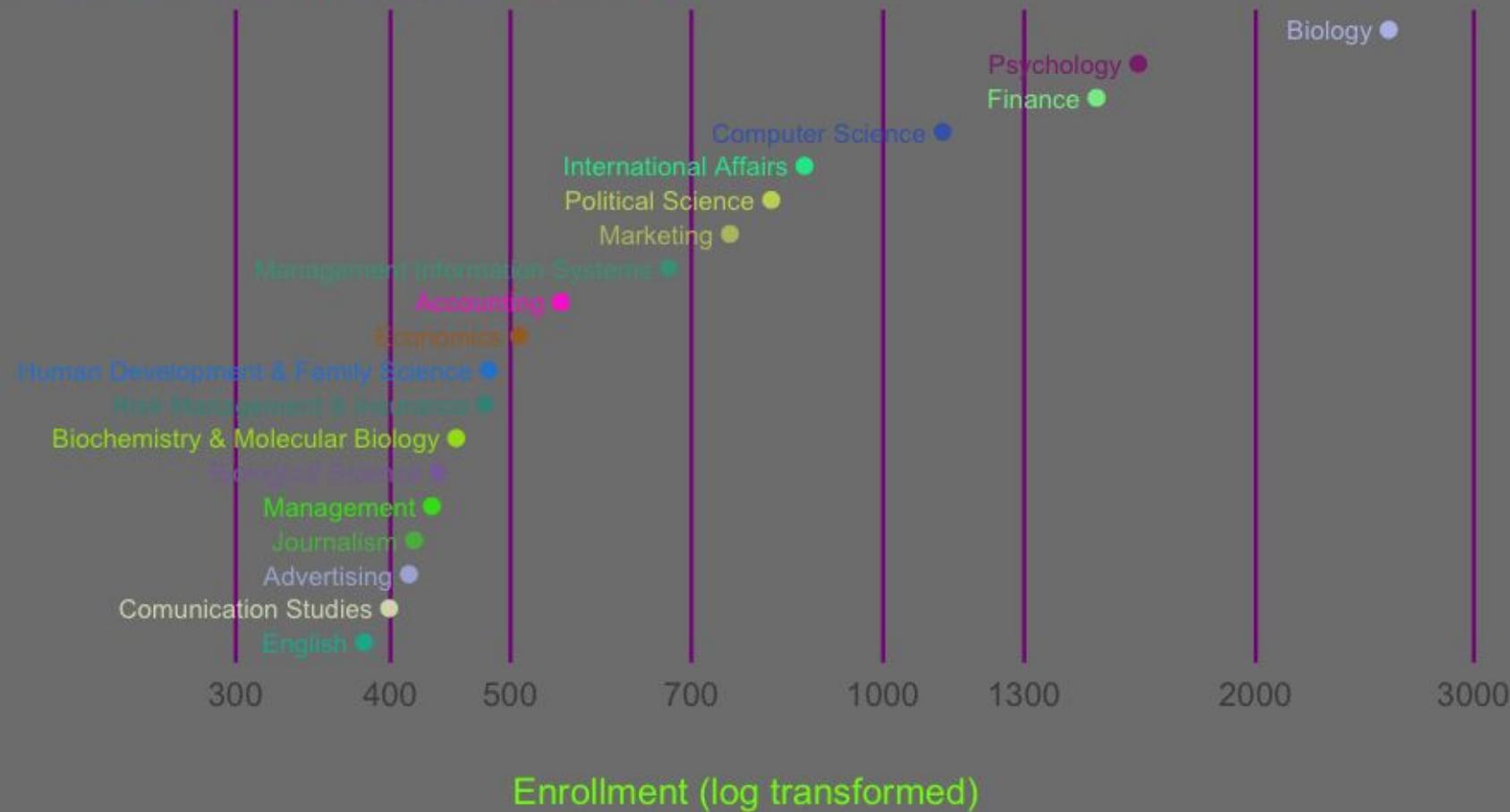


Send the right message: The dos and don'ts of color in data visualization

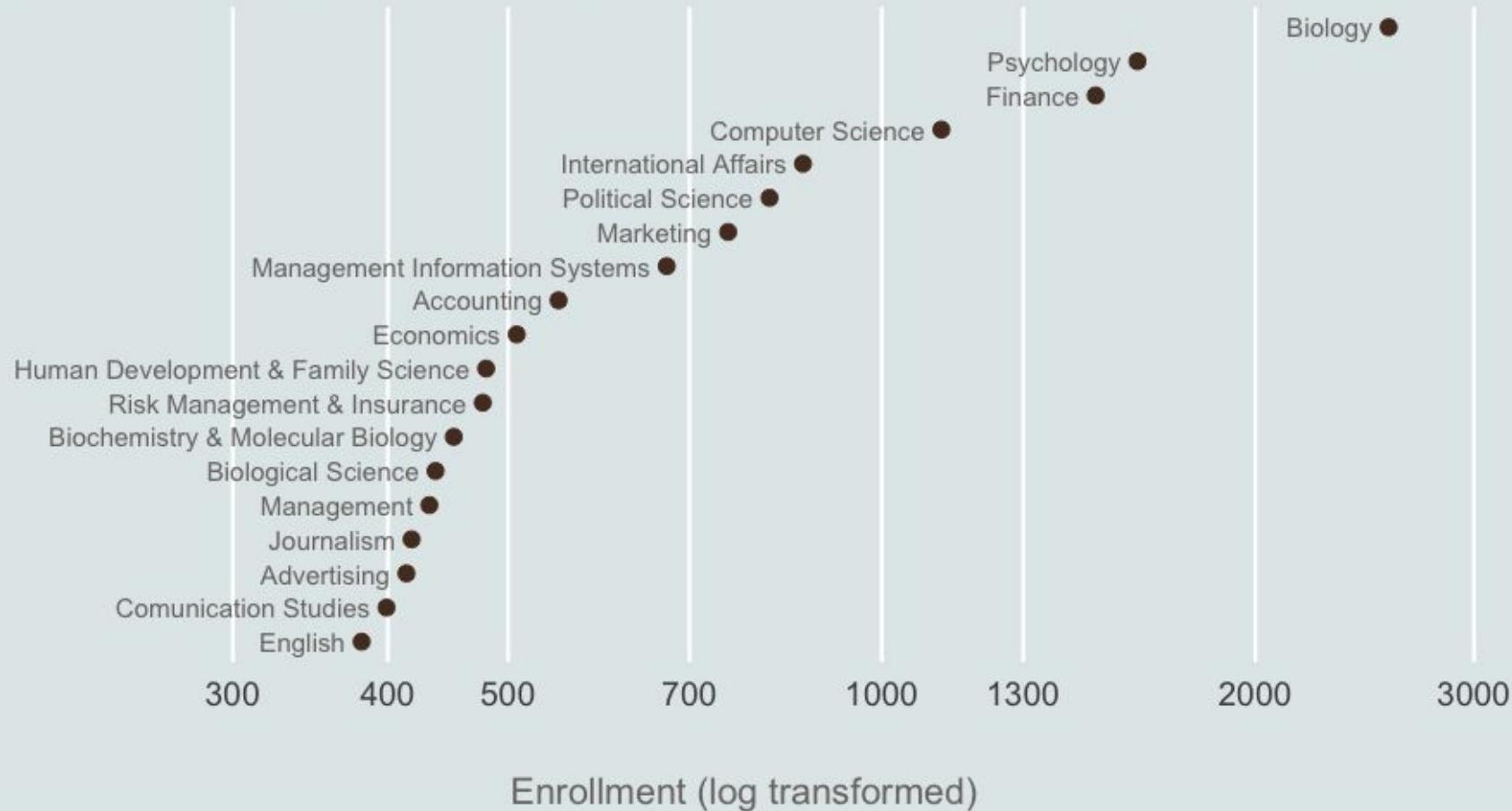
Joey Stanley & Meagan Duever

October 23, 2019
DigiLab, UGA

Top UGA Undergraduate Degrees

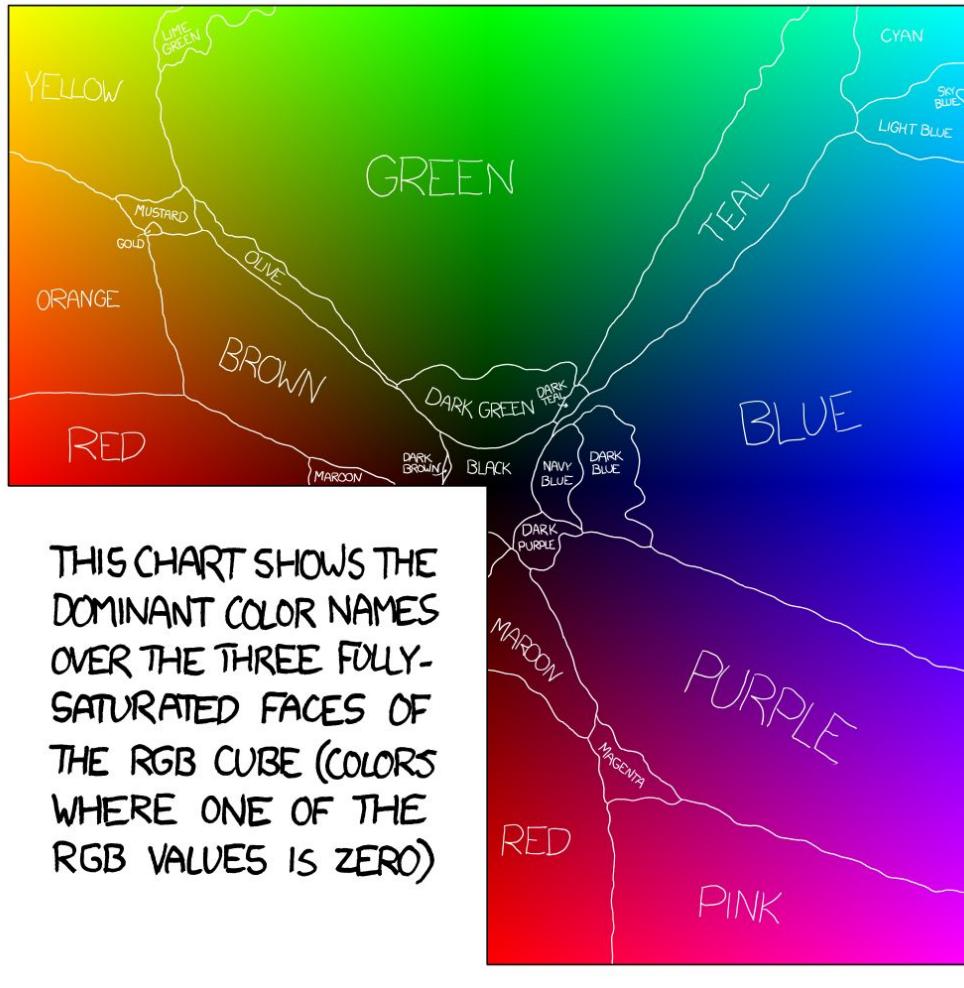


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General Principles of Color





THIS CHART SHOWS THE DOMINANT COLOR NAMES OVER THE THREE FULLY-SATURATED FACES OF THE RGB CUBE (COLORS WHERE ONE OF THE RGB VALUES IS ZERO)

Three dimensions of color

- hue, lightness, and saturation

- Hue = color



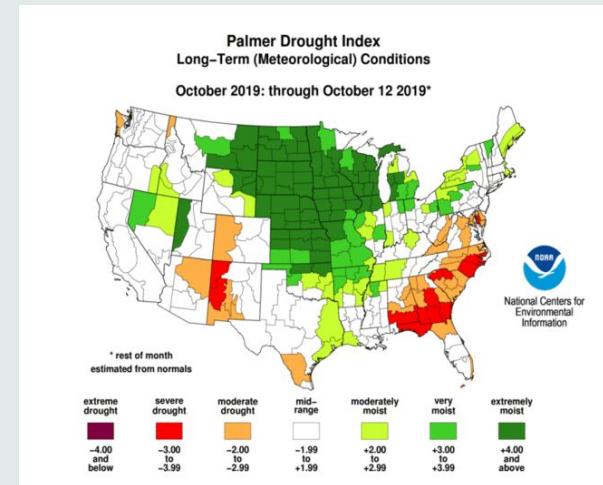
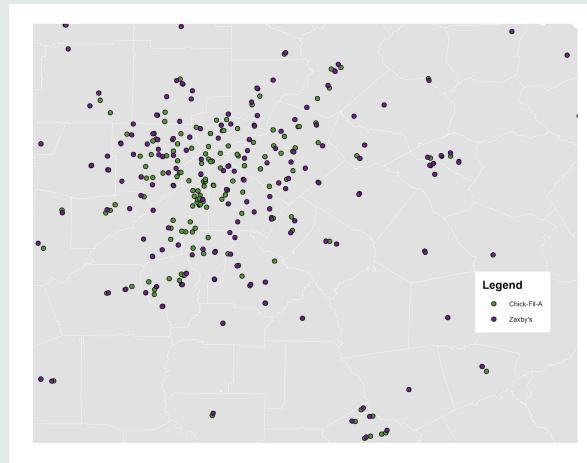
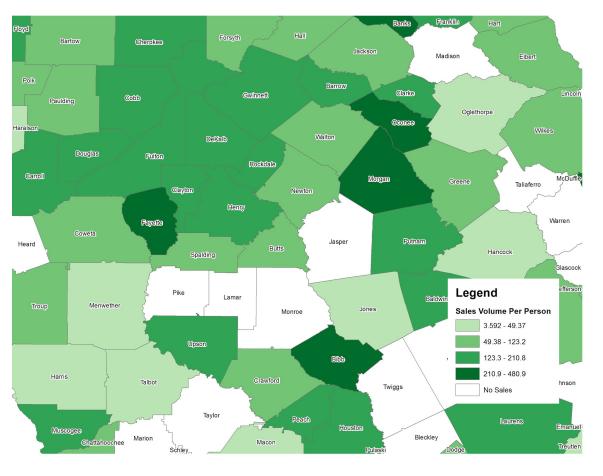
- Lightness - measures the relative degree of black or white that's been mixed with a given hue. Adding white makes the color lighter (creates tints) and adding black makes it darker (creates shades).



- Saturation - how pure or intense a color is; the more saturated a color, the more vivid or brighter it appears
 - Compare your phone display on low power vs fully charged

Your data determines the color scheme

- Sequential (continuous), categorical, diverging



Color Blindness

Color Blindness Simulator: <https://www.color-blindness.com/coblis-color-blindness-simulator/>

deuteranomaly—difficulty perceiving green

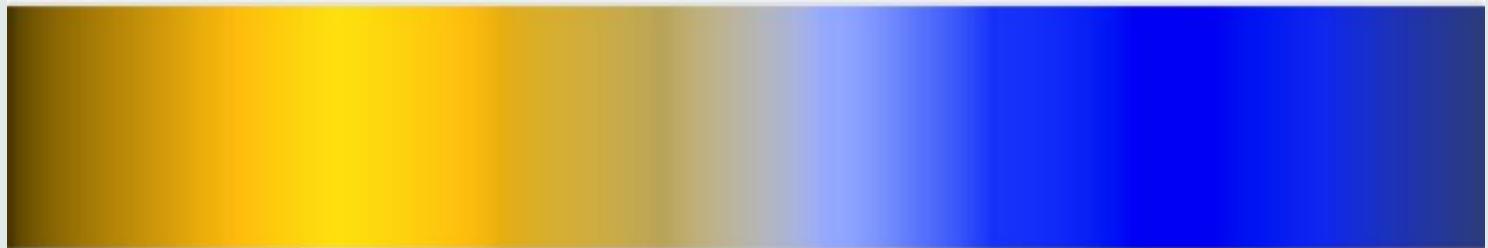
protanomaly—difficulty perceiving red

tritanomaly—confuse blue with green and yellow with violet.

original



deuteranomaly



protanomaly



tritanomaly



original



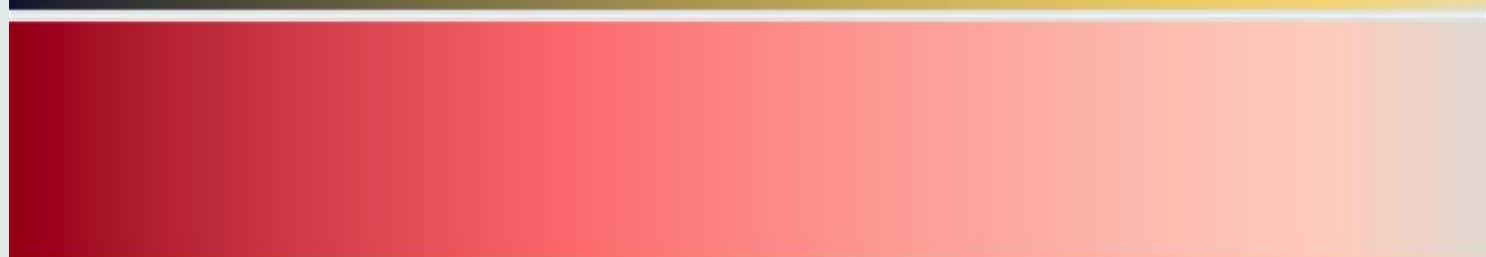
deuteranomaly



protanomaly



tritanomaly



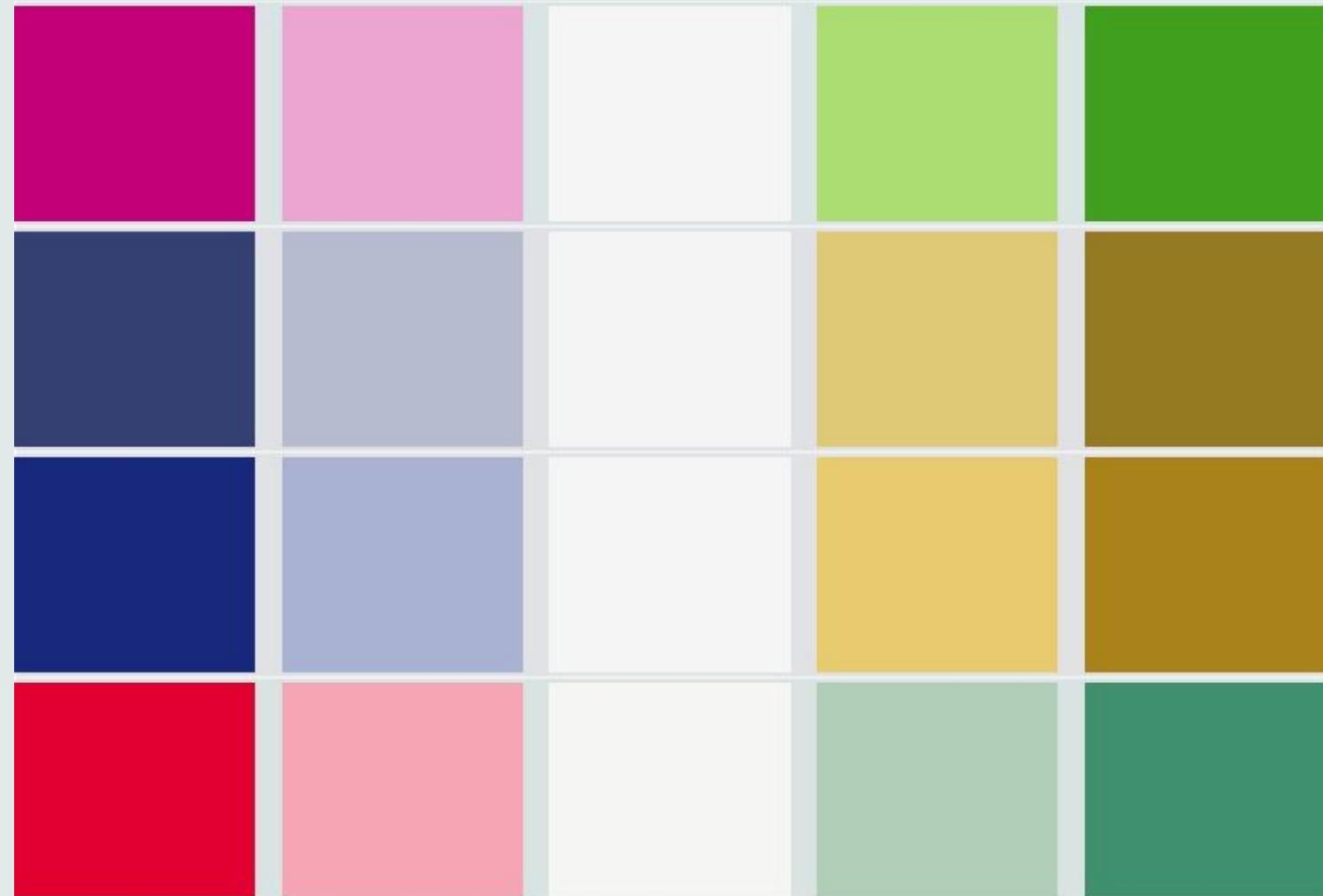


original

deuteranomaly

protanomaly

tritanomaly

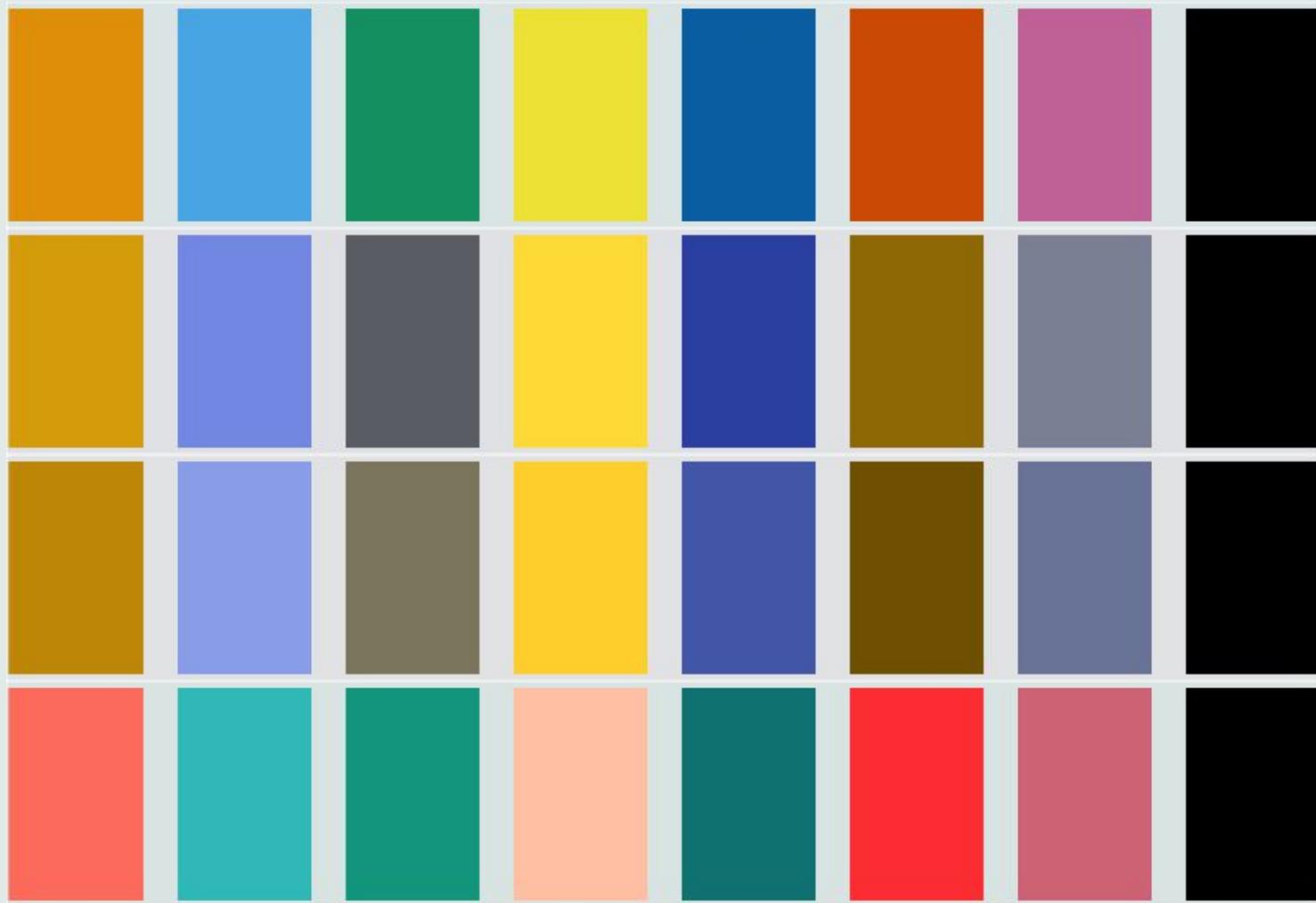


original

deuteranomaly

protanomaly

tritanomaly



Color Palettes

Good Color Palettes

- Color Brewer: <http://colorbrewer2.org/>
- Thomas Petersen's Scico: <https://www.data-imaginist.com/2018/scico-and-the-colour-conundrum/>
- Paul Tol's Color Schemes: <https://personal.sron.nl/~pault/>
- Stephen Few: http://www.perceptualedge.com/articles/visual_business_intelligence/rules_for_using_color.pdf
- Masataka Okabe & Kei Ito's Color Universal Design: <https://jfly.uni-koeln.de/color/>

What makes these ones good?

Color theory is a complex subject that analyzes how different hues/shades interact with one another.

A good palette will offer interest without distracting from the content. Choose colors close to each other on the color wheel, colors that are opposite each other, or colors that are equally spaced.

Palettes should be versatile, interesting, and balanced.

Wes Anderson Movies

<https://wesandersonpalettes.tumblr.com>



Other Movies

<https://twitter.com/CINEMAPALETTESS>



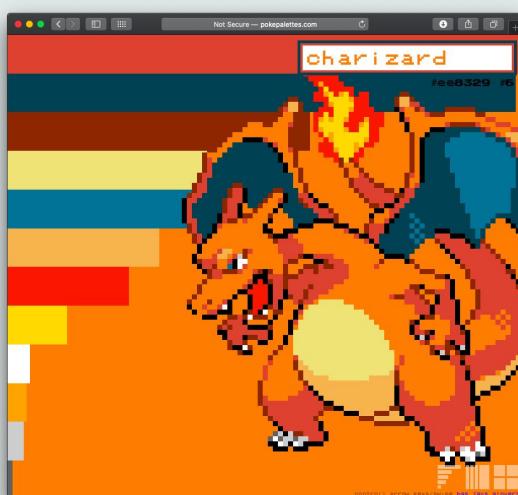
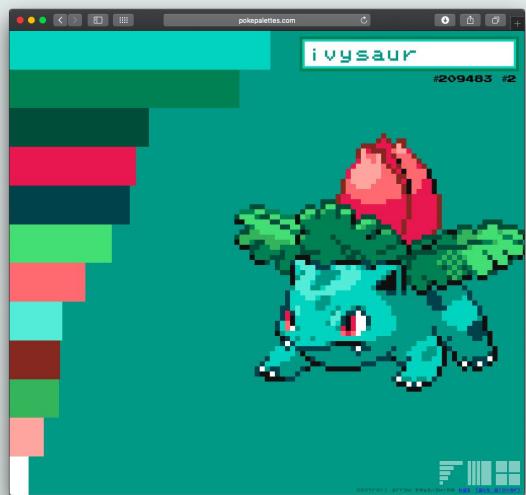
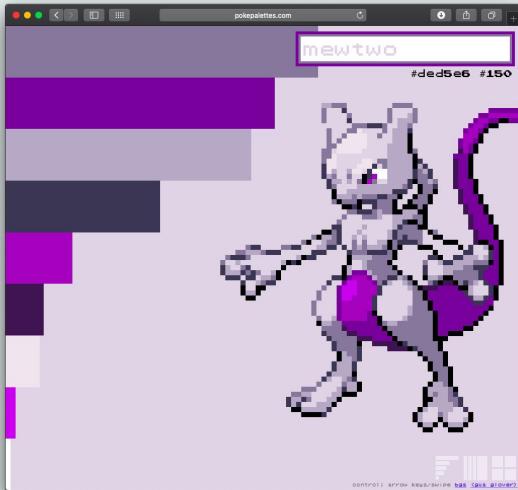
Dutch Artists

github.com/EdwinTh/dutchmasters



Pokemon

pokepalettes.com



Candy

<http://alyssafrazee.com/2014/03/06/RSkittleBrewer.html>



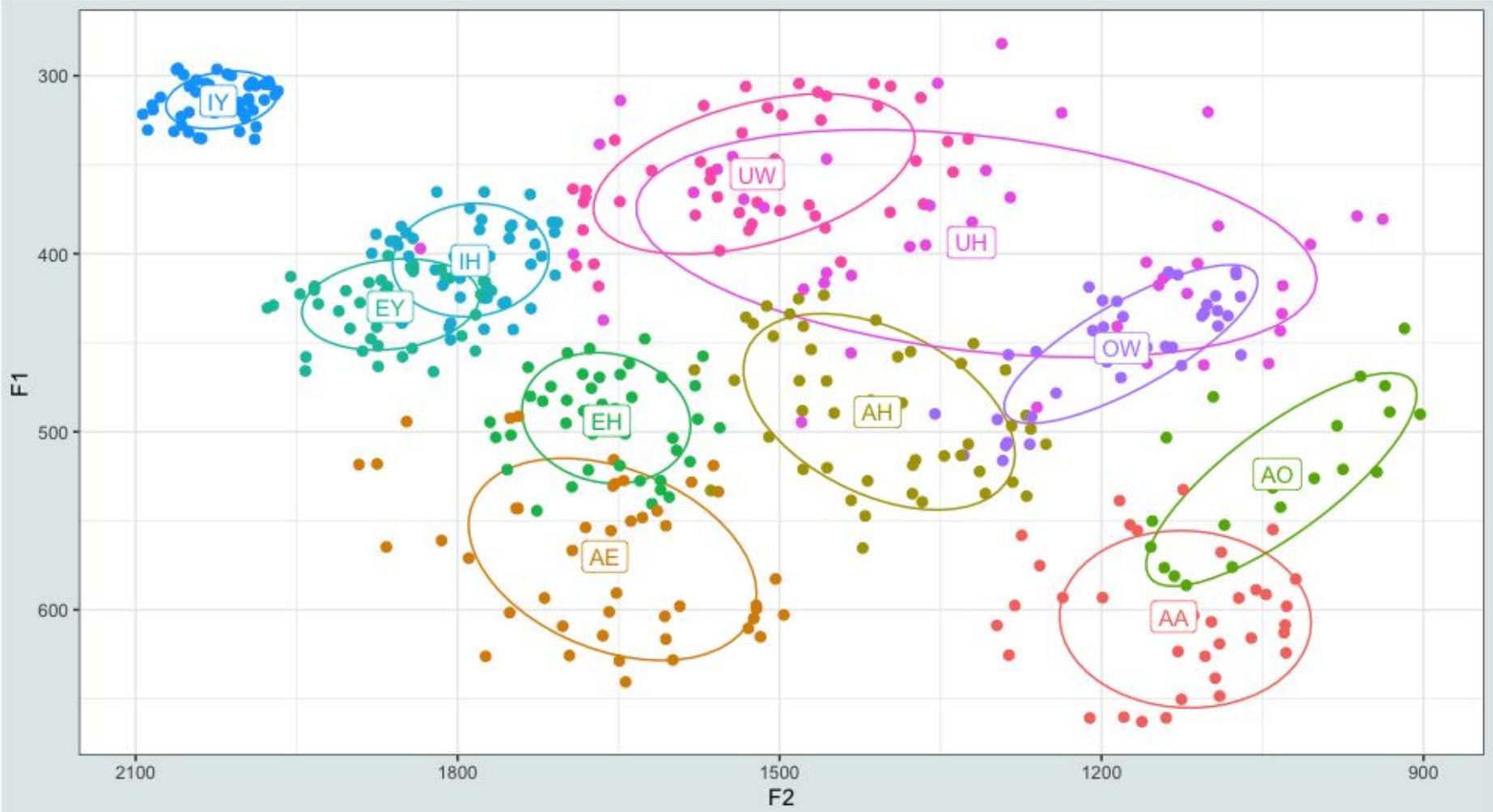
Creating your own palette

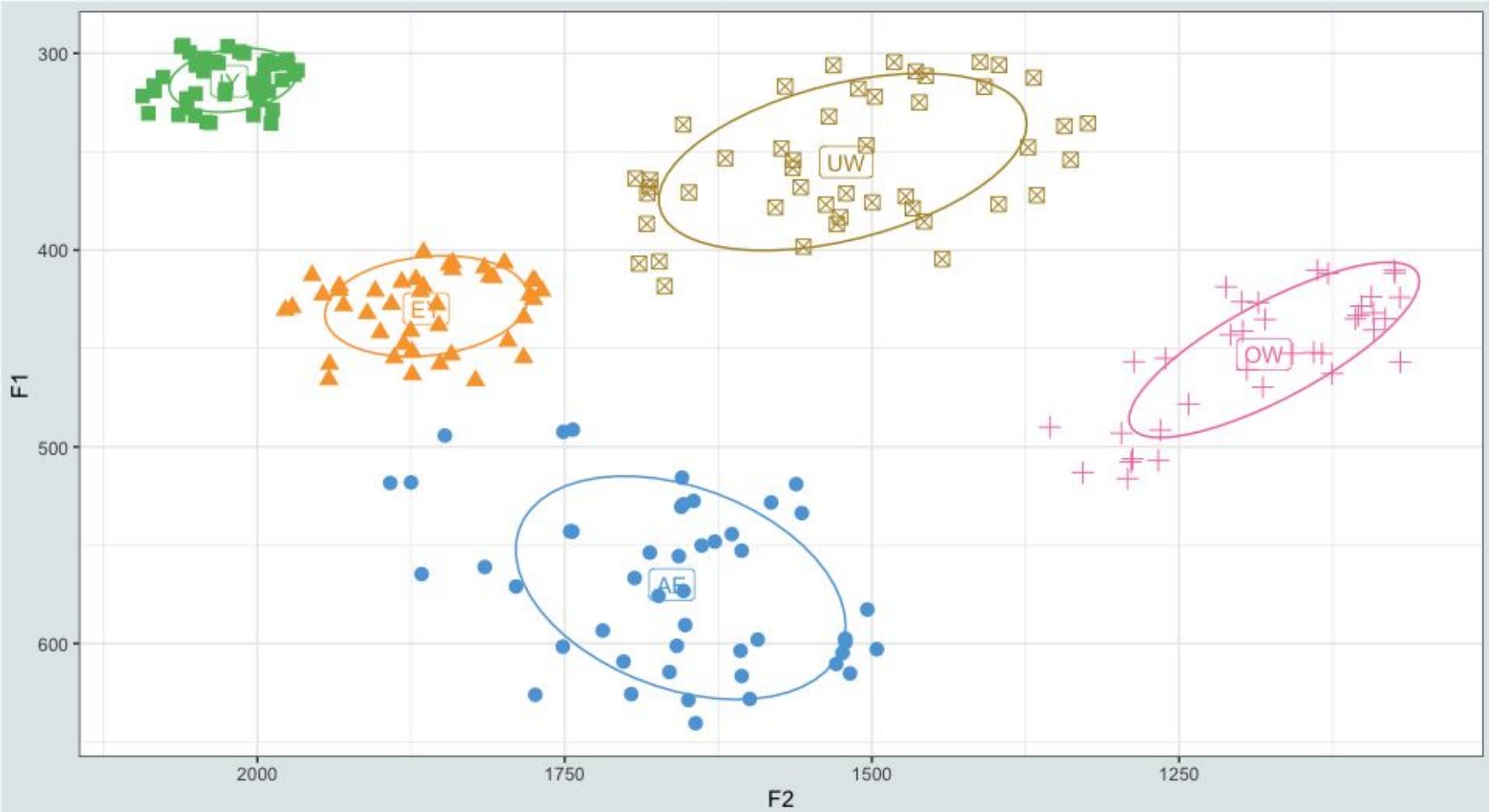
- Adobe: <https://colorls.co/app>
- Coolers.co: <https://colorls.co/app>
- Colorpicker: <http://tristen.ca/hcl-picker/>

General Advice

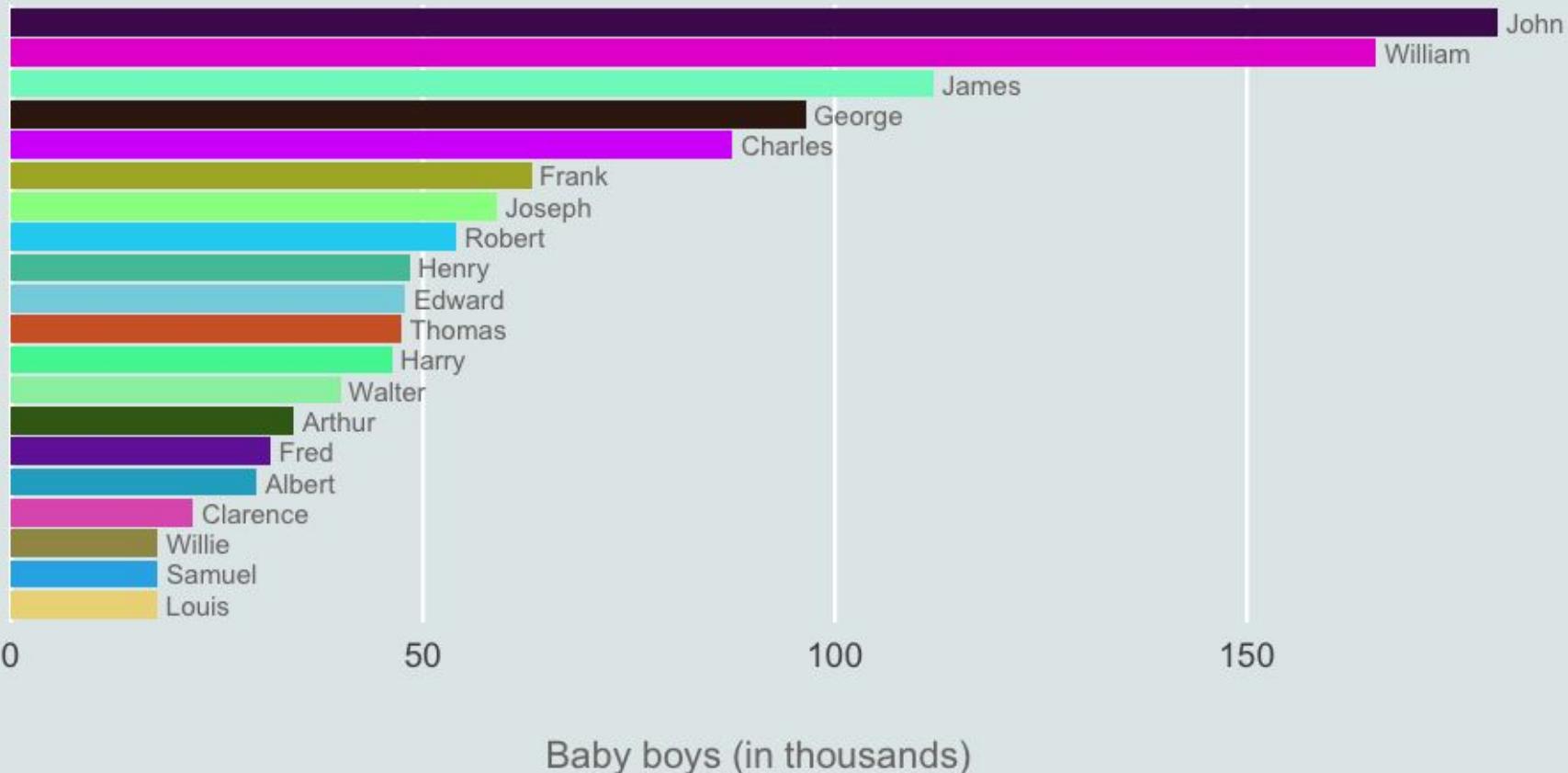
Outline for this section

- Be careful with categorical data
 - No more than ~8 different colors.
 - Remove color if it does nothing
 - Redundancy can be helpful
- Be careful with continuous color
 - Don't use it if it adds nothing
 - It's better to bin the categories.
 - No more than 6 bins



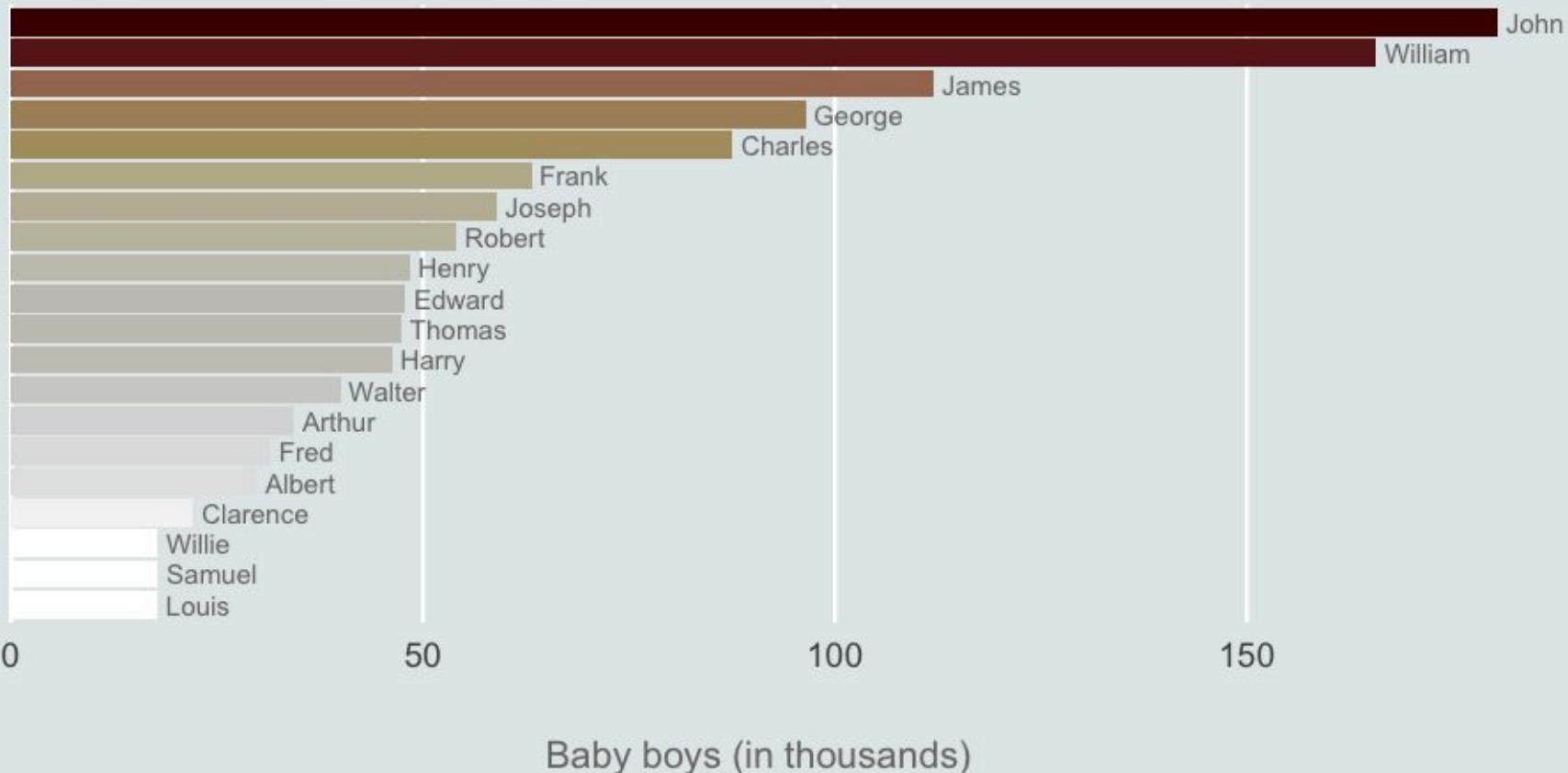


Most popular baby boy names between 1880 and 1900



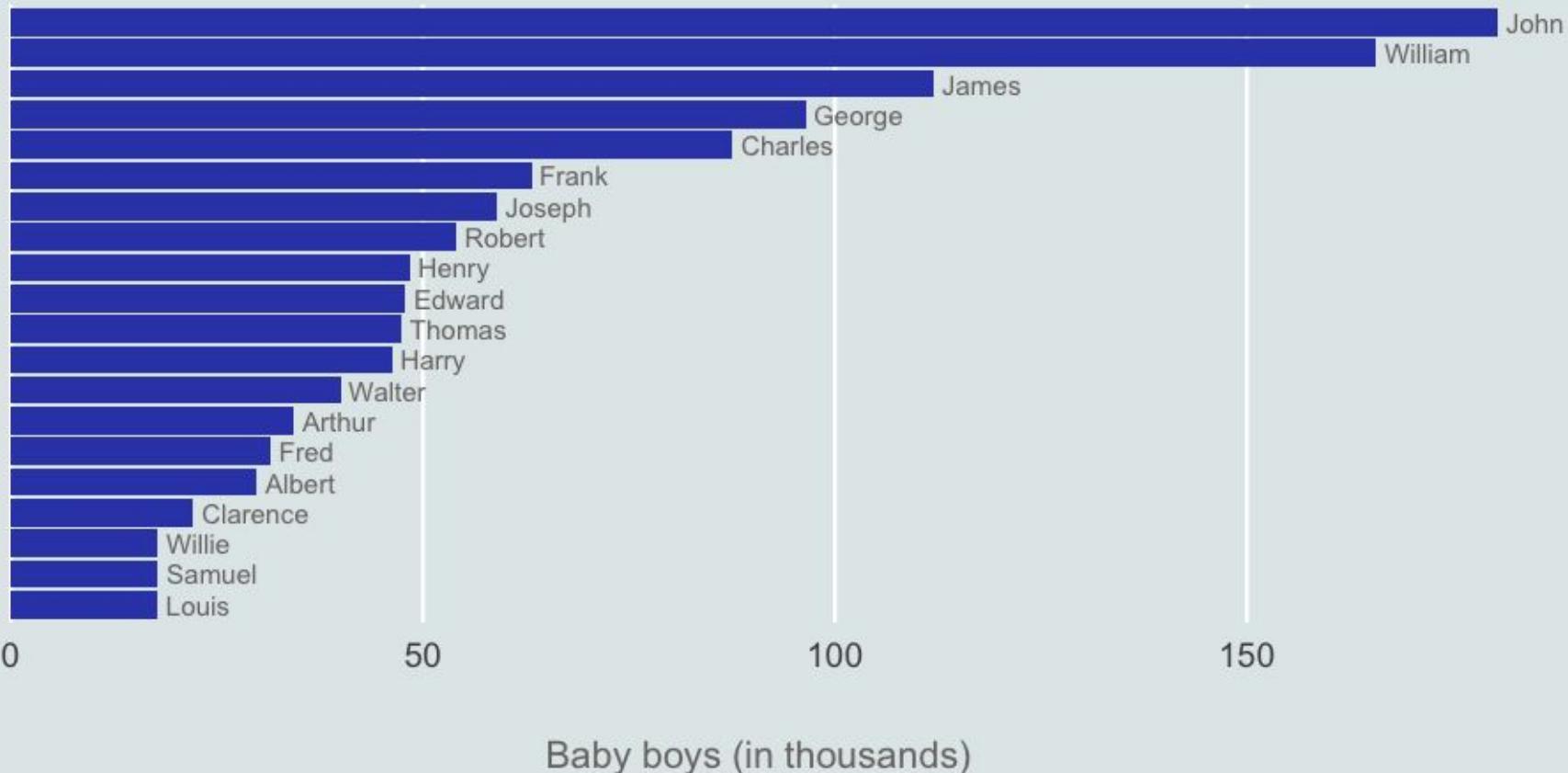
Data from the "babynames" package in R

Most popular baby boy names between 1880 and 1900

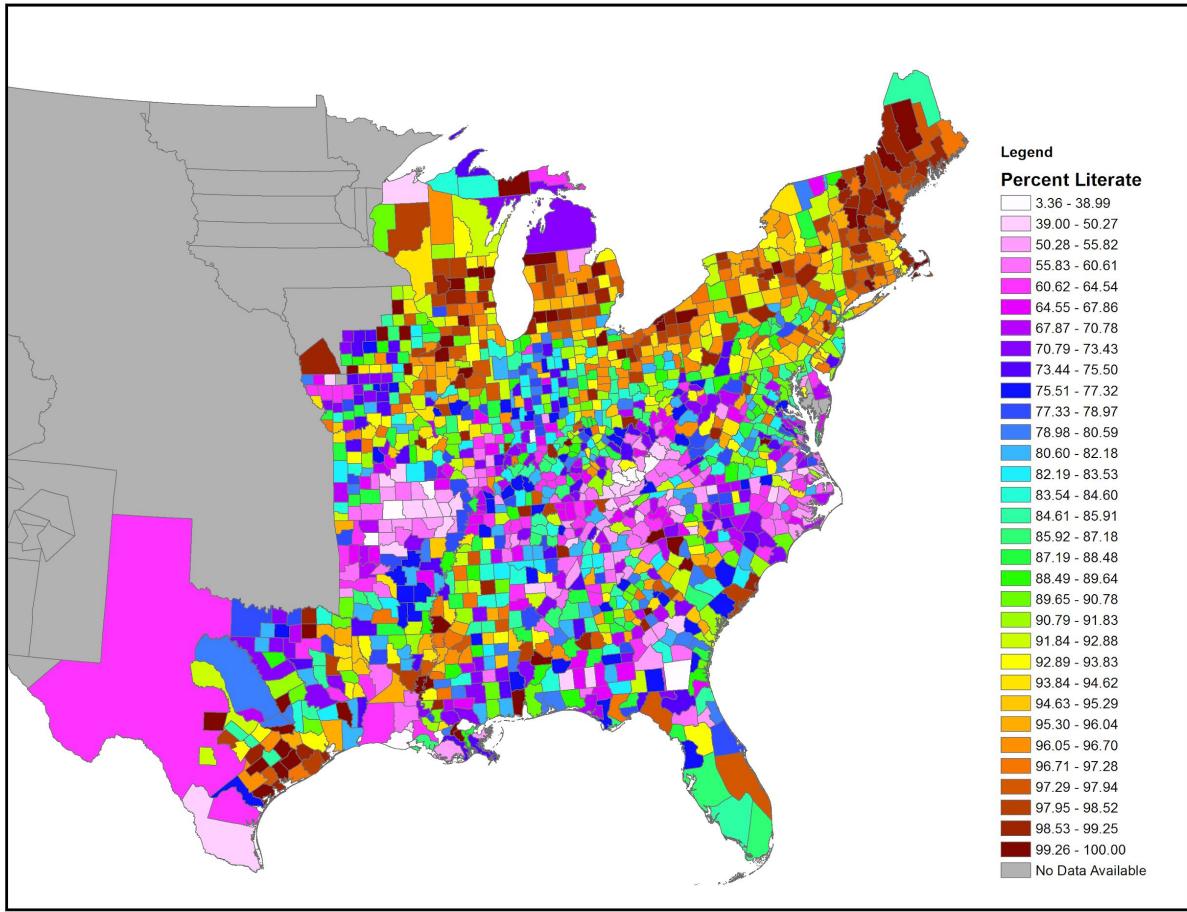


Data from the "babynames" package in R

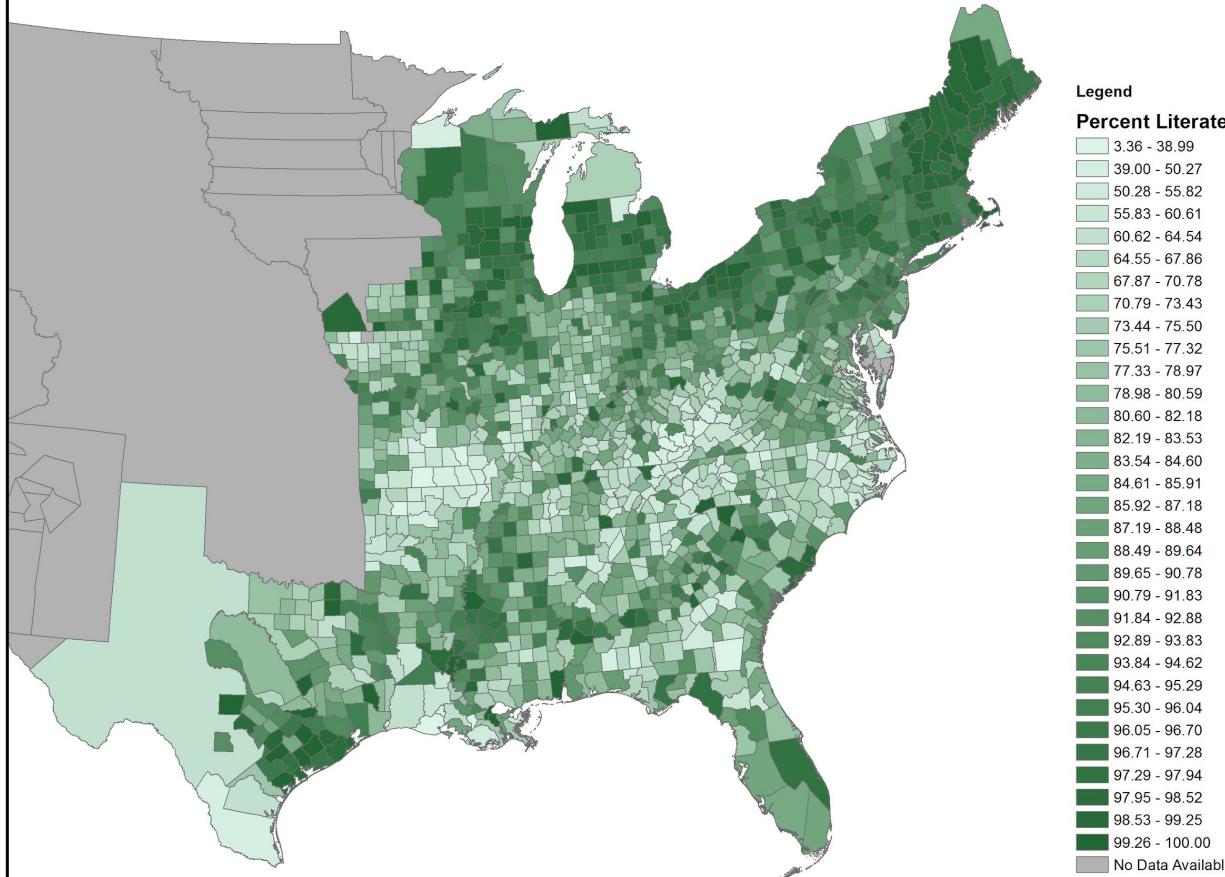
Most popular baby boy names between 1880 and 1900



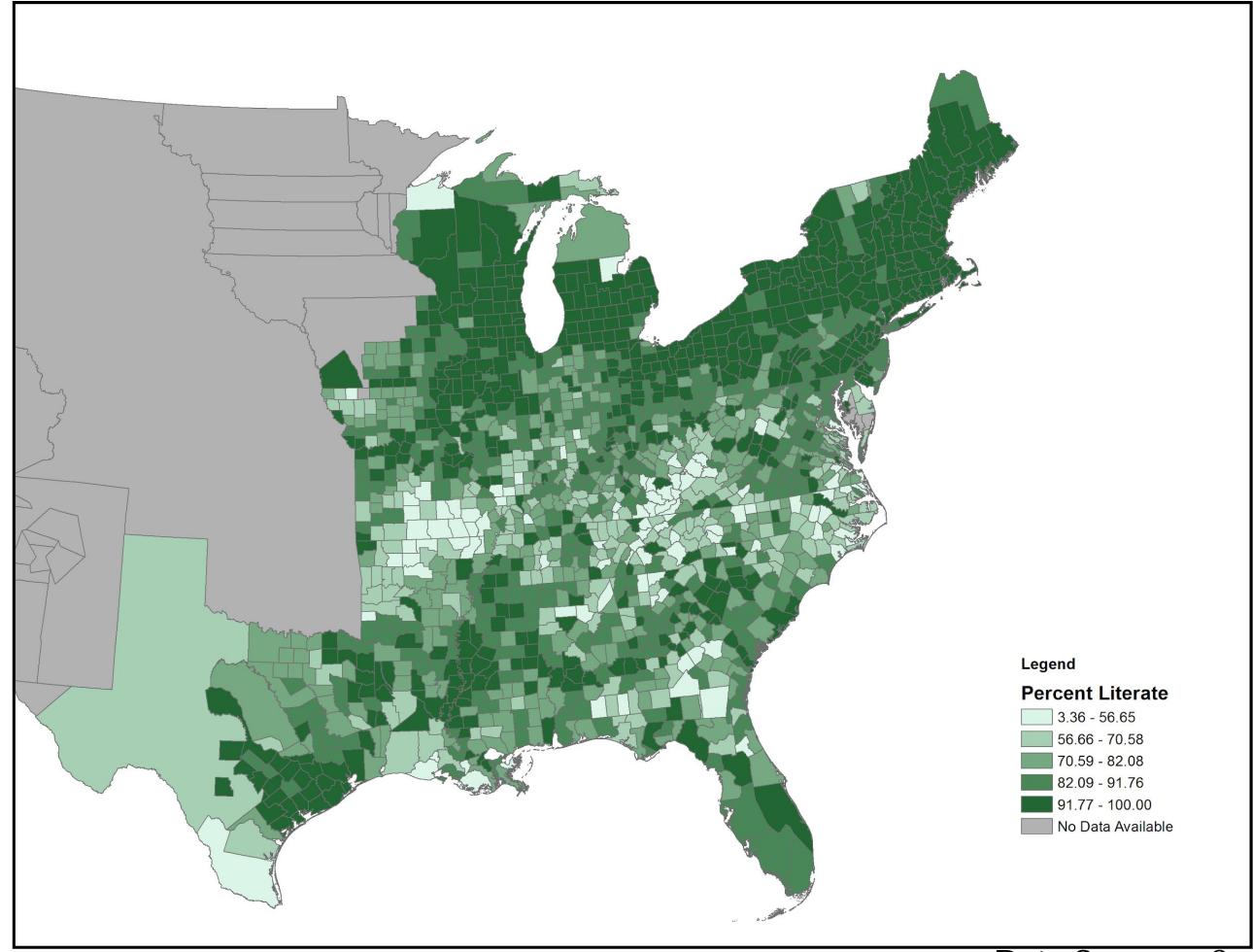
Data from the "babynames" package in R



Data Source: 1850 US Census



Data Source: 1850 US Census



Data Source: 1850 US Census

Hands-on Demonstration

What software should we demonstrate?

R

Excel/Powerpoint

ArcMap/QGIS

Others?