Accessible Graphics

Grinnell College

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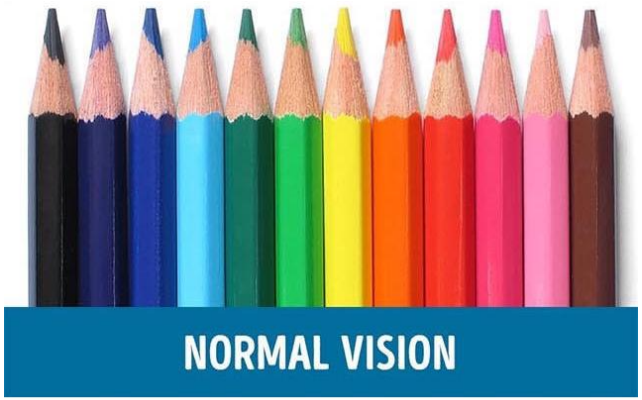
Motivation

Today we will be discussing making graphics accessible

- 8% of males and .5% of females are colorblind
  - Red and Green colorblindness is more common than AB- blood type
- Some will be low hanging fruit
  - Color blind friendly color pallettes
  - Using shapes/textures
  - Text and font decisions
- One will be more advanced
  - Alt text for graphics

Colorblind Types



Colorblind Challenges

Four main problems arise (as per Okabe and Ito)

1. Cannot distinguish certain colors
   - Red and green dots are going to fail and fail hard
2. Certain colors become difficult to see
   - Dark red vanishes in dark backgrounds
3. Similar to 2, things cannot be stressed in certain colors
   - Dark red text looks black and loses the emphasis
4. Difficulty in naming colors
   - Detecting differences is different from naming colors!
   - Don't say "the red points"
   - Colorblind and normal vision create different naming boundaries

Colorblind Friendly Pallettes

- Some color pallettes are more accessible than others
  - High Contrast colors
  - Ichihara et al introduced a set of four color combinations that are optimized for colorblind people
- Base R went color pallette friendlier circa 2019 (announcement here)
- Classic advice: Avoid red and green at all costs
- Avoid yellow-green color spectrum generally
- Aesthetics are a thing that should still be respected
  - "Break any of these rules sooner than [make a data visualization] outright barbarous" -George Orwell
  - Eg Rainbows with Pride is fine

Non-Color Based Solutions

Redundant coding for graphs is encoding the information in multiple ways (red cricles, blue squares, green triangles, etc..)

- Examples include...
  - shapes for scatterplots
  - line types when used (solid-, dotted-, dashed-, etc..)
  - textures on bar charts
  - the brightness of the colors chosen (eg dark red vs light green)
- Avoid conveying information using only one medium

If you can convert the graph to greyscale and it still carries the same information, you are doing fine

Non-Color Based Solutions

- Label lines/symbols directly on graphs if plausible
  - Cuts down on trying to figure out which subway line is the “red” one
- Don’t be too wordy with axis or labels
  - Leads to small font or cluttered graphics
  - Counters the goal of graphics being quick and easy to interpret
  - Needed with the above point
- Make lines/symbols extra thick
  - Easier to differentiate similar hues

Fonts

- Don't use small fonts!!!
  - Absolute most common mess up with posters
  - 11 point font on a 36x48 poster is a terrible idea, terrible to read, and terribly easy to fix
  - Be less wordy
- Advice: Look at the graph yourself in the medium it'll be shown
  - Eg prof.s are encouraged to do dry runs of our presentations initially in the classrooms we teach to see how they look
- Avoid fonts with serfs (excess fancy things)
- This text uses a typeface that is suppose to be good for people with Dyslexia

Alternative (Alt) Text for Statistical Graphics

- Graphs offer information which can be lost for the blind or those with poor vision
- **Alt text** is effectively a verbose caption of a graph
- Usually not shown
- Best Practices:
  - Focus on what you are trying to convey with the graph
  - Mention the type of graph you are using (bar chart, scatterplot, etc...)
  - Imagine that you have the context of the image but can't see it; what would you like to know?
  - Don't duplicate text

Take Aways

Be conscious that color-blind, blind, and people with poor vision exist!

- Color-blind friendly color pallettes
  - Avoid red + green and the green-yellow spectrum
- Redundant coding (don't convey information in color only!)
- Readable fonts
- Avoid fonts with serfs
  - Dyslexic fonts exist if you know your audience
- Alt-text is a verbose description of graphs
  - Excellent if you want your graph seen by the world
- Aesthetics is a thing