

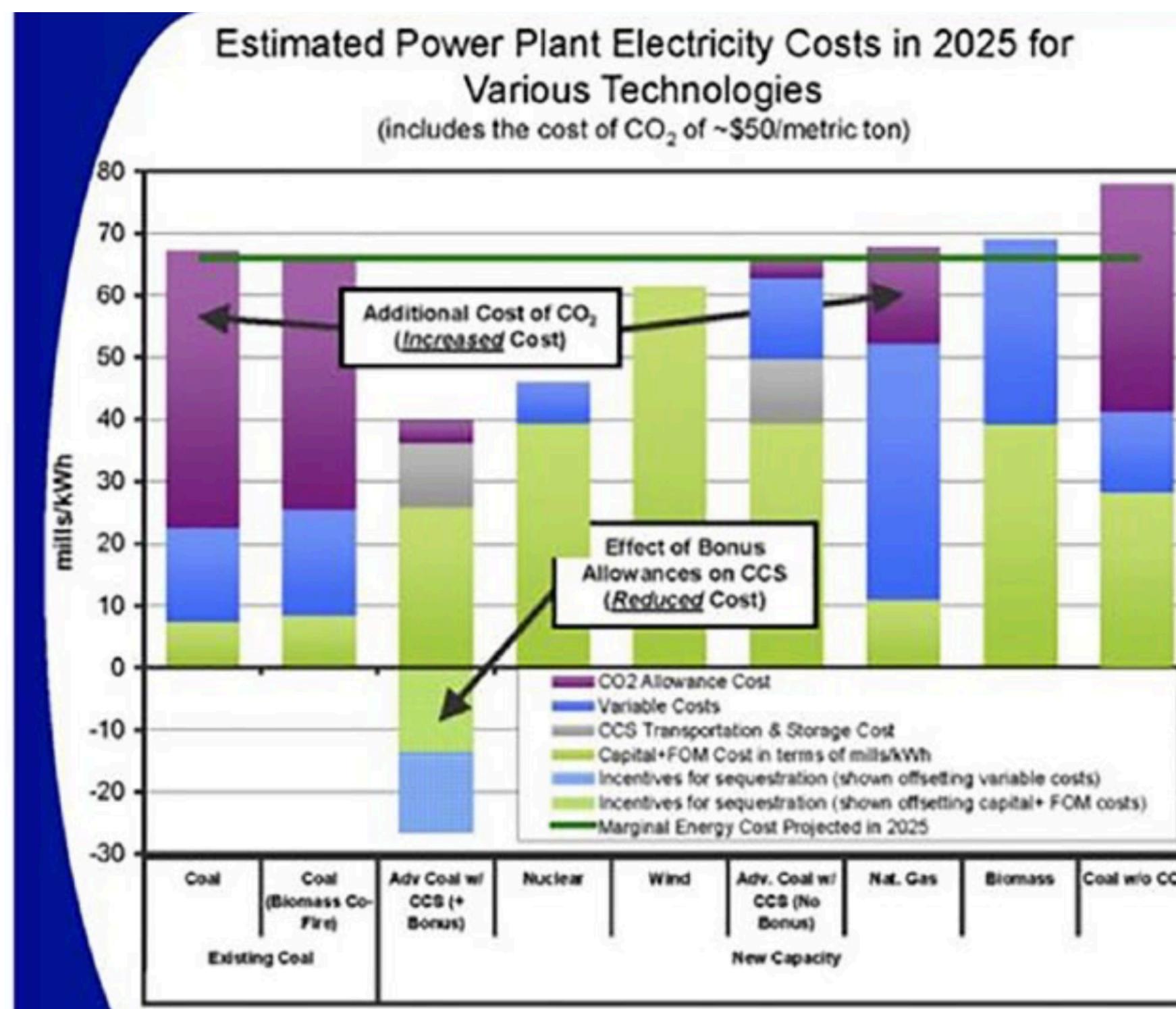
# Making Graphs

PADLAB

John Franchak

What makes visualizations  
effective?

# What makes this graph so bad?



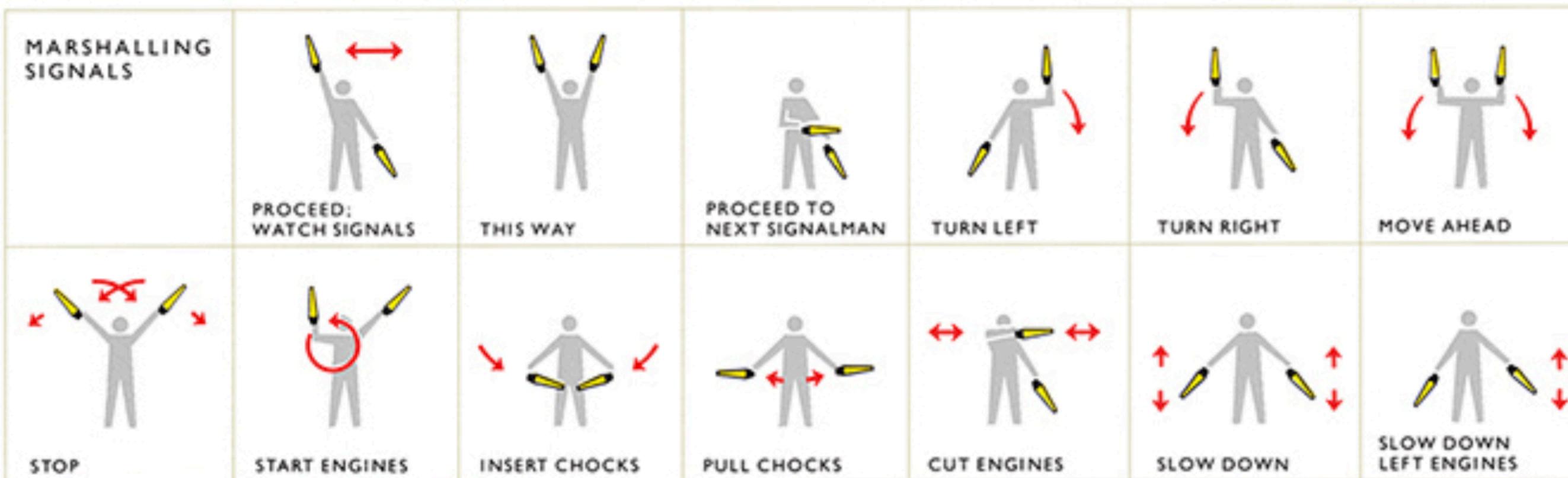
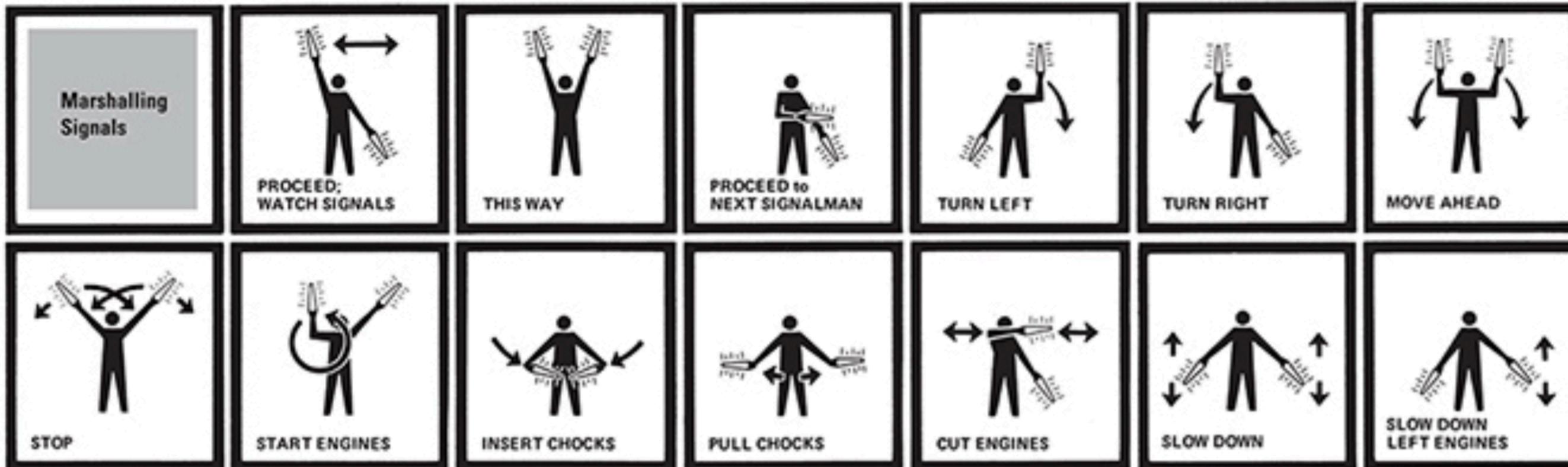
# Effective visualizations...

- Emphasize the right information
- Don't make the reader work
- Don't mislead or distort
- Use consistent style
- Follow conventions
- Look nice

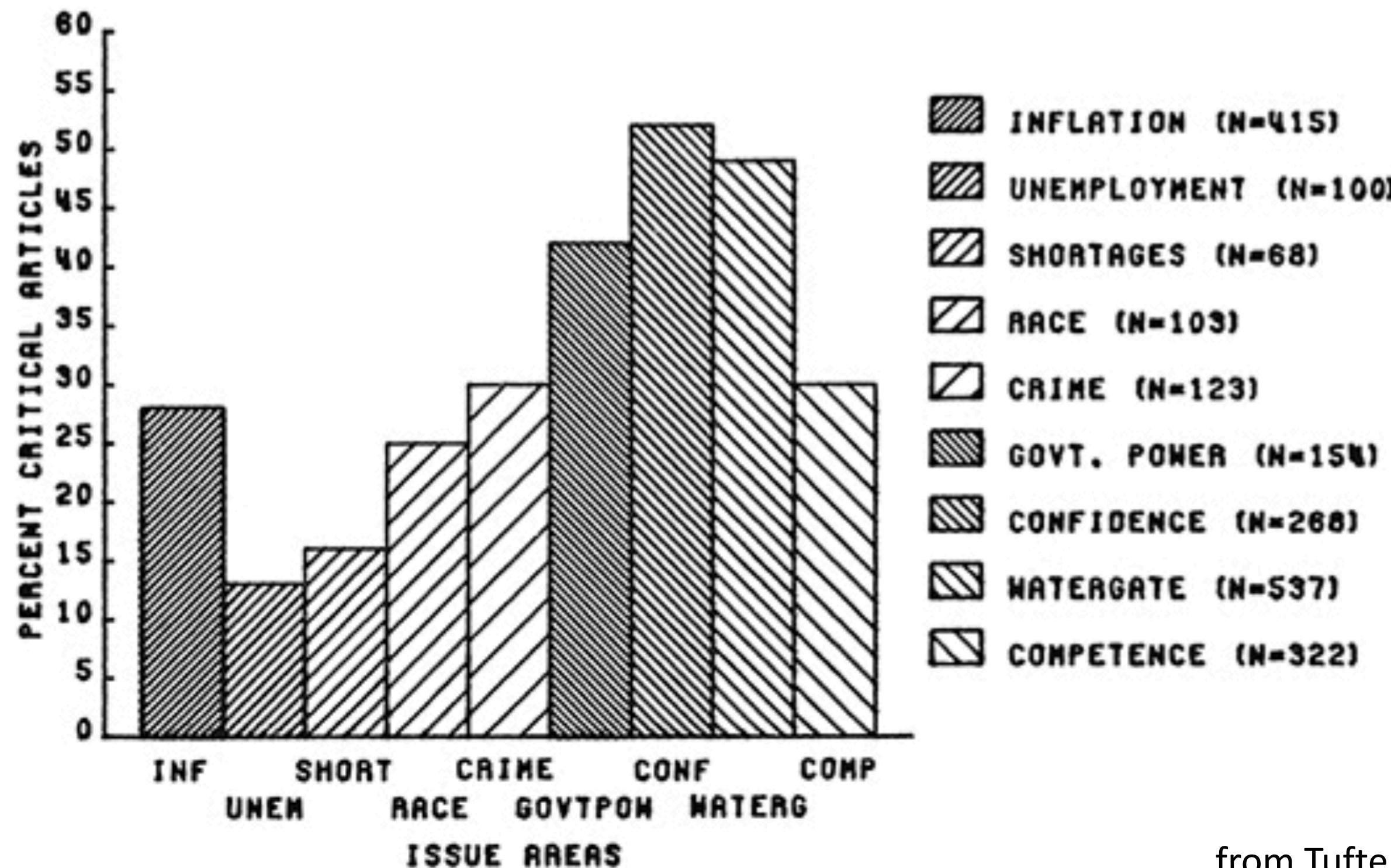
# Emphasize the right information

THE interior decoration of graphics generates a lot of ink that does not tell the viewer anything new. The purpose of decoration varies—to make the graphic appear more scientific and precise, to enliven the display, to give the designer an opportunity to exercise artistic skills. Regardless of its cause, it is all non-data-ink or redundant data-ink, and it is often chartjunk. Graphical decoration, which prospers in technical publications as well as in commercial and media graphics, comes cheaper than the hard work required to produce intriguing numbers and secure evidence.

# Emphasize the right information

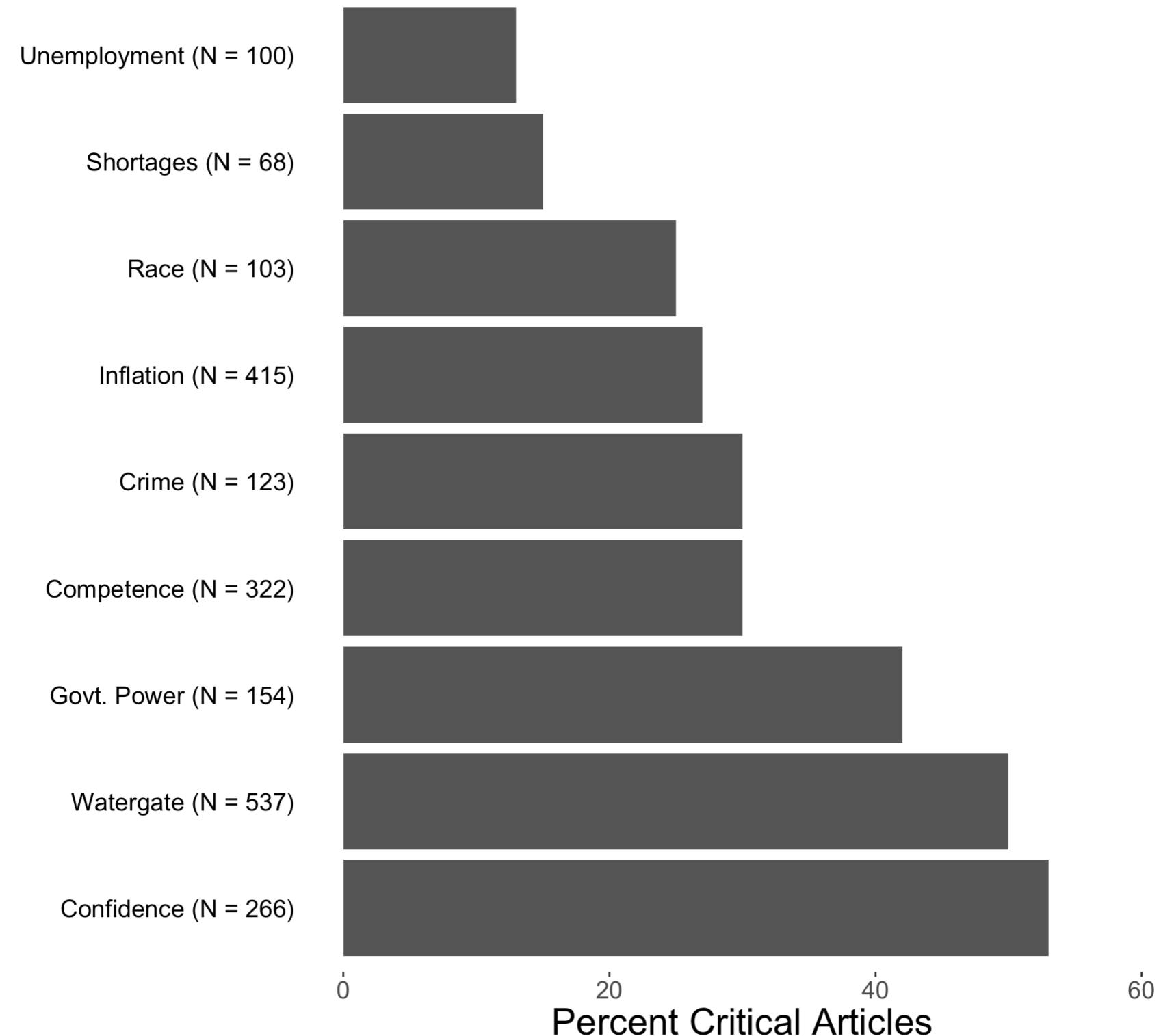
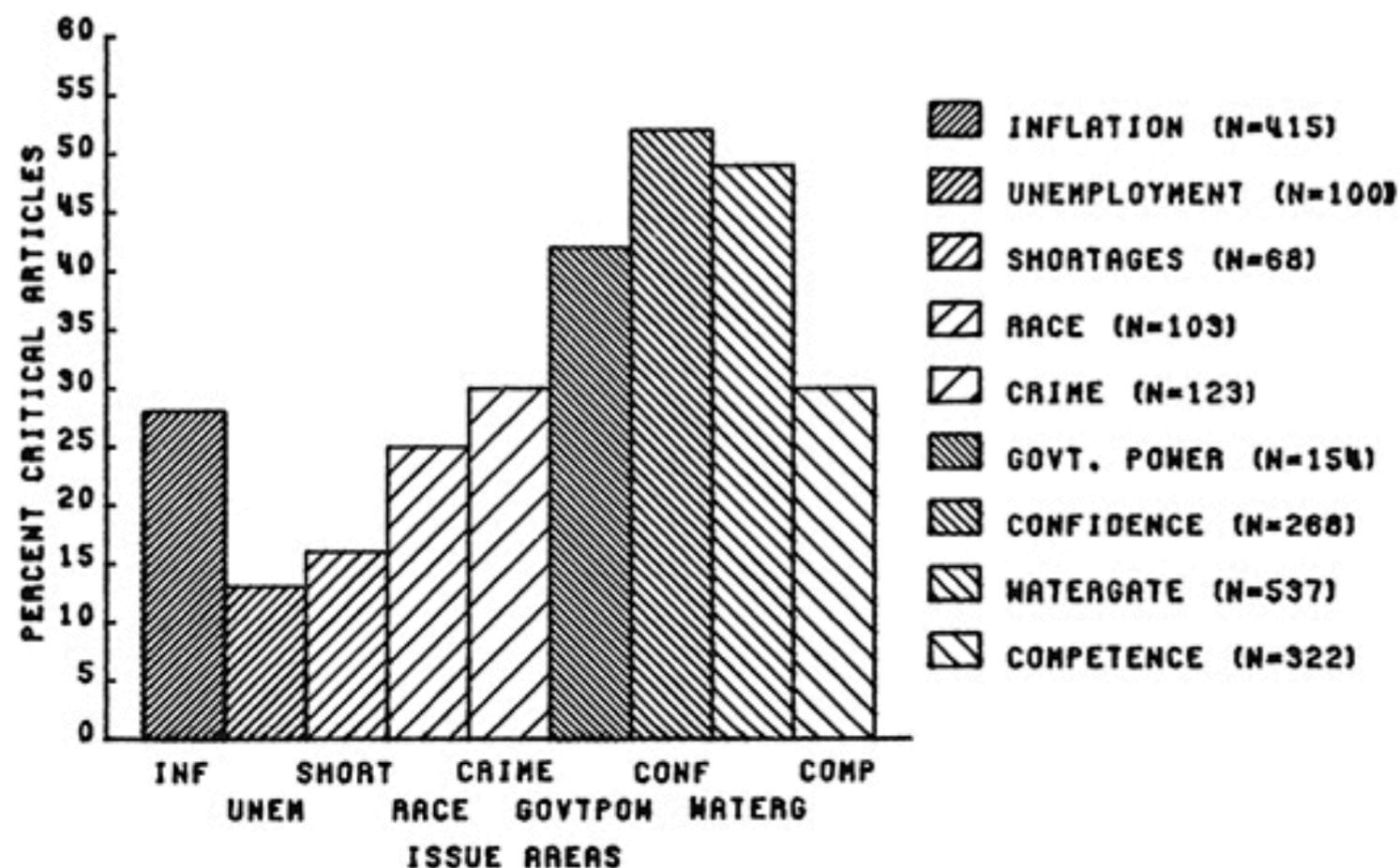


# Emphasize the right information (pattern distracts from length)

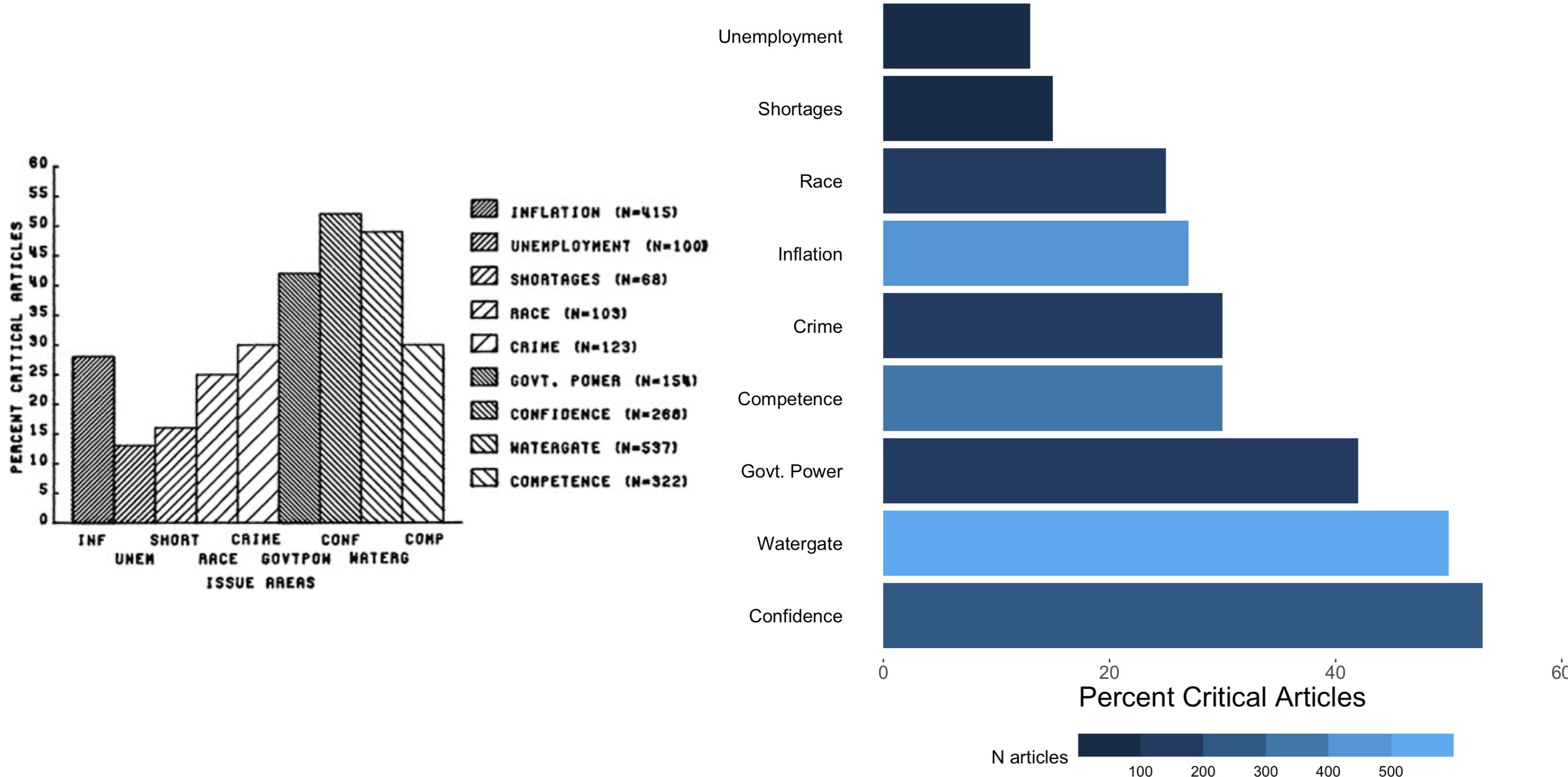


from Tufte Chartjunk website

# Emphasize the right information

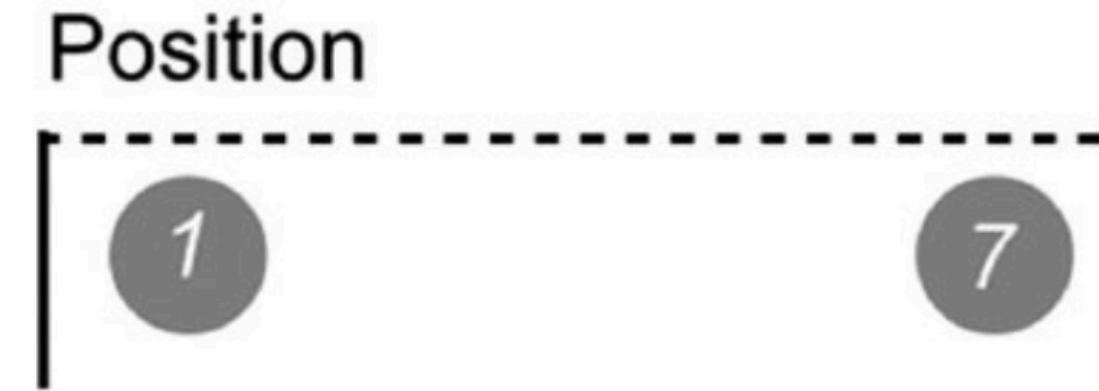


# Emphasize the right information



# Don't make the reader work

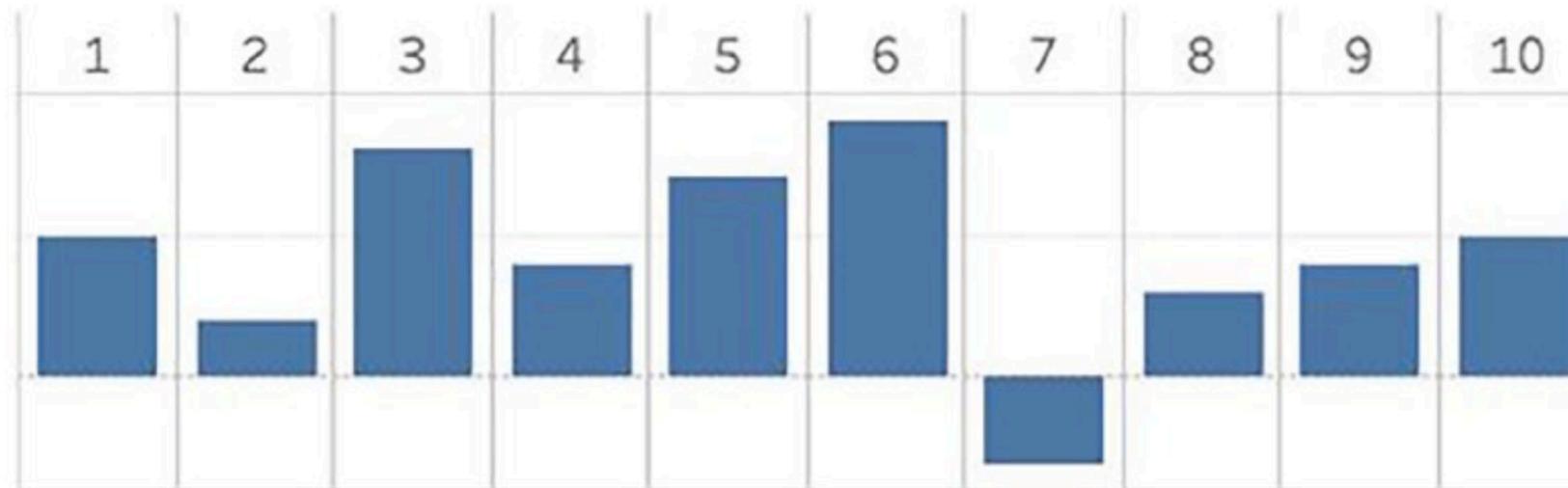
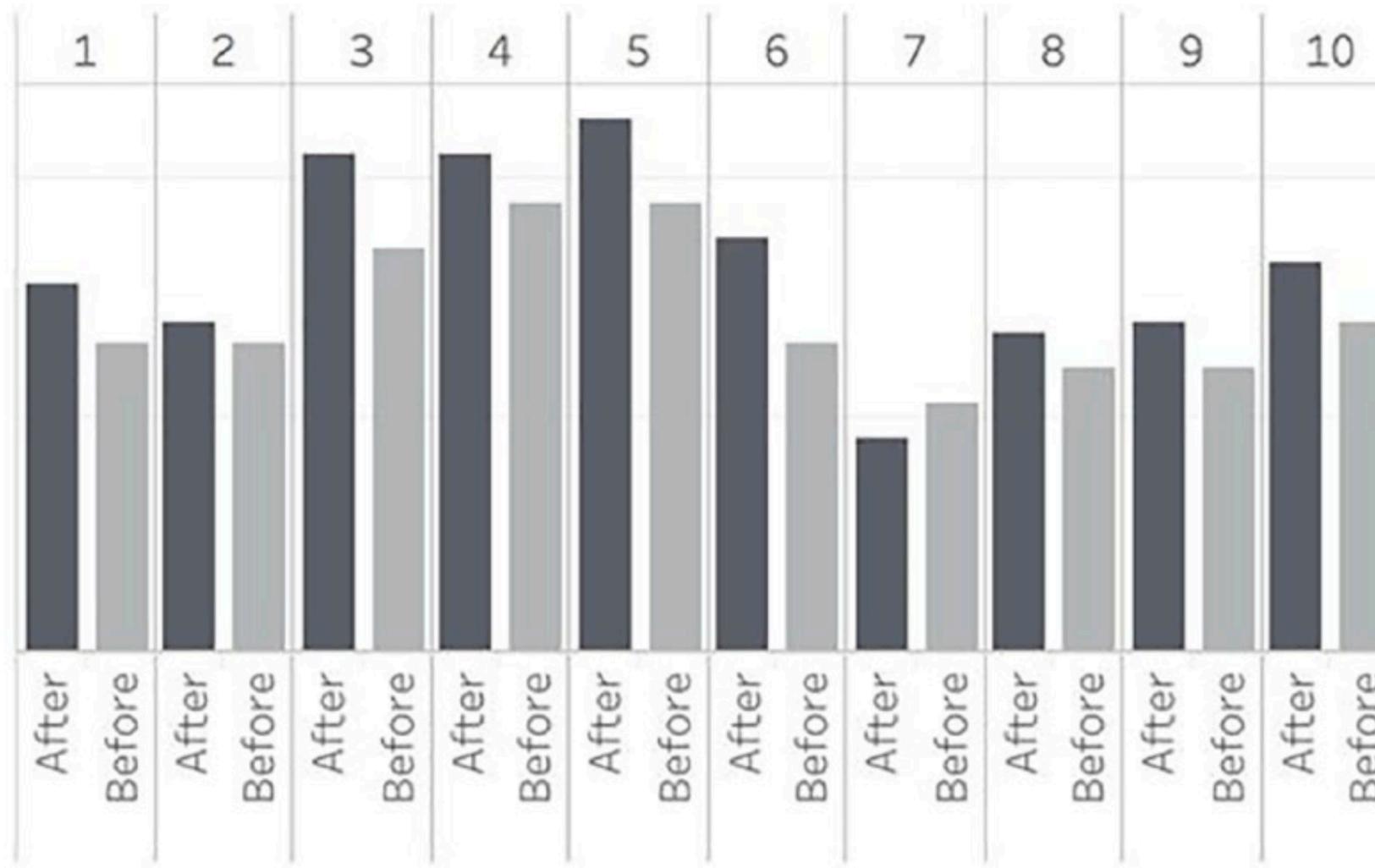
## Use the right visual features!



Intensity



# Don't make the reader work



from Zacks & Franconeri (2020)

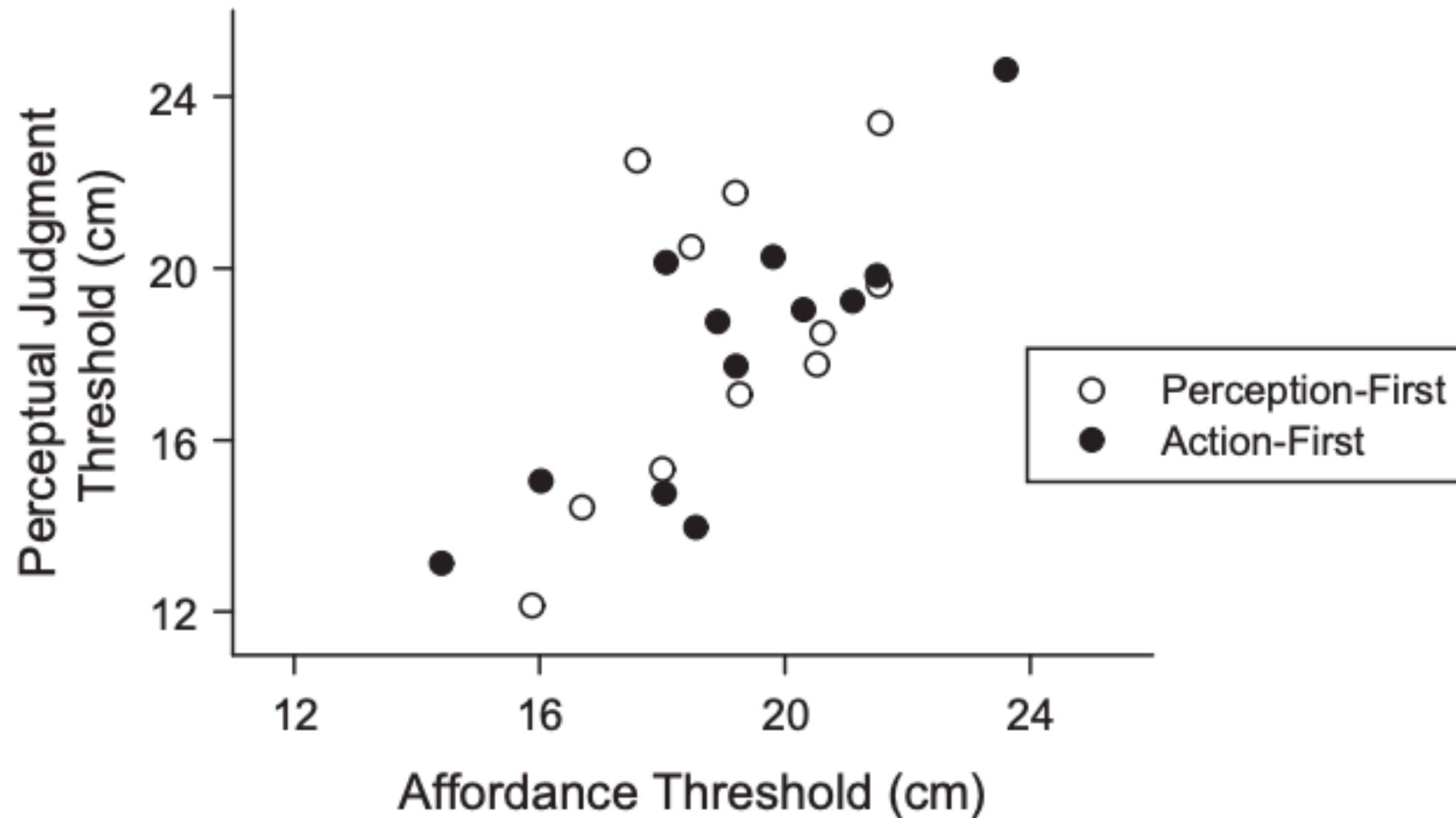
**data ink > non-data ink!**

**use color and contrast to draw the eye  
to important comparisons**

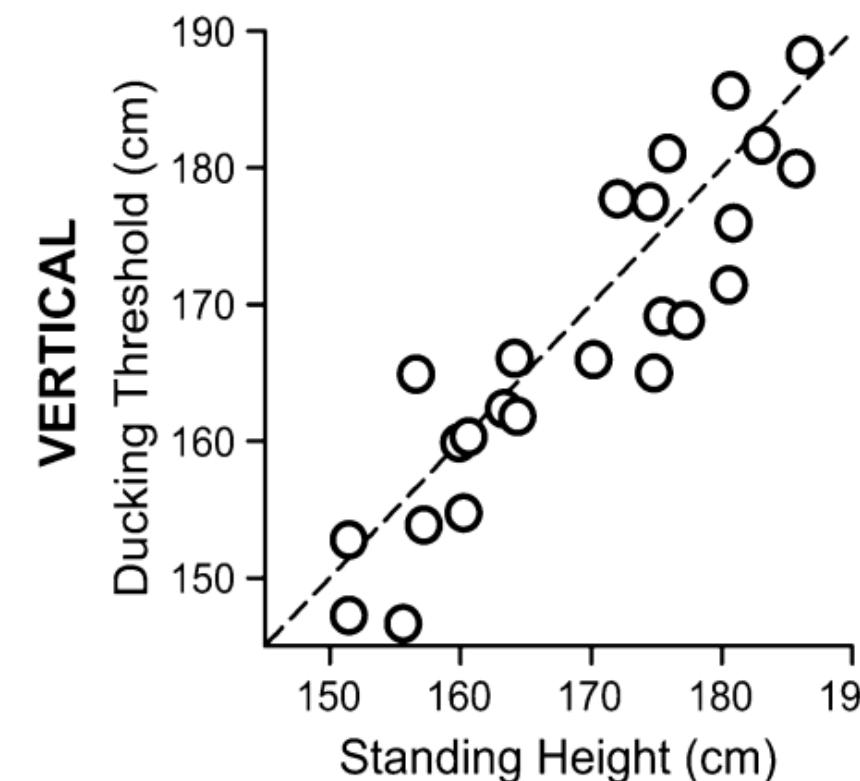
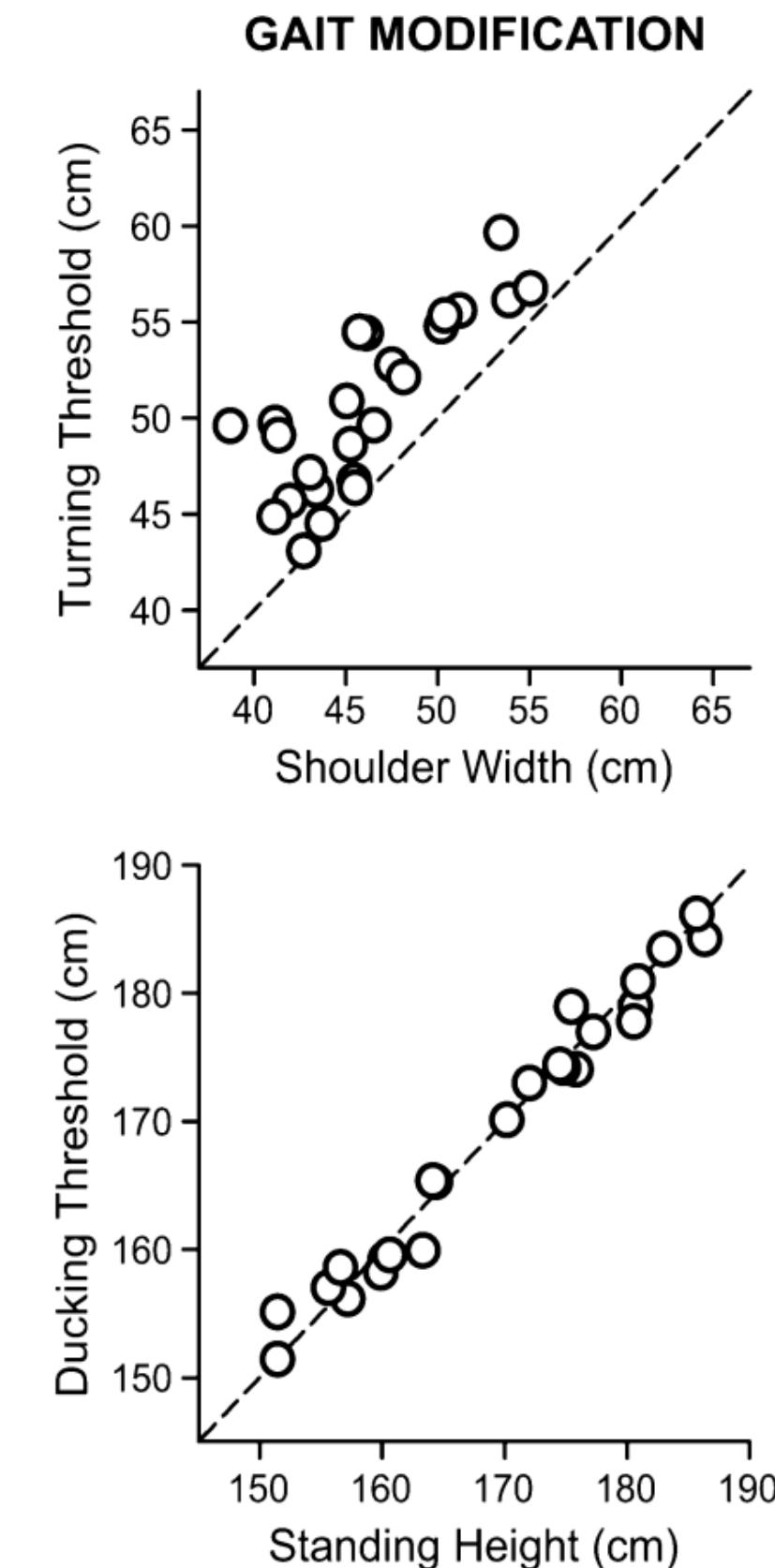
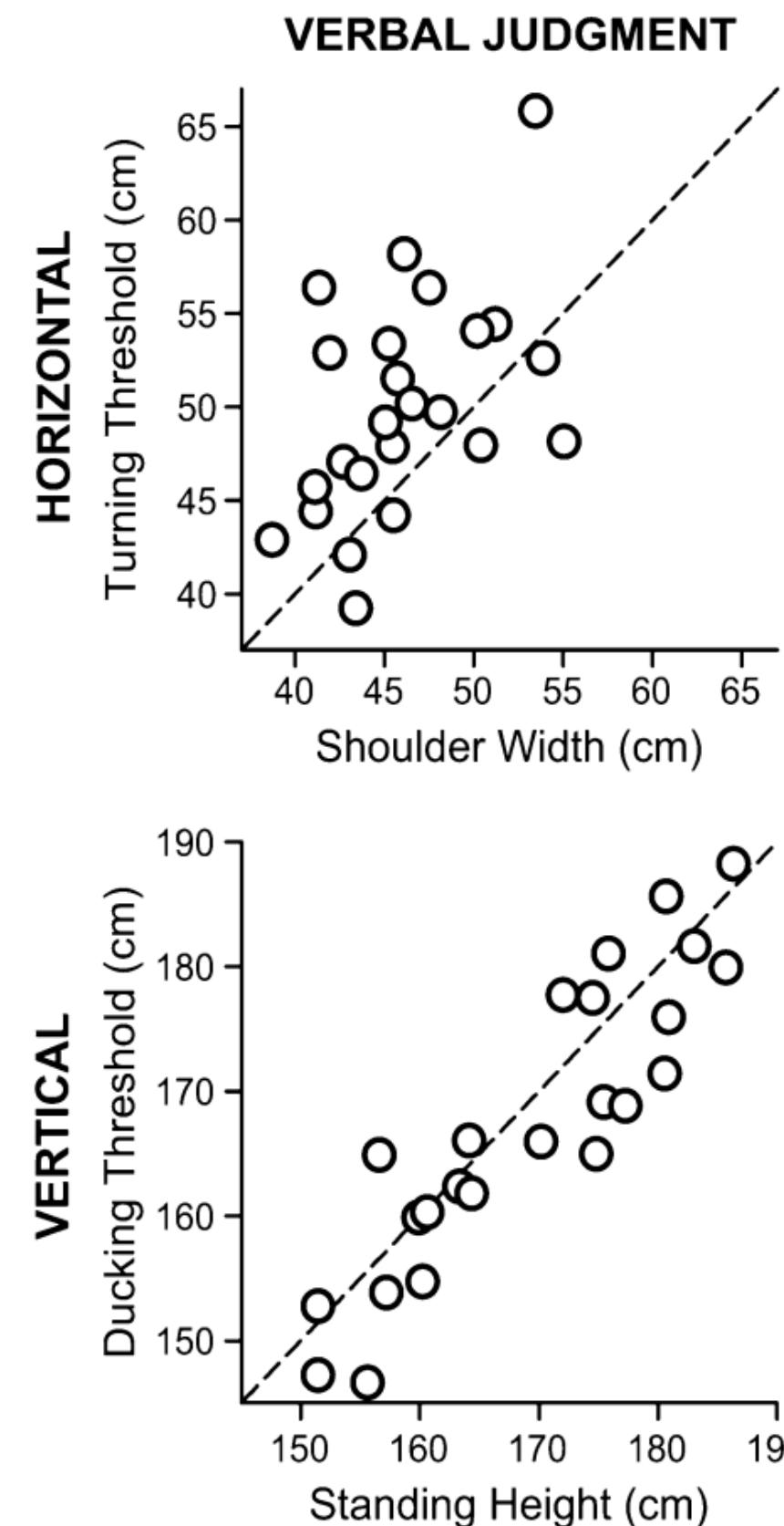
**group/sort data to facilitate comparison**

**Remove**  
to improve  
(the **data-ink** ratio)

Don't mislead or distort  
(ugh...this one is mine)

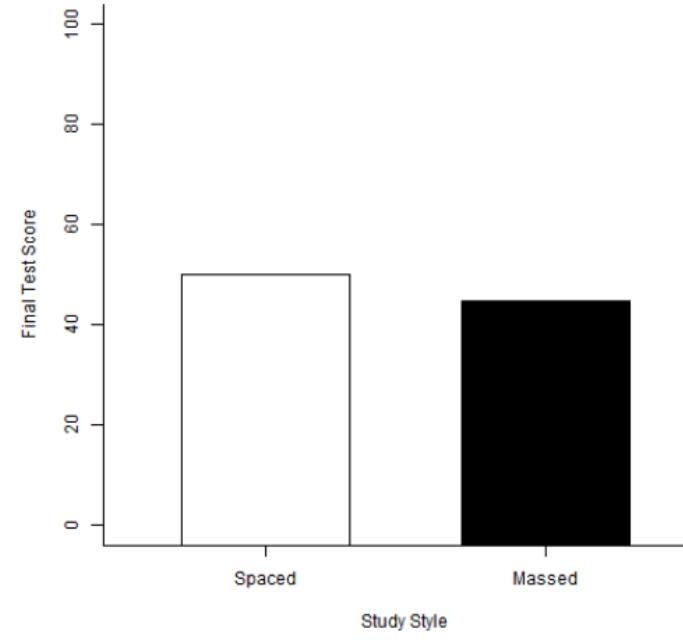


# Don't mislead or distort (aspect ratio)

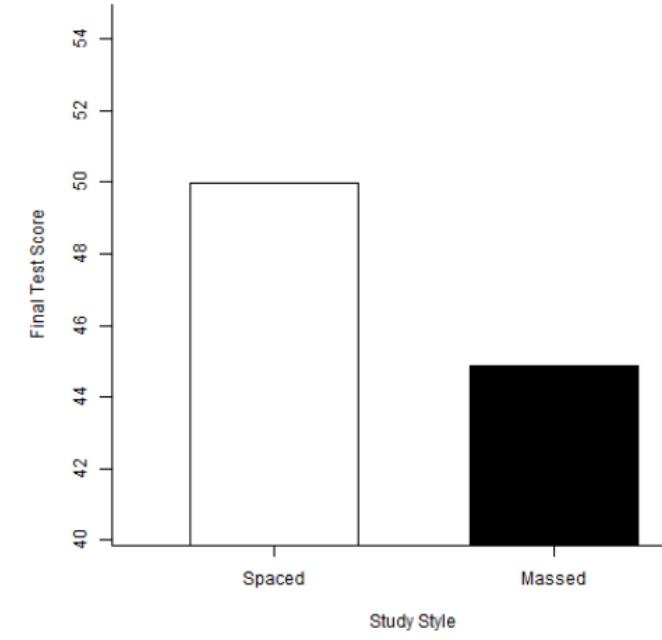


# Don't mislead or distort (ranges)

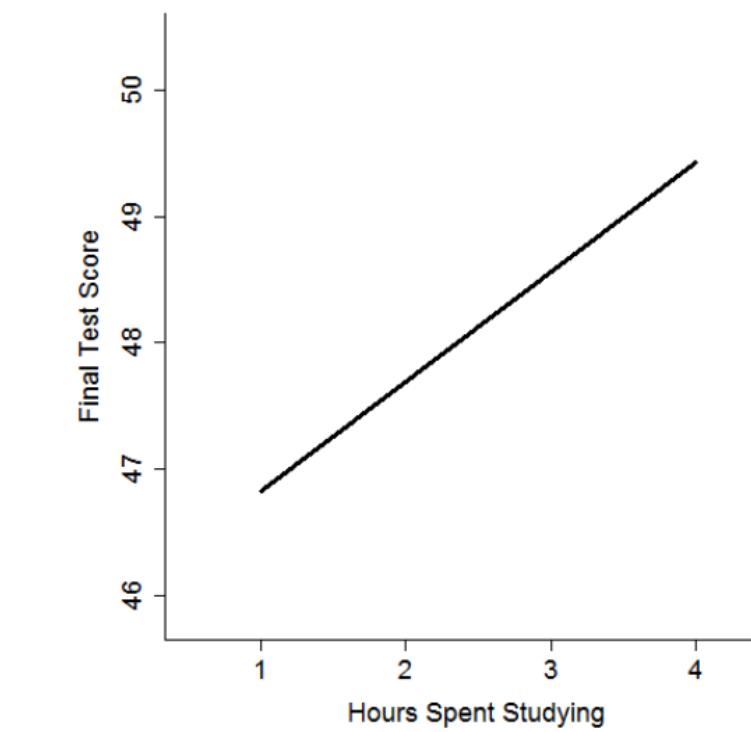
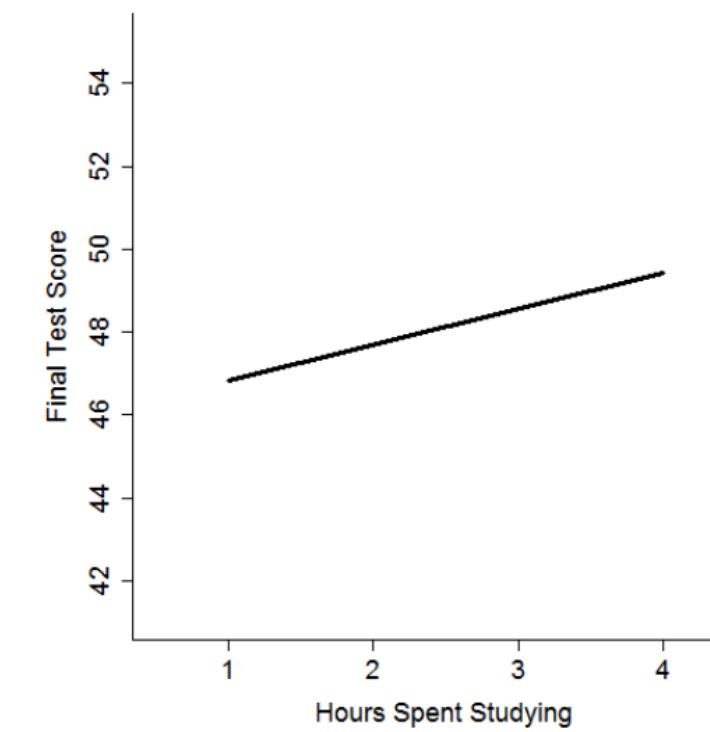
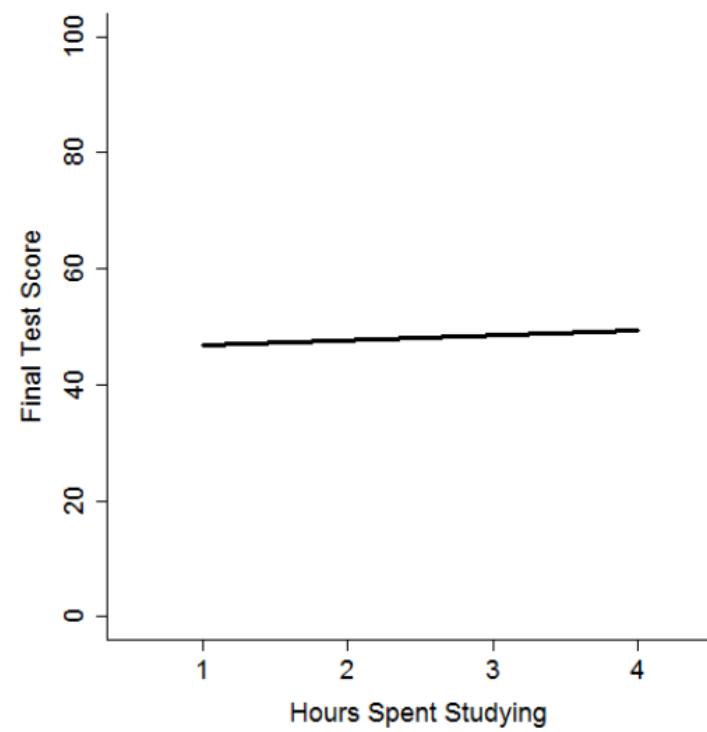
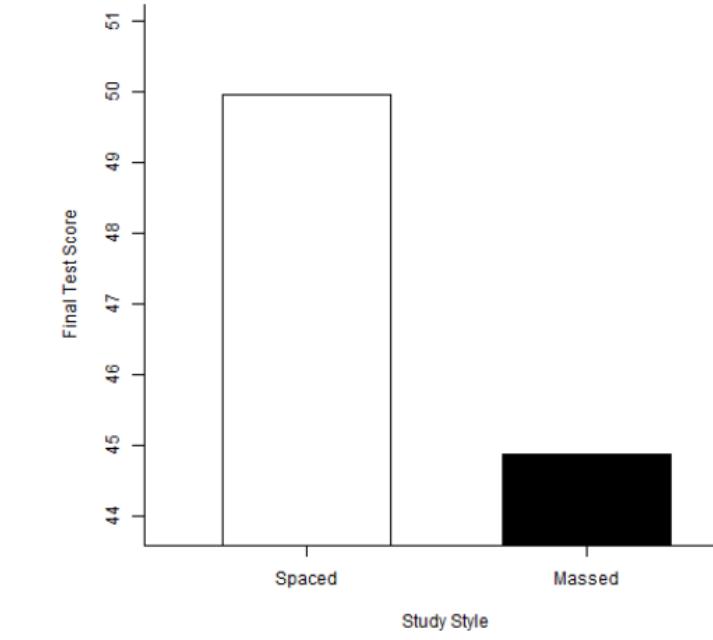
Full



Standardized

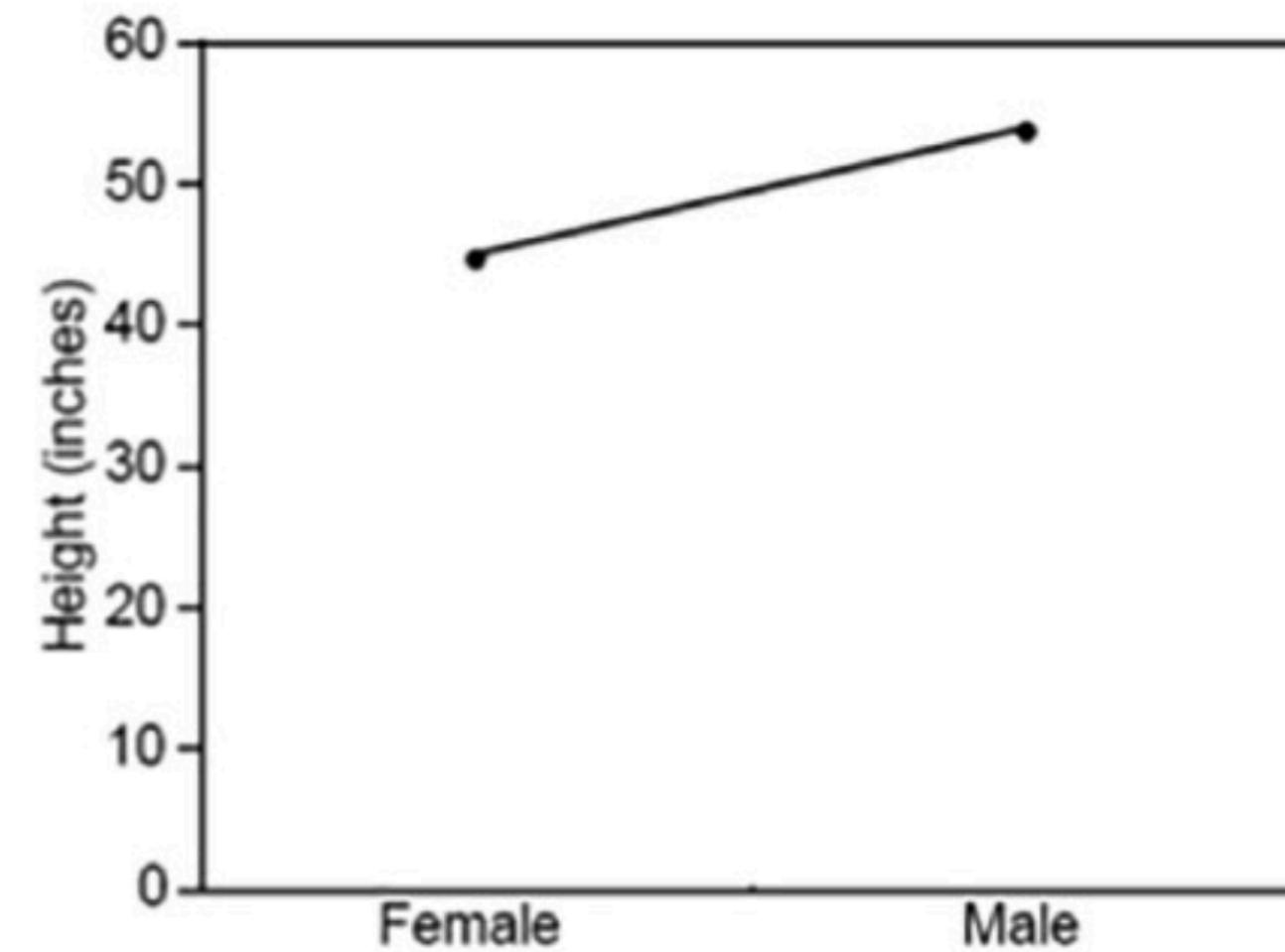
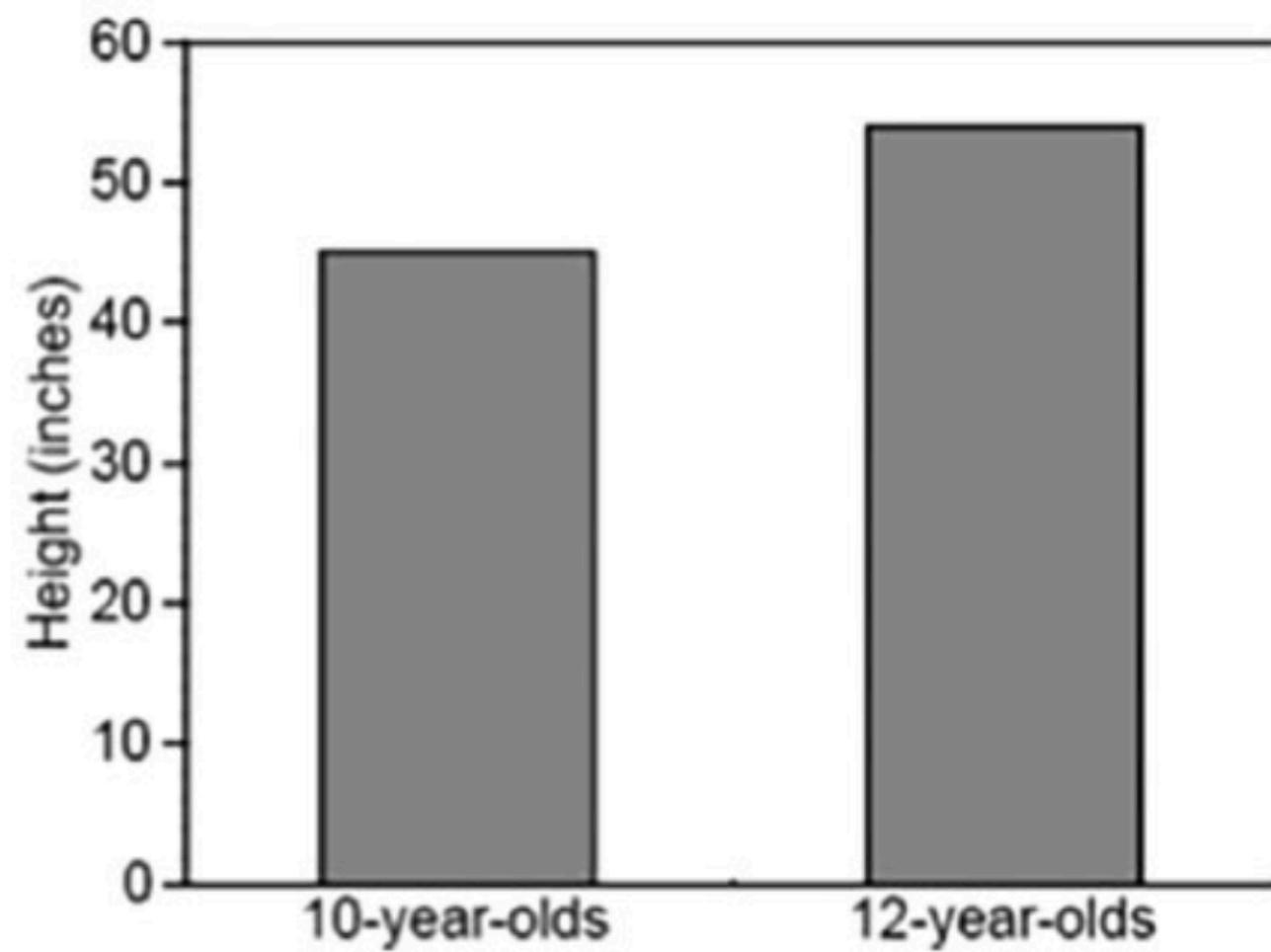


Minimal



from Witt (2019)

# Follow conventions



from Zacks & Franconeri (2020)

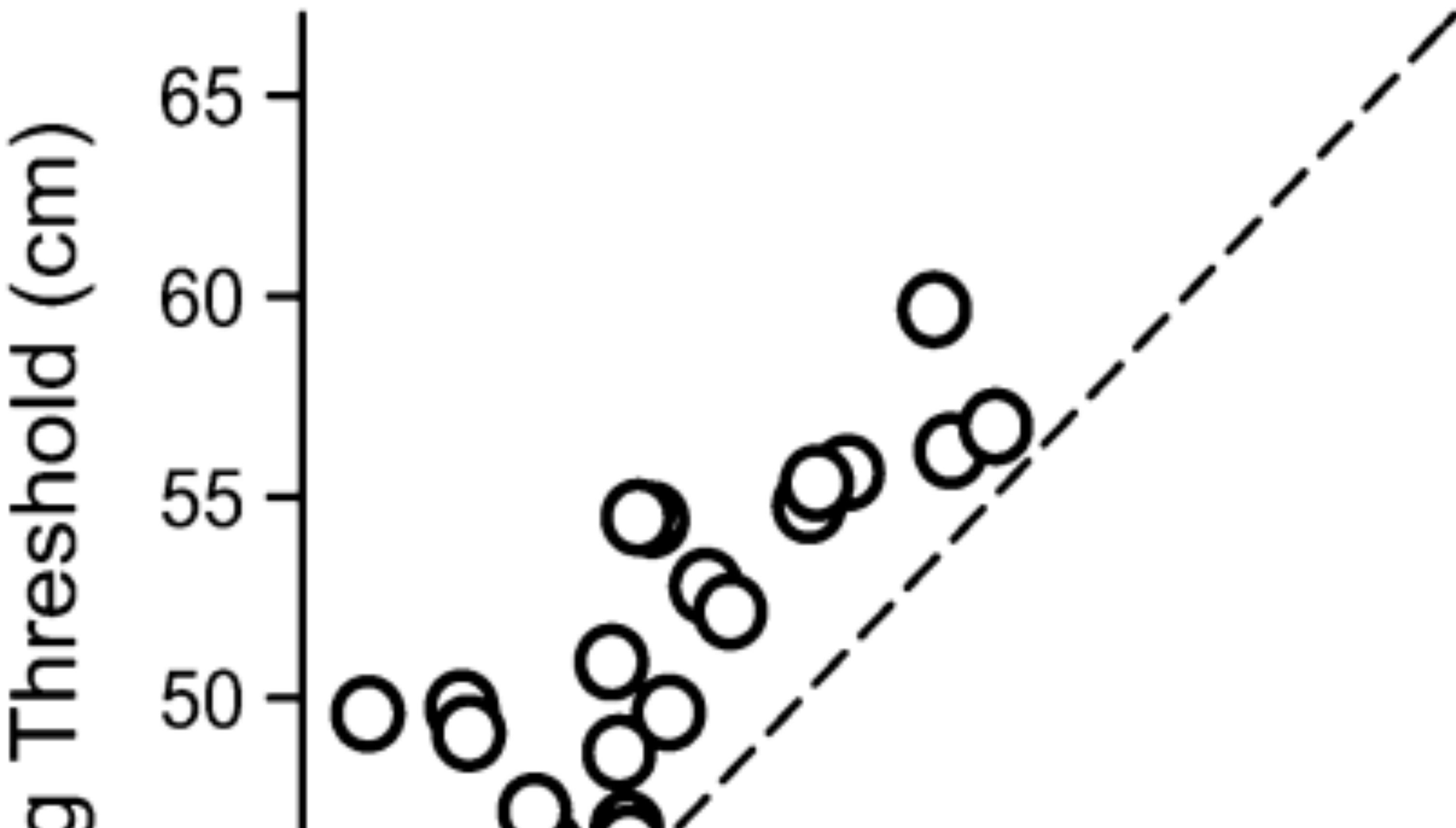
**carefully consider axes limits  
and their relative size (aspect ratio)**

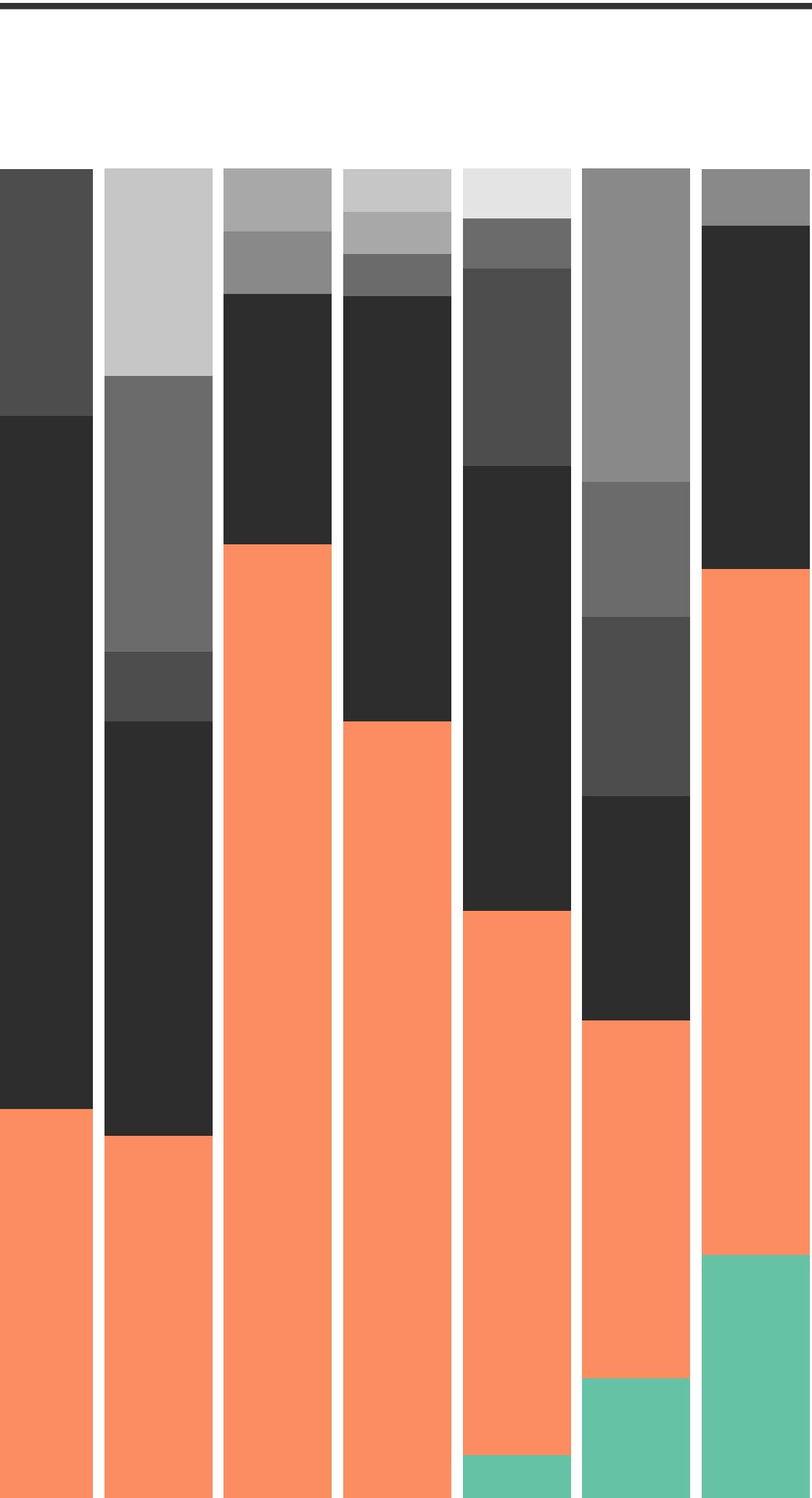
**map graphical elements to be consistent  
with the field/your other figures**

# A quick note about image formats

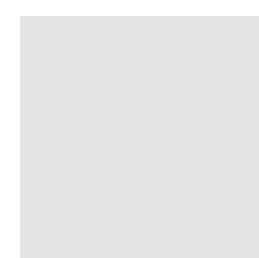
- Bitmap graphics (.bmp, .jpg, .png) contain a map of values for each pixel
  - Look good at the size they were intended to be viewed
  - Look distorted when resized
  - Only use for photos
- Vector graphics (.eps, .svg) represent an image as a series of equations
  - Scale perfectly to any size
  - Ideal for graphs

# GAIT MODIFICATION





# Activity



Fussing/comforting



Reading

# A quick note about image formats

- `ggsave()` can export either format
- Vector graphics software like Adobe Illustrator and Inkscape (free) can edit `.eps` to give you more flexibility

