CHARLES UNIVERSITY

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CENTER FOR SYSTEMS BIOLOGY DRESDEN

Preparing Visuals of Data Analysis

The selling point of your research

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Effective Data Visualization

- **Facilitates Communication**: Data visualization serves as a powerful tool for effective communication.
- **Increases Data Accessibility**: Visualizations can be designed to be user-friendly, allowing even non-technical individuals to interact with data and extract meaningful insights.
- **Enhances Storytelling**: Visualizations can turn data into compelling narratives.

Introduction

We have Reproducibility in Data Science - but what about charts?

Telling the same story over and over - the link between Reproducibility and **Interpretability**.

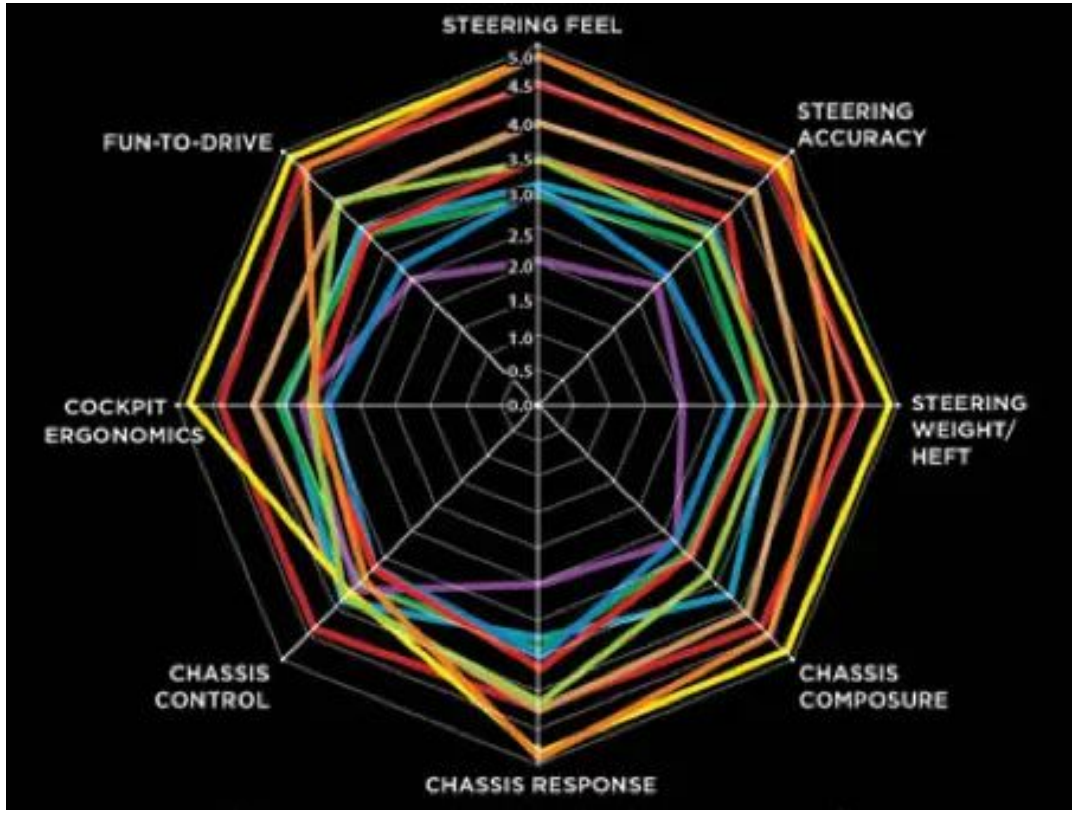
Reproducibility and Validation of your charts can be even easier than the BIA workflow or Image scripts. And it is highly **Reusable**!

Introduction to Charts

Does not matter if you use Power BI, Tableau, MS Excel, Adobe Illustrator or Python, there are some guidelines.

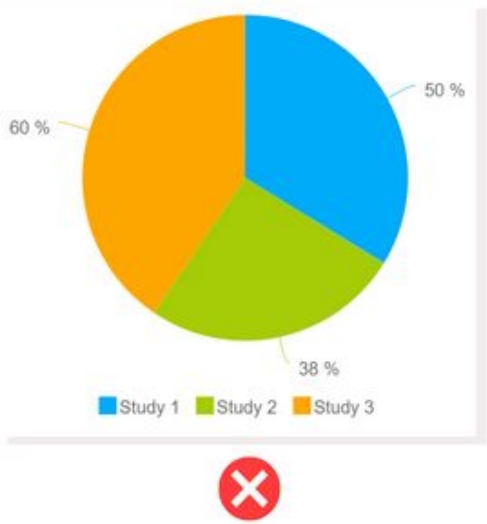
Martins TV infographic rule:

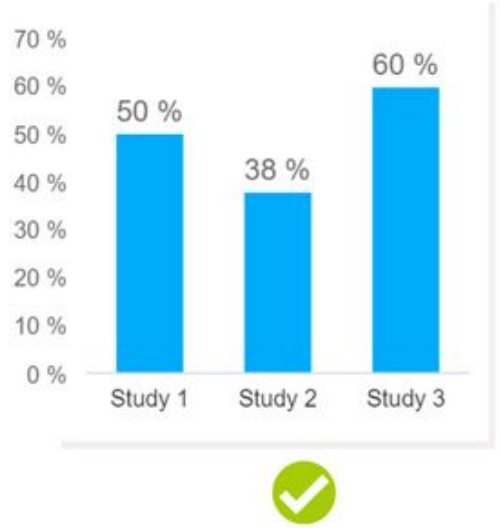
If you can’t make sense of it in 5s,
It is too complex!



“Marketing rules”

1. Respect your audience
2. This means don’t mislead them by making bad infographics
3. Quality data is a non-negotiable
4. Provide plenty of context in your infographic
5. Ask yourself if you’re using the best visual
6. Always pay attention to the axes
7. Please minimize clutter in your infographic
8. Use titles and labels to clarify
9. Use color intentionally
10. Own and correct your mistakes if you create a bad infographic





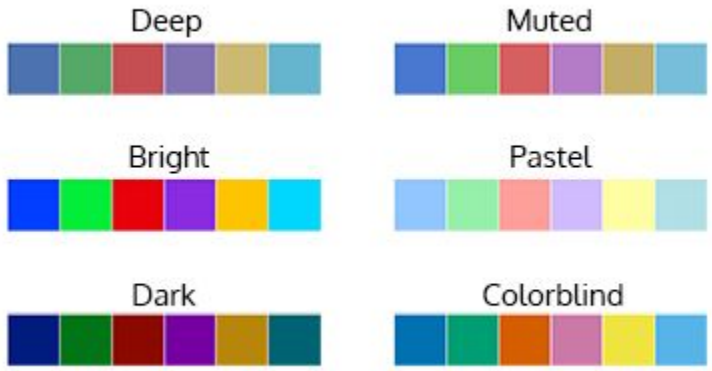
But what about some minimal approach?

Source:
https://flowingdata.com/2012/06/07/always-label-your-axes/

Reflecting Color Palettes

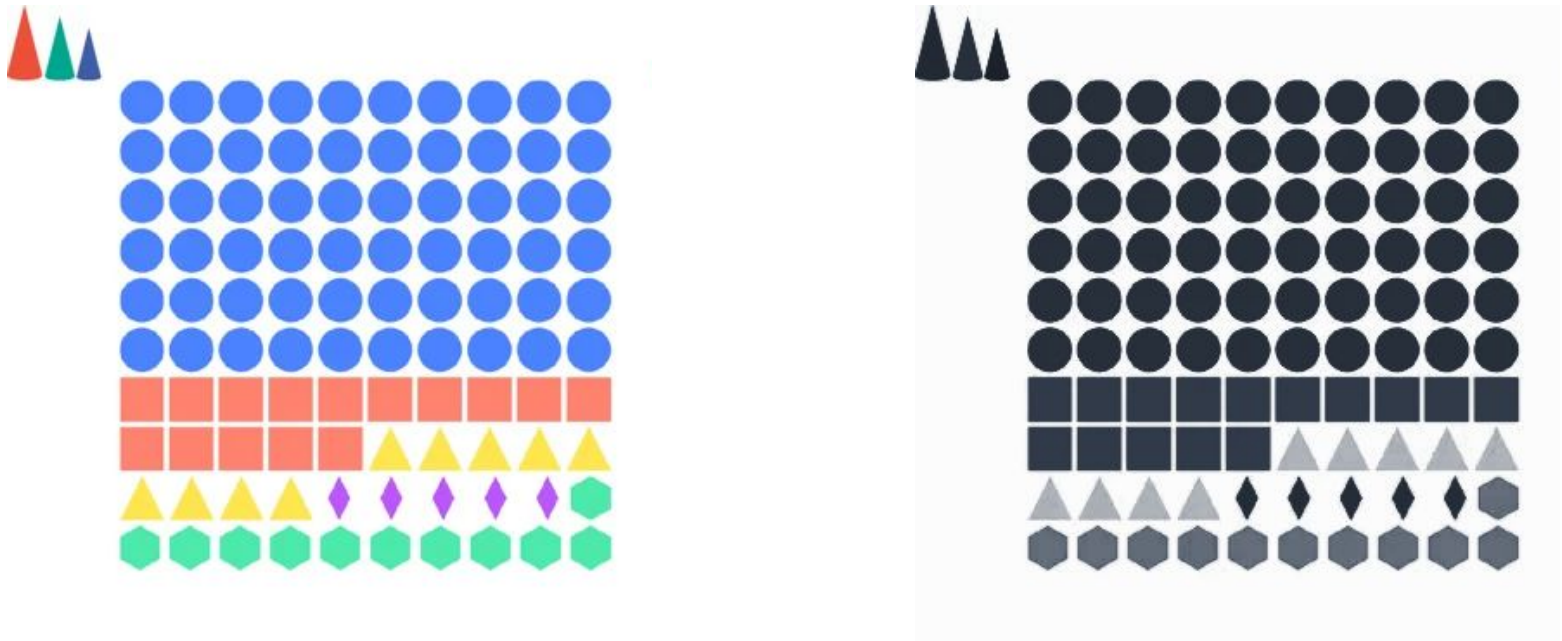
- Defining color palettes and their significance in image presentation
- Color palettes == set of predefined colors for data visualization

Know how you present, and to whom! Screen/Projector/Print



Impact of color palettes on clarity, contrast, and accessibility

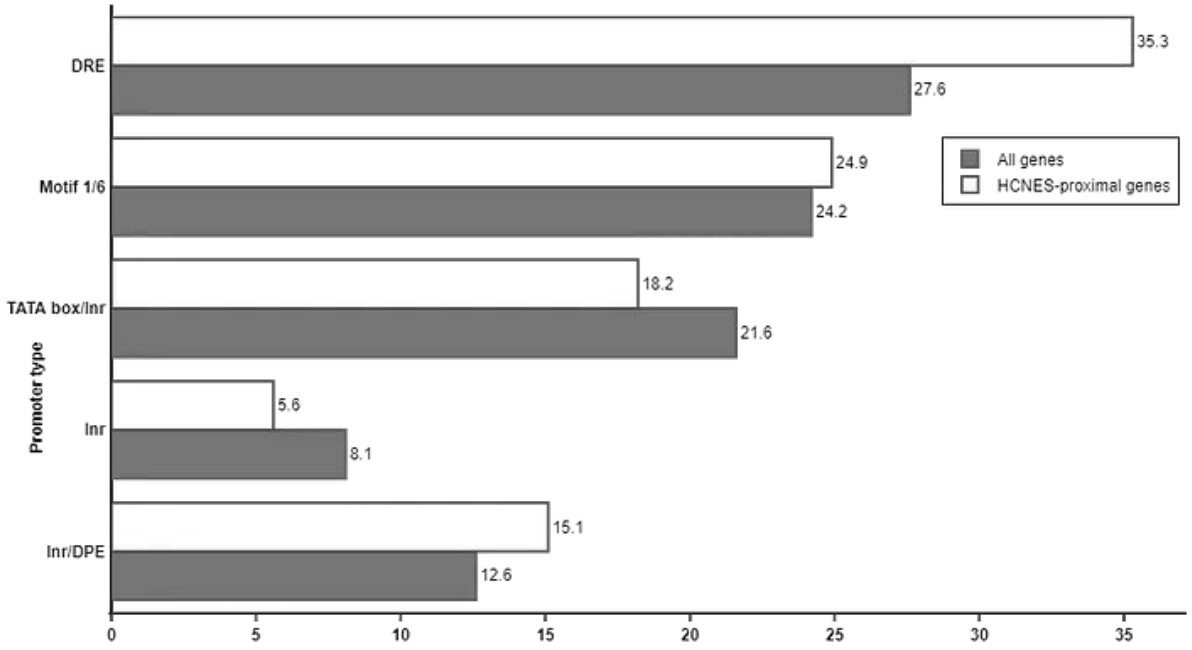
- Importance of choosing appropriate color palettes for data visualization
  - Usually easiest way is thinking grayscale - and using different marks!

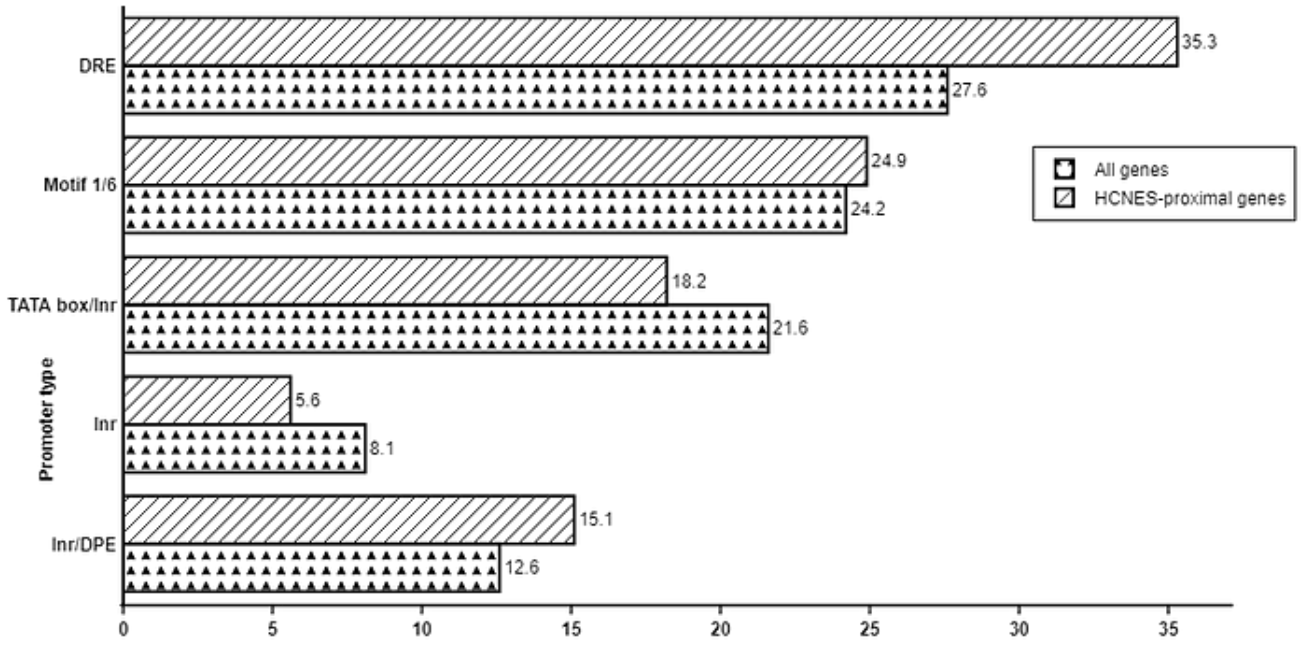


"Perfection is achieved not when there is nothing more to add, but when there is nothing left to take away."
– Antoine de Saint-Exupery.

Impact of color palettes on clarity, contrast, and accessibility

- Ensuring effective representation of data categories and variations





"Perfection is achieved not when there is nothing more to add, but when there is nothing left to take away."
Antoine de Saint-Exupery.

Screen/Projector/Print

RGB

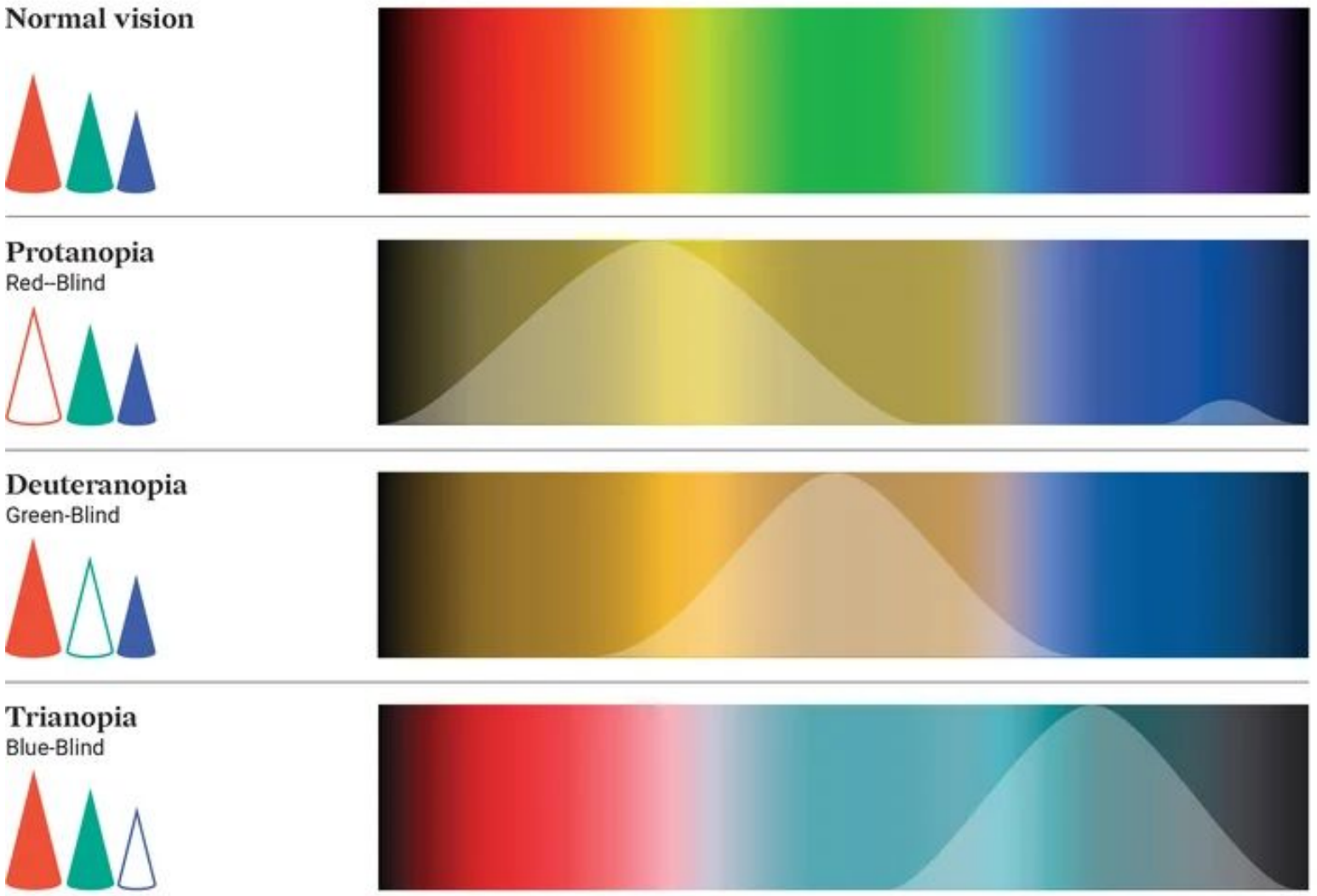
Projector

CMYK

Considering color blindness and accessibility guidelines

- Best practices for selecting color palettes
  - Consider number of classes/elements in your chart
  - Choose predefined paletes
    - They have high contrast
    - They consider color blindness and accessibility guidelines
  - If you are not sure - test it!

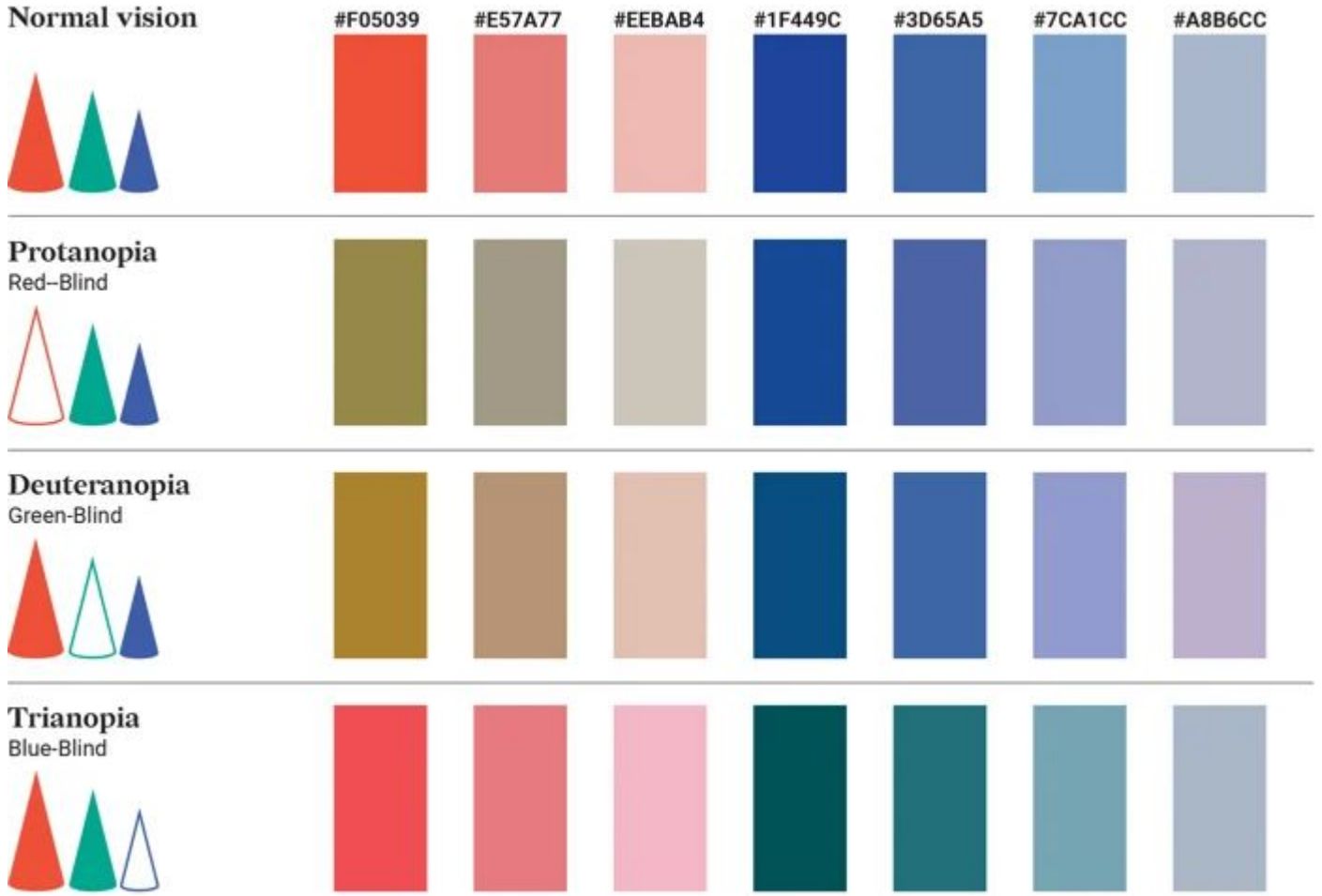
Considering color blindness



Considering color blindness

Avoid combination of red and green!

Use only two basic hues: blue and red (orange and yellow will also fit). The other colors should be made out of these two hues. All the variations can be made by using different saturation or lightness of the basic color.



References & Utilizing color palette tools and resources for guidance

Color Theory 101:

- https://blog.hubspot.com/marketing/color-theory-design

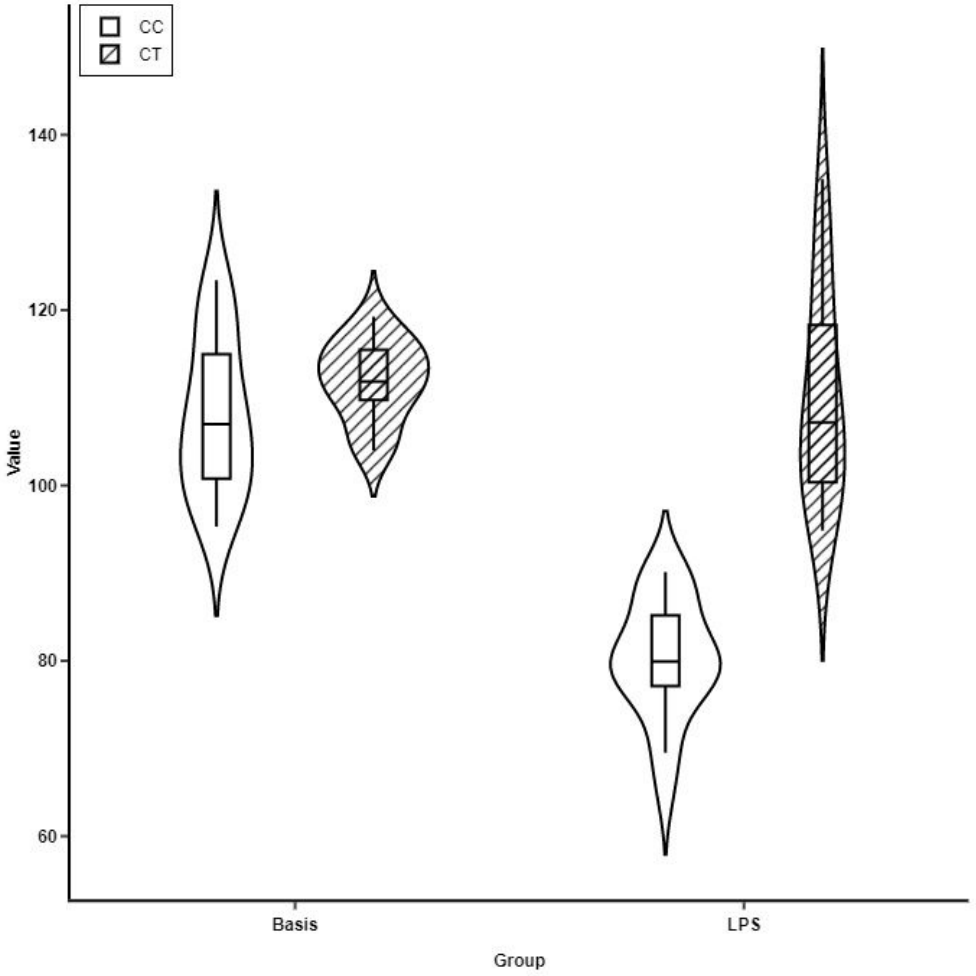
Color Blindness Tests:

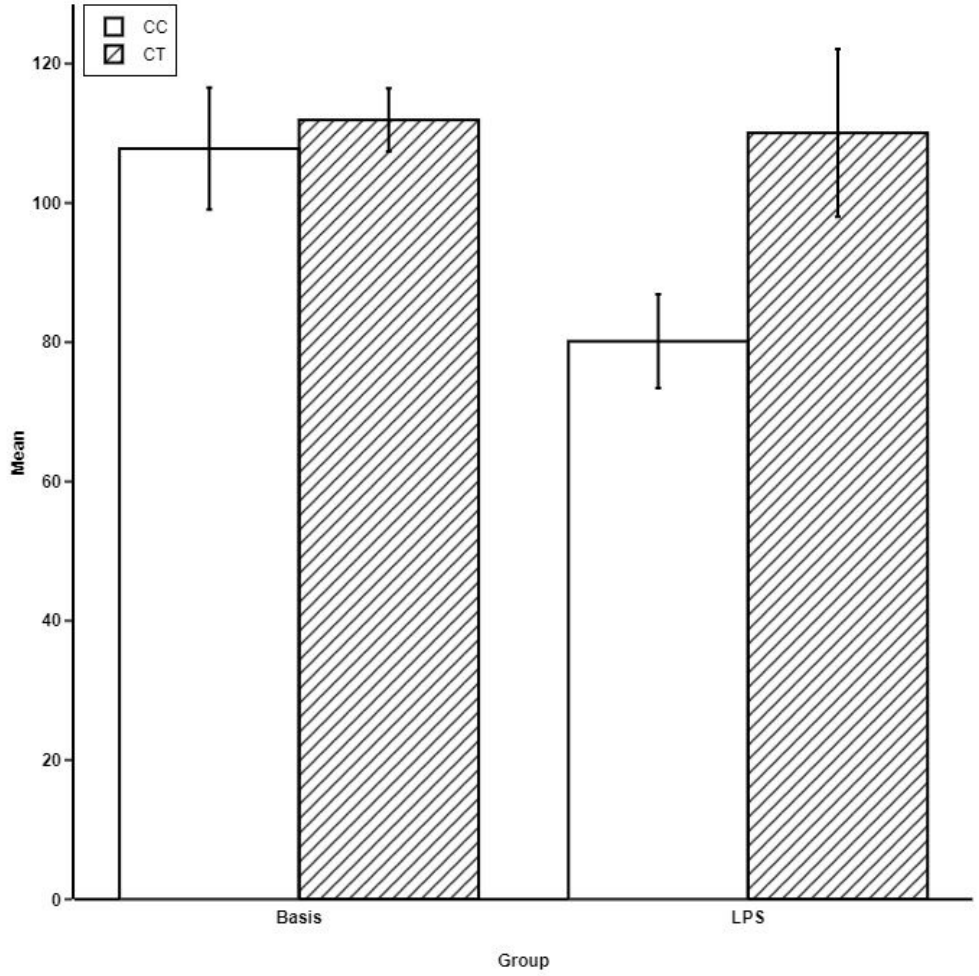
- https://daltonlens.org/colorblindness-simulator
- https://www.color-blindness.com/coblis-color-blindness-simulator/

Color Blindness Tests Python package:

- https://github.com/DaltonLens/DaltonLens-Pythonhttps://github.com/DaltonLens/DaltonLens-Python

Choosing Right Chart





Choosing Right Chart