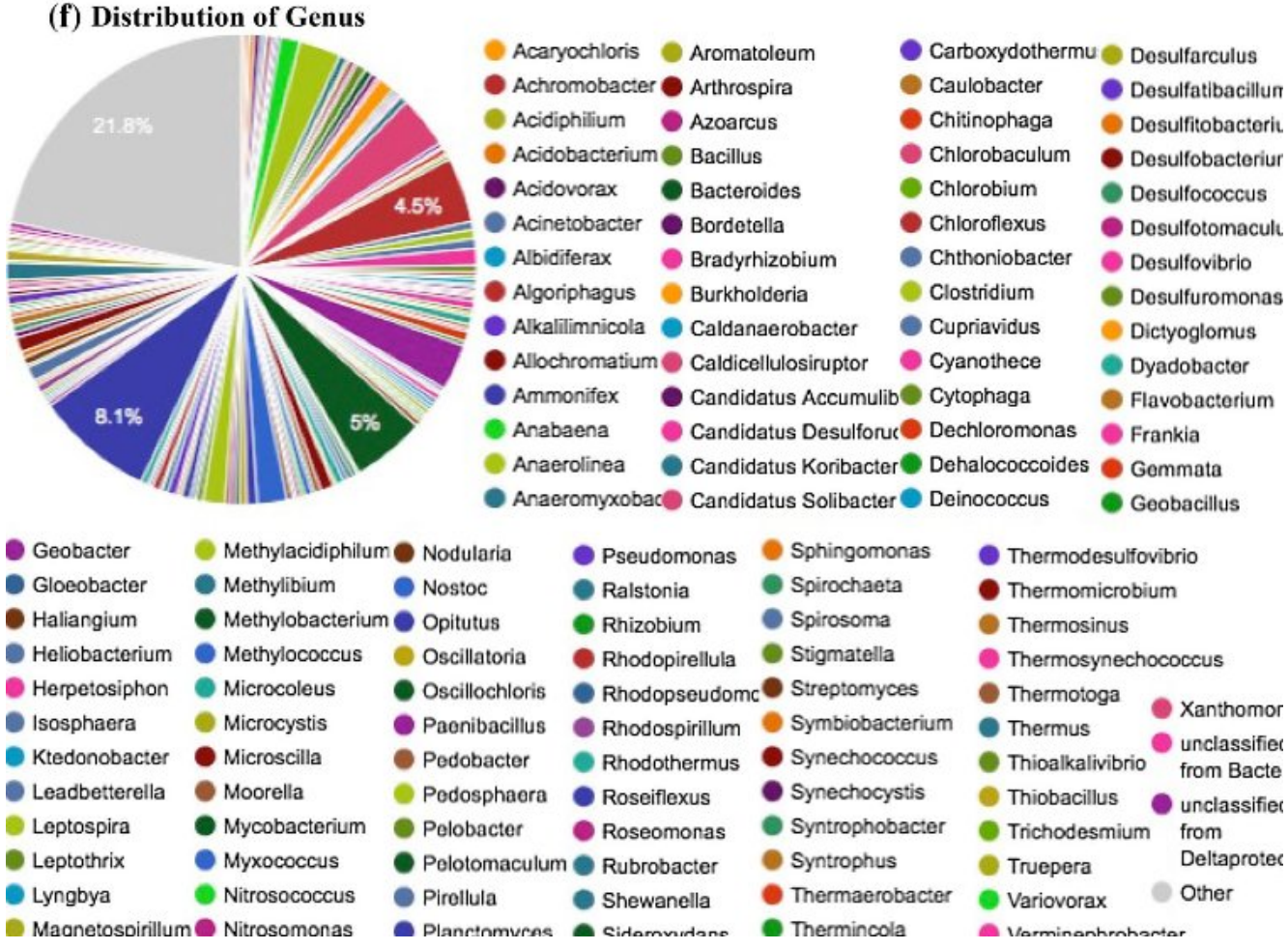
No perceptual issues

Honesty + good judgment

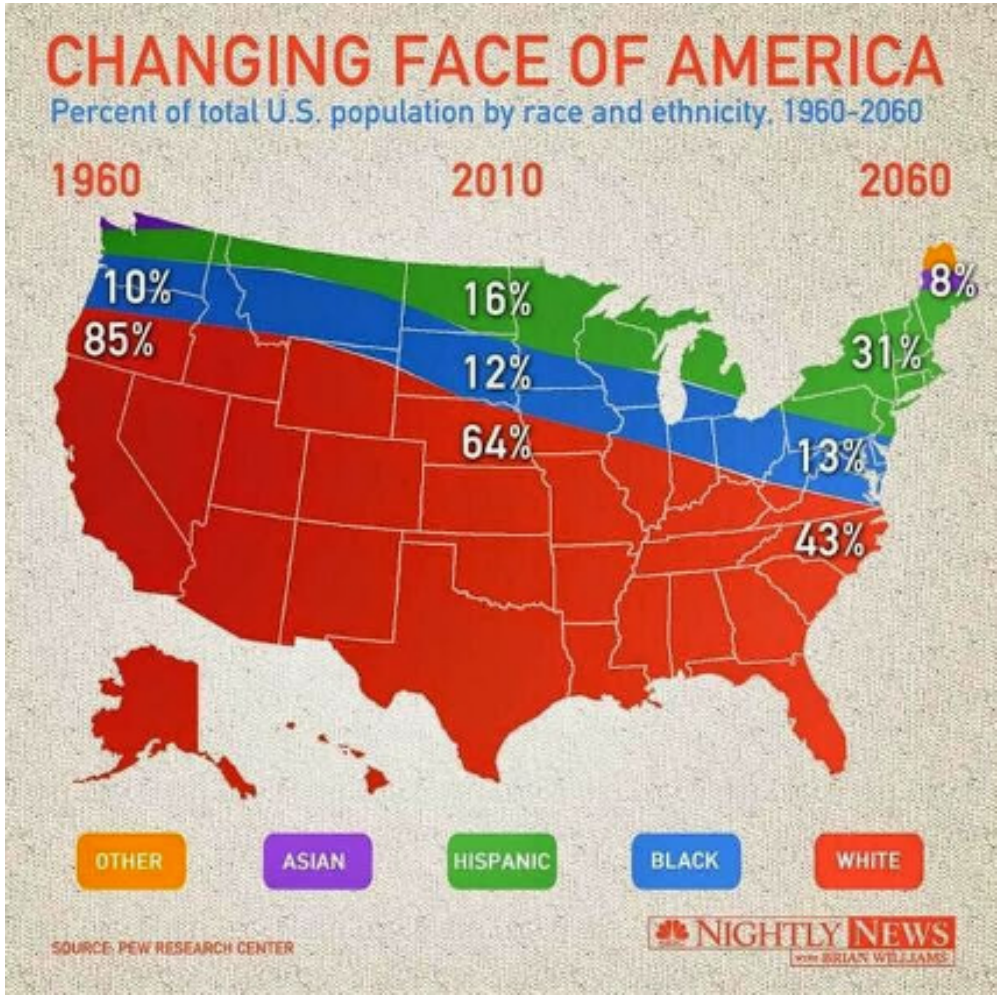
Good aesthetics

Kieran Healy, *Data Visualization: A Practical Introduction*

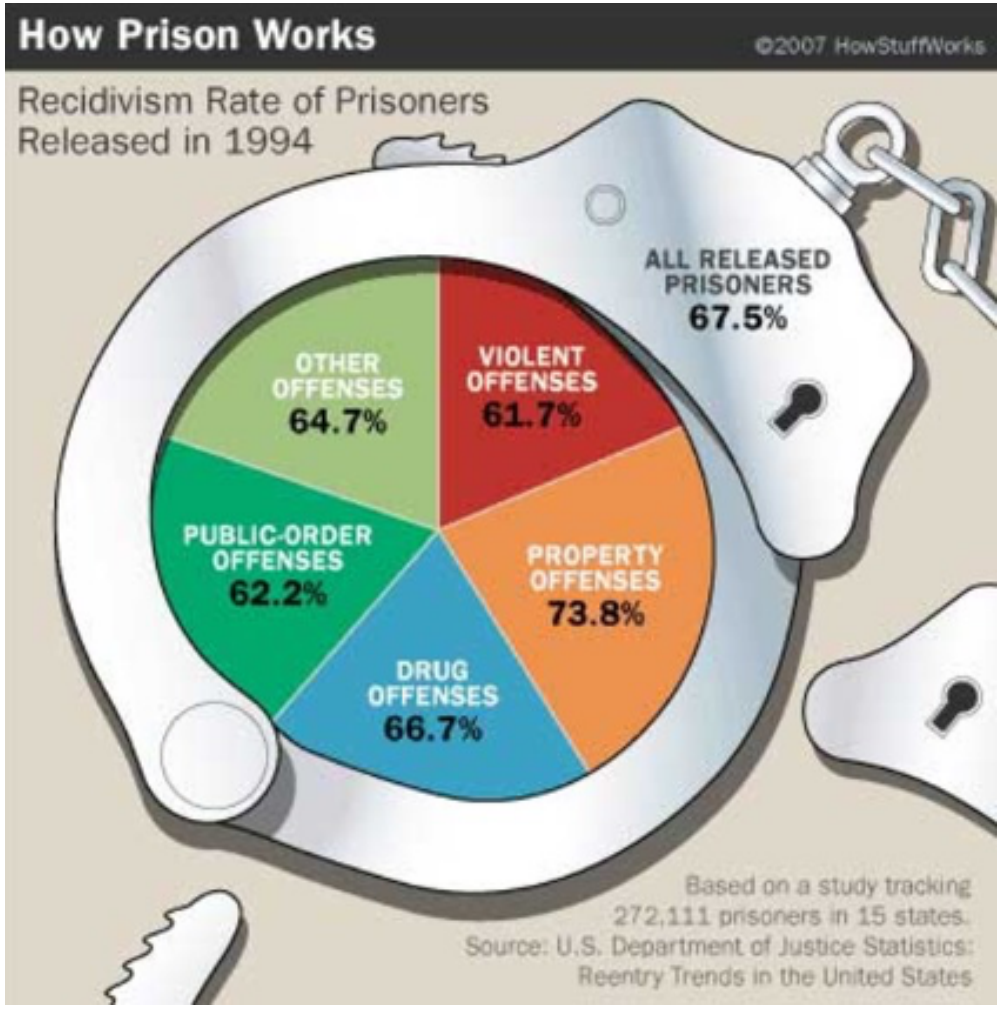
What's wrong?


(f) Distribution of Genus
21.8%
4.5%
8.1%
5%
Acaryochloris
Achromobacter
Acidiphilium
Acidobacterium
Acidovorax
Acinetobacter
Albidiferax
Algoriphagus
Alkalilimnicola
Allochromatium
Ammonifex
Anabaena
Anaerolinea
Anaeromyxobac
Aromatoleum
Arthrospira
Azoarcus
Bacillus
Bacteroides
Bordetella
Bradyrhizobium
Burkholderia
Caldanaerobacter
Caldicellulosiruptor
Candidatus Accumulib
Candidatus Desulforuc
Candidatus Koribacter
Candidatus Solibacter
Carboxydothermu
Caulobacter
Chitinophaga
Chlorobaculum
Chlorobium
Chloroflexus
Chthoniobacter
Clostridium
Cupriavidus
Cyanothece
Cytophaga
Dechloromonas
Dehalococcoides
Deinococcus
Desulfarculus
Desulfatibacillun
Desulfitobacteriu
Desulfobacteriur
Desulfococcus
Desulfotomaculu
Desulfovibrio
Desulfuromonas
Dictyoglomus
Dyadobacter
Flavobacterium
Frankia
Gemmata
Geobacillus
Geobacter
Gloeobacter
Haliangium
Heliobacterium
Herpetosiphon
Isosphaera
Ktedonobacter
Leadbetterella
Leptospira
Leptothrix
Lyngbya
Magnetospirillum
Methylacidiphilum
Methylibium
Methylobacterium
Methylococcus
Microcoleus
Microcystis
Microscilla
Moorella
Mycobacterium
Myxococcus
Nitrosococcus
Nitrosomonas
Nodularia
Nostoc
Opitutus
Oscillatoria
Oscillochloris
Paenibacillus
Pedobacter
Pedosphaera
Pelobacter
Pelotomaculum
Pirellula
Planctomyces
Pseudomonas
Ralstonia
Rhizobium
Rhodopirellula
Rhodopseudomc
Rhodospirillum
Rhodothermus
Roseiflexus
Roseomonas
Rubrobacter
Shewanella
Sideroxydans
Sphingomonas
Spirochaeta
Spirosoma
Stigmatella
Streptomyces
Symbiobacterium
Synechococcus
Synechocystis
Syntrophobacter
Syntrophus
Thermaerobacter
Thermincola
Thermodesulfovibrio
Thermomicrobium
Thermosinus
Thermosynechococcus
Thermotoga
Thermus
Thioalkalivibrio
Thiobacillus
Trichodesmium
Truepera
Variovorax
Verminephrobacter
Xanthomor
unclassifiec
from Bacte
unclassifiec
from
Deltaprotec
Other

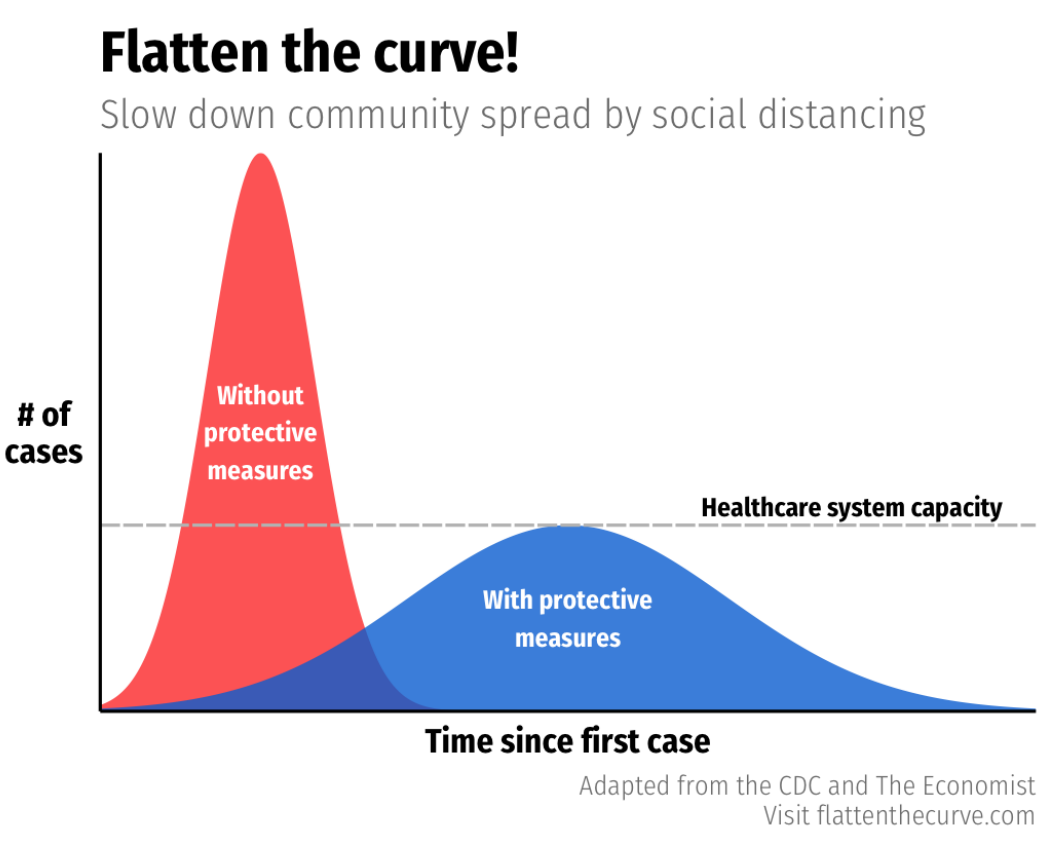
What's wrong?


CHANGING FACE OF AMERICA
Percent of total U.S. population by race and ethnicity, 1960-2060
1960
2010
2060
10%
85%
16%
12%
64%
8%
31%
13%
43%
OTHER
ASIAN
HISPANIC
BLACK
WHITE
SOURCE: PEW RESEARCH CENTER
NIGHTLY NEWS
with BRIAN WILLIAMS

What's wrong?


How Prison Works
©2007 HowStuffWorks
Recidivism Rate of Prisoners Released in 1994
ALL RELEASED PRISONERS 67.5%
OTHER OFFENSES 64.7%
VIOLENT OFFENSES 61.7%
PUBLIC-ORDER OFFENSES 62.2%
PROPERTY OFFENSES 73.8%
DRUG OFFENSES 66.7%
Based on a study tracking 272,111 prisoners in 15 states.
Source: U.S. Department of Justice Statistics: Reentry Trends in the United States

What's right?



Thread by Carl T. Bergstrom