

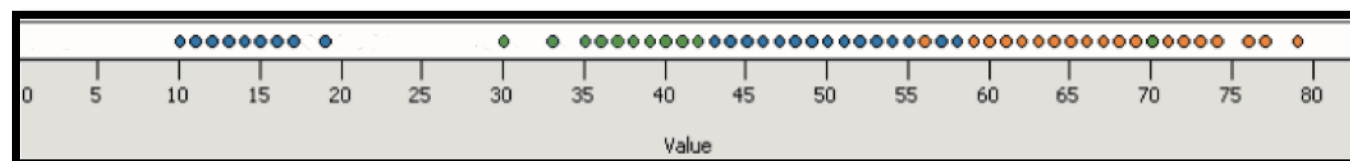
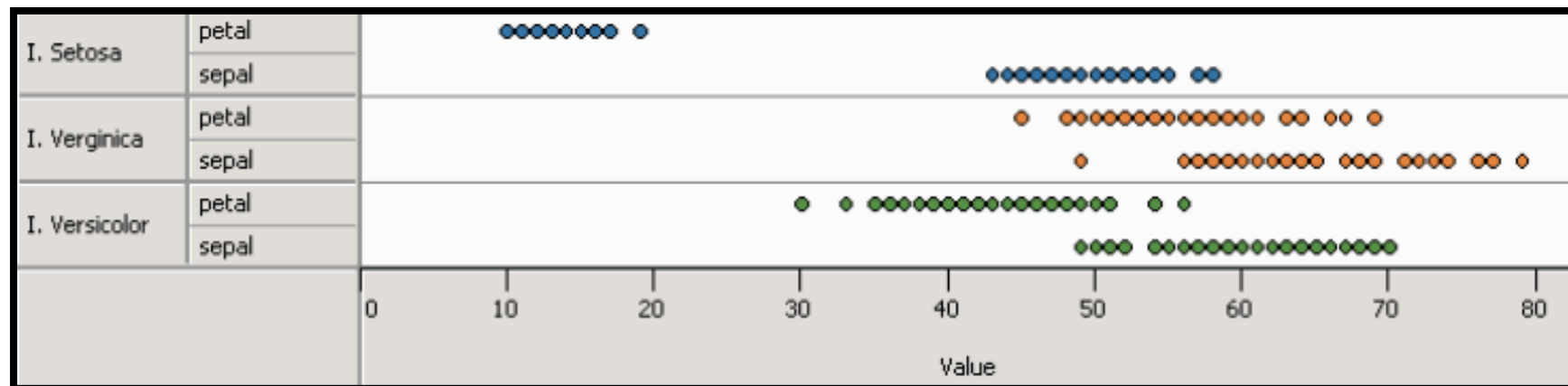
# lecture 09: design principles

October 16, 2017

# Principle 1: expressiveness

Encode all the facts

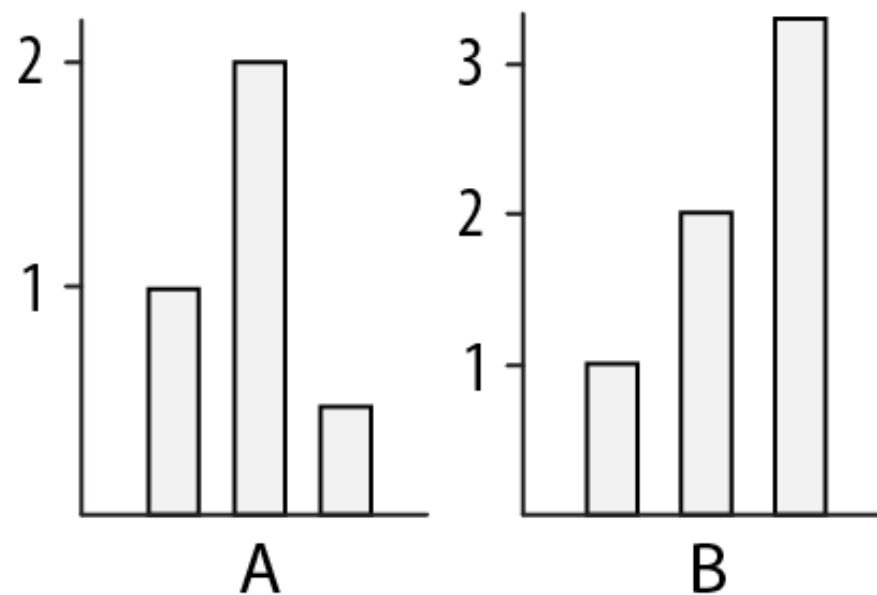
Encode only the facts



# Principle 2: consistency

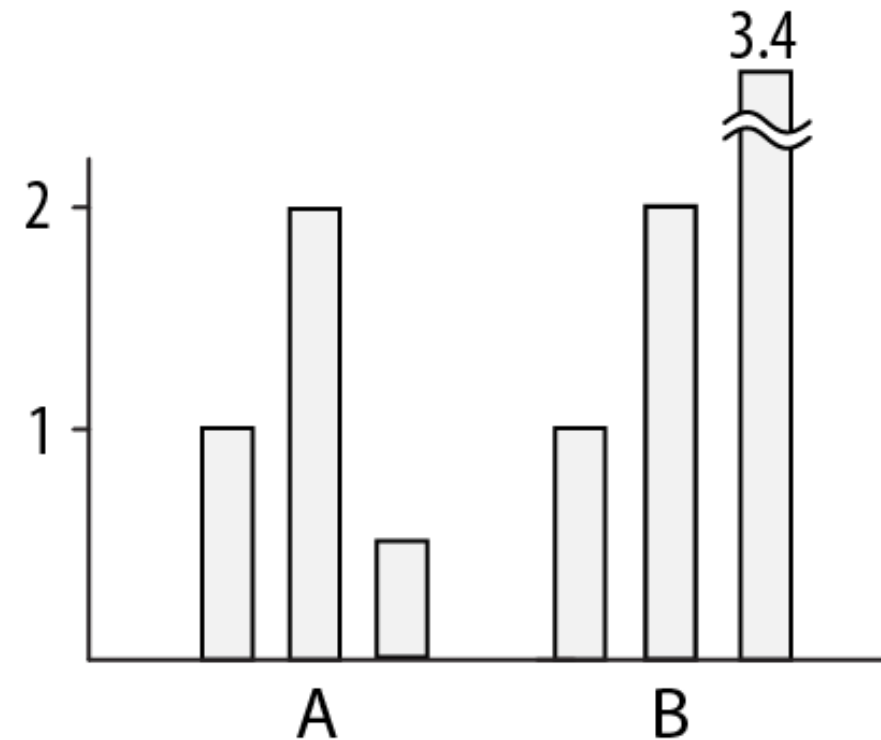
Use consistent axes when comparing charts

*misleading*



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

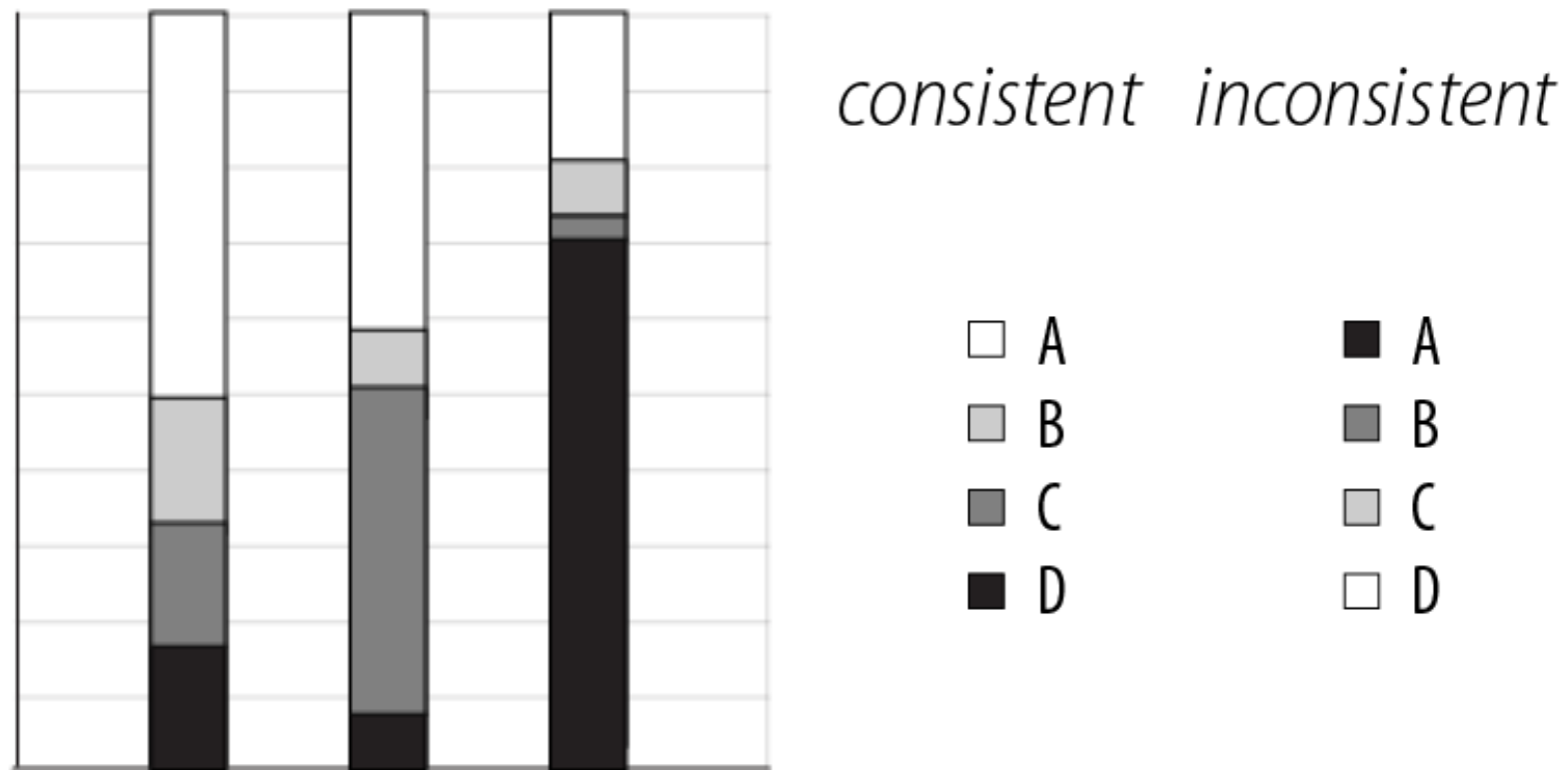
*improved*



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

# Principle 2: consistency

A note on legends: order items according to appearance



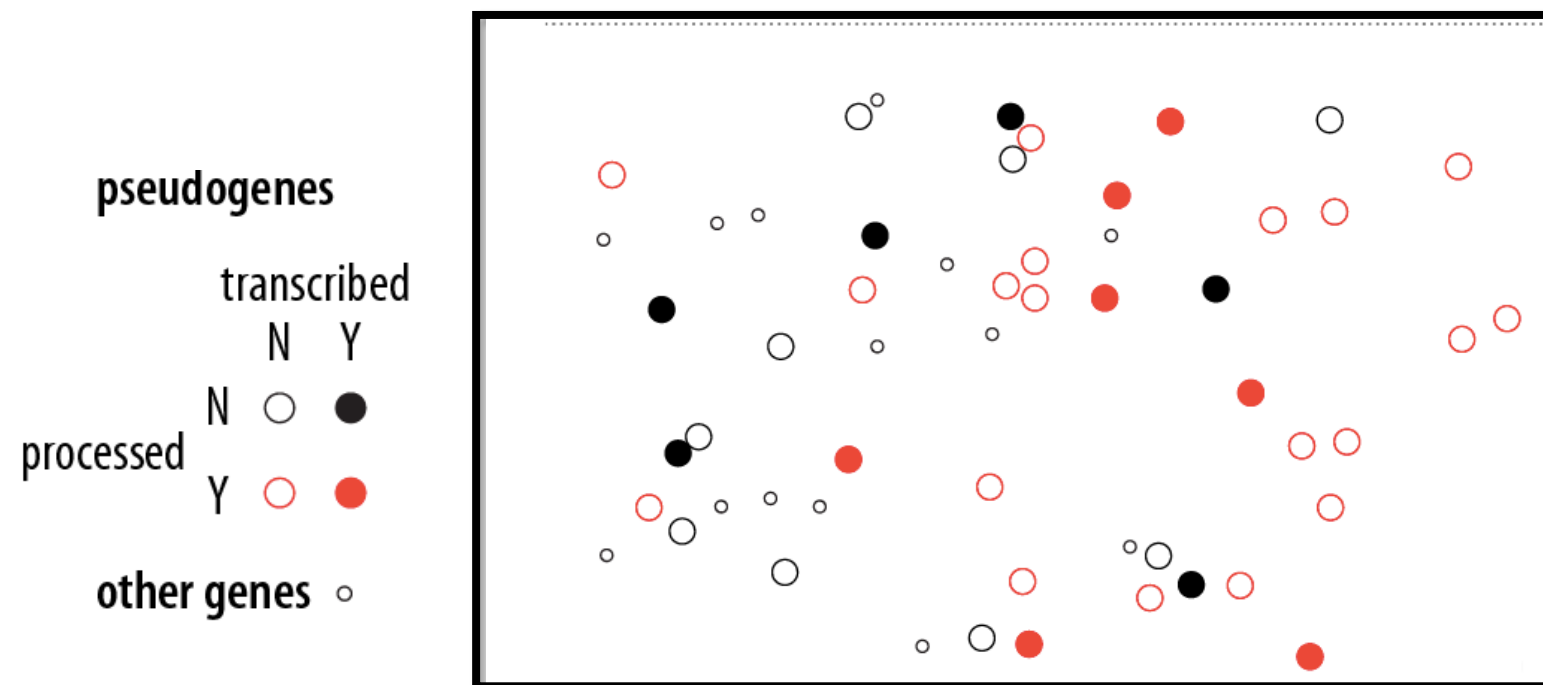
M. Krzwinski, behind every great visualization is a design principle, 2012



# Principle 2: consistency

Visual variation should reflect and enhance the underlying variation in the data

Avoid visually similar encodings for independent variables



# Principle 2: consistency

Uniform size and alignment reduces visual complexity and aids interpretation

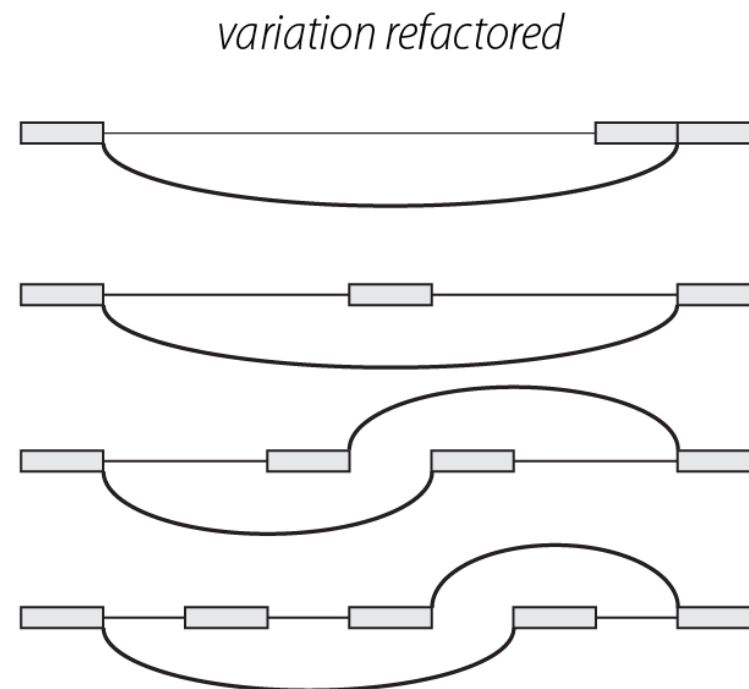


Fig. 1: Sharov AA et al. (2005) Genome-wide assembly and analysis of alternative transcripts in mouse. *Genome Res* 15: 748-754.

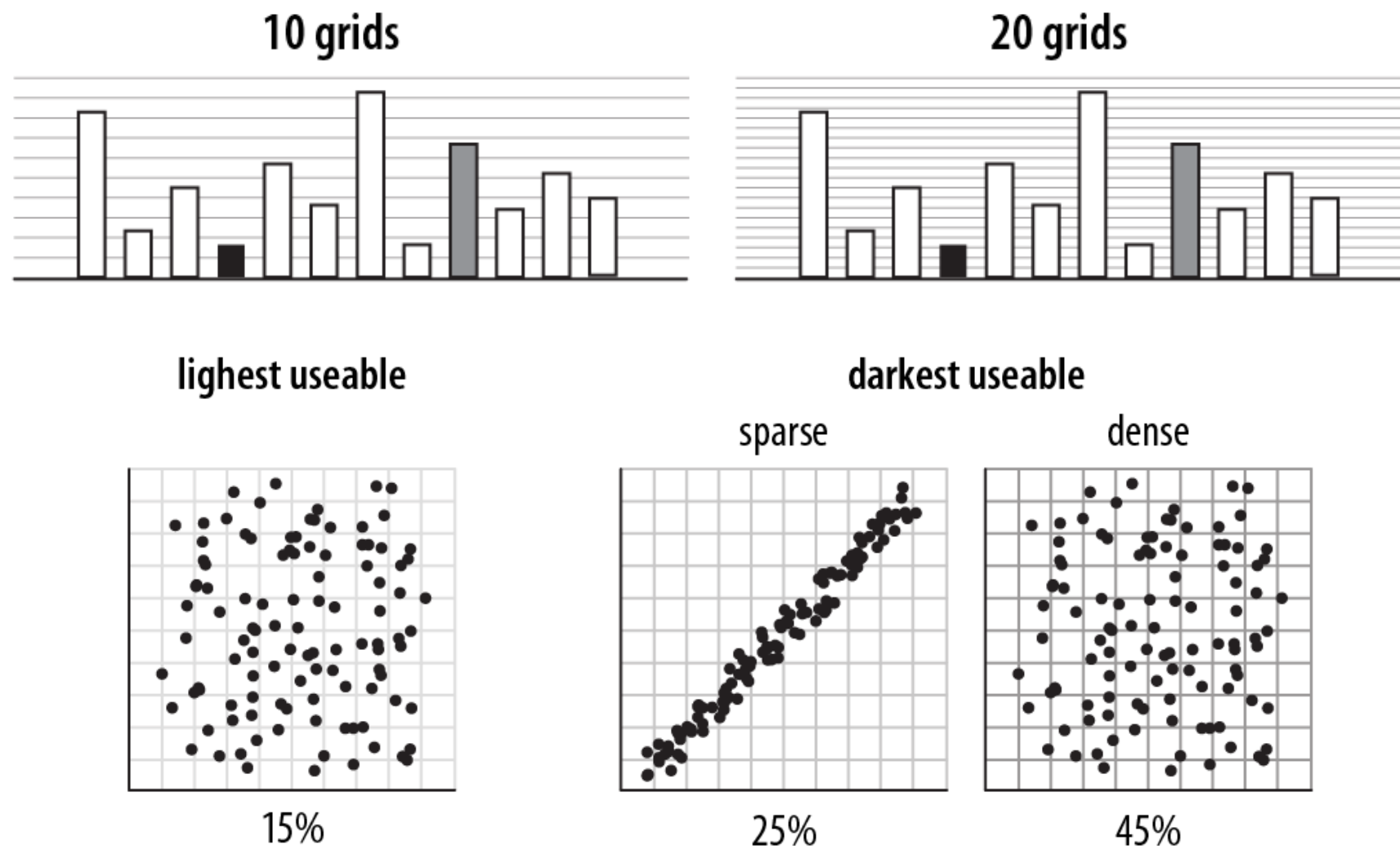
Fig. 2: M. Krzwinski, behind every great visualization is a design principle, 2012

# Principle 3: importance ordering

Avoid unnecessary containment and repetition

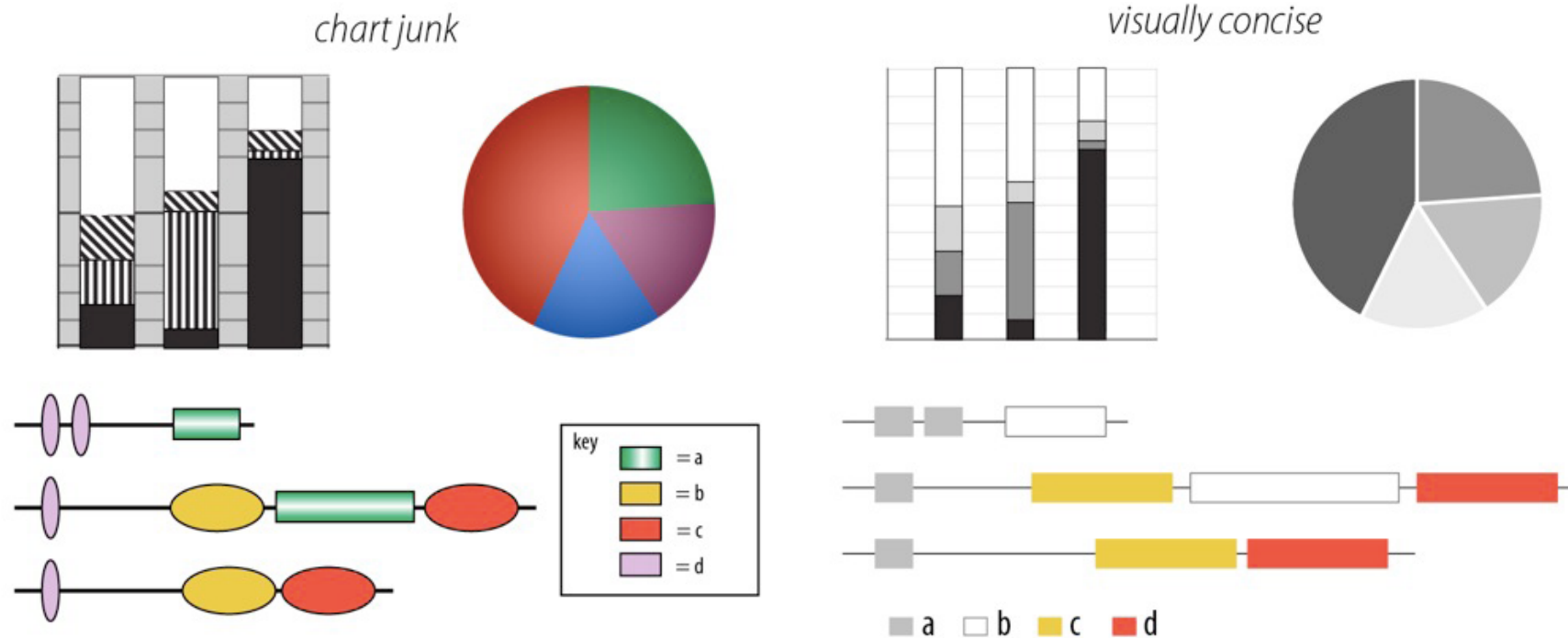
Navigational aids shouldn't compete with data

Avoid: heavy axes, error bars



# 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

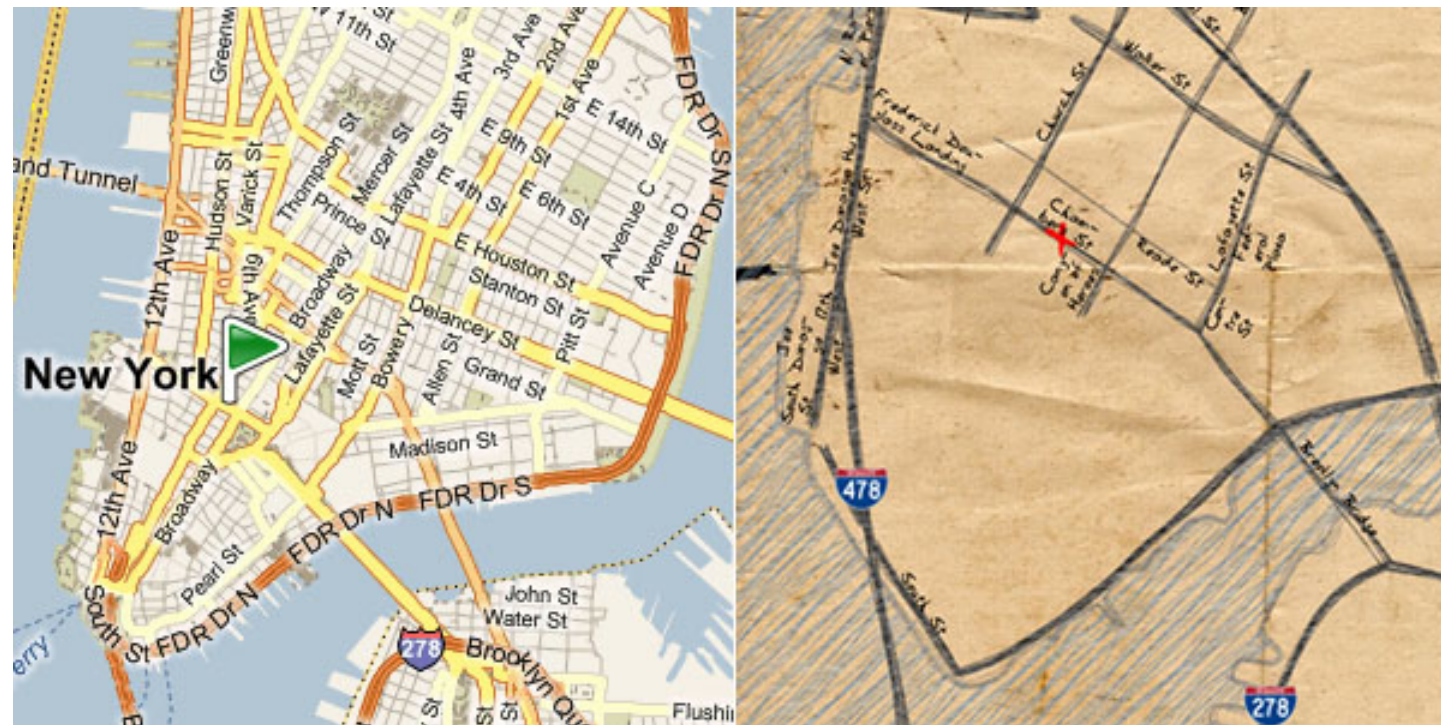
# Tufte and the data-ink ratio

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

# Familiar example: maps





# Mini “lab”: What’s wrong with this picture?

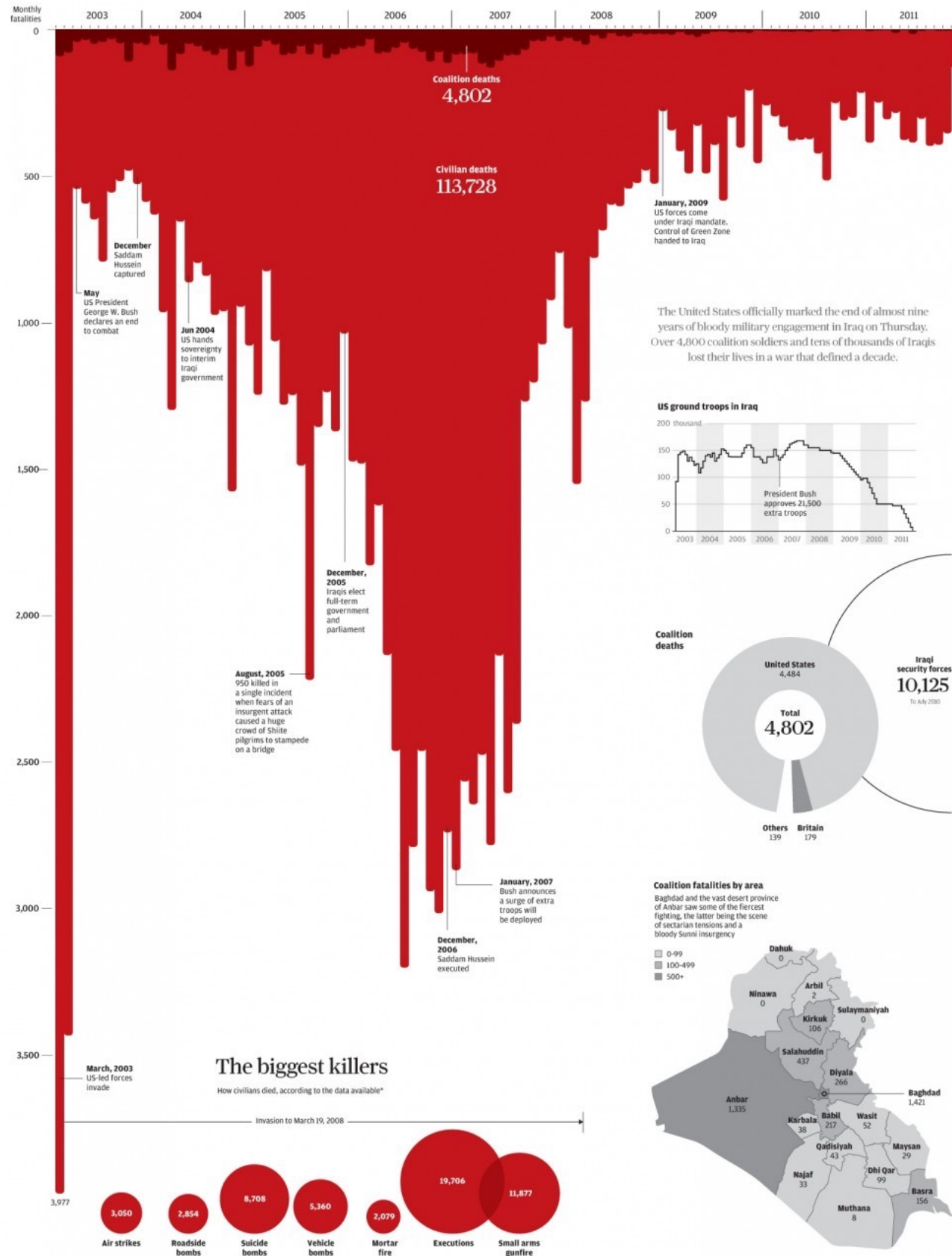
During this lab, we will critique some professionally-made visualizations using these principles

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?

Pick one of the visualizations I've selected, or  
go to  
<https://www.informationisbeautifulawards.com/>  
and find an example you like

# Iraq's bloody toll



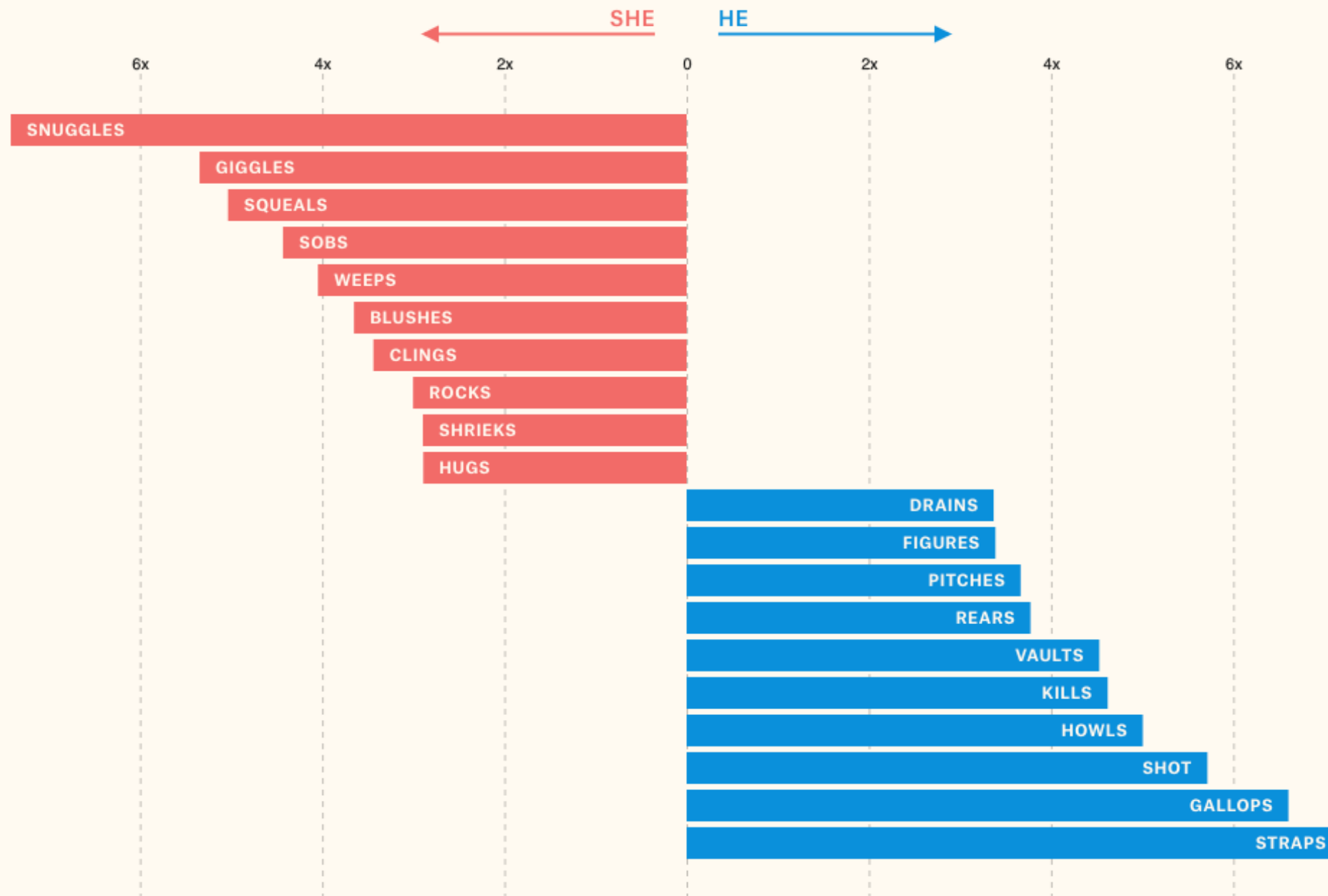
\*SCMP graphics: Simon Scott

\*Deaths from unknown causes are not included. Causes of death accounting for less than 0.5 per cent of deaths also not included.

Sources: Casualties, Iraq Body Count, New England Journal of Medicine, Global Security, Brookings Institution

# The most used words for women vs. men

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



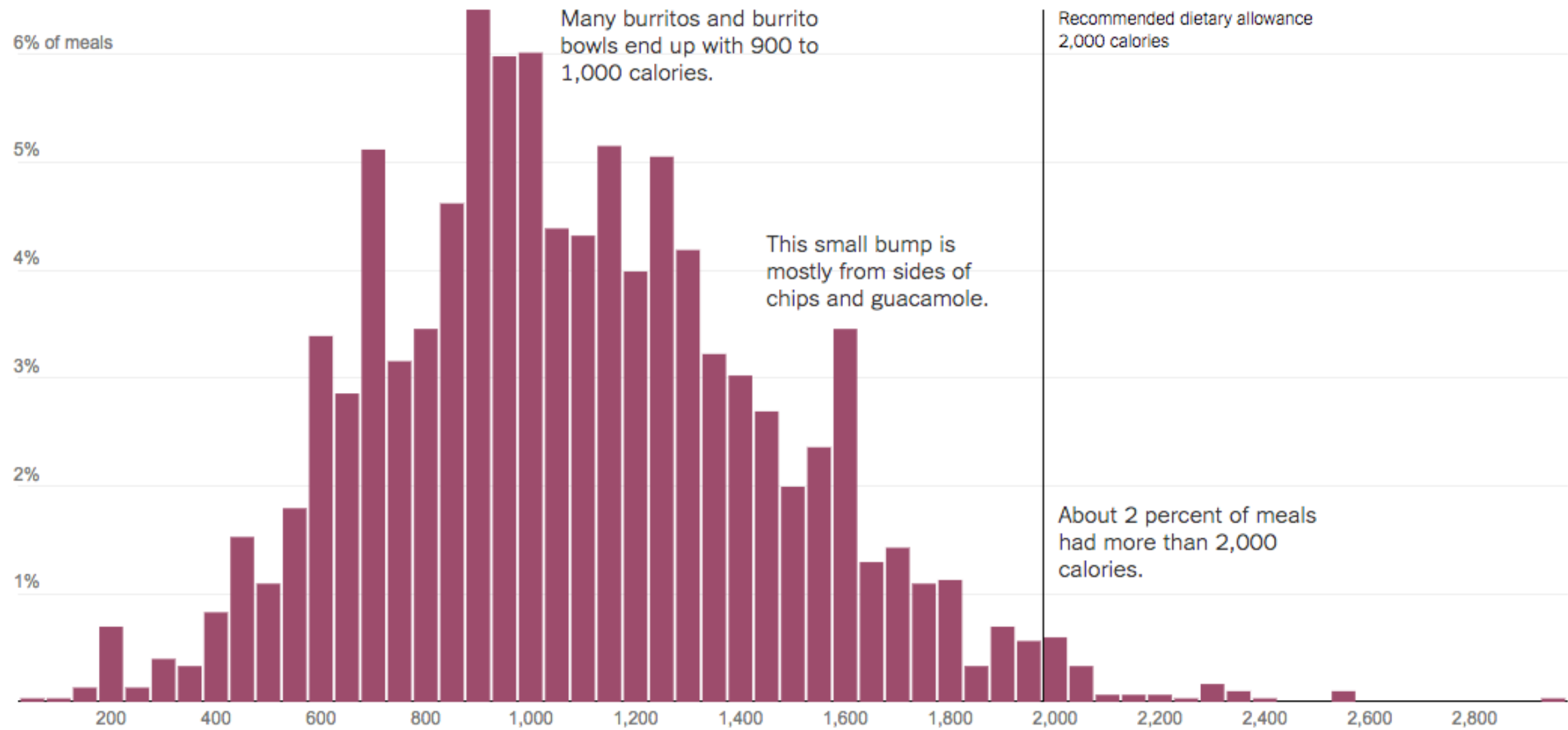
These are the most extreme examples. There is a high likelihood that women will snuggle, giggle, squeal, and sob, relative to men. Conversely, men are more likely to strap, gallop, shoot, howl, and kill.

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

# At Chipotle, How Many Calories Do People Really Eat?

By KEVIN QUEALY, AMANDA COX and JOSH KATZ FEB. 17, 2015

Most meals have more than 1,000 calories and almost a full day's worth of sodium. [RELATED ARTICLE](#)

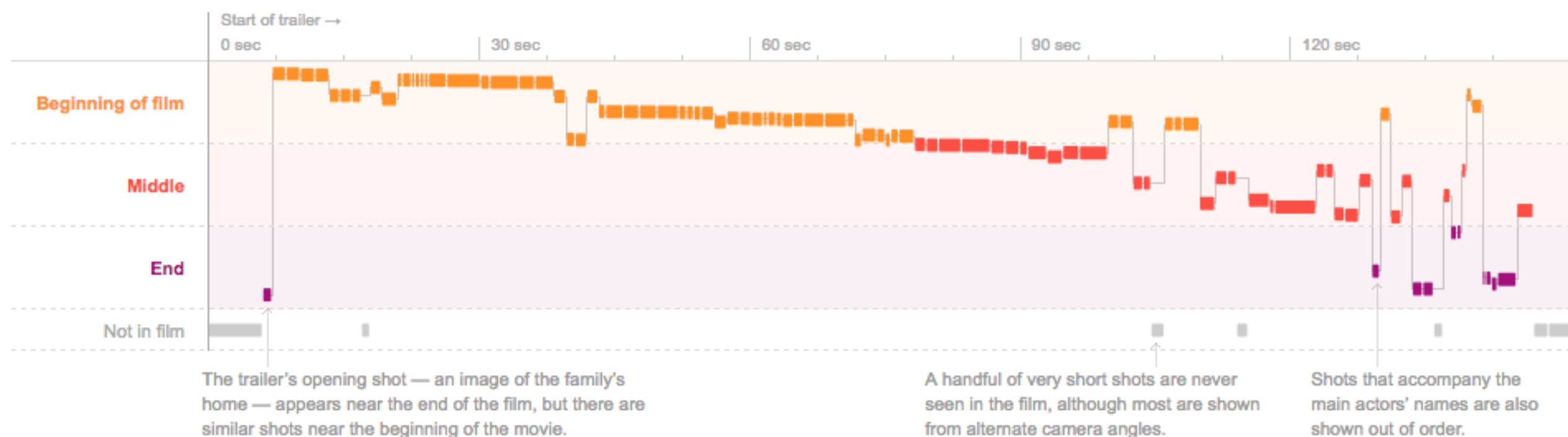
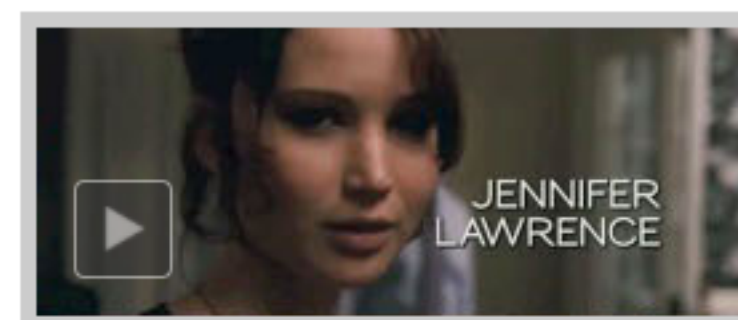


# Dissecting a Trailer: The Parts of the Film That Make the Cut

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.





## NameVoyager: Explore baby names and name trends letter by letter

Looking for the perfect baby name? [Sign up for free](#) to receive access to our expert tools!

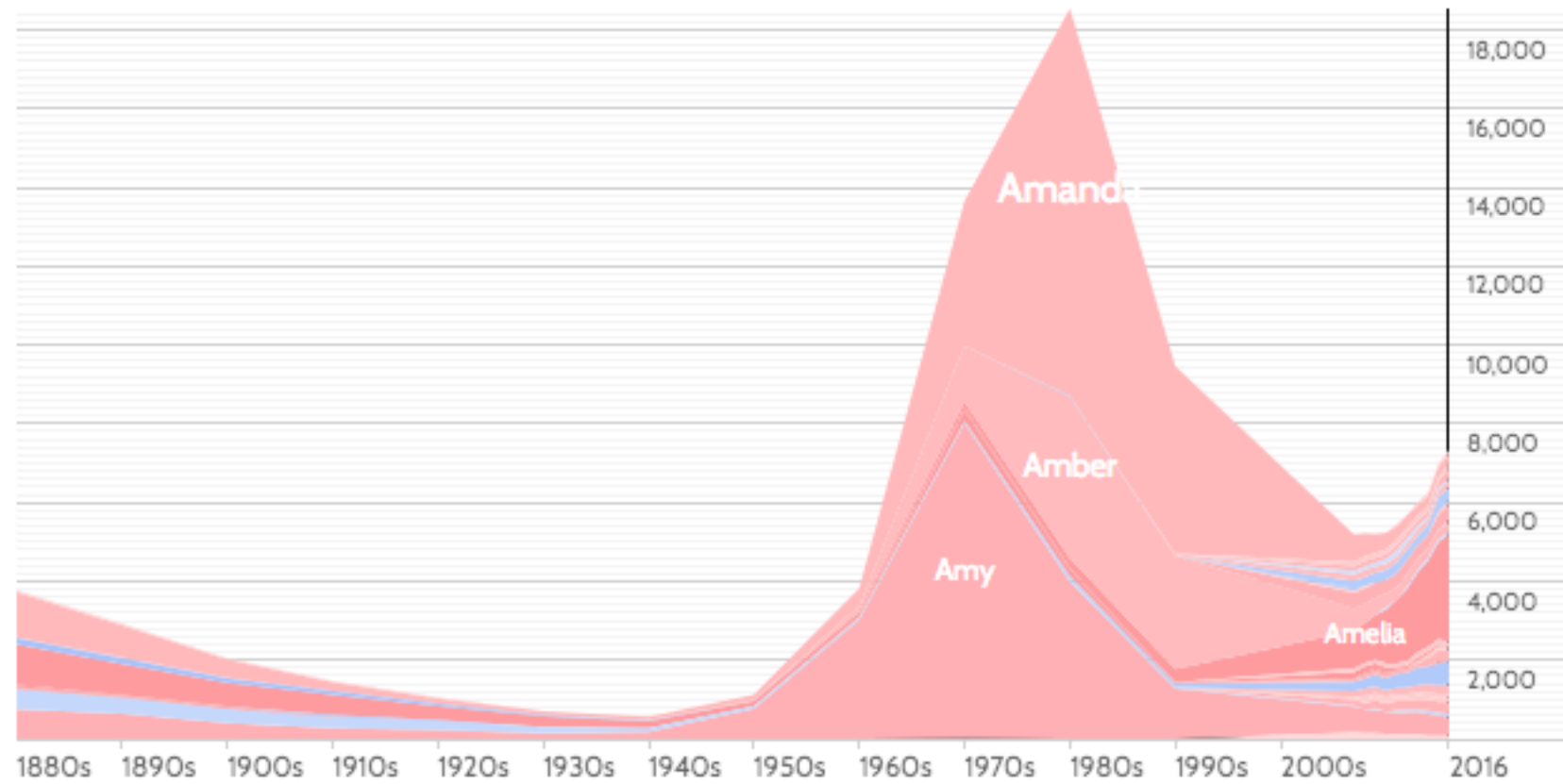
Baby Name >   Both  Boys  Girls

boys	1000	500	100	25	1
girls	1000	500	100	25	1

Current rank:

Names starting with 'AM' per million babies

per million births



Click a name graph to view that name. Double-click to read more about it.

[enlarge](#)

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