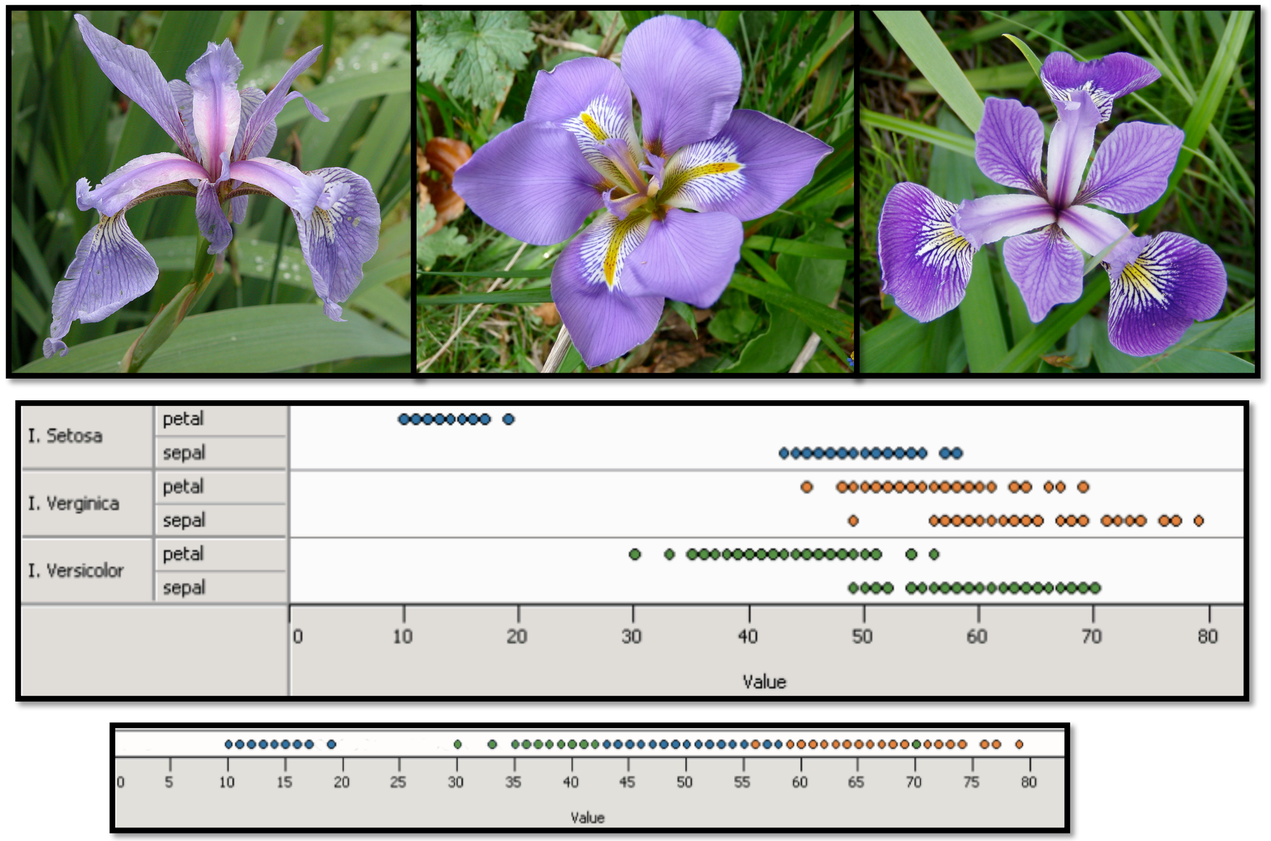
Design principles

Portions of this slide deck adapted from Jordan Crouser of Smith College, who in turn adapted from the "Visualization Principles" Tutorial by J. Kennedy, C. Nielson, & M. Krzywinski VIZBI 2012

Principle 1: expressiveness

Encode all the facts
Encode only the facts

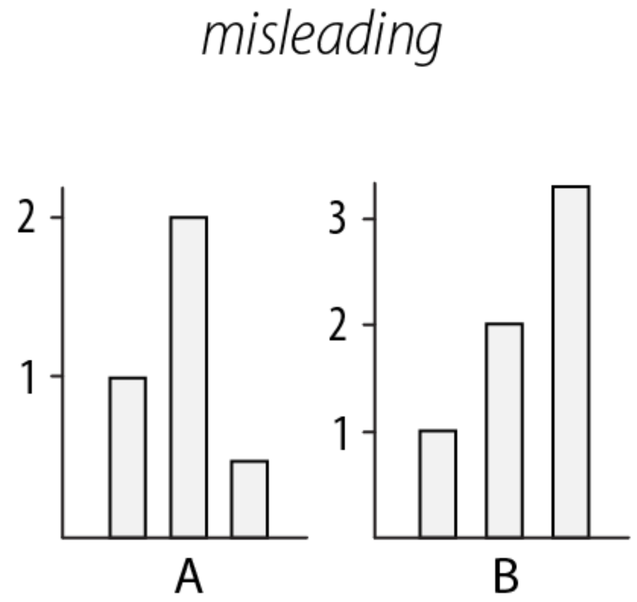


via Jordan Crouser

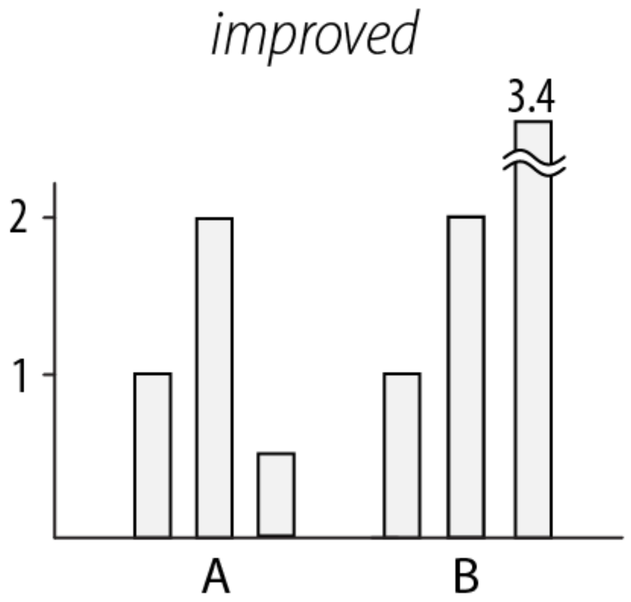
Fig. Courtesy of M Krzywinski

Principle 2: consistency

Use consistent axes when comparing charts



Raina SZ, et al. (2005) Evolution of base-substitution gradients in primate mitochondrial genomes. Genome Res 15: 665-673.

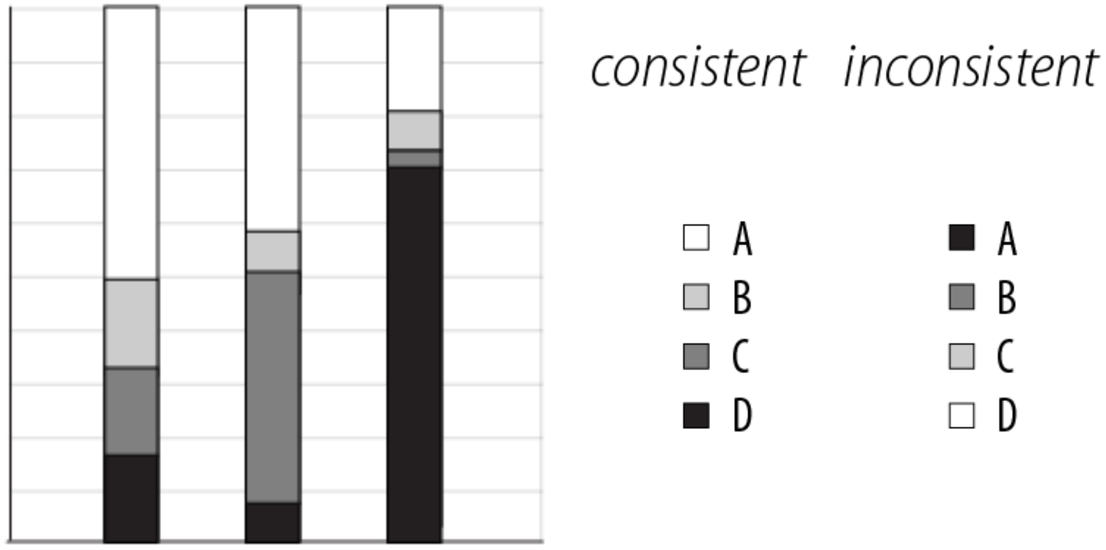


M. Krzwinski, behind every great visualization is a design principle, 2012

via Jordan Crouser

Principle 2: consistency

A note on legends: order items according to appearance

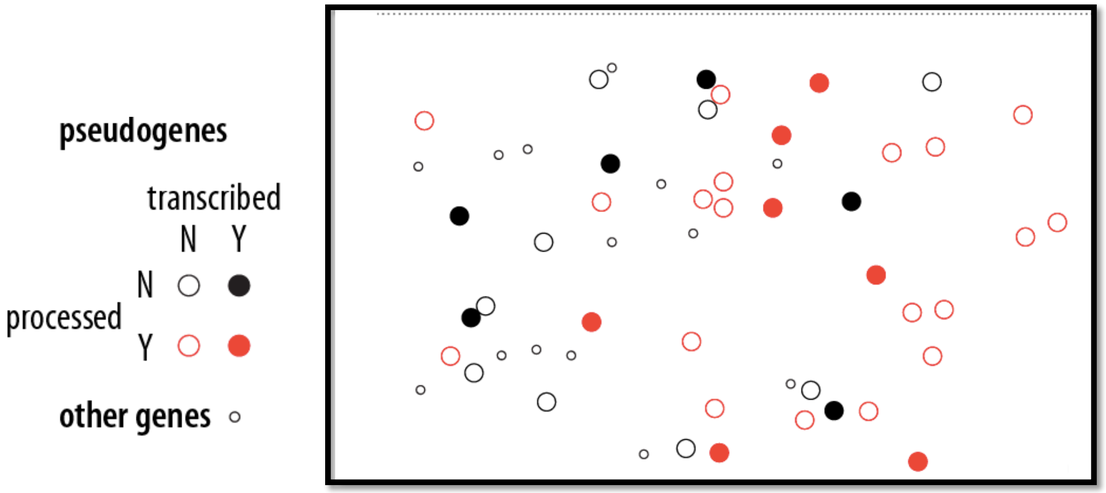


M. Krzwinski, behind every great visualization is a design principle, 2012

via Jordan Crouser

Principle 2: consistency

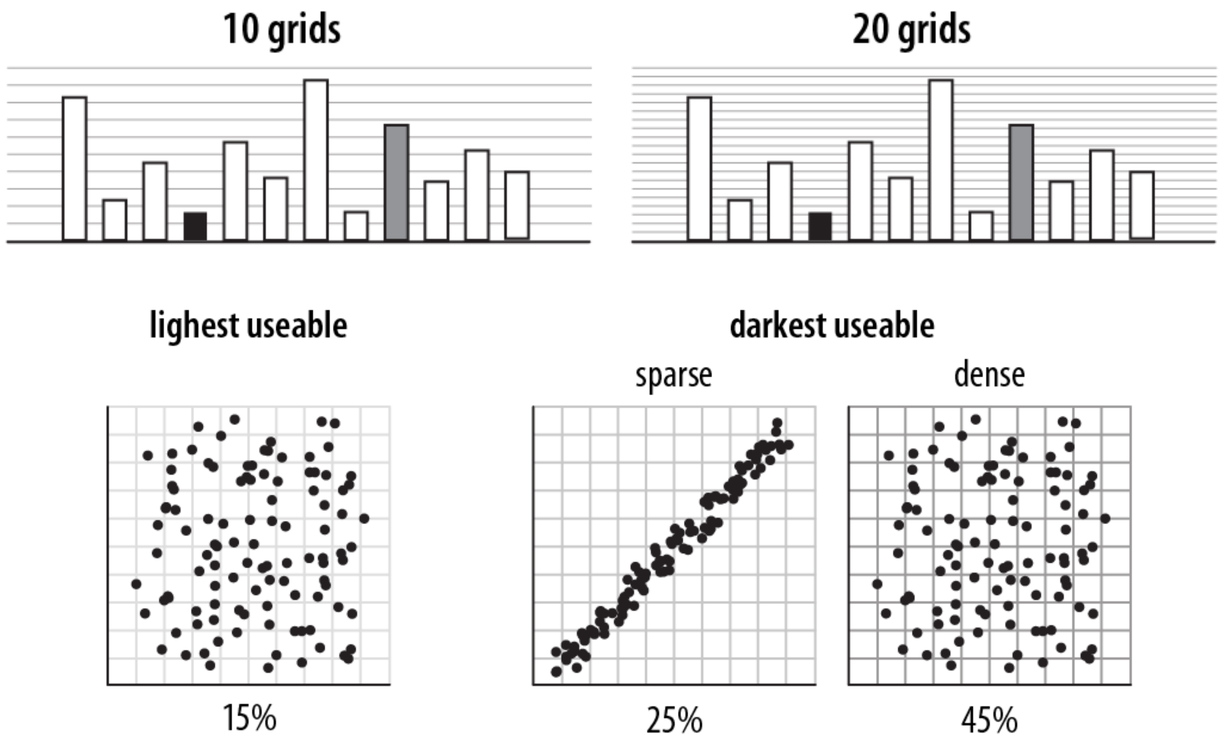
Visual variation should reflect and enhance the underlying variation in the data
Avoid visually similar encodings for independent variables



via Jordan Crouser

Principle 3: importance ordering

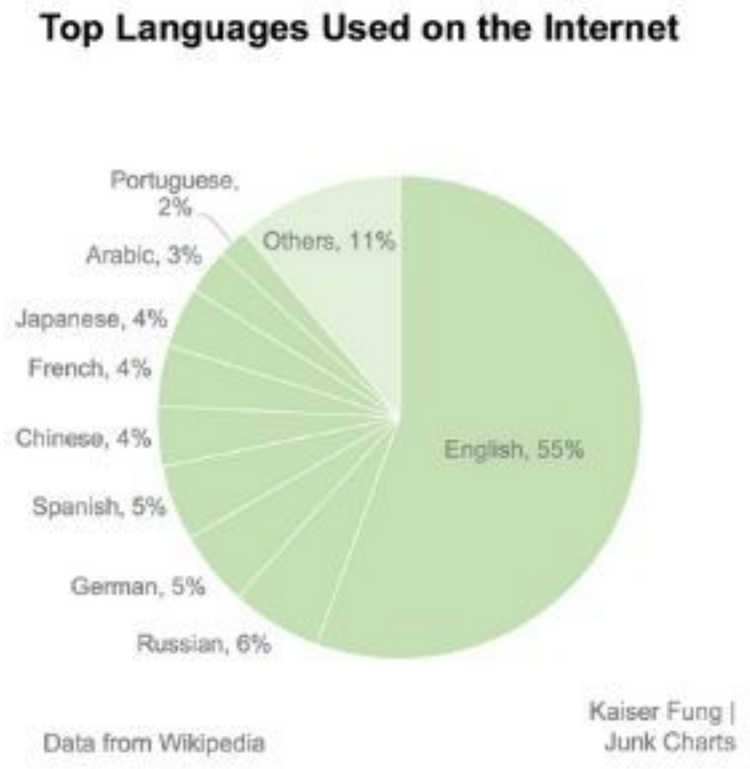
Avoid unnecessary containment and repetition
Navigational aids shouldn't compete with data
Avoid: heavy axes, error bars

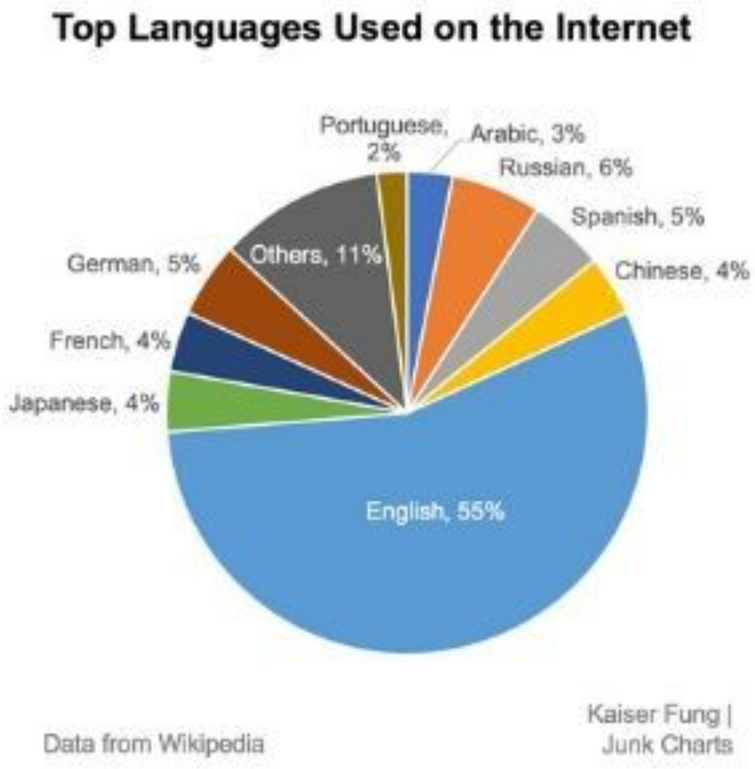


Heer J, Bostock M (2010) Crowdsourcing graphical perception: using mechanical turk to assess visualization design. Proceedings of the 28th international conference on Human factors in computing systems.

Principle 3: importance ordering

- use a reasonable number of slices, aggregating minor categories if necessary
- order the slices by size from the largest to the smallest
- place the 'Other' slice at the end of the sequence, regardless of the order scheme
- position the first and largest slice against the upper vertical radius, and arrange the other slices in a clockwise fashion
- vary colours only if the colours are encoding data.

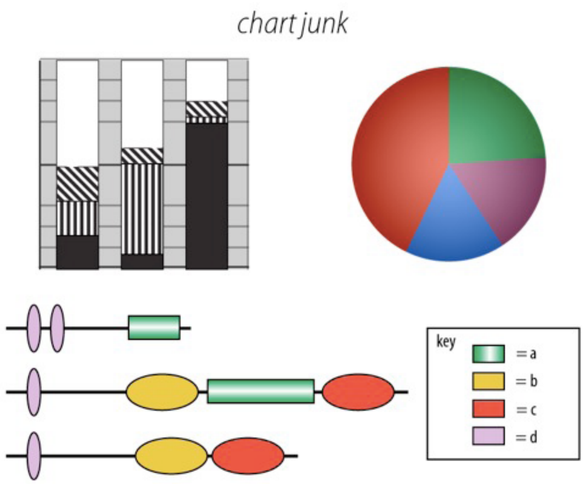




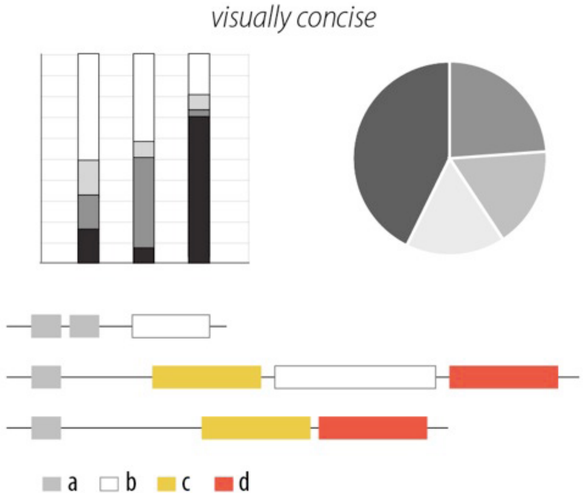
https://datajournalism.com/read/longreads/the-unspoken-rules-of-visualisation-and-when-to-break-them

Principle 3: importance ordering

Simplify, simplify, simplify



Sharov AA, et al (2006) Genome Res 16: 505-509.
Peterson J, et al. (2009) Genome Res 19: 2317-2323.
Thomson NR, et al. (2005) Genome Res 15: 629-640.
DB, Ko MS (2005) Genome Res 15: 748-754.



M. Krzwinski, behind every great visualization is a design principle, 2012

via Jordan Crouser

Tufte and the data-ink ratio

data-ink ratio = data ink / total ink used to print the graphic

= proportion of a graphic's ink devoted to the non-redundant display of data-information

= 1 - proportion of a graphic that can be erased

via Jordan Crouser

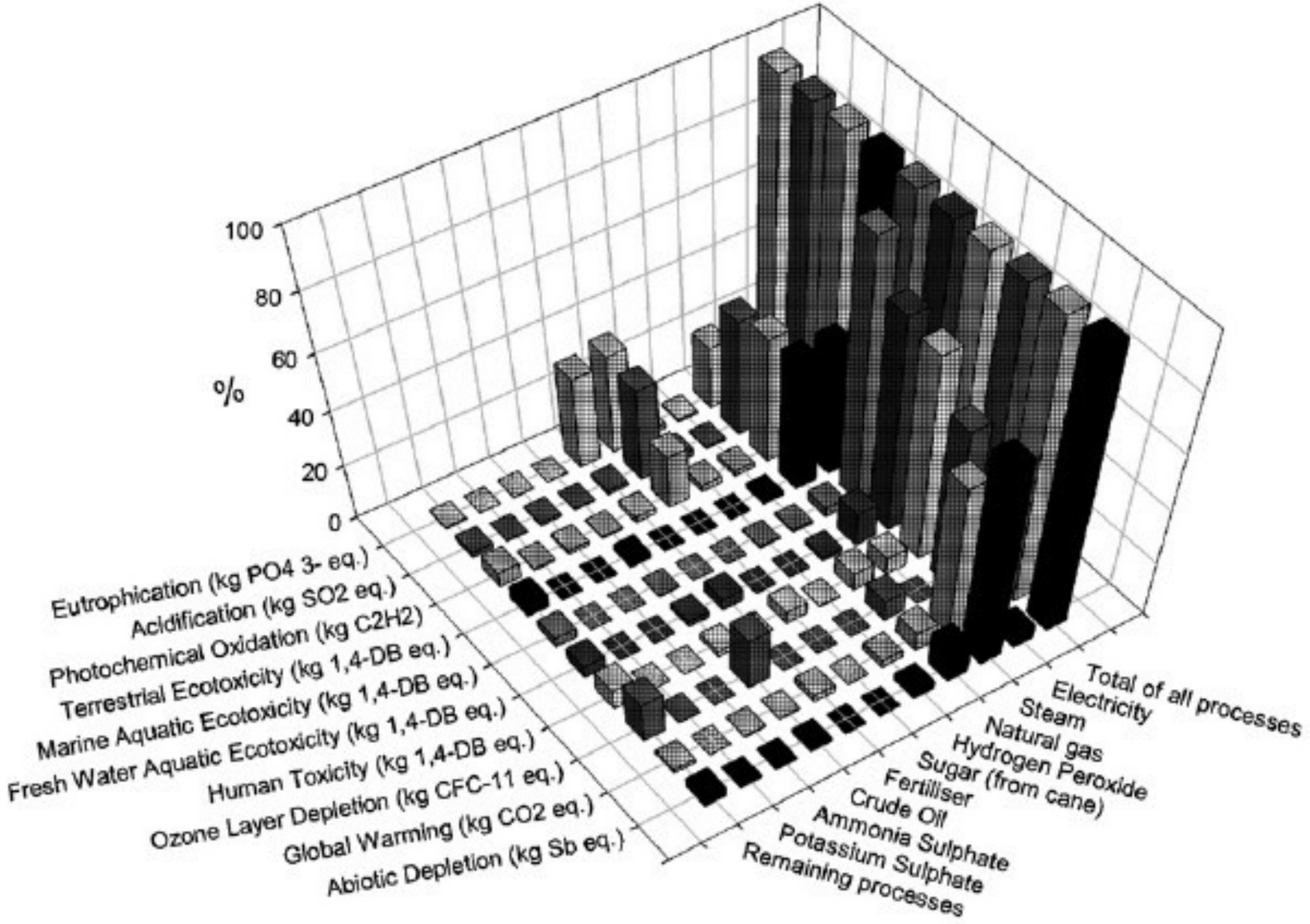
https://www.darkhorseanalytics.com/blog/data-looks-better-naked/

What’s wrong with this picture?

Let’s critique some visualizations using these principles

Try to think about the following questions:

- What is the first thing you notice about the visualization?
- What is the point the visualization is trying to make?
- Who is the intended audience?
- What is the visualization doing well?
- What problems do you see with the visualization design?
- Why do you think the designer made those choices?

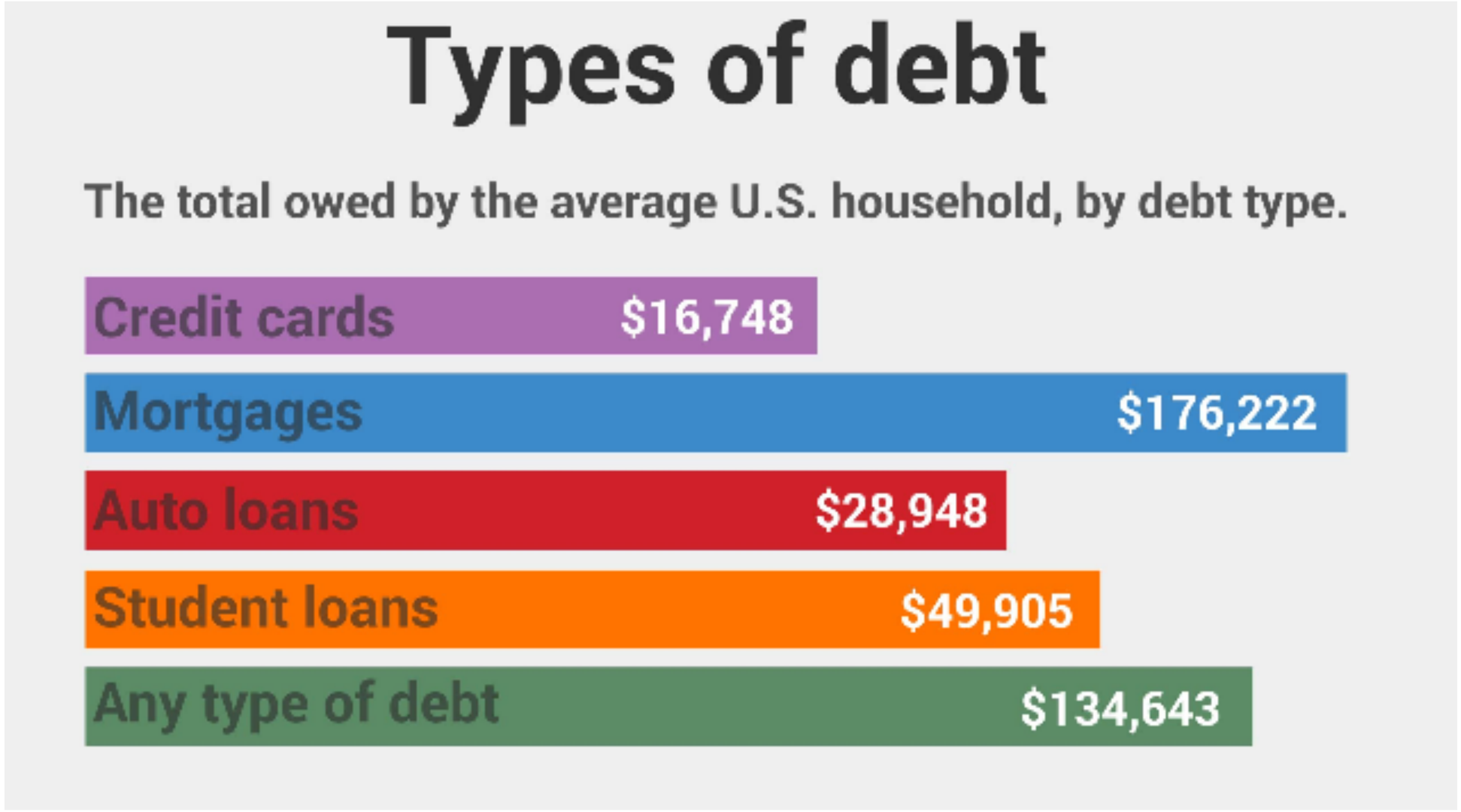


http://viz.wtf/post/1642602615l6/impact-categories-easy-presented

7. Salaries

Salaries are also diverse.

http://viz.wtf/post/163991311758/payscales#notes

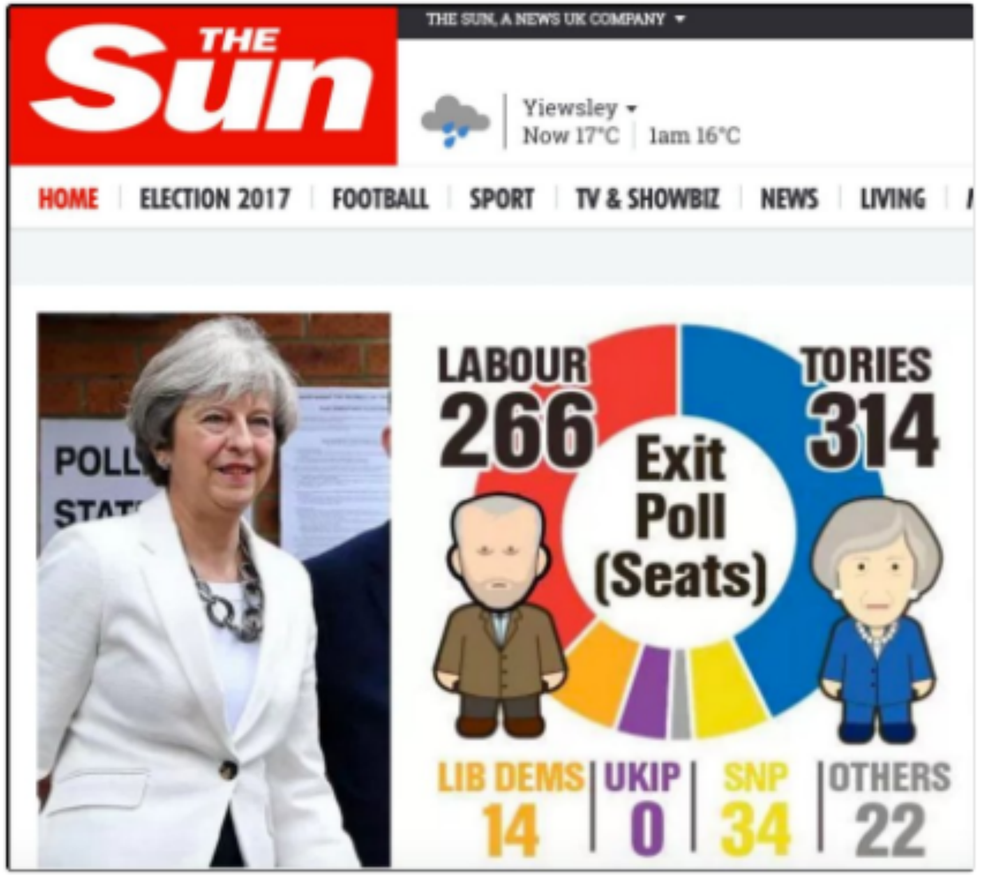


http://viz.wtf/post/163295399667/how-not-to-do-a-bar-chart-lengths-are-not

Arieh Kovler
@ariehkovler

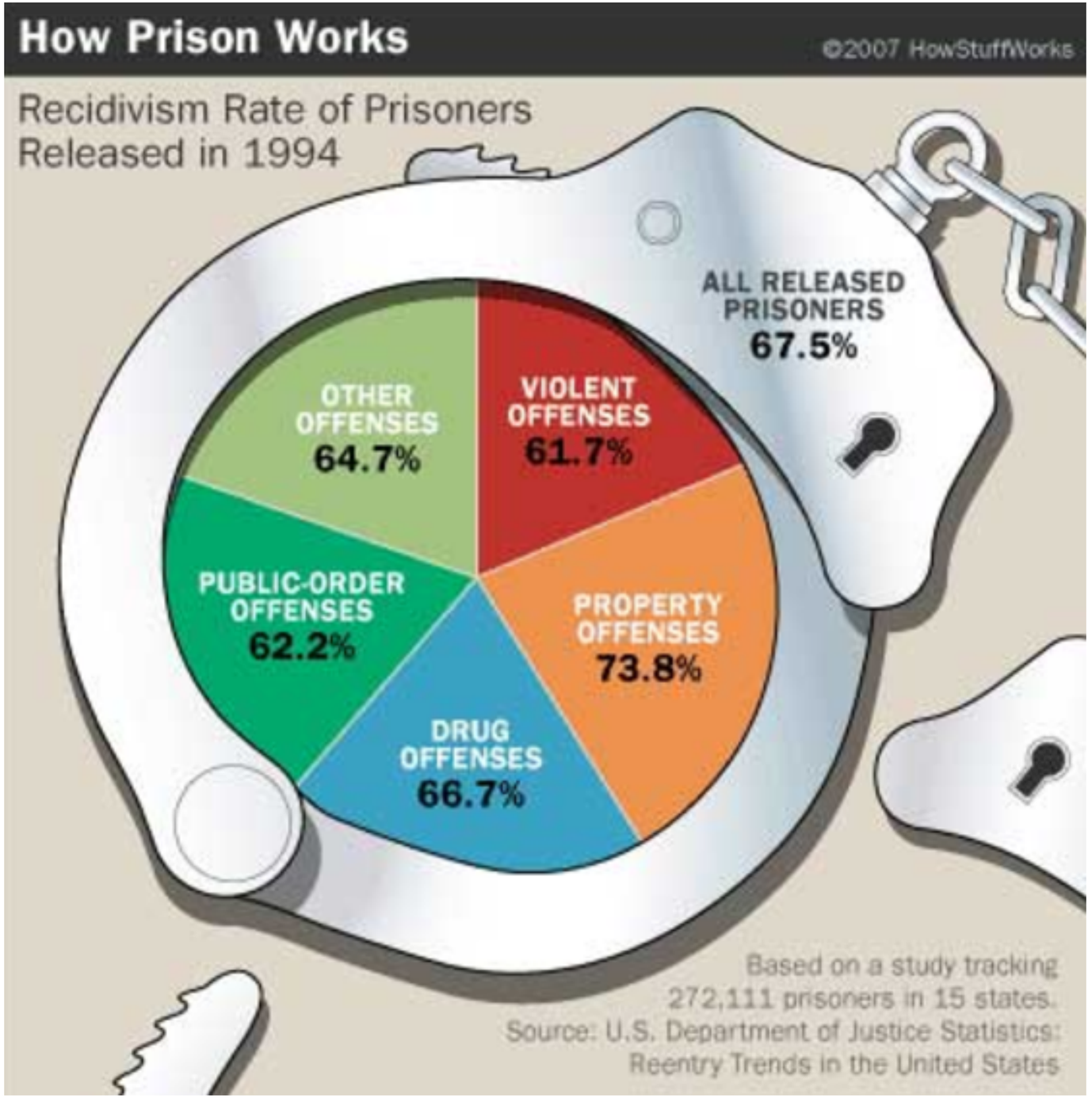
Follow

"Is 34 bigger or smaller than 14?"
"Smaller. Definitely smaller"
"What about zero?"
"Zero's a bit less than 34 but it's much more than 22"

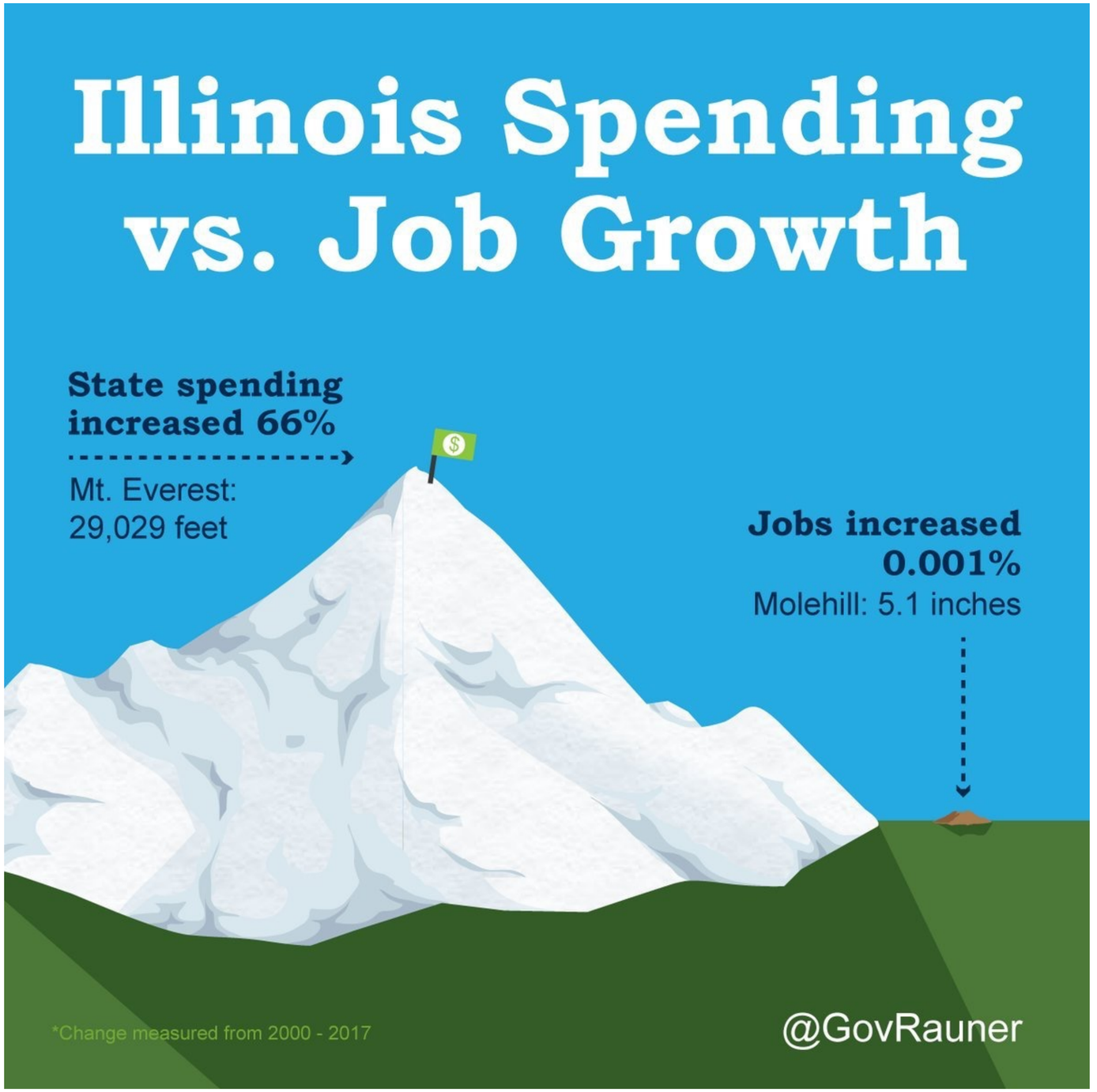


RETWEETS 53 LIKES 77

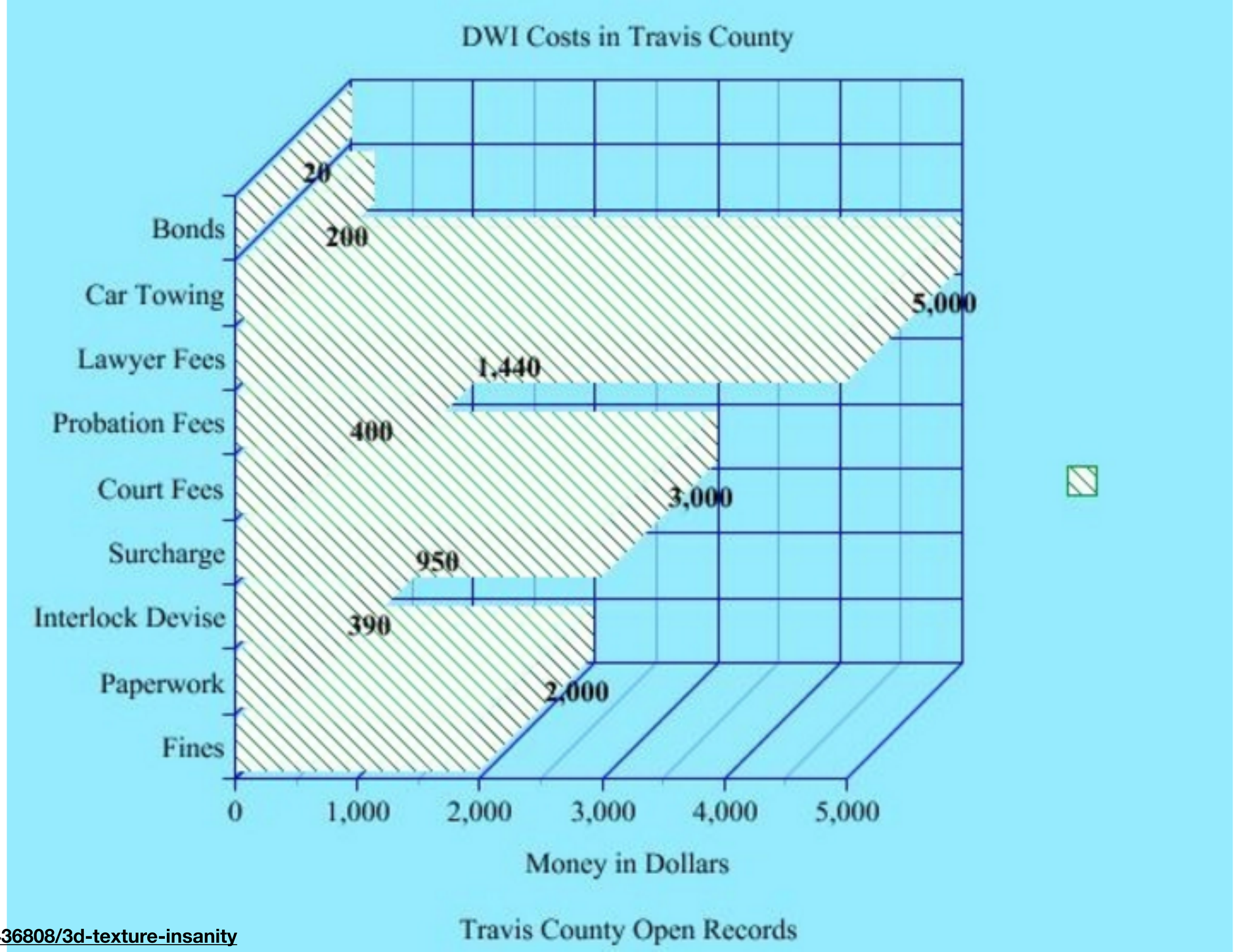
http://viz.wtf/post/162244611331/its-all-relative



http://viz.wtf/post/162169270900/what-is-the-recidivism-rate-for-pie-chart

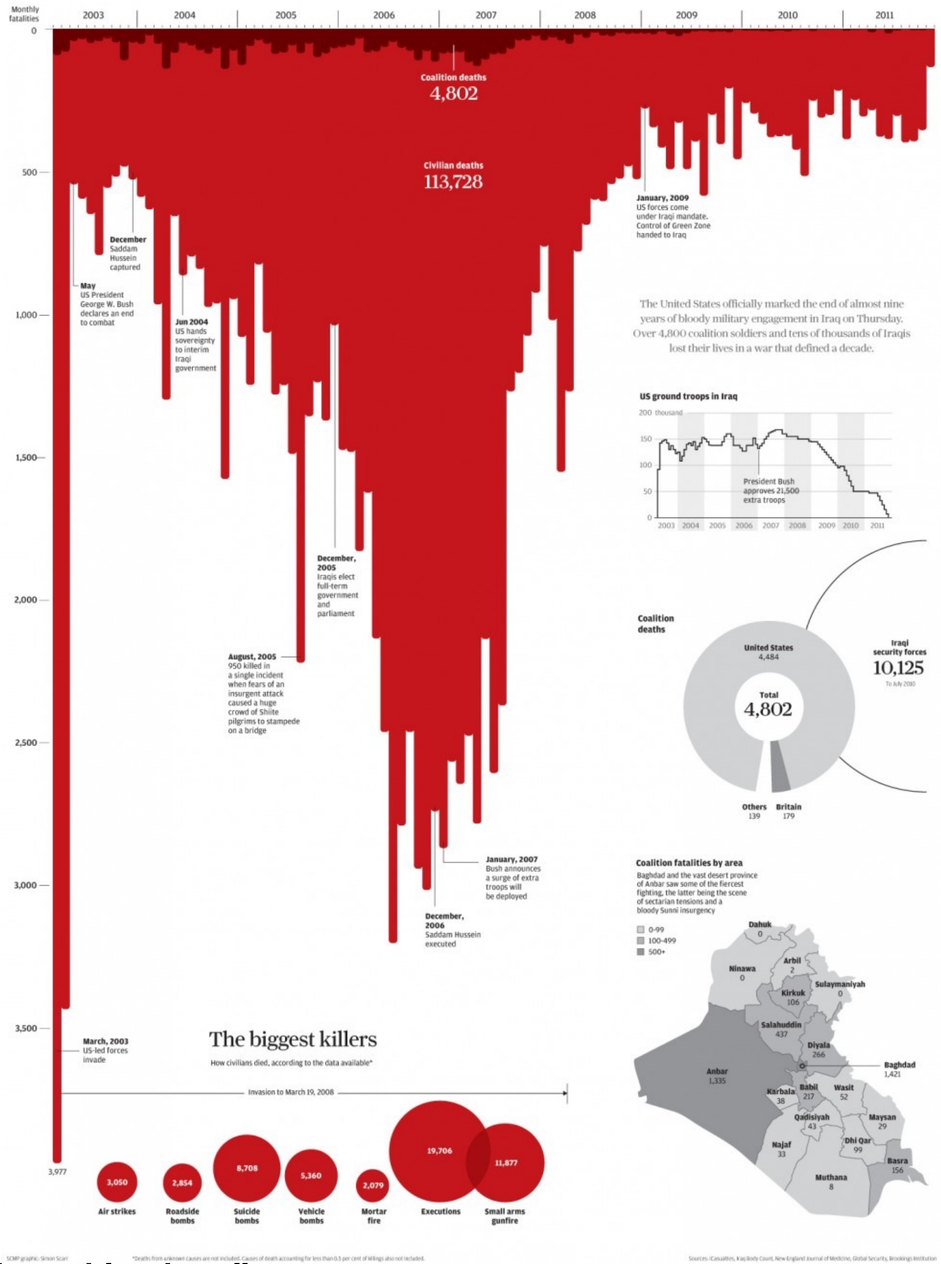


http://viz.wtf/post/159307760031/illinois-gov-bruce-rauners-analogy-of-mt



http://viz.wtf/post/158934436808/3d-texture-insanity

Iraq's bloody toll

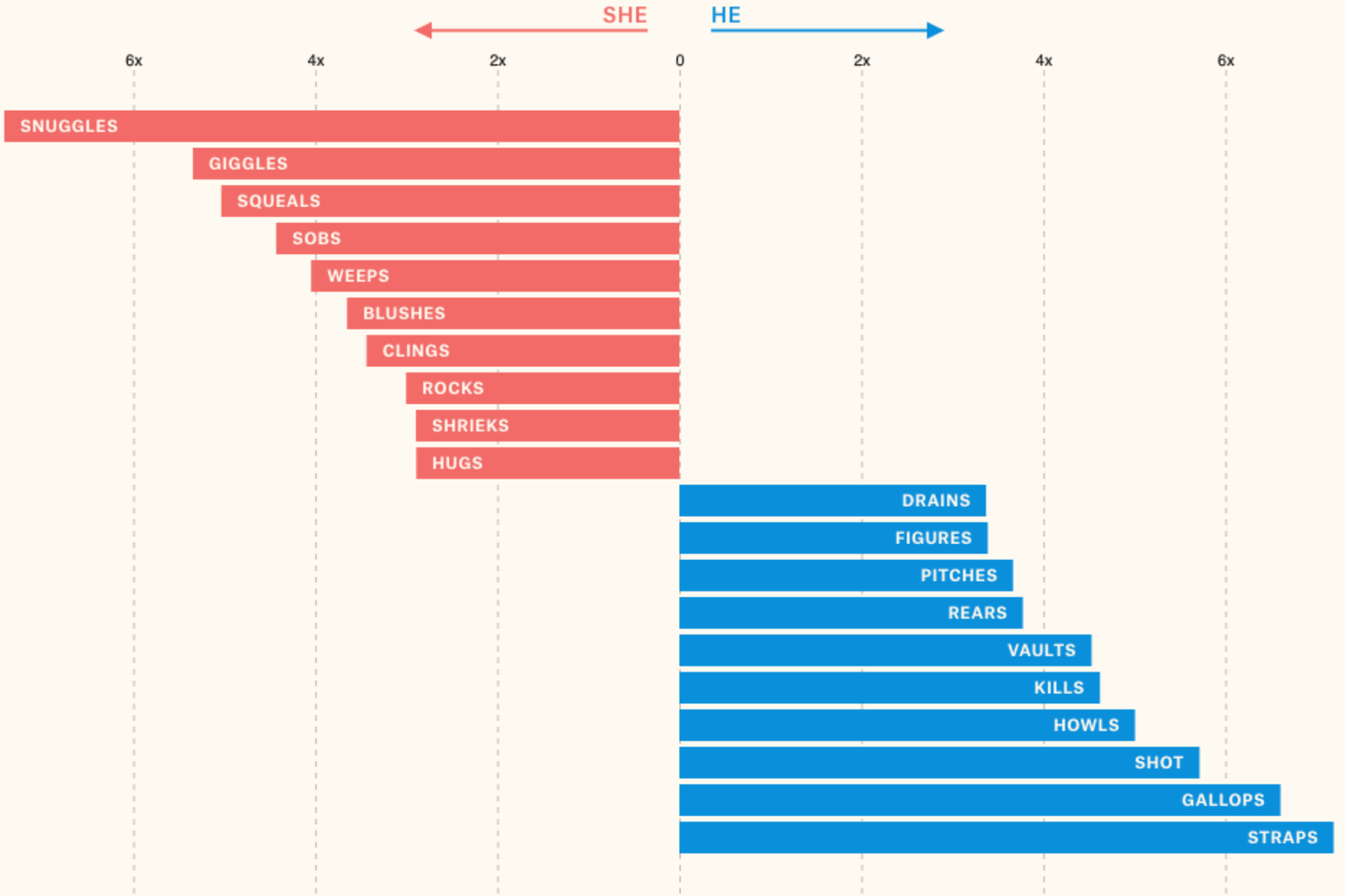


http://www.scmp.com/infographics/article/1284683/iraqs-bloody-toll

http://www.visualisingdata.com/2014/04/the-fine-line-between-confusion-and-deception/

The most used words for women vs. men

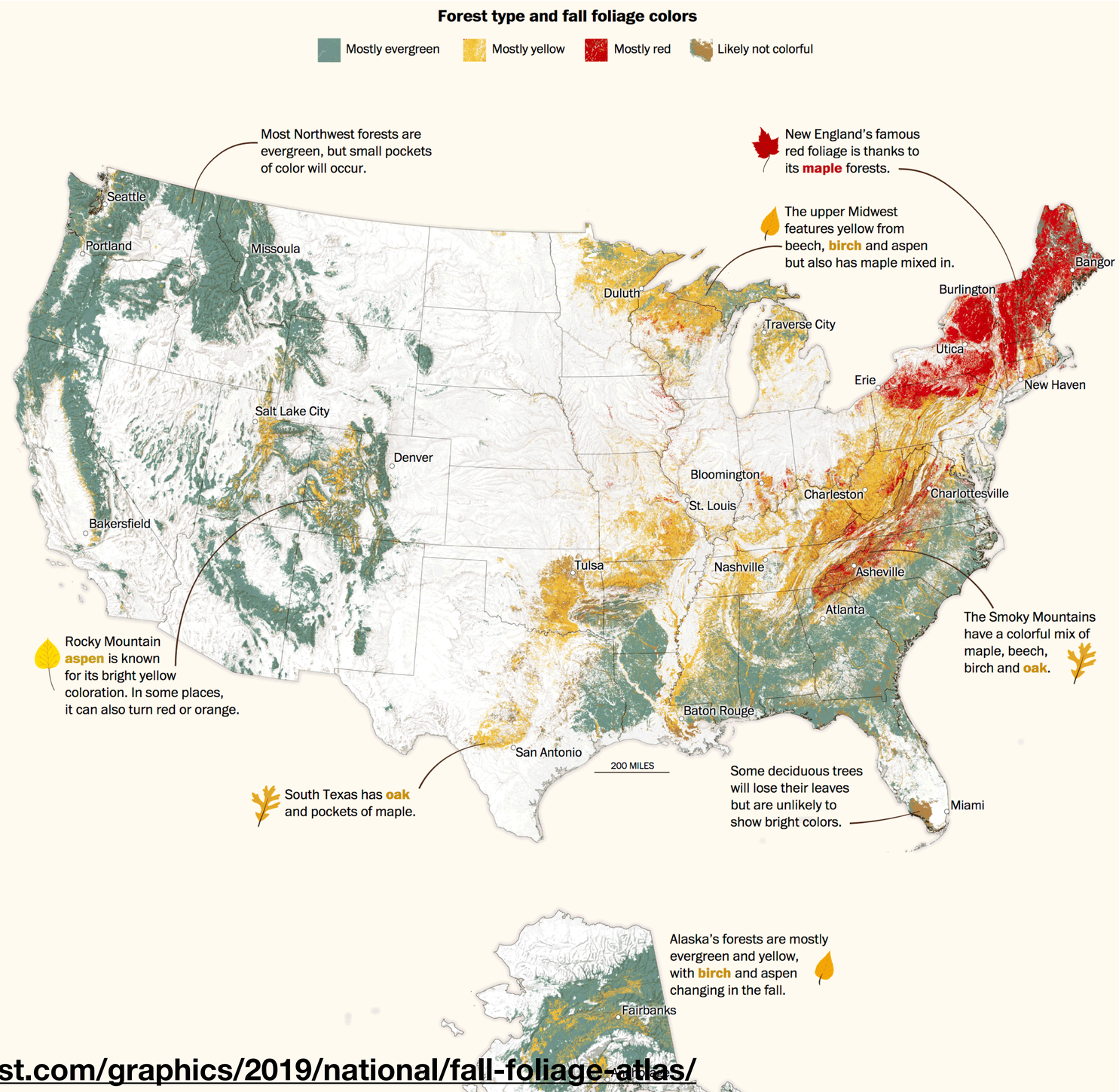
Likelihood that certain words appear after “she” vs. “he” in screen direction.



These are the most extreme examples. There is a high likelihood that women will snuggle, giggle, squeal, and sob, relative to men. Conversely, men are more likely to strap, gallop, shoot, howl, and kill.

Let’s now examine the 800 most commonly used pronoun pairs in screen direction.

https://pudding.cool/2017/08/screen-direction/



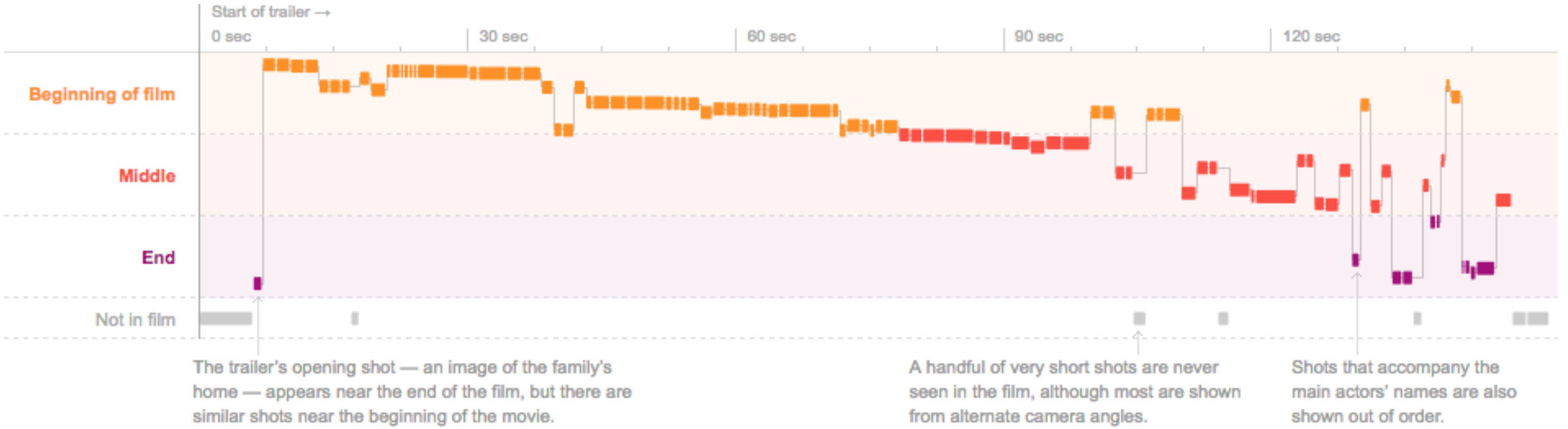
https://www.washingtonpost.com/graphics/2019/national/fall-foliage-atlas/

Dissecting a Trailer: The Parts of the Film That Make the Cut

How scenes from five of the nine best picture nominees were reassembled to promote the films.

Silver Linings Playbook

"Silver Linings Playbook" follows the standard model for trailers, according to Bill Woolery, a trailer specialist in Los Angeles who once worked on trailers for movies like "The Usual Suspects" and "E.T. the Extra-Terrestrial." While introducing the movie's story and its characters, the trailer largely follows the order of the film itself.



http://www.nytimes.com/interactive/2013/02/19/movies/awardsseason/oscar-trailers.html

Question to ponder: should visualizations be immediately readable, or should you need to study them?