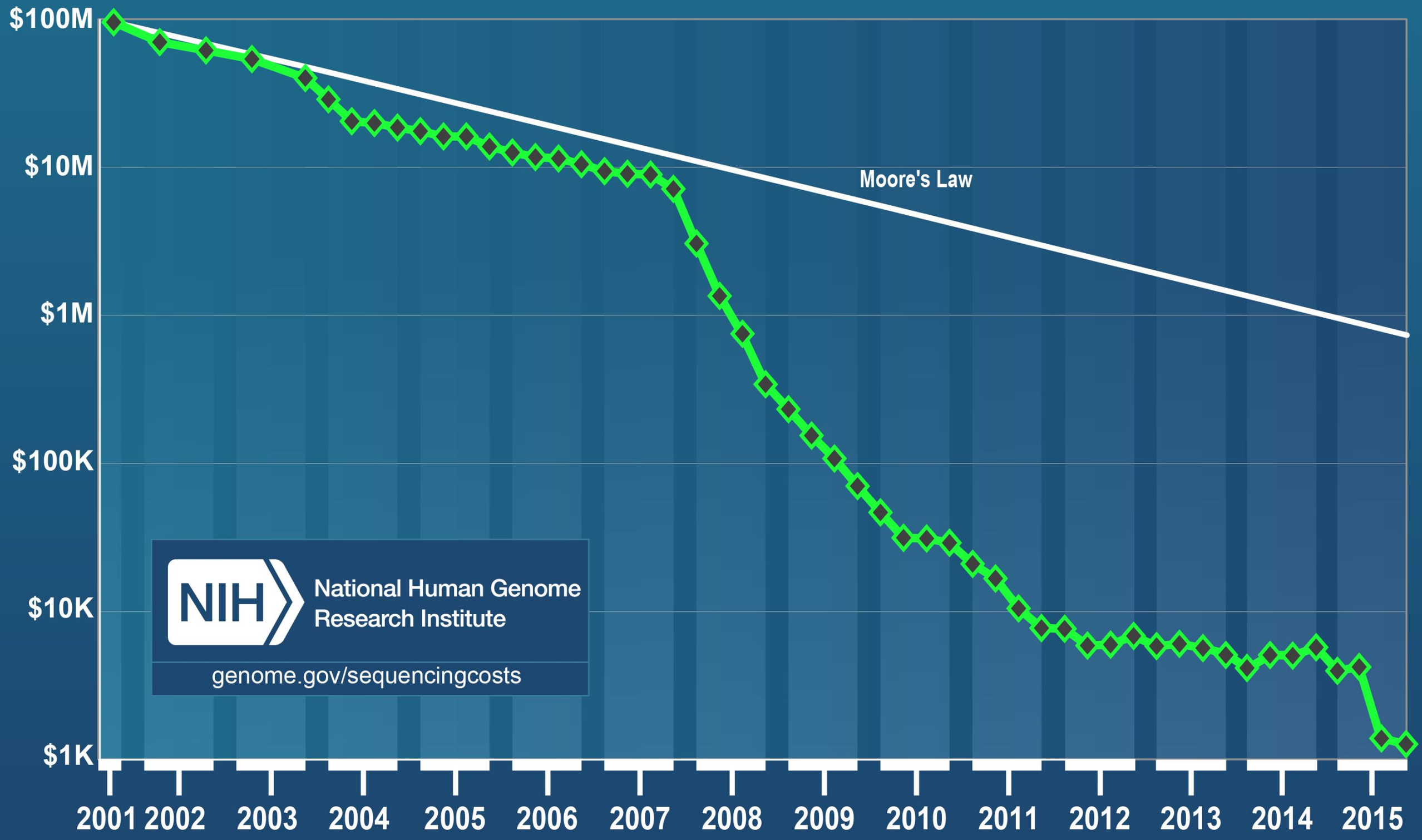
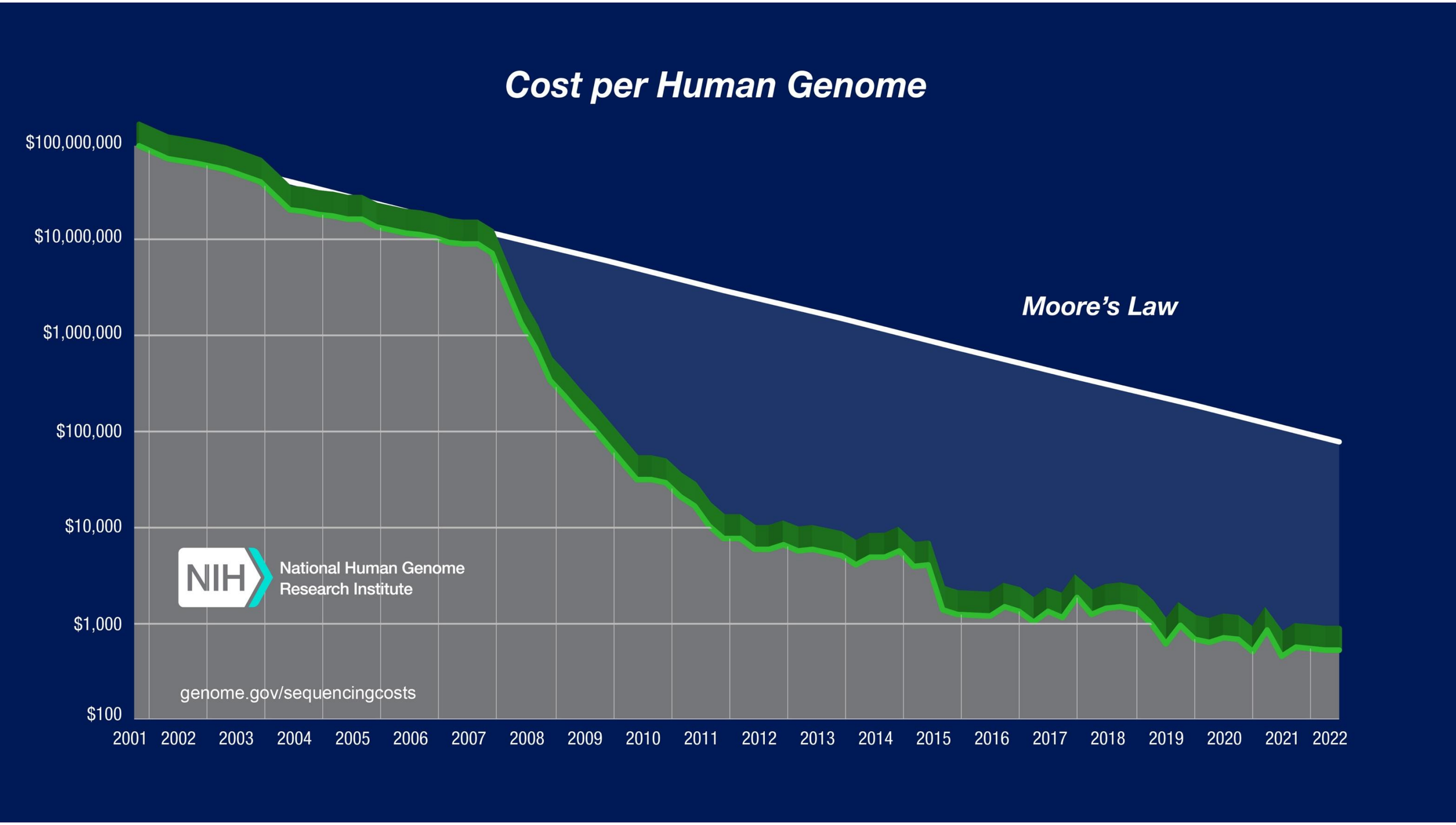
# Plotting and Visualization with R

https://r4ds.had.co.nz/data-visualisation.html
https://is.gd/ggplot

# Cost per Genome



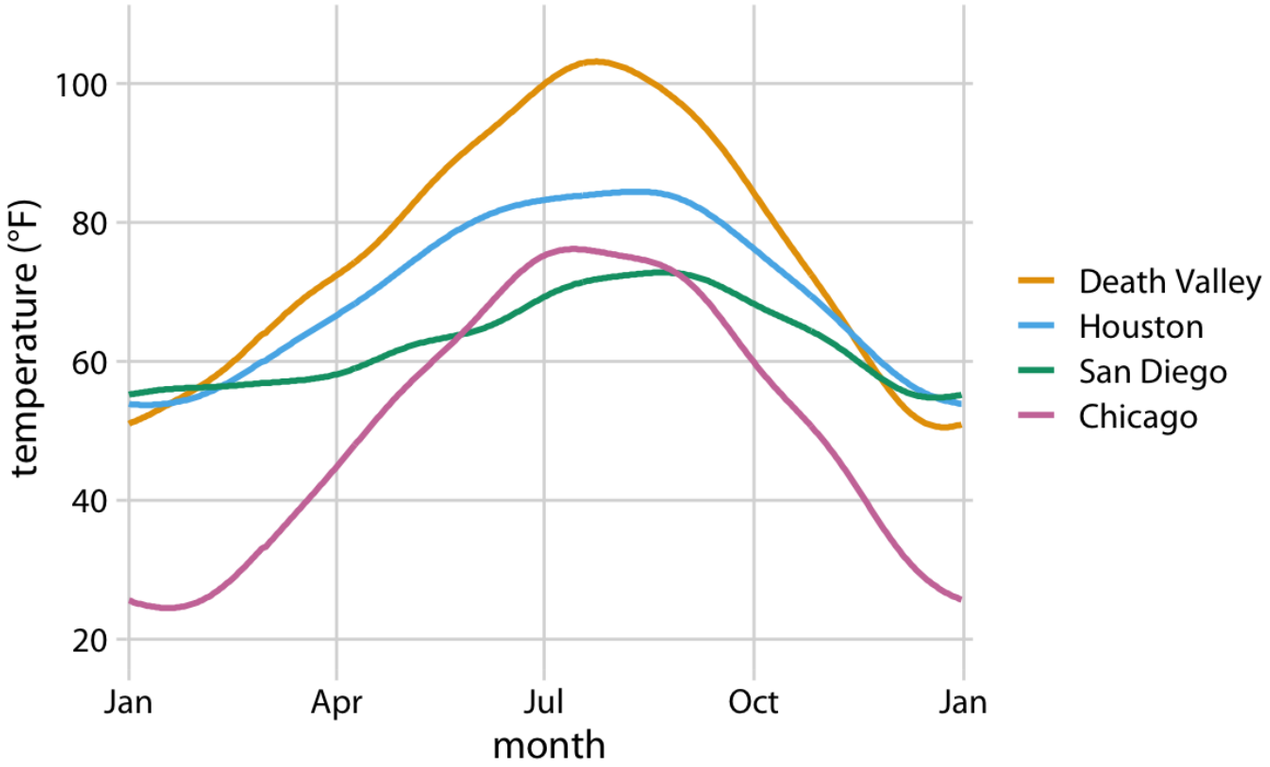

Cost per Human Genome
$100,000,000
$10,000,000
$1,000,000
$100,000
$10,000
$1,000
$100
Moore's Law
NIH
National Human Genome Research Institute
genome.gov/sequencingcosts
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022

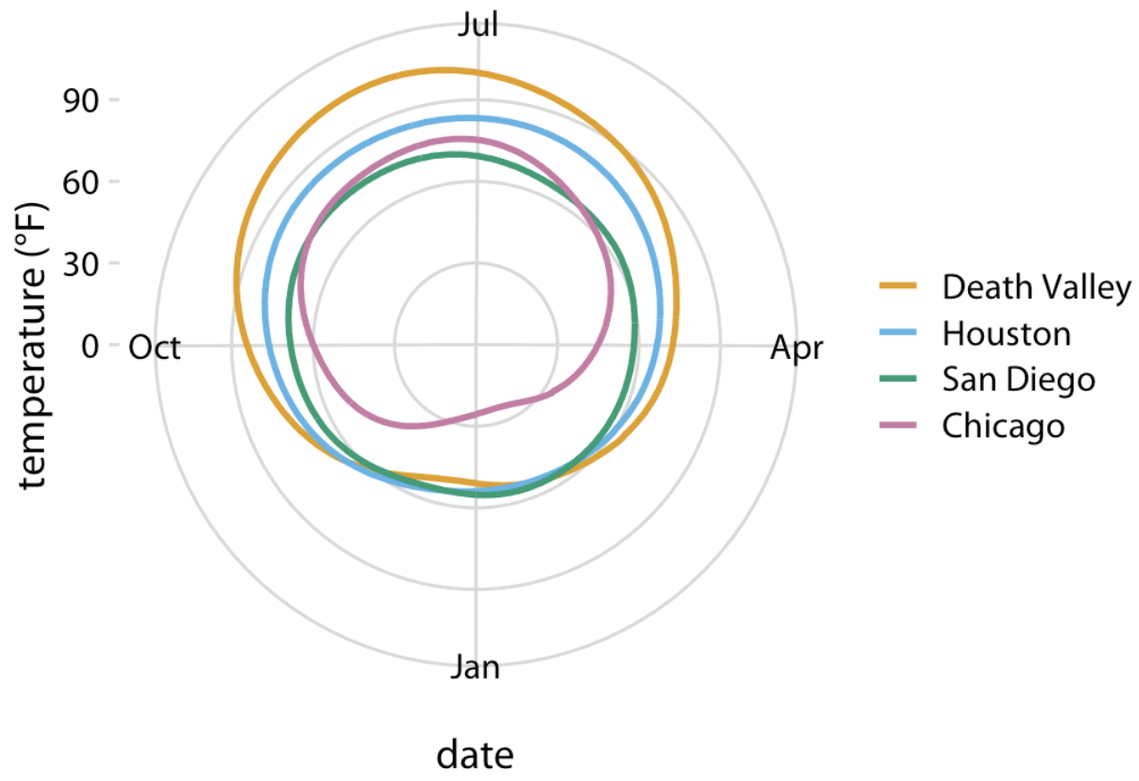

$100,000,000
$10,000,000
$1,000,000
$100,000
$10,000
$1,000
$100
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
Graphic Design
IS
MY
PASSION

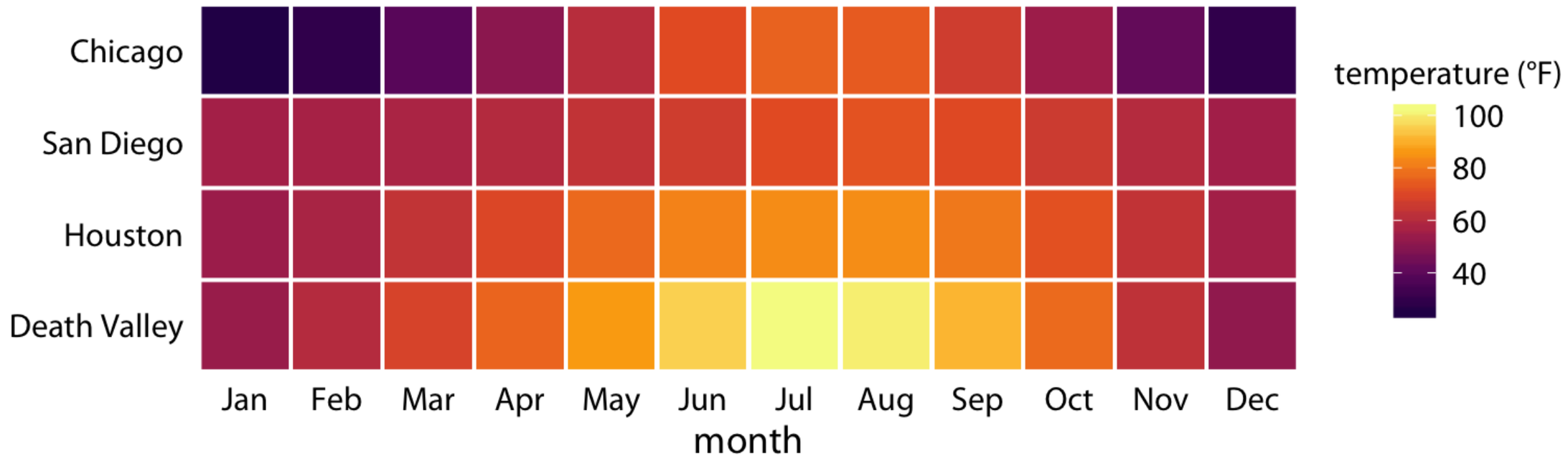
# Fundamentals of Data visualization

Adapted from https://clauswilke.com/dataviz/

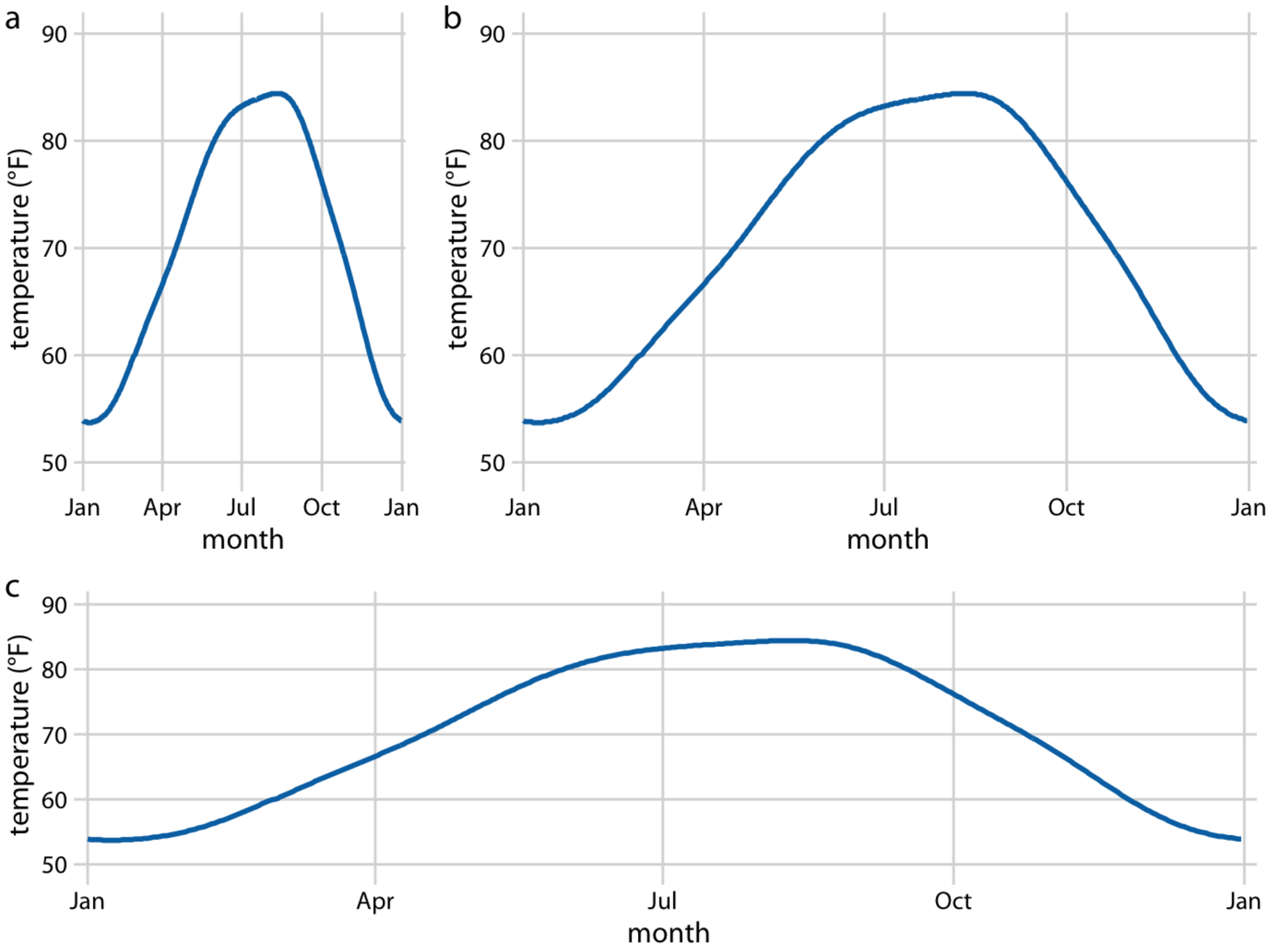
# Alternative representations



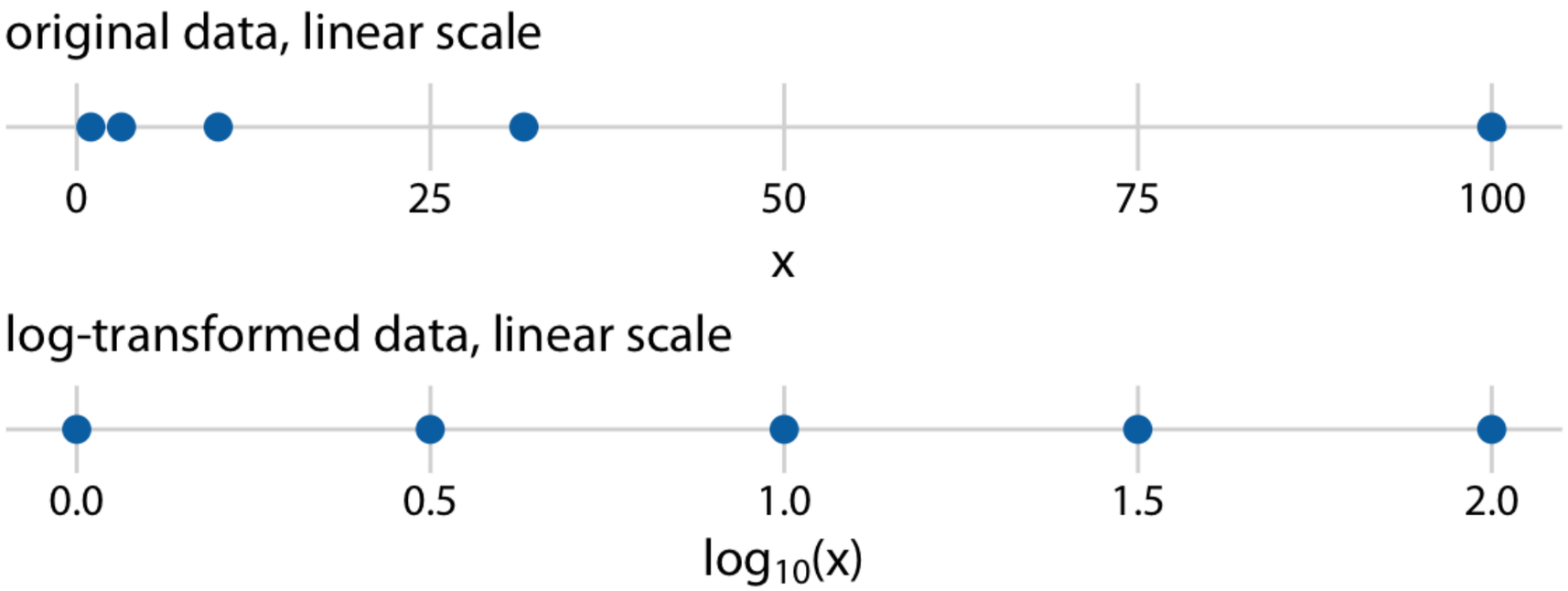



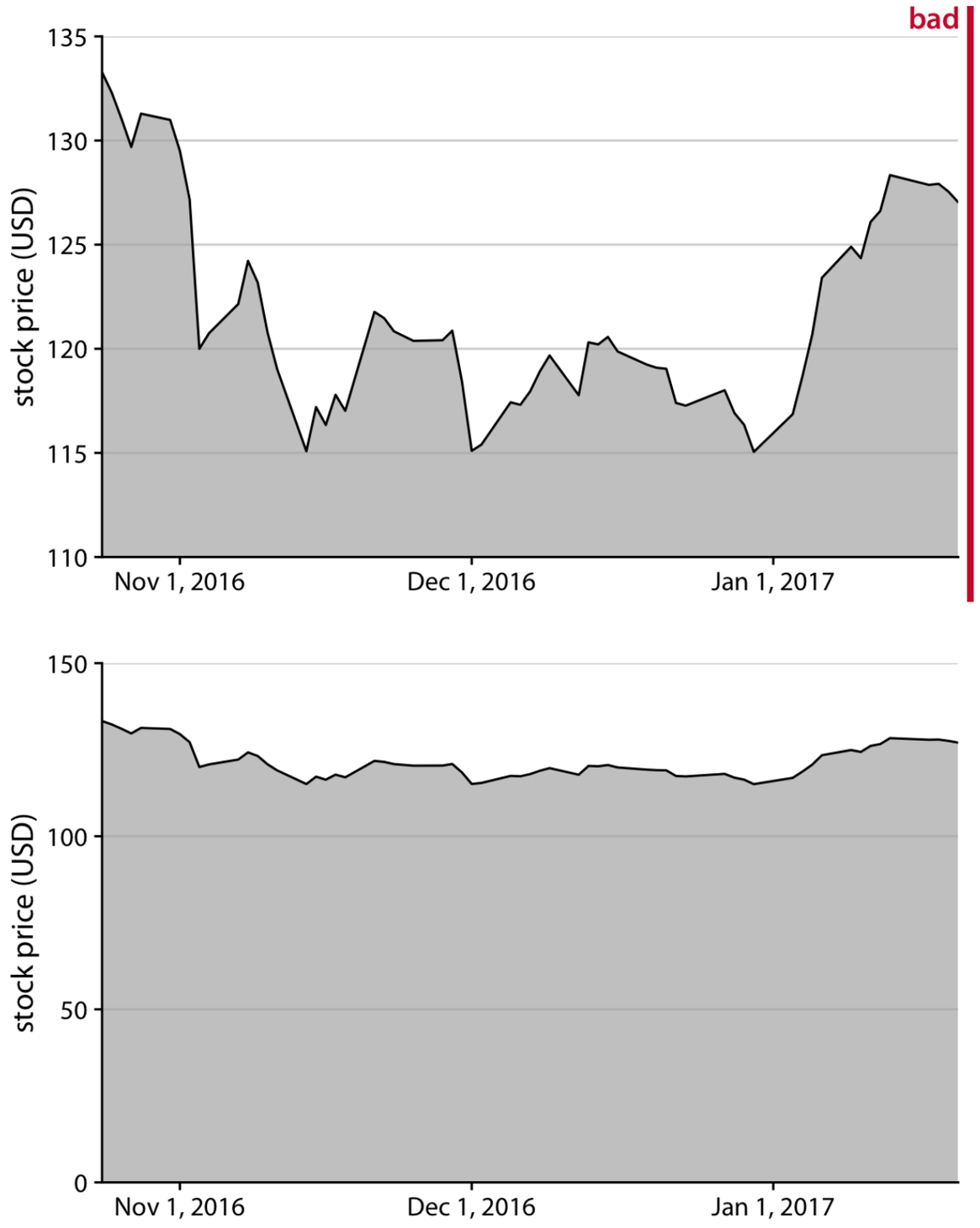
# Aspect ratio



# Scaling axes



# Scaling axes



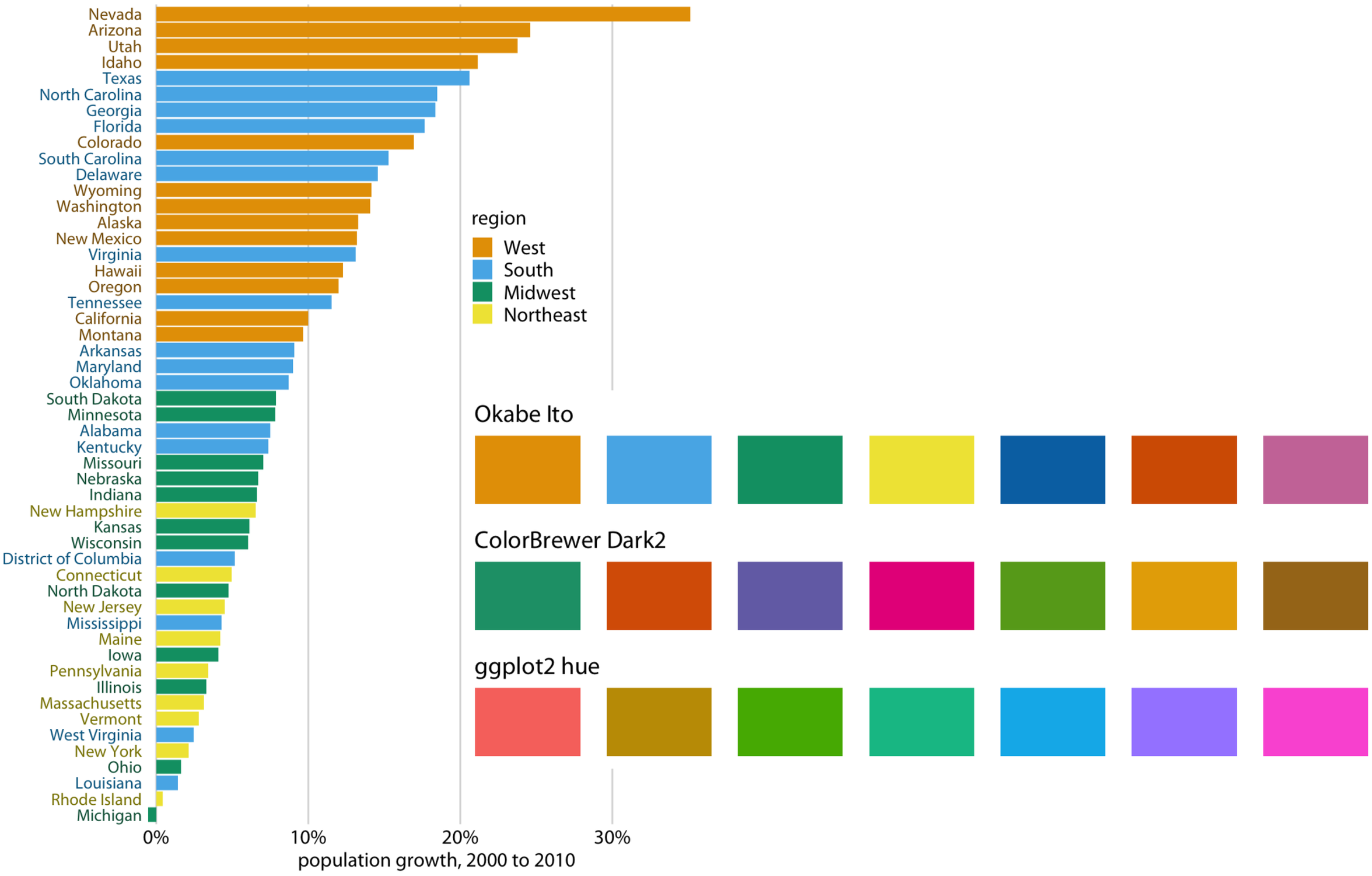
# Color scales – three uses

1) To distinguish between groups

2) To represent data values

3) To highlight

# Color to distinguish

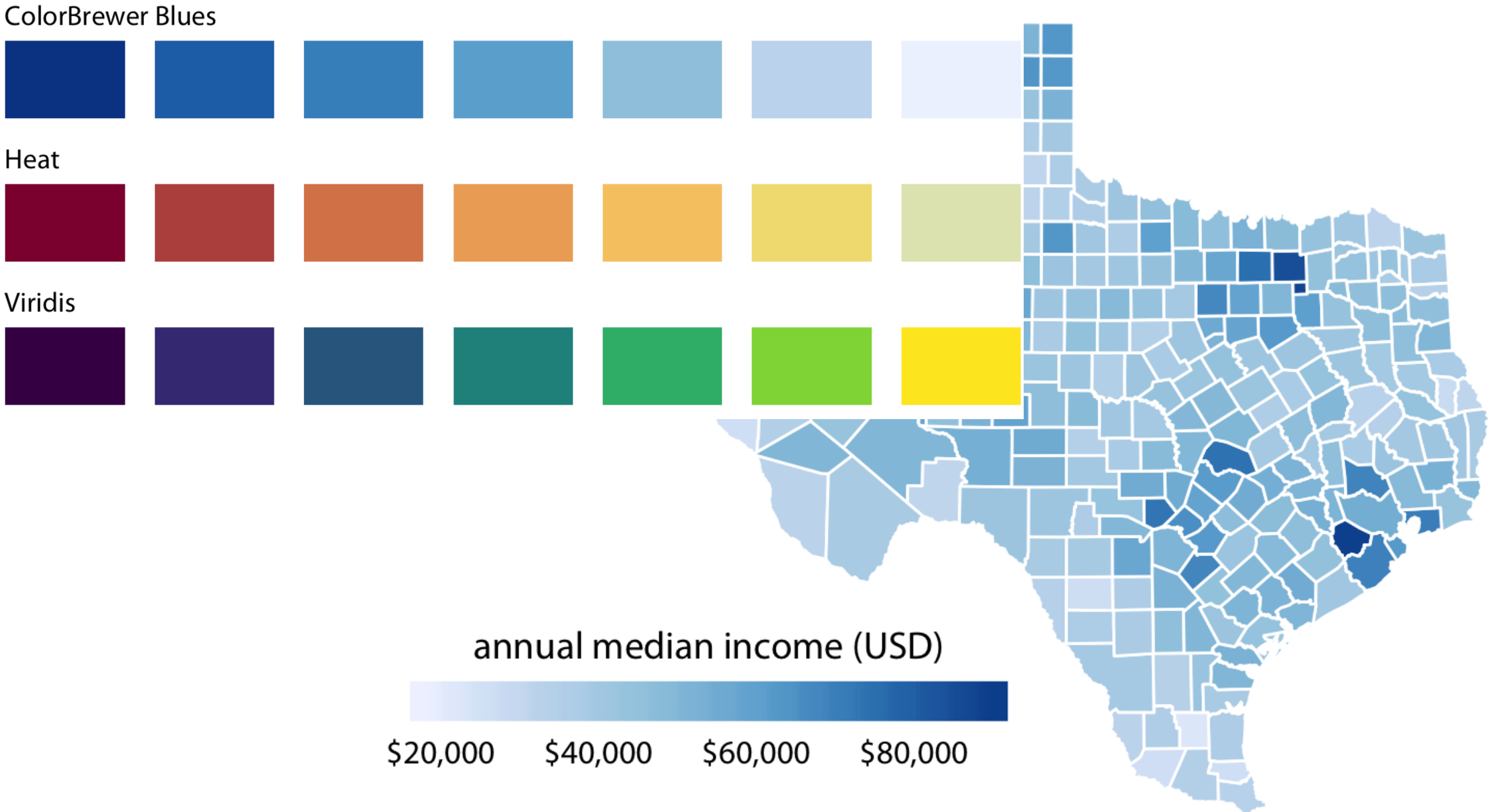


# Color to represent data values

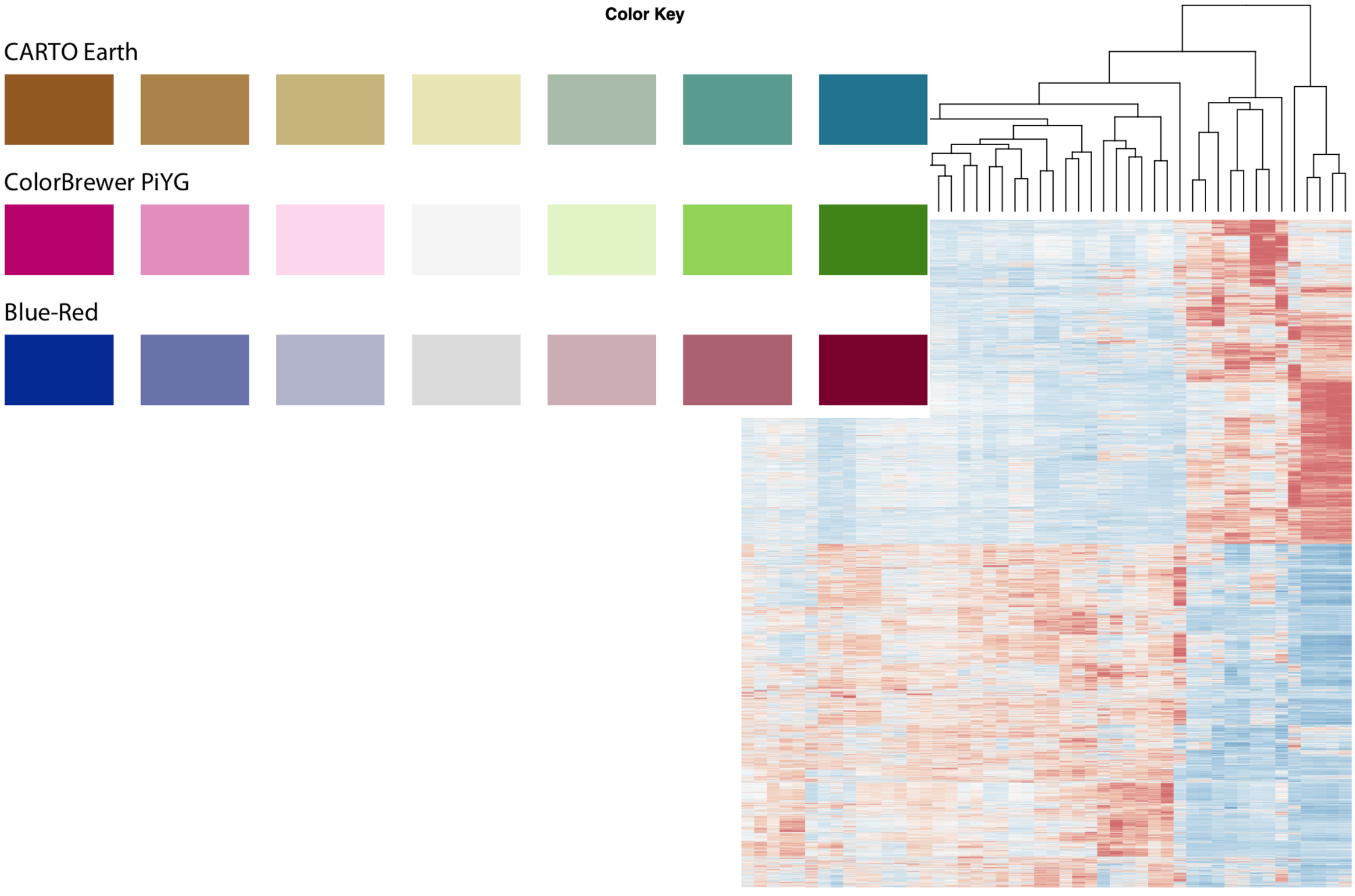
ColorBrewer Blues

Heat

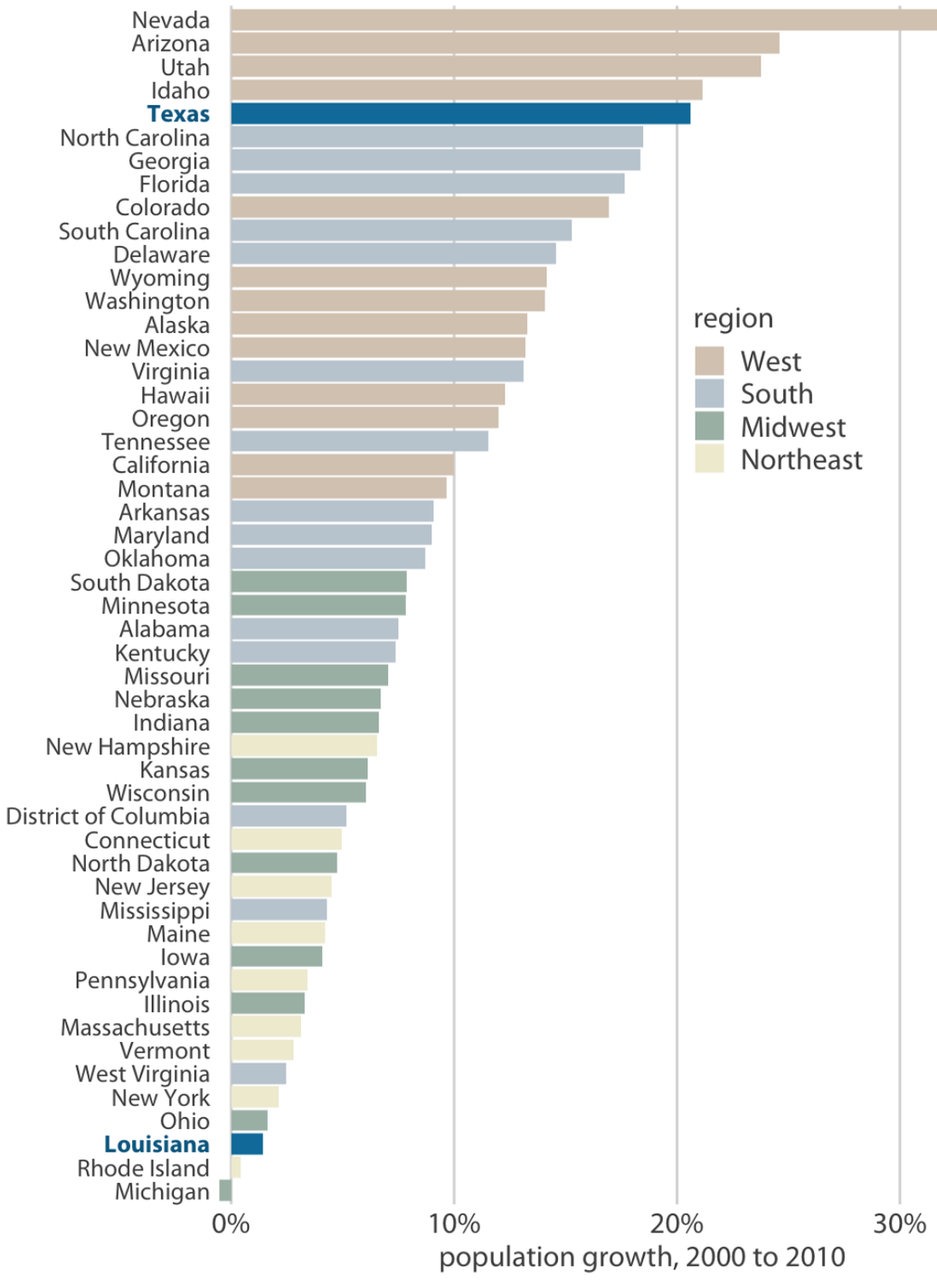
Viridis

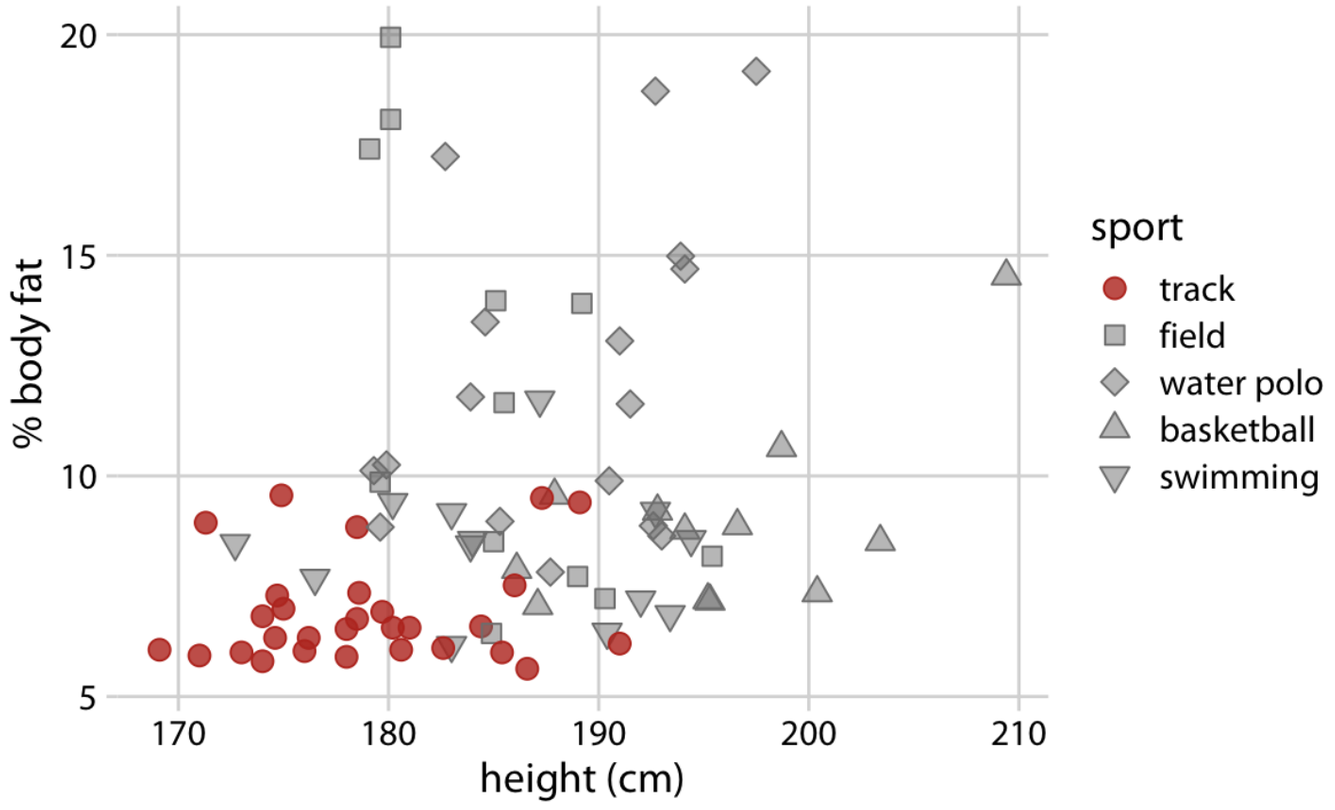


# Color to represent data values

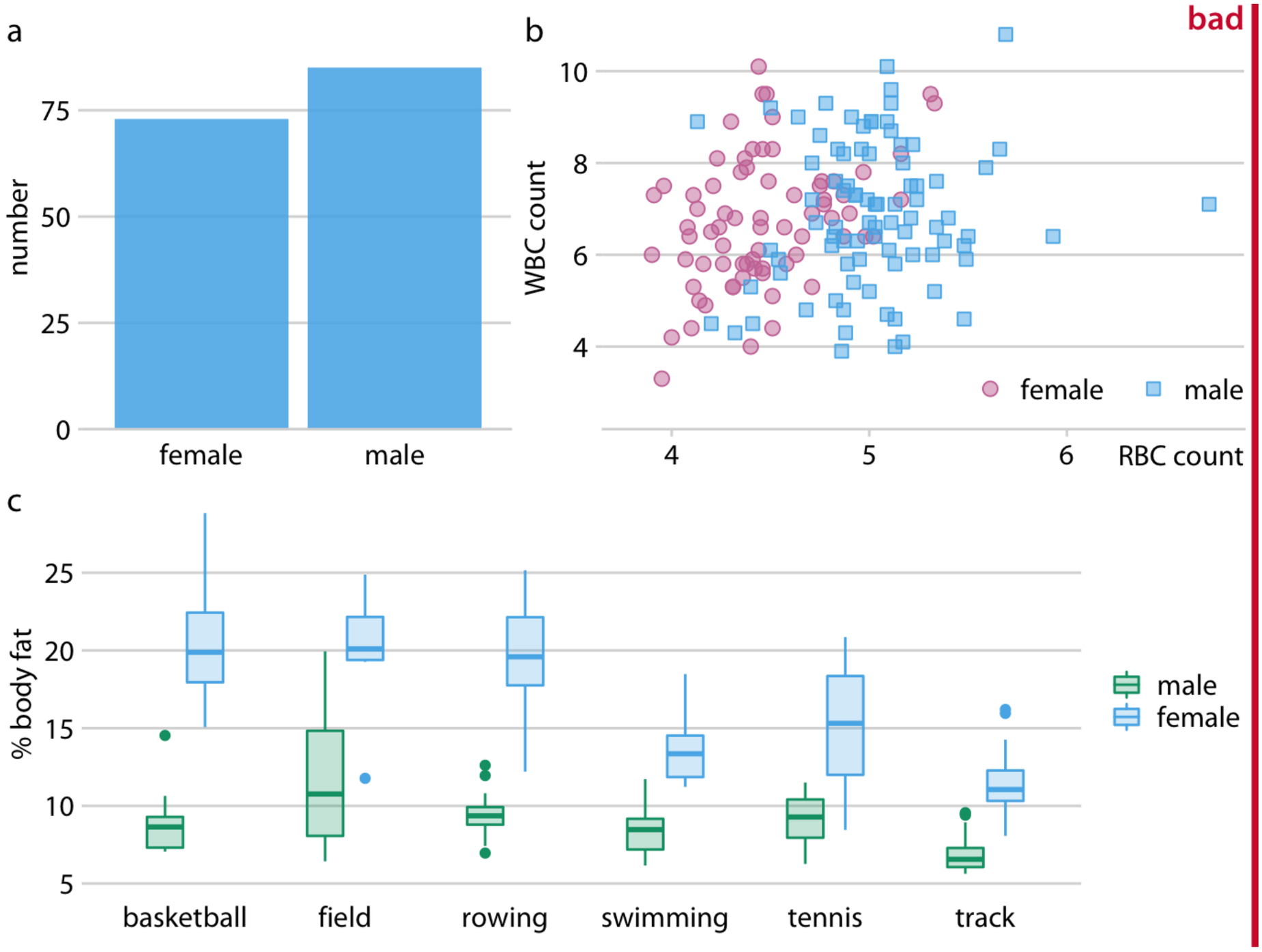


# Color to highlight

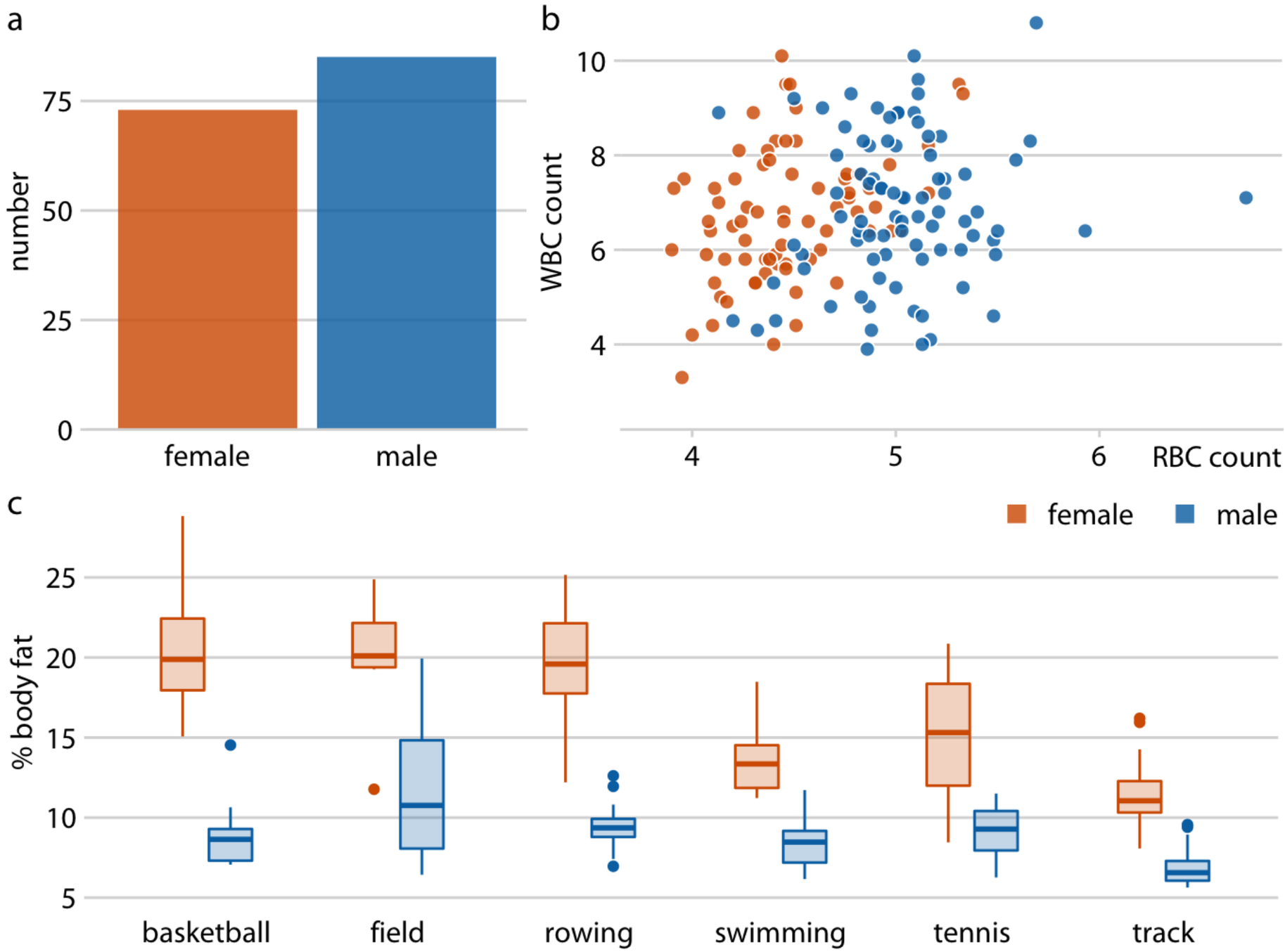


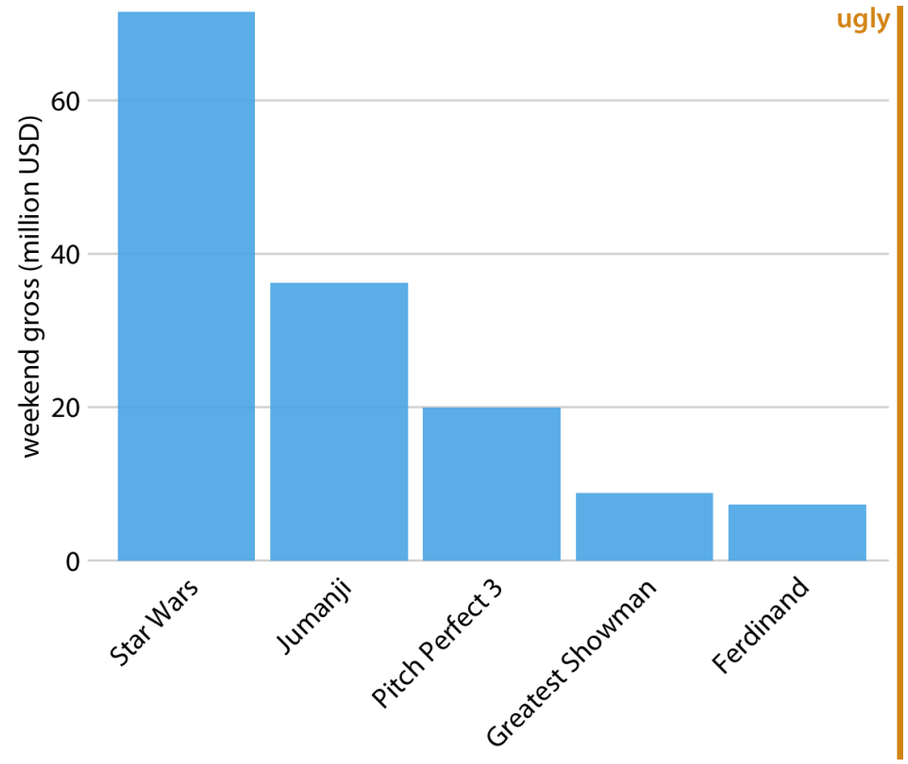
# Be consistent across panels and figures

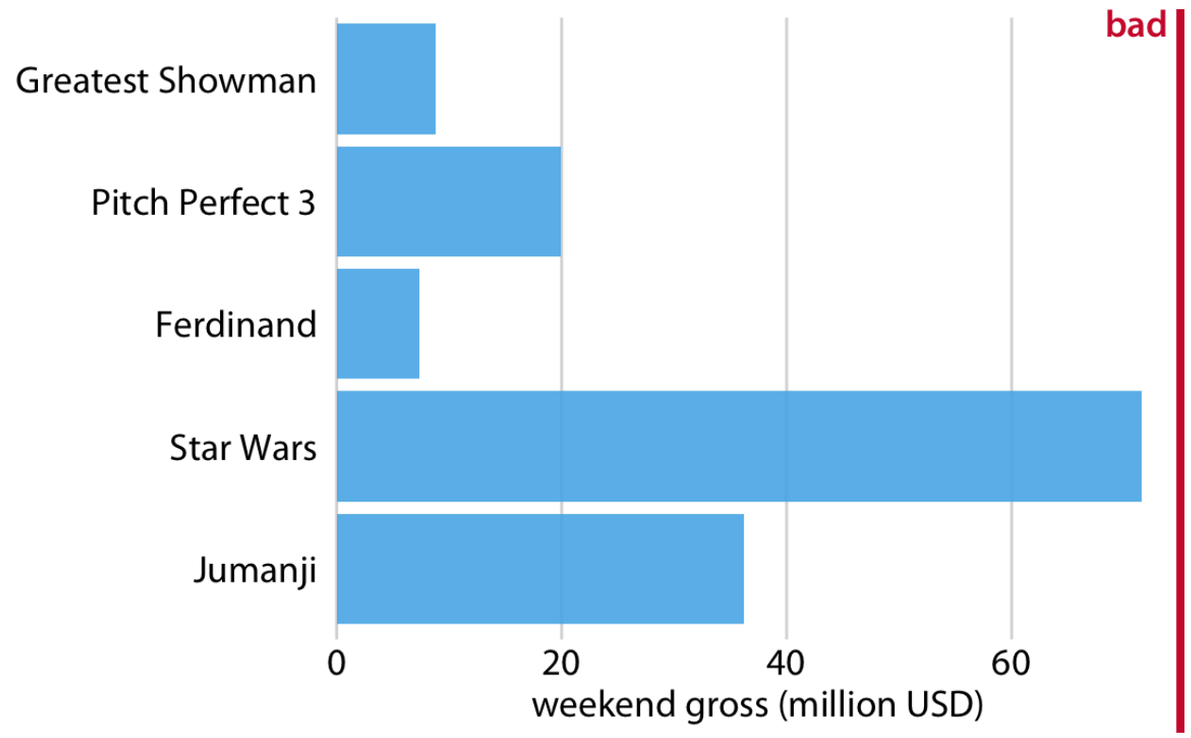


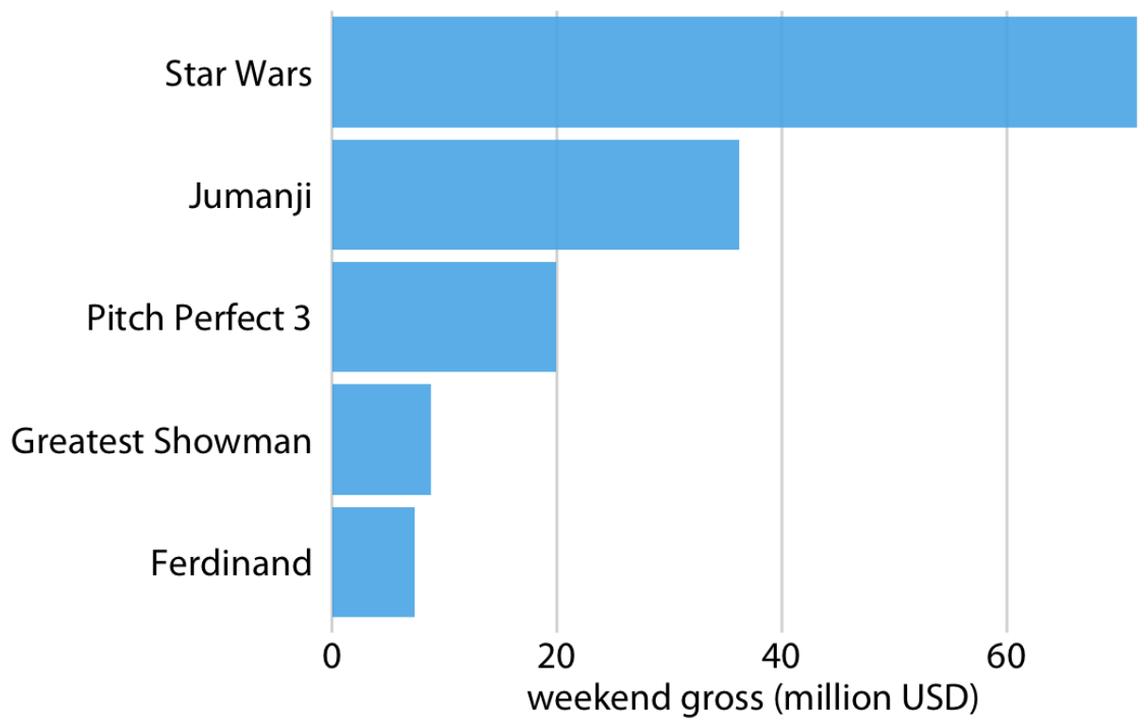
# Be consistent across panels and figures



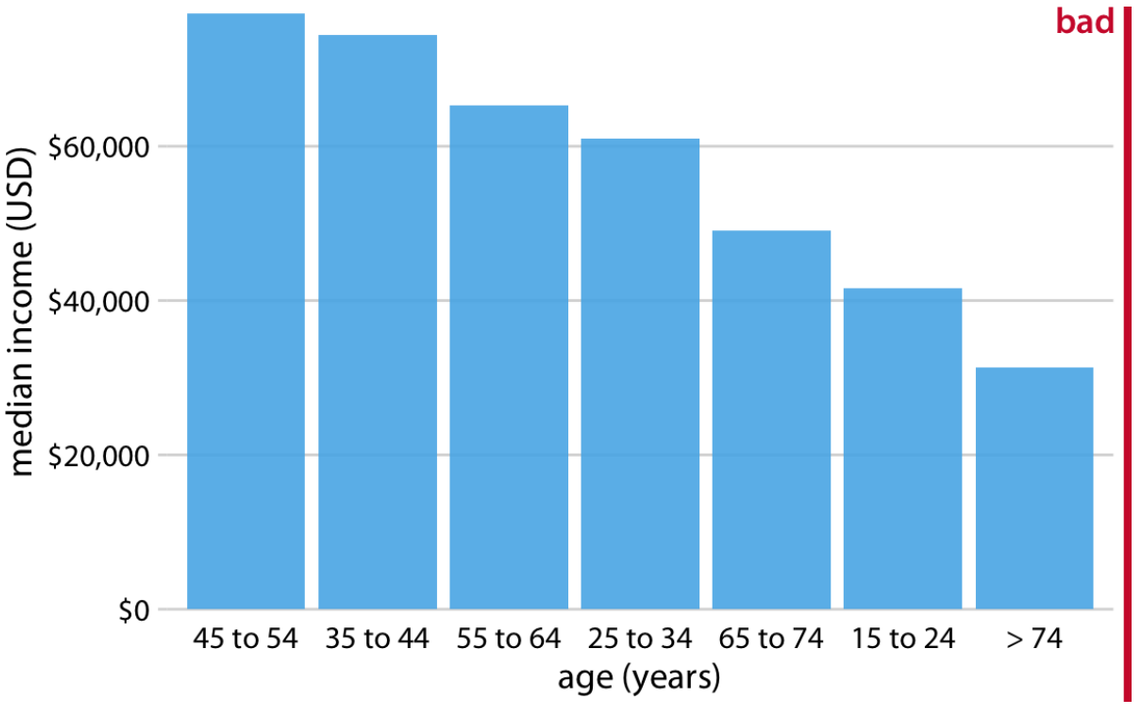
# Bar plots

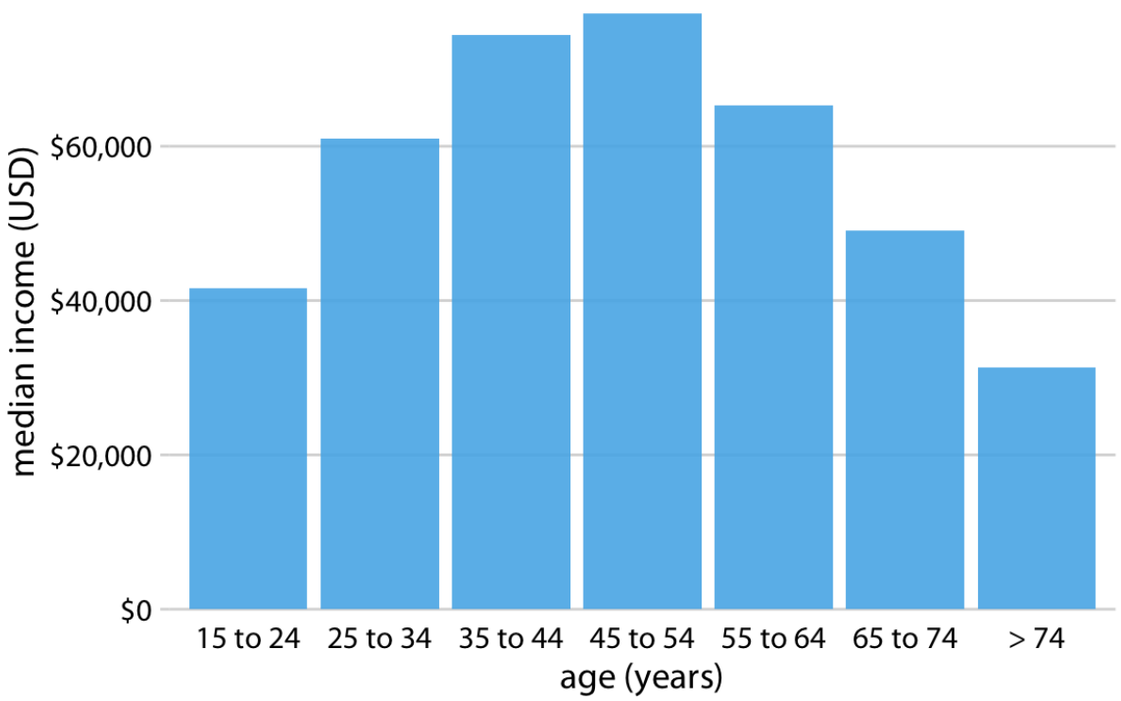

ugly
weekend gross (million USD)
60
40
20
0
Star Wars
Jumanji
Pitch Perfect 3
Greatest Showman
Ferdinand


bad
Greatest Showman
Pitch Perfect 3
Ferdinand
Star Wars
Jumanji
0
20
40
60
weekend gross (million USD)

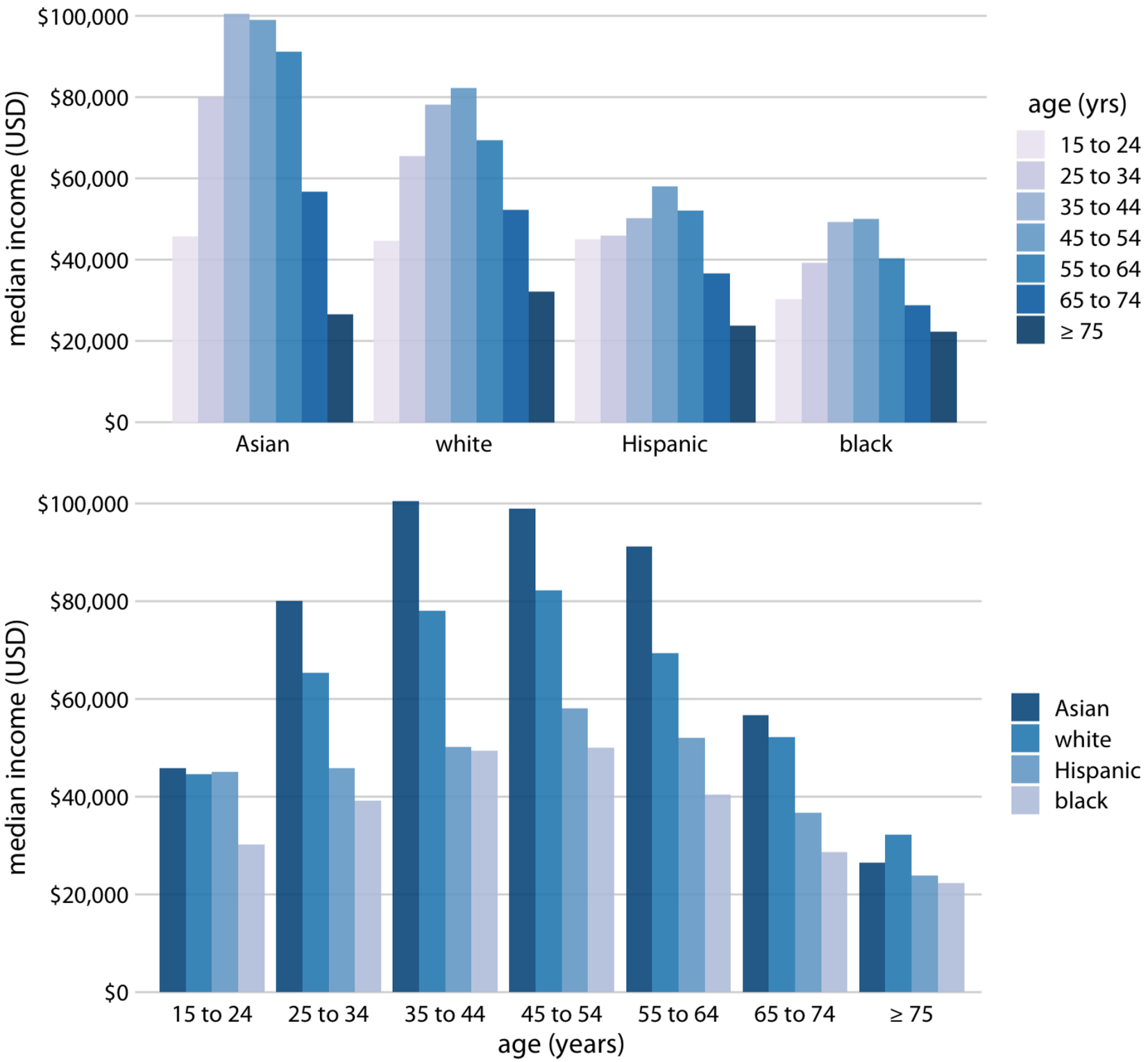

Star Wars
Jumanji
Pitch Perfect 3
Greatest Showman
Ferdinand
0
20
40
60
weekend gross (million USD)

# Bar plots

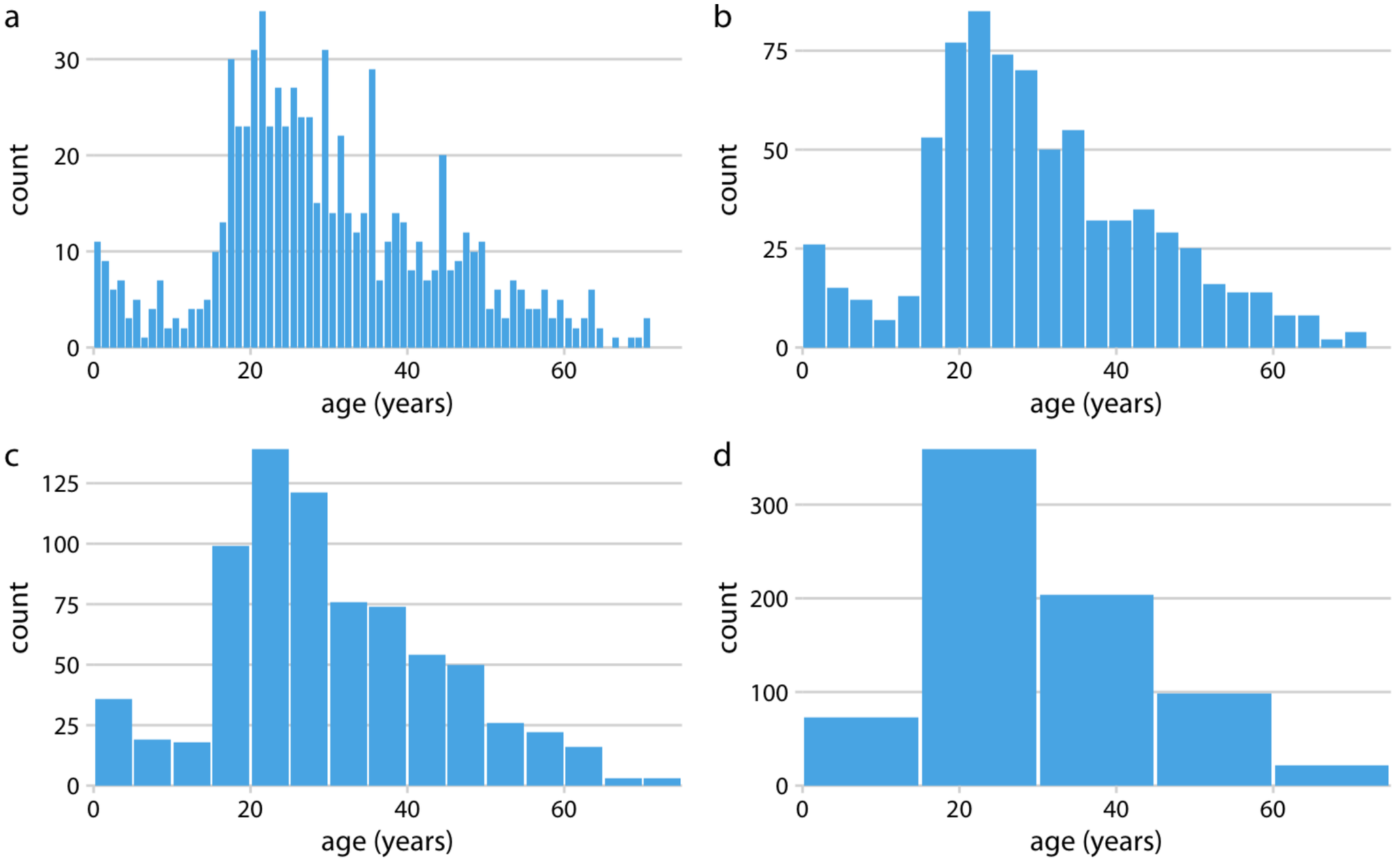

bad
$60,000
$40,000
$20,000
$0
median income (USD)
45 to 54
35 to 44
55 to 64
25 to 34
65 to 74
15 to 24
> 74
age (years)


$60,000
$40,000
$20,000
$0
median income (USD)
15 to 24
25 to 34
35 to 44
45 to 54
55 to 64
65 to 74
> 74
age (years)

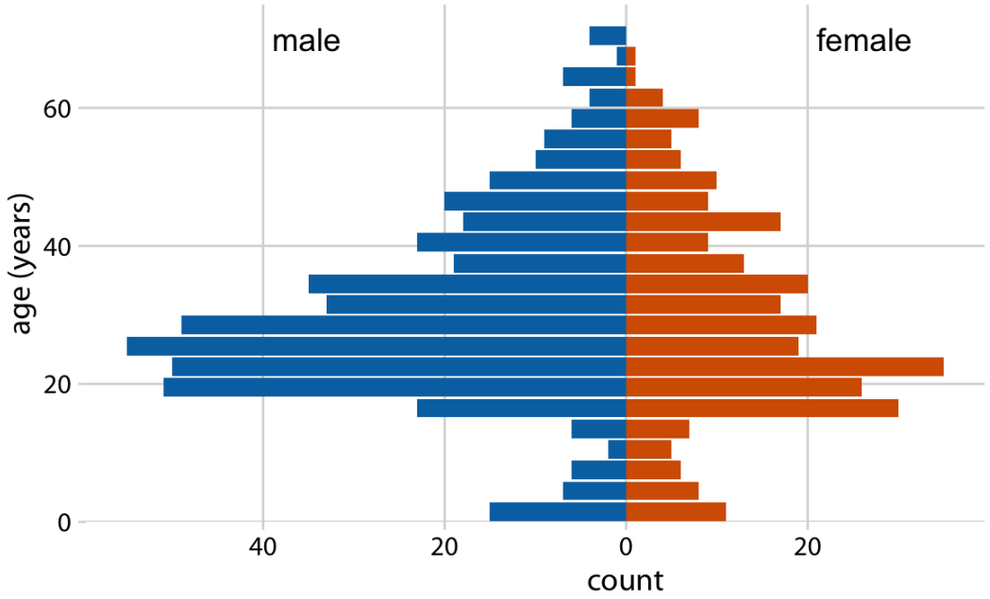
# Grouped Bar Plots

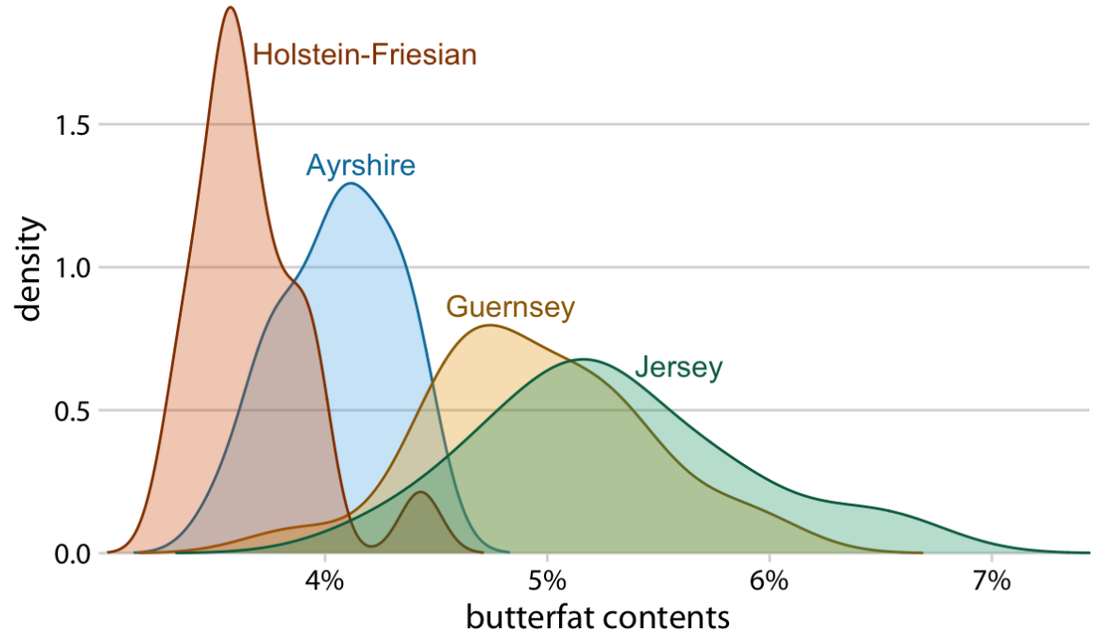


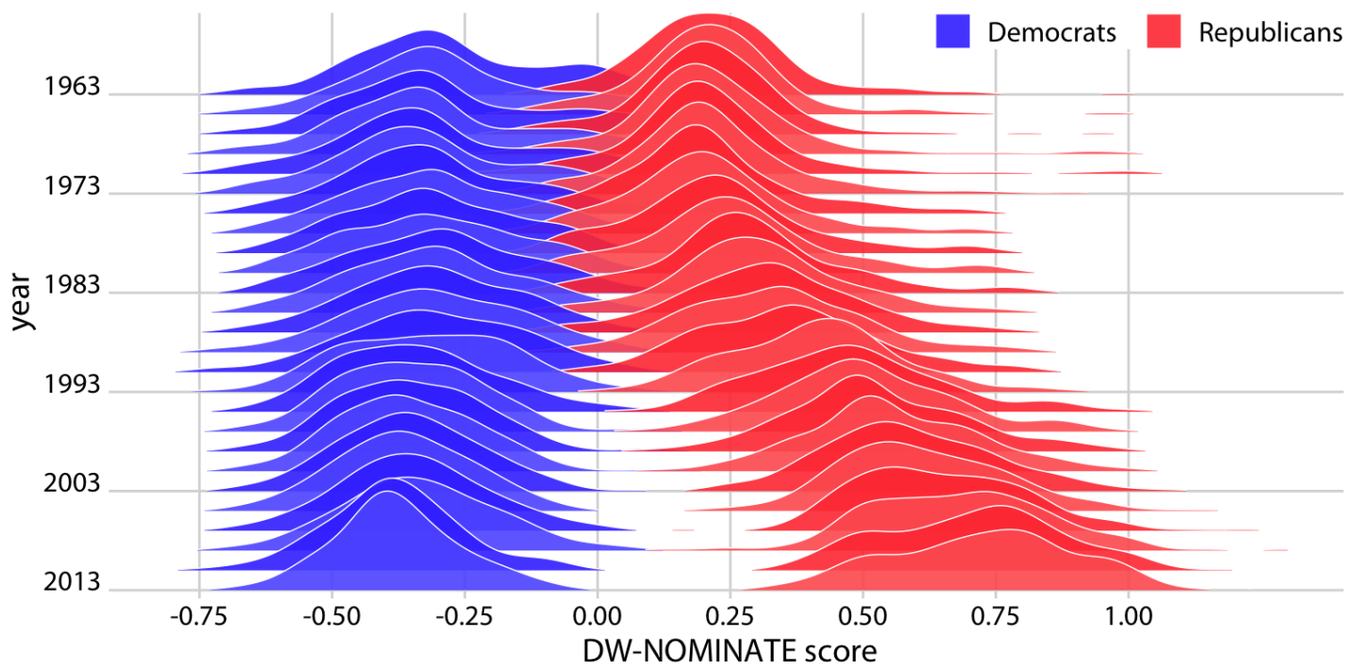
# Granularity of your data

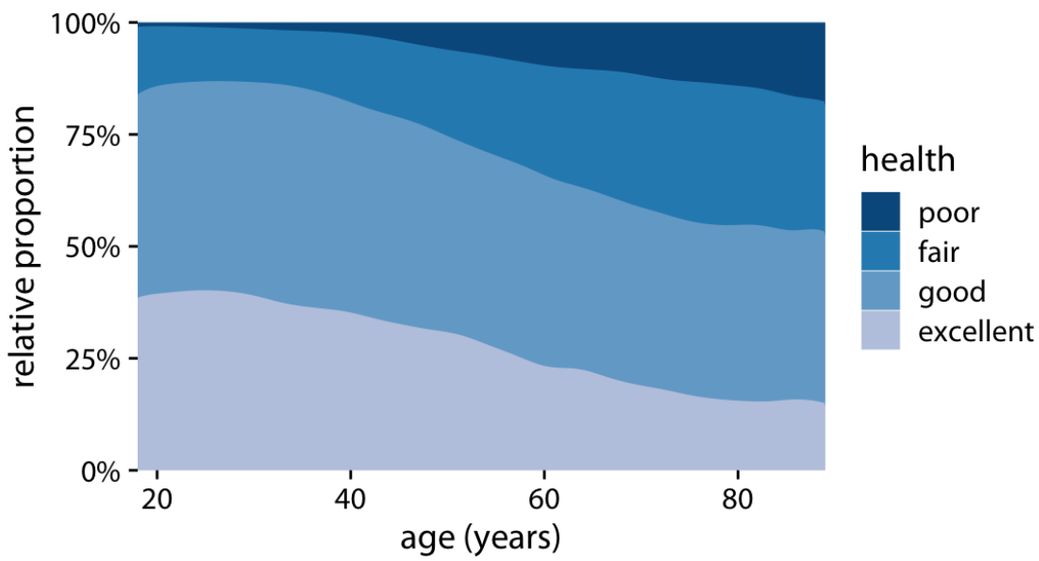


# Expose yourself to lots of ideas!



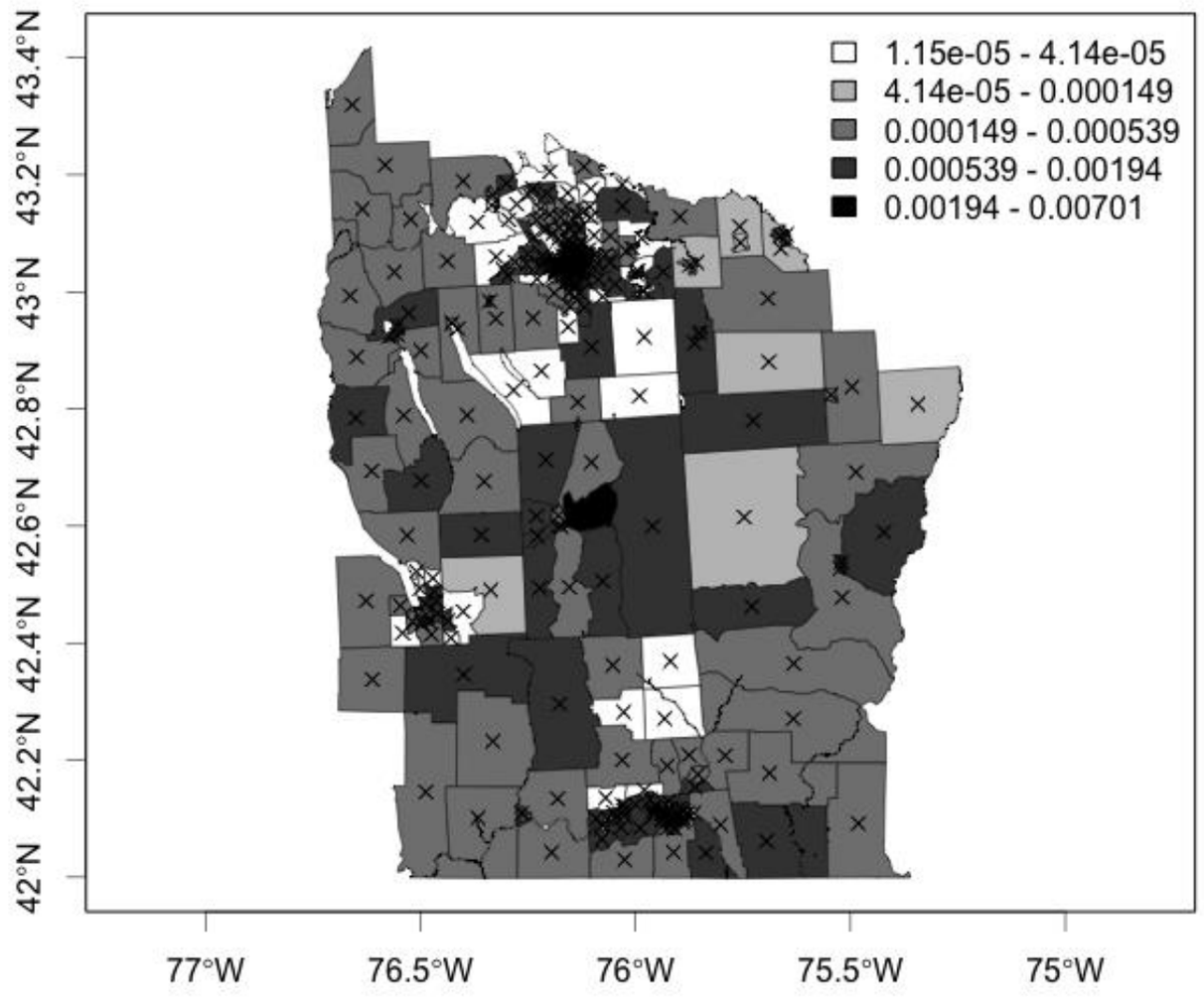



# Advanced and Other Applications in R

# Spatial Epidemiology and Maps

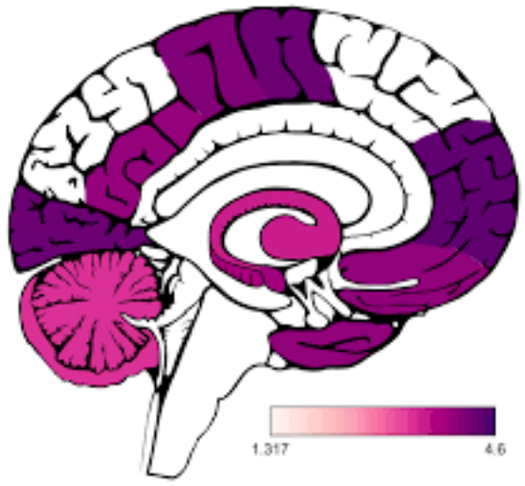
```
library(SpatialEpi)

data(NYleukemia)
sp.obj <- NYleukemia$spatial.polygon
centroids <- latlong2grid(NYleukemia$geo[, 2:3])
population <- NYleukemia$data$population
cases <- NYleukemia$data$cases

plotmap(cases/population, sp.obj, log=TRUE, nclr=5)
points(grid2latlong(centroids), pch=4)
```



# Anatomical Mapping

## CerebroViz

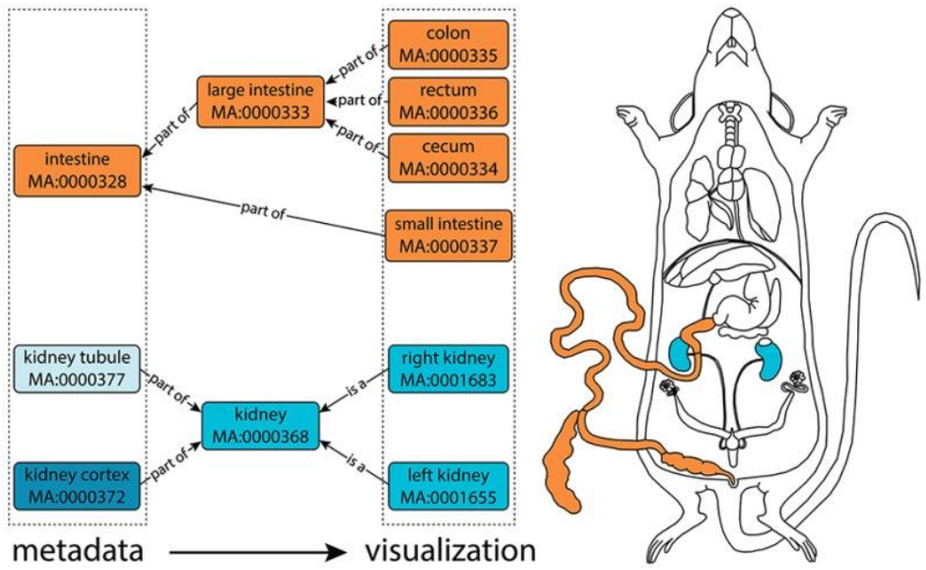
https://github.com/ethanbahl/cerebroViz




```
library("cerebroViz")
data(cerebroEx)
head(cerebroEx)[, c(1:7)]
```

## COMICS

https://github.com/y-popov/COMICS



# Animation / Interactivity

| Indicator Name | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Average | Improvement |
|---|---|---|---|---|---|---|---|---|
| Prevalence of Obesity | 19.1 | 23.6 | 23.3 | 20.5 | 24.0 | 23.2 | 22.28 | -21.47 |
| Prevalence of Tobacco Use | 17.4 | 15.0 | 15.3 | 12.2 | 16.6 | 16.7 | 15.53 | 4.02 |
| Prevalence of Cardiovascular Disease | 5.0 | 4.9 | 1.5 | 4.4 | 4.9 | 6.2 | 4.48 | -24.00 |
| Prevalence of Diabetes | 8.0 | 7.2 | 9.3 | 7.2 | 7.5 | 10.4 | 8.27 | -30.00 |