

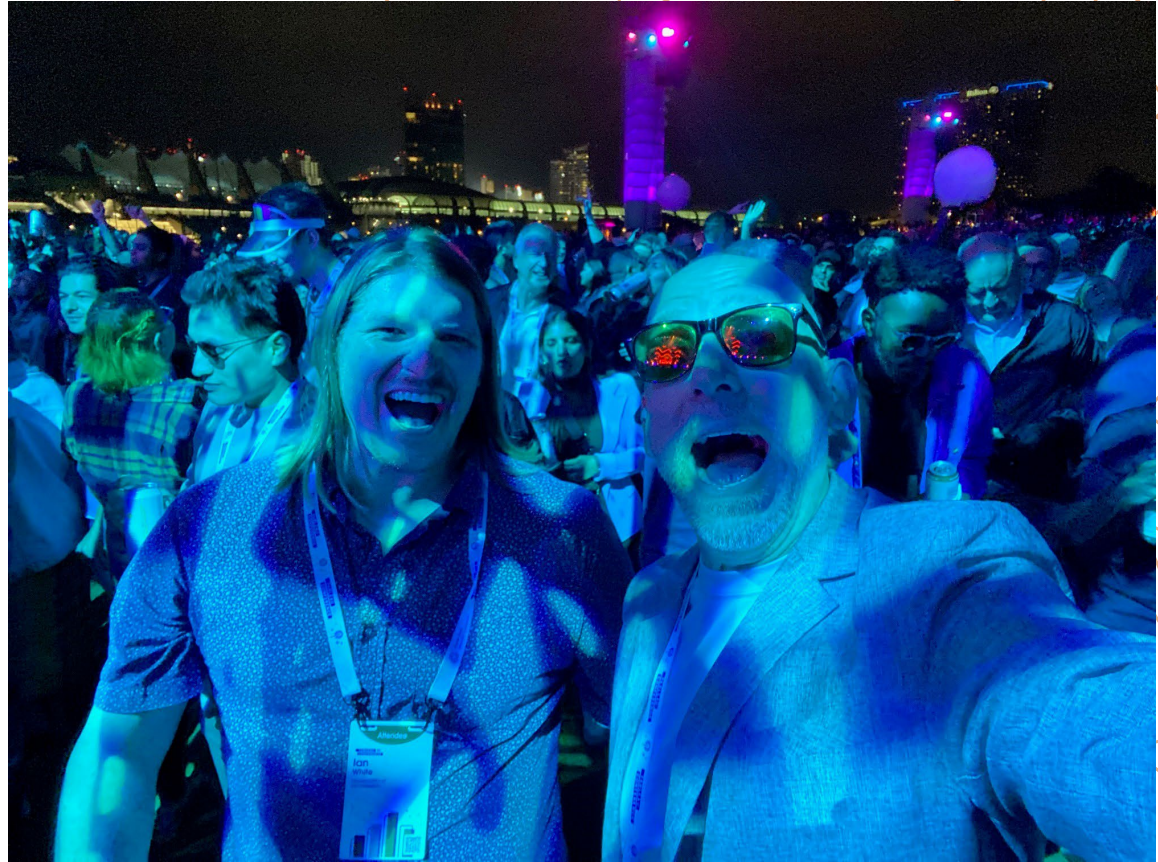
Abstract geometric lines in the top left corner, consisting of several overlapping, irregular polygons and lines in a light beige color.

Accessibility in Data Visualization

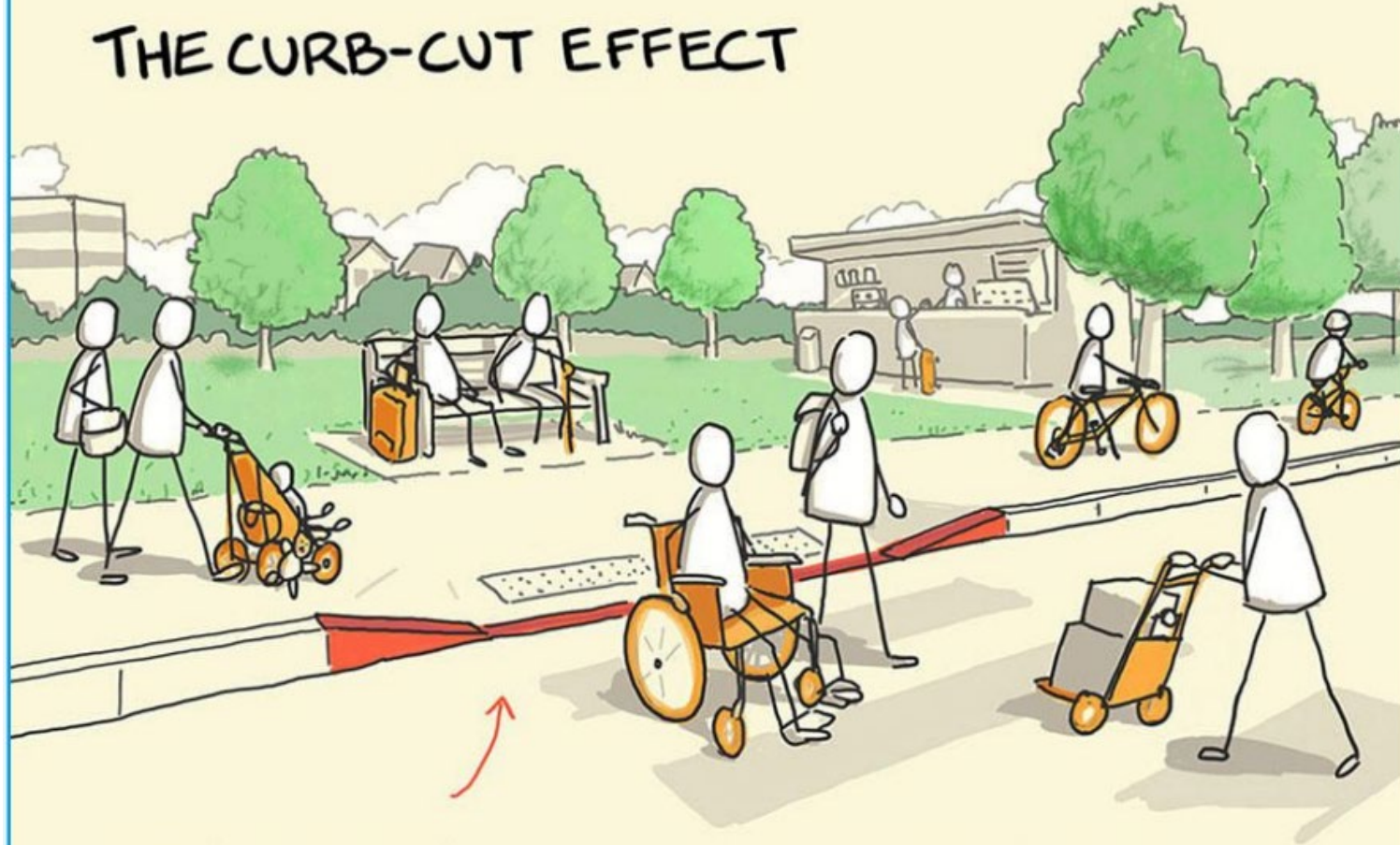
Dr. AJ Womack & (Not a Dr.) Ian White

About us

We're a Data Specialist and Data Analyst, helping state workers improve their data visualizations – teaching, troubleshooting, training, or talking, we're here to help!



THE CURB-CUT EFFECT



WHEN WE DESIGN
FOR DISABILITIES

... WE MAKE THINGS
BETTER FOR EVERYONE

sketchplanations

Have a clear objective

1. Identify your user(s)



Before evaluating the design of a dashboard, be sure to identify the user(s) of the interface. Consider the primary as well as secondary users but always keep primary users as your focal point.

2. Outline the use scenario



Outline when and how you anticipate them using it, as well as for what. What questions does this dashboard attempt to address? What conditions may impact the use of this dashboard?

3. Identify key features



Identify what features to include or omit, what the included features will look like, and how they will respond to user actions. Identify key design features that contribute to the positive or negative evaluation of the interface.

4. Evaluate the design



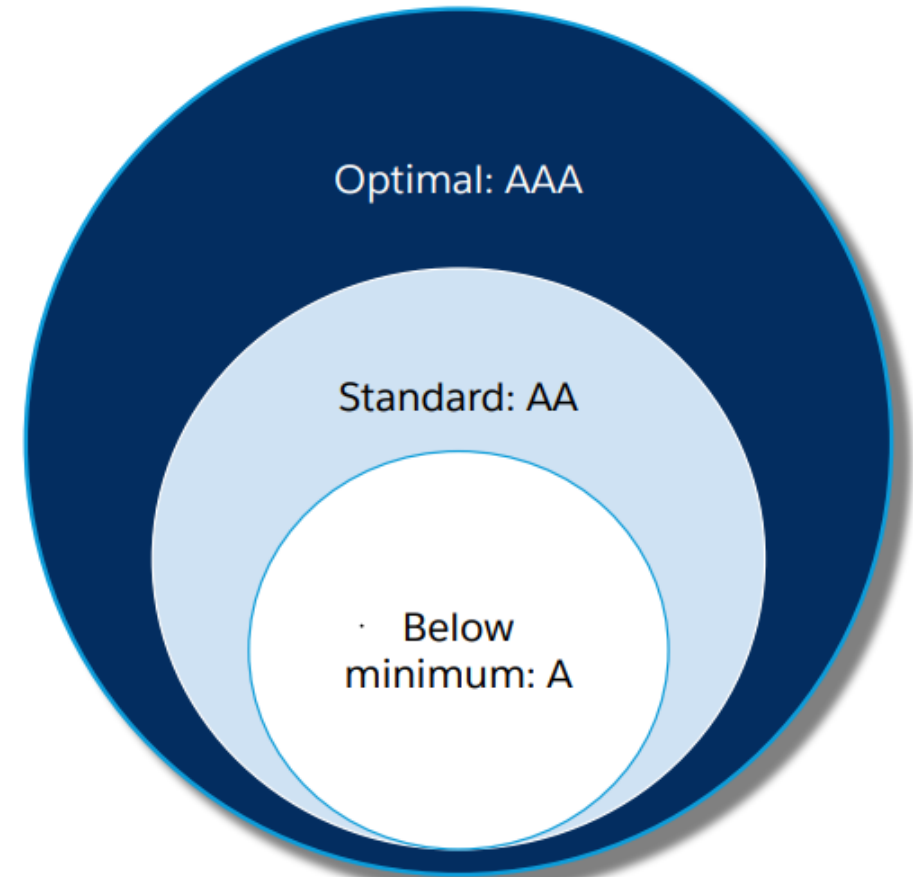
Assess your dashboard from the POV of your users. Consider best practices as well as what to avoid.



What is WCAG? (Web Content Accessibility Guidelines)

**Covers a wide range of recommendations
for making Web content more accessible**

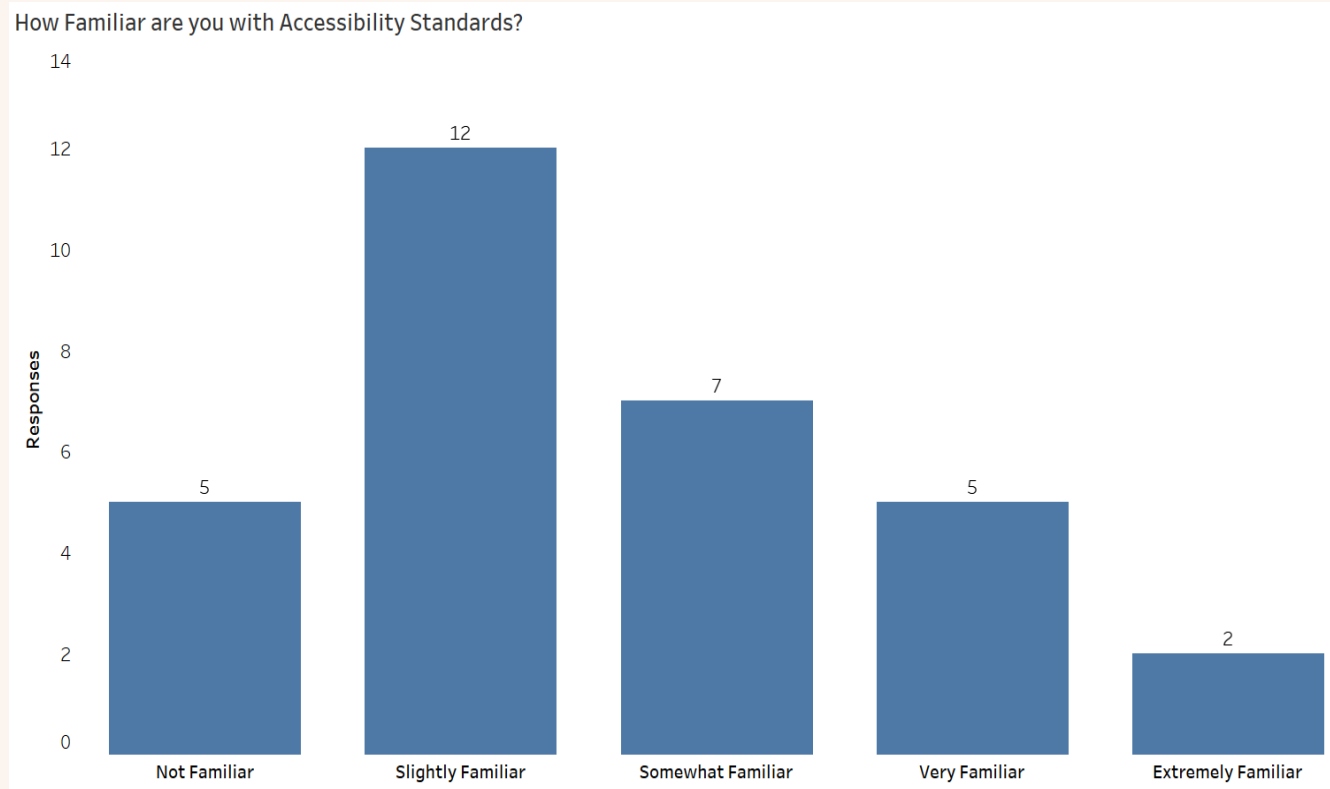
Perceivable
Operable
Understandable
Robust



<https://www.w3.org/WAI/WCAG21/quickref/>

What is a Data Visualization?

Information in a chart, diagram, map, picture, sketch, graph, etc.



Good data vizzes are:

Perceivable

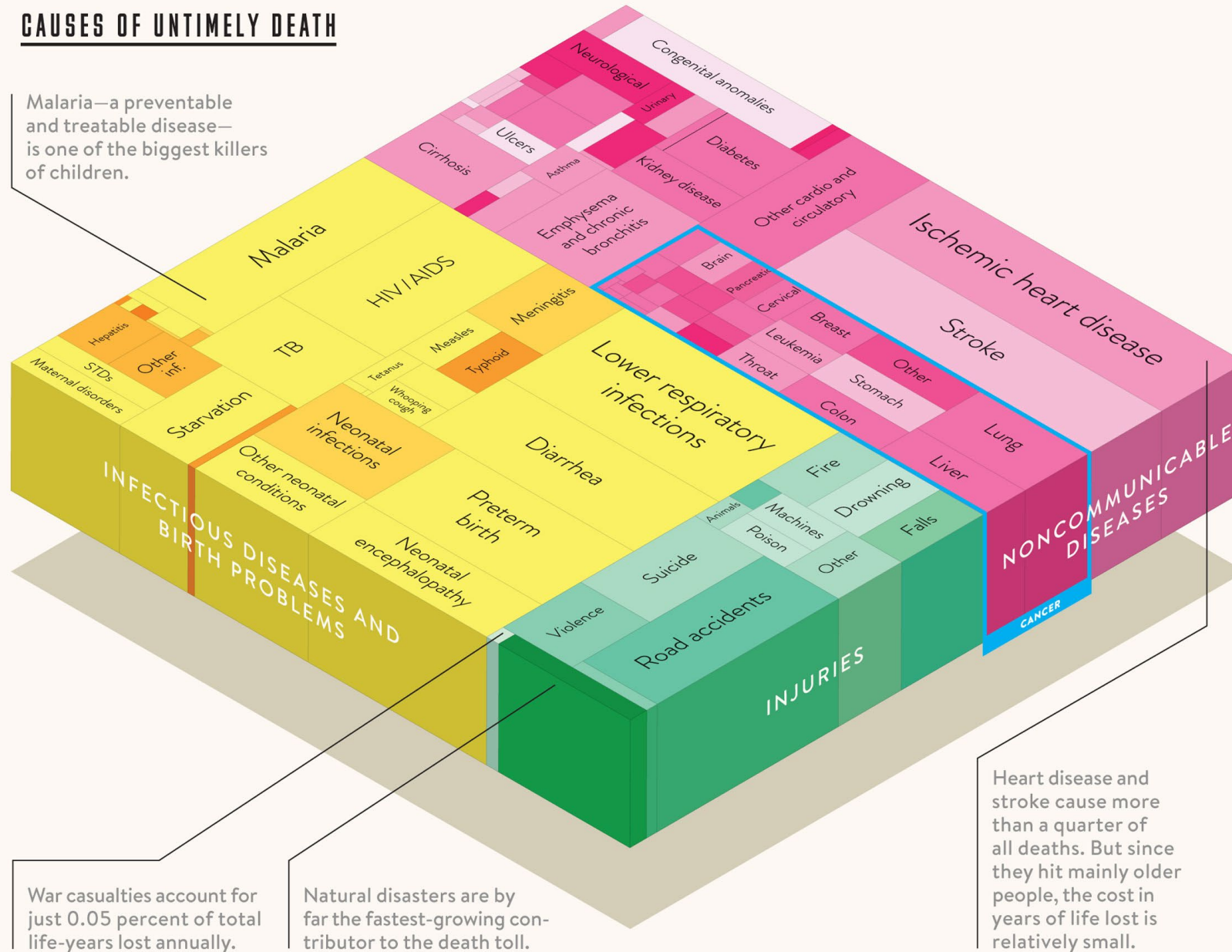
Operable

Understandable

Robust

CAUSES OF UNTIMELY DEATH

Malaria—a preventable and treatable disease—is one of the biggest killers of children.



War casualties account for just 0.05 percent of total life-years lost annually.

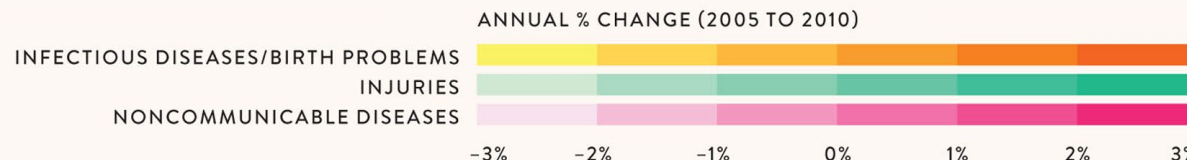
Natural disasters are by far the fastest-growing contributor to the death toll.

Heart disease and stroke cause more than a quarter of all deaths. But since they hit mainly older people, the cost in years of life lost is relatively small.

Visualizations should be easy to understand

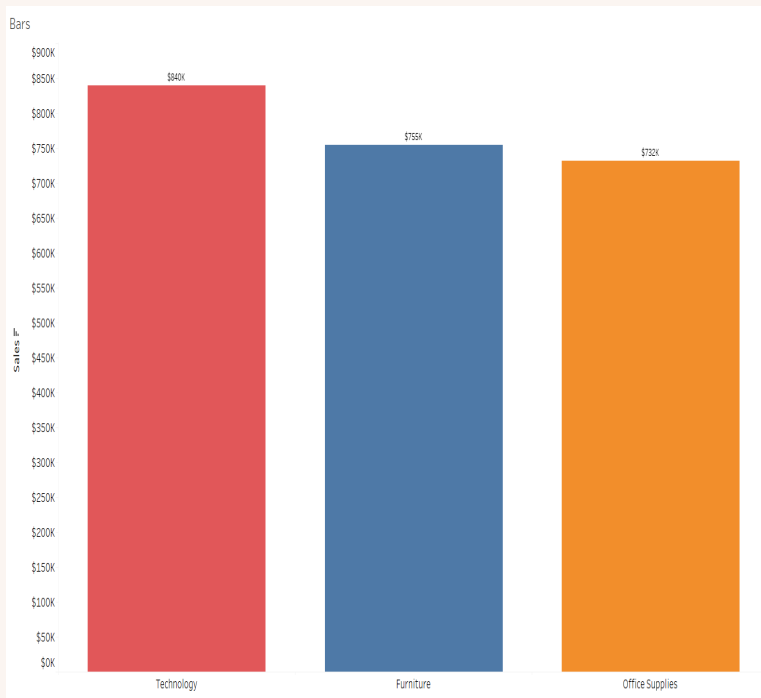
Keep in mind:

- Graphic type
- Color
- Contrast
- Language
- Shapes
- Axes
- Labels
- Titles

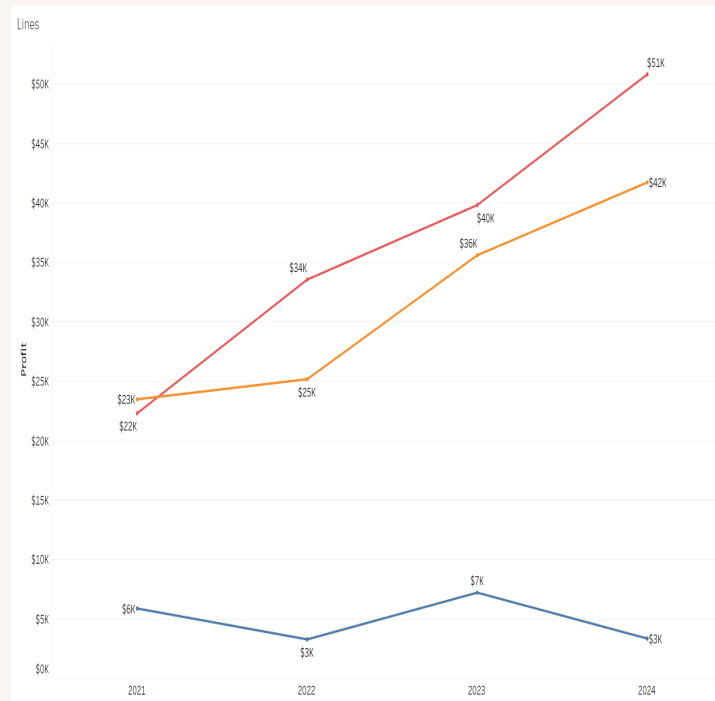


Choose an appropriate chart

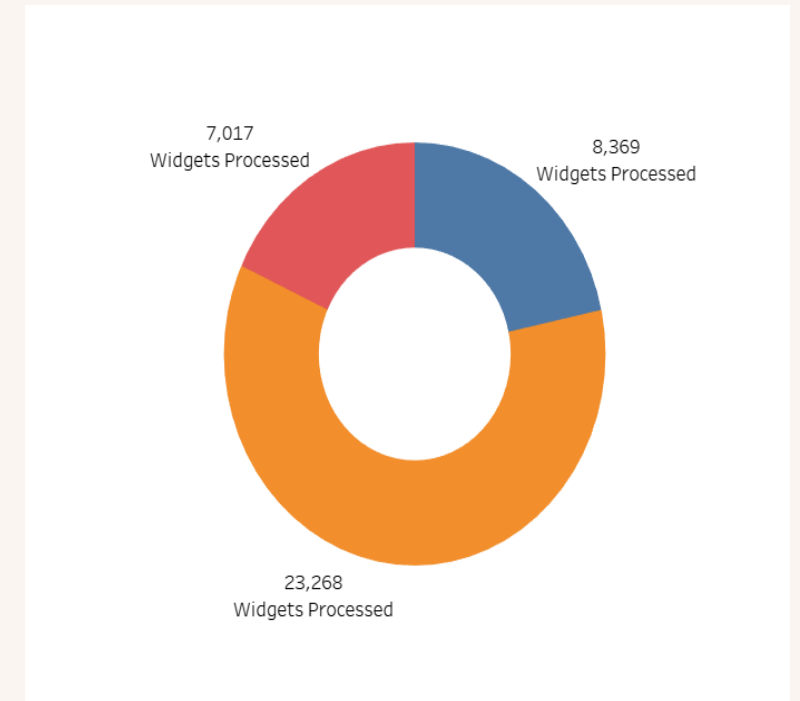
Bars/Stacked Bars –
Quantities across **categories**



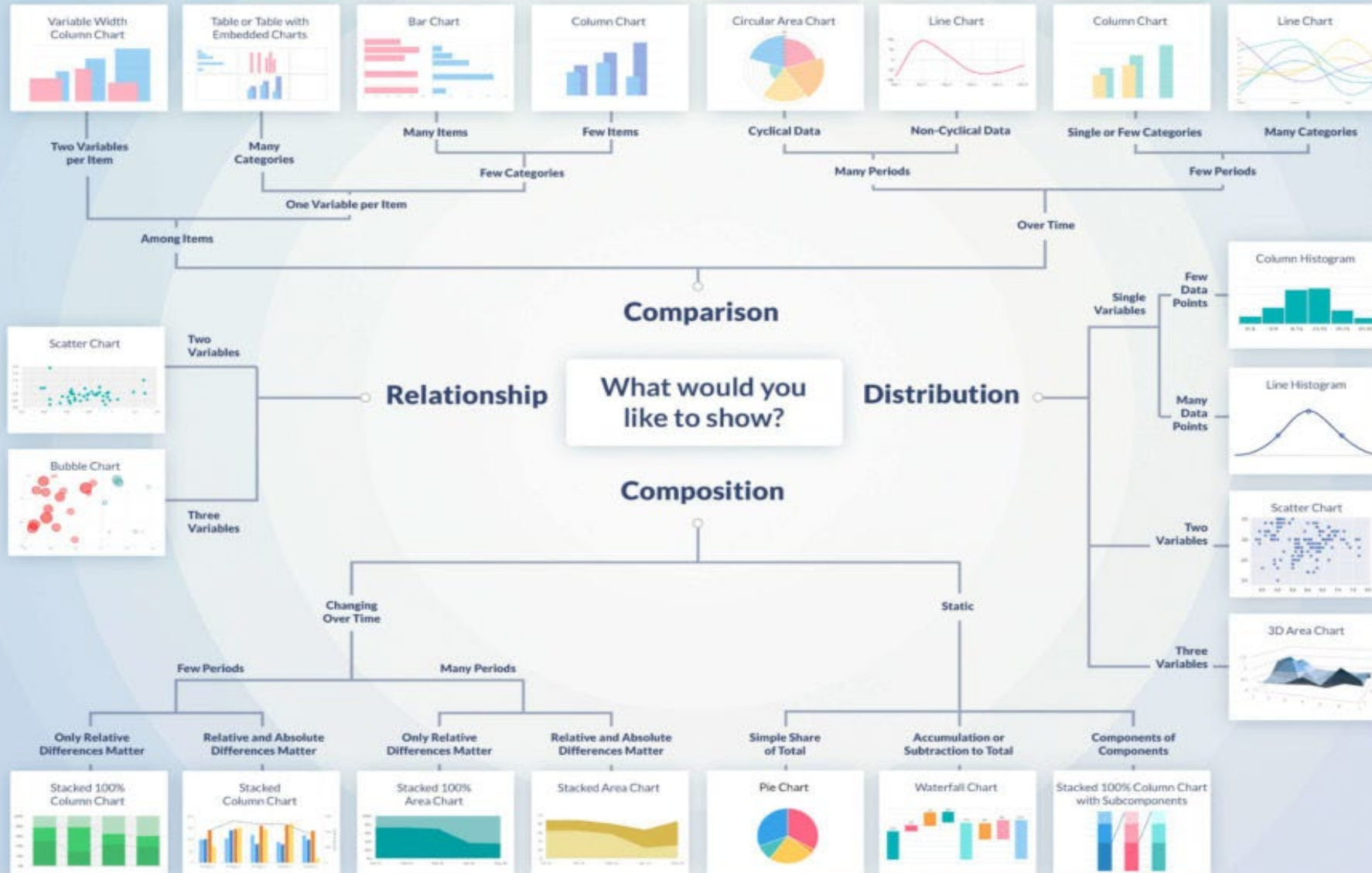
Line/Area Graphs –
Patterns over **time**



Pie/Donut Charts –
Proportions within a **whole**



Guided Visualizations for Charts and Graphs



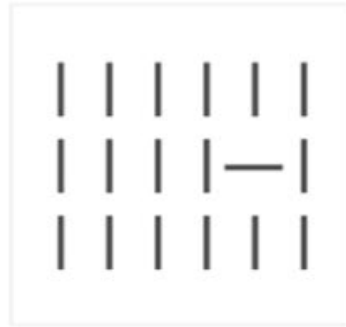
Pre-attentive attributes



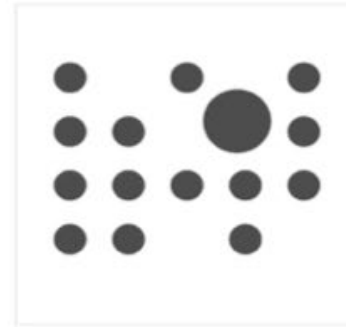
Length



Width



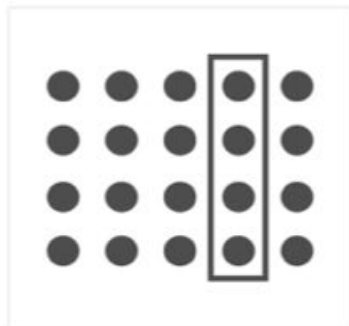
Orientation



Size



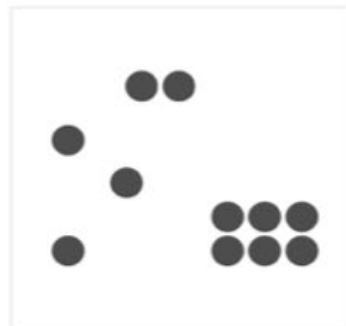
Shape



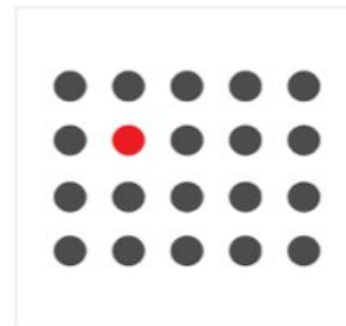
Enclosure



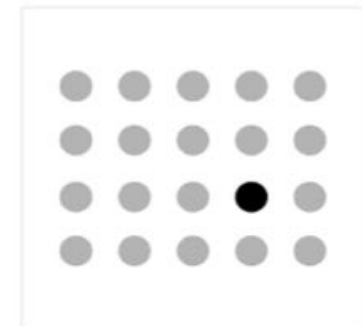
Position



Grouping



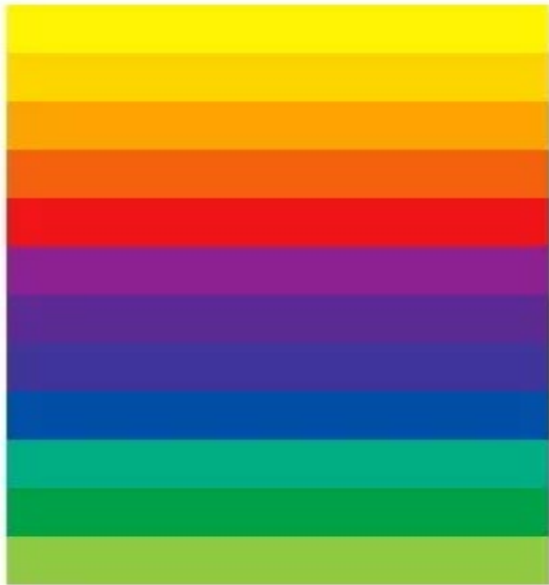
Color Hue



Color
Intensity

Colors in Data Visualization

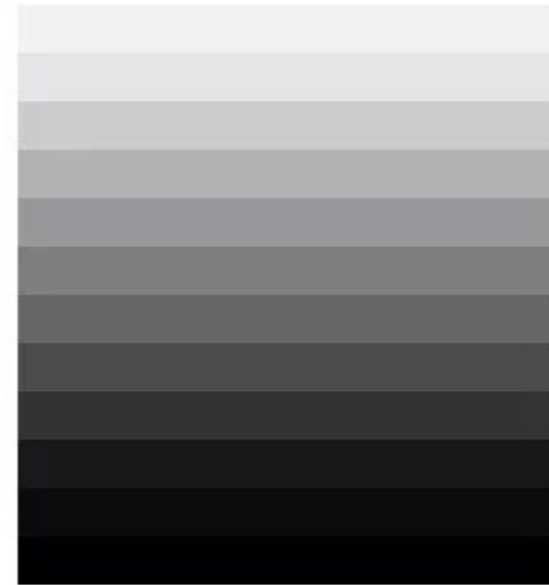
HUE



SATURATION



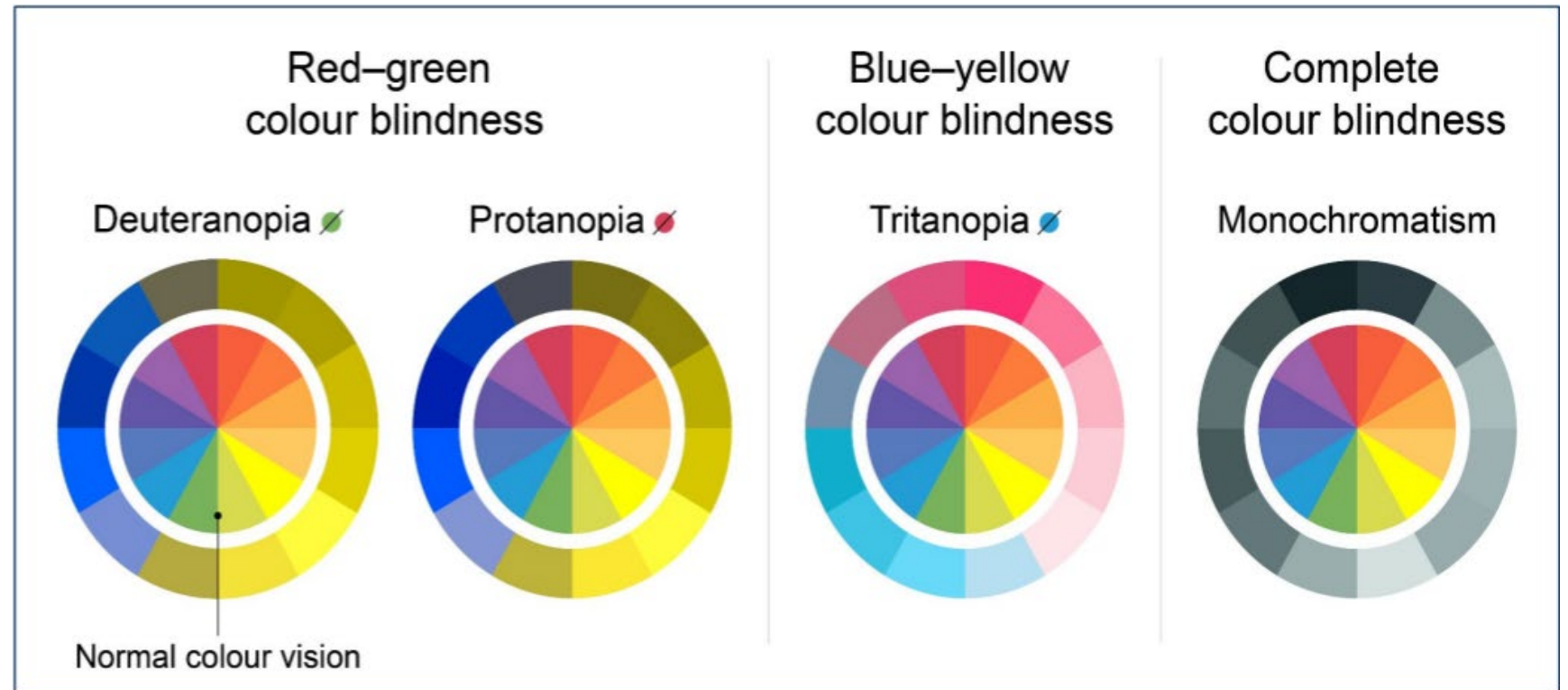
VALUE



Color Palettes

Consider your
agency's branding

Color blindness
affects 1 in 12 men
and 1 in 200 women



Contrast

Ratio for Normal text: 4.5 : 1

Ratio for Large text: 3 : 1

Ratio for User interface: 3 : 1

Readable

Still readable

Not very readable

How do I check my colors/contrast?

- [WebAIM: Contrast Checker](#)
- Install Color Contrast Analyser
- Hit windows key + ctrl + c
- Ask Lainie Strange

The image shows the WebAIM Contrast Checker interface. It has two main sections: 'Foreground' and 'Background'. The 'Foreground' section has a 'Hex Value' input field with '#0000FF', a 'Color Picker' showing a blue color, and an 'Alpha' input field with '1'. The 'Background' section has a 'Hex Value' input field with '#FFFFFF', a 'Color Picker' showing a white color, and a 'Lightness' slider. Below these sections, a 'Contrast Ratio' box displays '8.59:1' in a large font, with a 'permalink' link below it.

Normal Text

WCAG AA: **Pass**

WCAG AAA: **Pass**

The five boxing wizards jump quickly.

Large Text

WCAG AA: **Pass**

WCAG AAA: **Pass**

The five boxing wizards jump quickly.

Graphical Objects and User Interface Components

WCAG AA: **Pass**



Text Input

Plain Language

- Information in logical order
- Important details first
- Use active voice
- Avoid jargon
- Spell out acronyms
- Use familiar language
- **Add alternative text to images/charts**



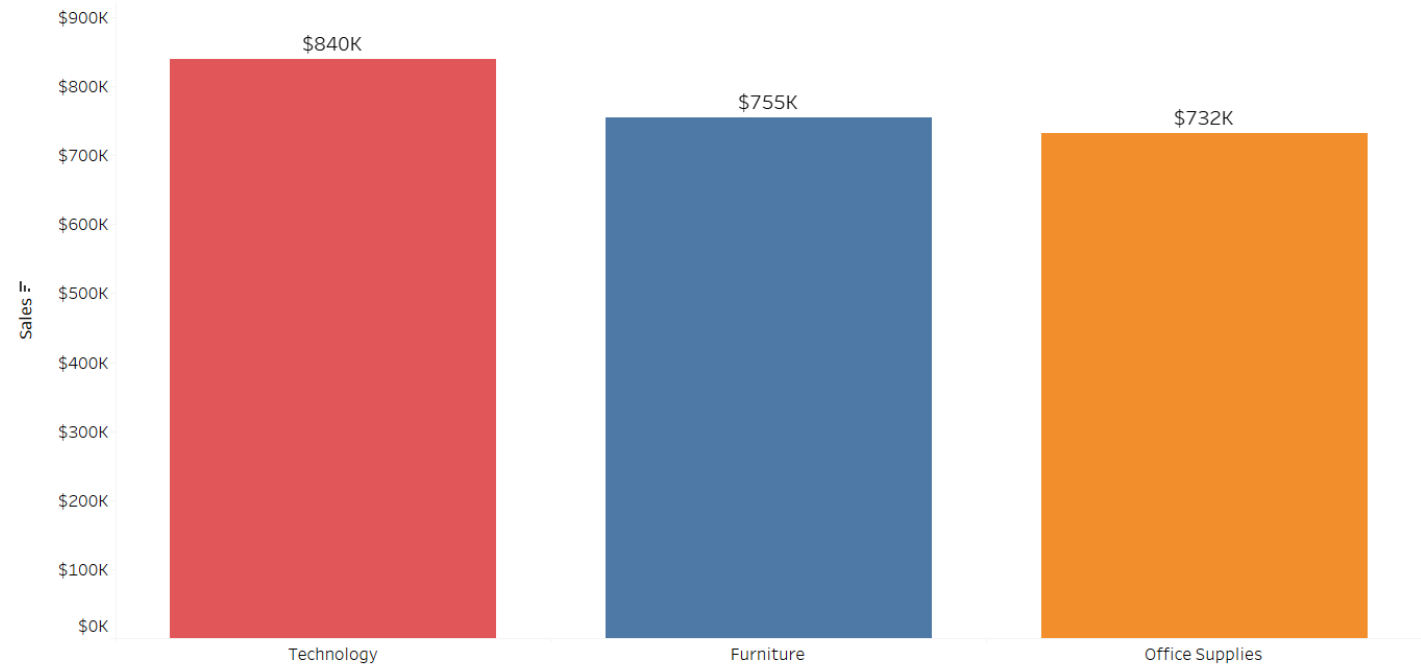
Axes and Titles

- Use your titles to describe the visualizations
- Use plain language
- Y axes should almost always start at zero
 - (Certain cases should truncate axes)

Sales by Product Category

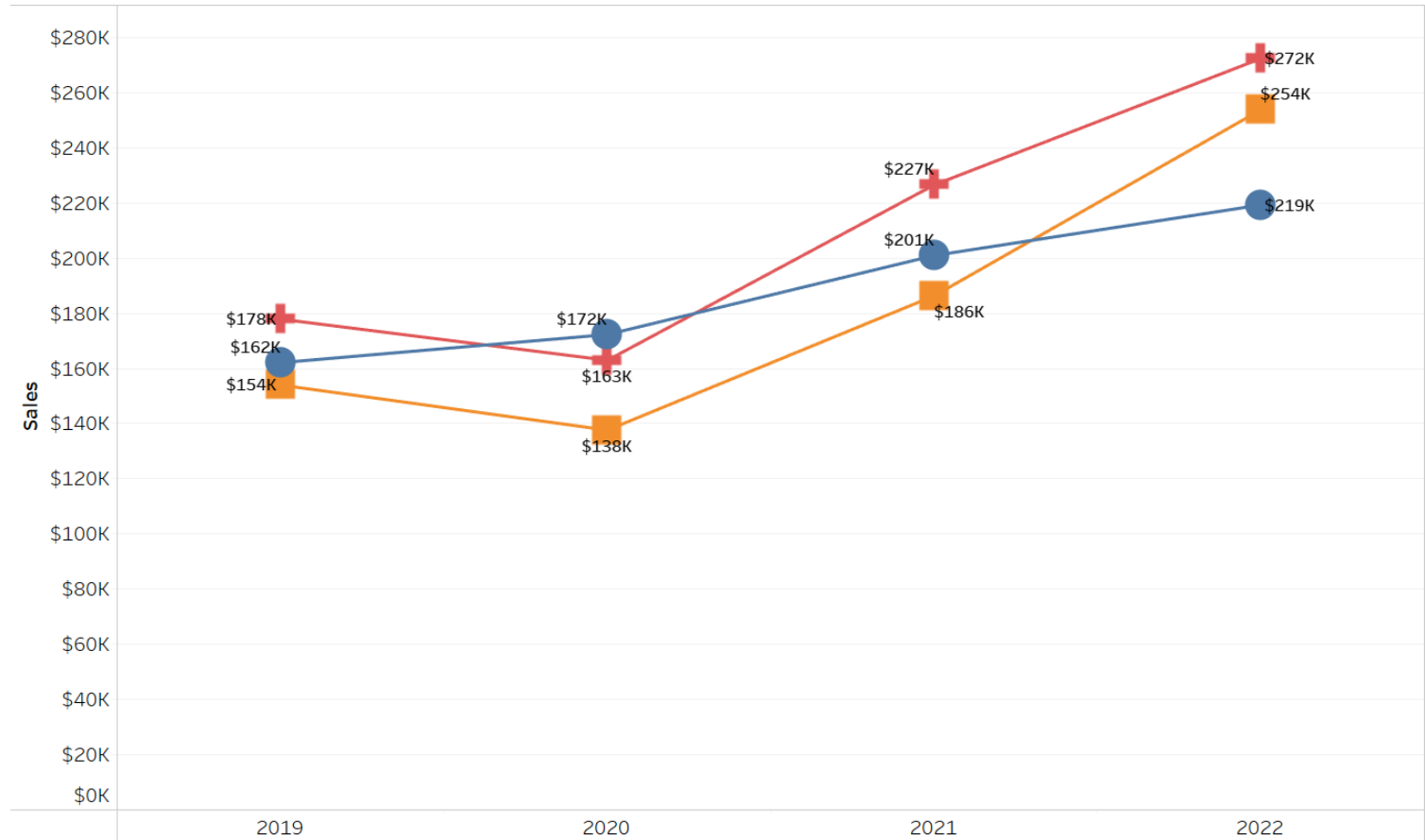
Length of bar shows sales

Text for each bar shows Sum of Sales



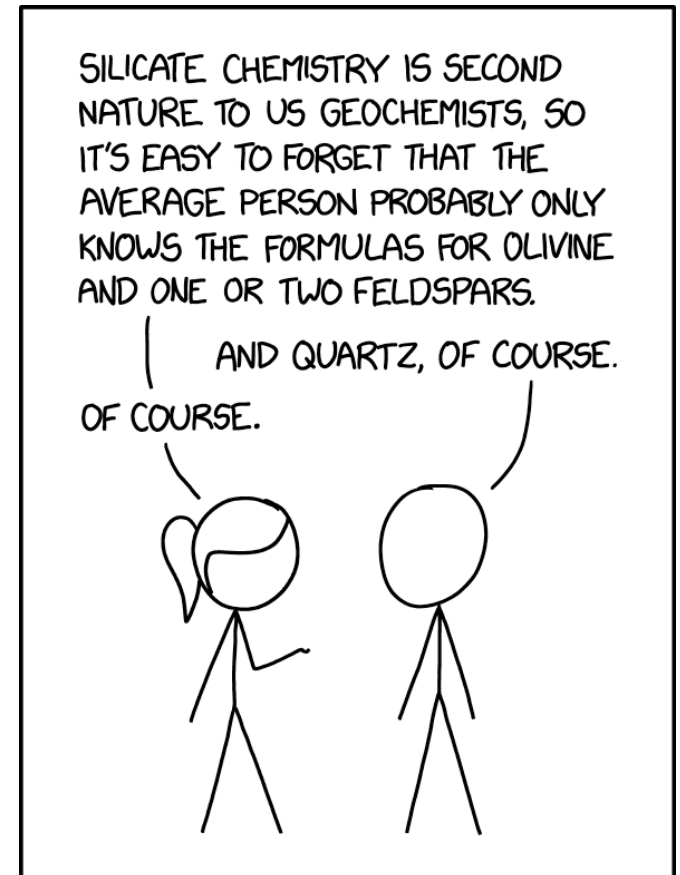
Shapes and Labels

- Use both **shapes** and **labels** to transmit/differentiate information
- Redundant encoding is key!



How do I check my text content?

- Do you have redundant encoding? (Two ways of getting the information)
- Check your contrast again ([WebAIM: Contrast Checker](#))
- Paste your text into Microsoft word, go to the 'Home' tab, then 'Editor' and click on 'Document Stats'. Word will show you readability information
- Use an extension/site like Grammarly, Hemingway, Readable, etc.
- Ask colleagues/someone who hasn't seen the visualization/data to see if it makes sense
- Ask Lainie Strange



EVEN WHEN THEY'RE TRYING TO COMPENSATE FOR IT, EXPERTS IN ANYTHING WILDLY OVERESTIMATE THE AVERAGE PERSON'S FAMILIARITY WITH THEIR FIELD.

Key takeaways:

- Accessibility improves your viz overall
- Perceivable, Operable, Understandable, Robust
- Check your colors – hue, saturation, contrast
- Check your charts
- Check your text size
- Check your language, labels, titles
- “Simplicity is the ultimate sophistication” – Leonardo da Vinci

Dashboard Evaluation Questions



1. Does the design or feature allow the user to achieve their goals?

Think about the goals of the user. If they achieved their goals, the design is good. If they did not, the design is bad.



2. Can the user achieve their goals efficiently?

It is important that they can do this smoothly, quickly, and with minimum errors. If the design allows the user to achieve their goals quickly and efficiently, then it is good design.



3. Does the design or feature communicate to the user what it is supposed to do and how to use it?

The user should be able to understand just from looking at the design what it is designed for and how to use it.



4. Does the design or feature respond to user actions in an expected, predictable, and systematic way?

A specific design feature should always respond to user actions in the same way and the way the user expects it to.



5. Does the design offer positive, pleasurable, and joyful experiences to the user?

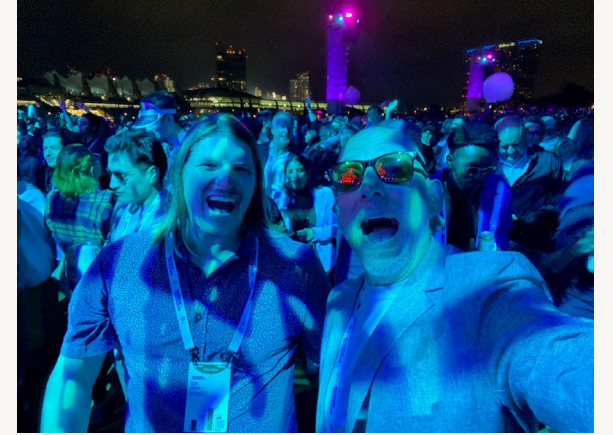
Remember that user interfaces are designed for people, not for robots. Therefore, even task-oriented interfaces should take into consideration aesthetics, emotions, pleasurable use, and positive experiences.



6. Does the design or feature match the user's mindset and background?

Good design fits the ways that people think given their background, education, access to resources, and experiences.

Questions?



More resources:

[WCAG 2 Overview | Web Accessibility Initiative \(WAI\) | W3C](#)

[Chartability](#)

[Tableau Accessibility Best Practice](#)

[Build Views for Accessibility](#)

[Accessible WCAG 2.1 AA Guide](#)

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