Using Data in Reports and Presentations

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SAN RAFAEL

THE CITY WITH A MISSION

The Data Process

Formulate a question

Articulate your hypothesis

Clean data

Transform data

Analyze data

Visualize data to understand

Visualize data to present

In a report or presentation, you can use data in the following ways:

1. Within your narrative

2. In a table

3. In a visualization

When should you use each tool?

- Narrative:
  - When you only have a few specific data points to call out (3 or less),
  - You need to provide context around data that is in a table or chart
- Tables:
  - To present detailed data/information
  - When the data has many data points (6+ rows)
  - To show exact figures
- Visuals:
  - To summarize a table
  - To show trend lines, correlations, outliers
  - To illustrate a specific assertion

Visualization Pros and Cons

Pros

- Our eyes are drawn to colors and patterns
- We can quickly see and internalize trends and outliers
- A good visualization makes data more understandable and accessible

Cons

- A poorly designed visual can lead viewers to make inaccurate assumptions
- Core messages can get lost in a visual
- A visual is only as good as the underlying data!

Visualization Fundamentals

1. Use text to make a clear assertion
2. Choose a chart that best displays your data
3. Make one assertion per visualization
4. Guide viewers to the evidence that supports your assertion
5. Keep it simple. Less is more
6. Avoid misleading visualizations
7. Keep equity in mind

Use text to make a clear assertion

- **In presentations**: Make your assertion in the title of your chart

- **In reports**, make your assertion in the title, subtitle, or caption of the chart, depending on the required report format

Choose your chart type based on your assertion and data

- **Bar charts:** Best for comparisons between categories and/or to show negative and positive values
- **Line charts**: Used to emphasize trends over time
- **Scatter charts:** Shows correlations and/or clustering, especially with many data points
- **Maps:** Helpful to display spatial data

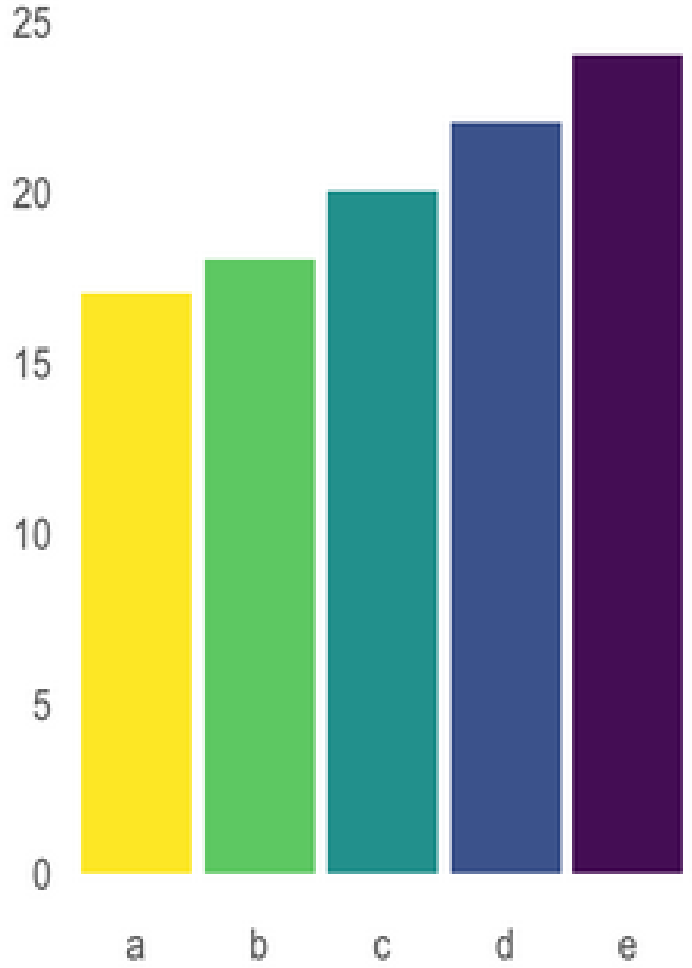
Avoid pie charts if you can

- Humans are not naturally good at estimating quantities from angles (like in a pie chart)
- People are much better at comparing lengths and heights
- To demonstrate, let’s vote…

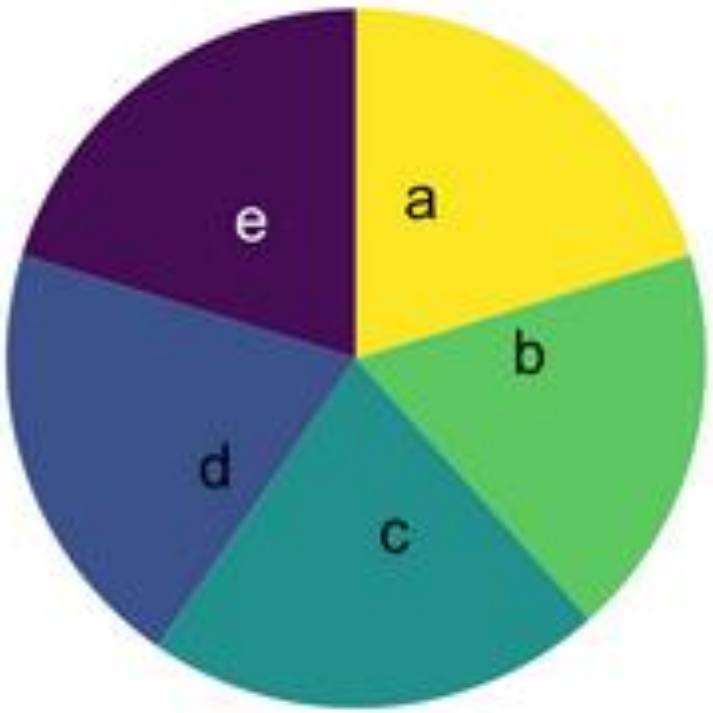
Source: https://www.data-to-viz.com/caveat/pie.html

Which section is the biggest?

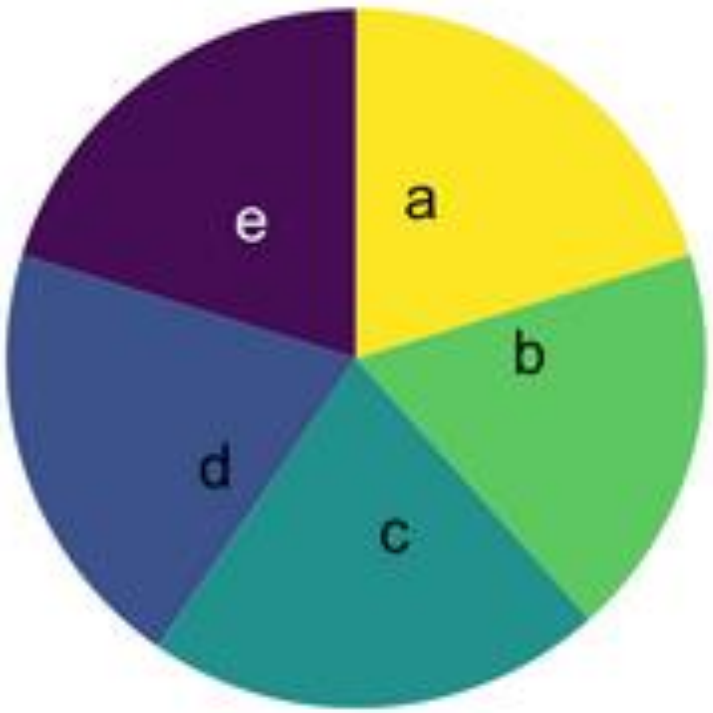
The same data with a bar chart

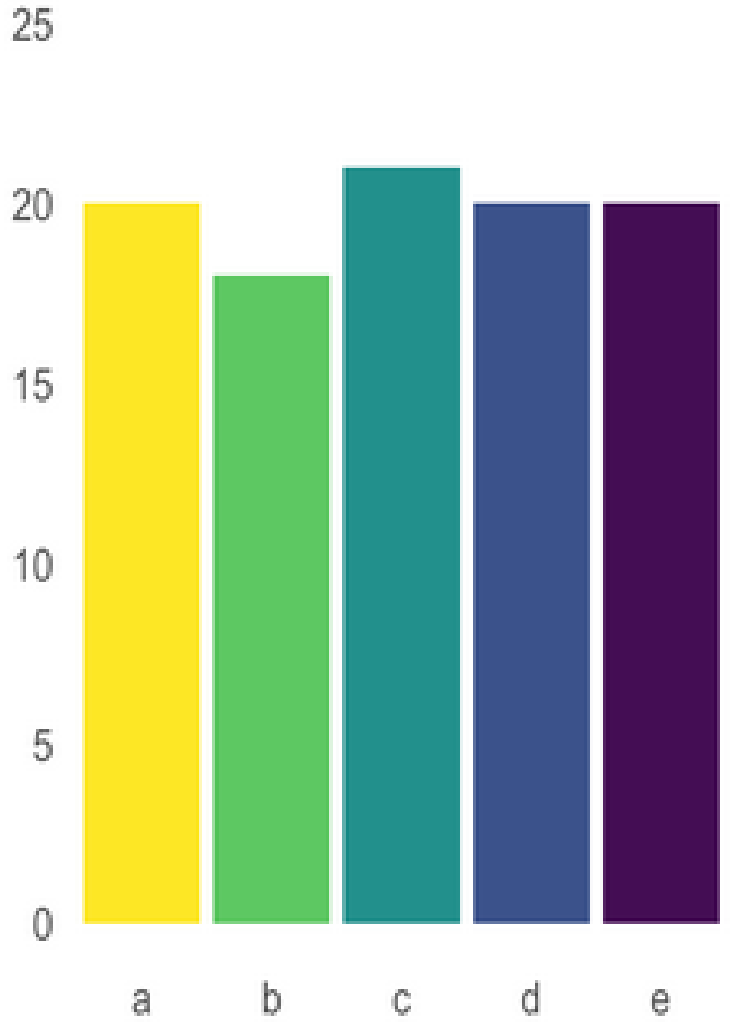


I like this game, so one more time..
Which section is the biggest?



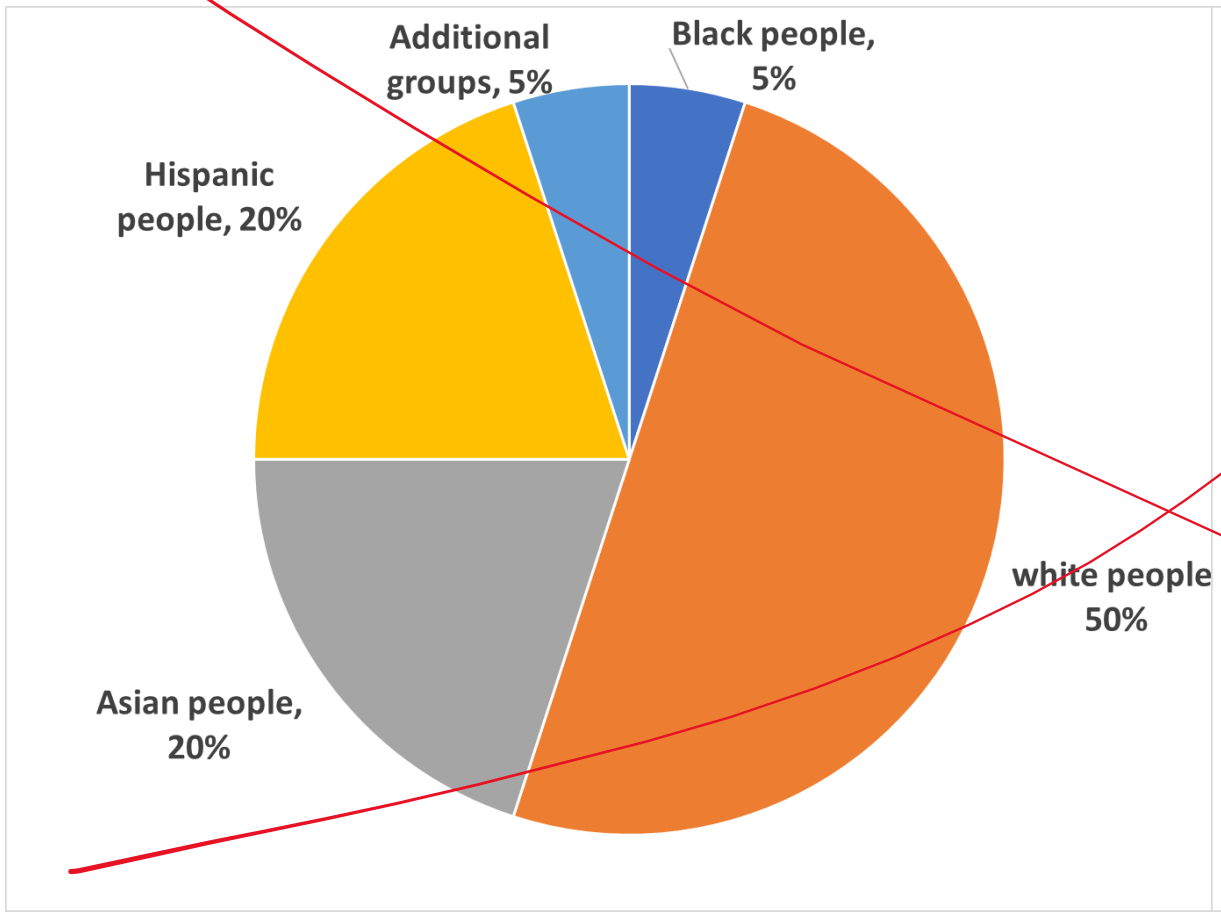
The same data with a bar chart



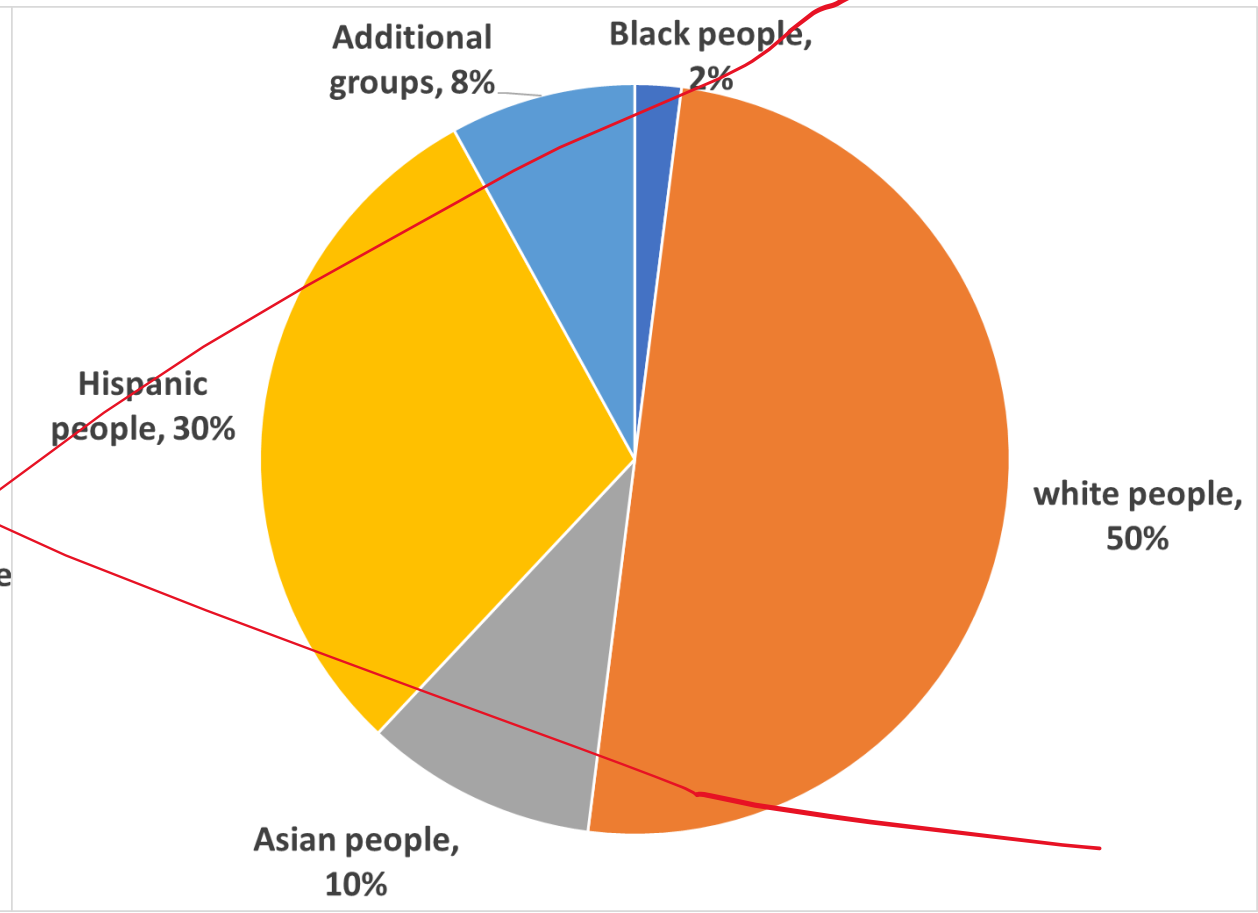


Especially avoid pie charts when comparing groups

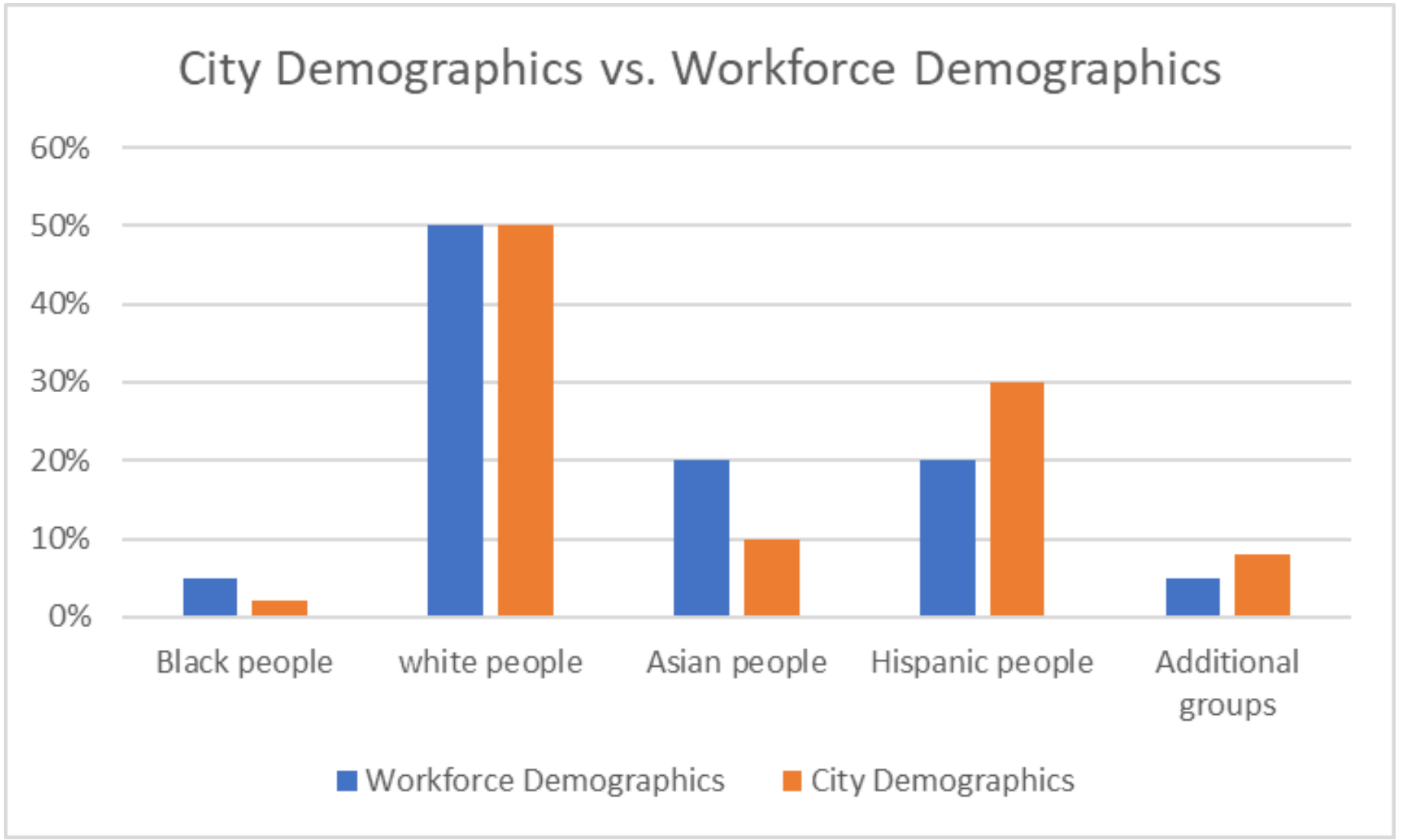
Workforce Demographics (FICTIONAL DATA)



City Demographics (FICTIONAL DATA)

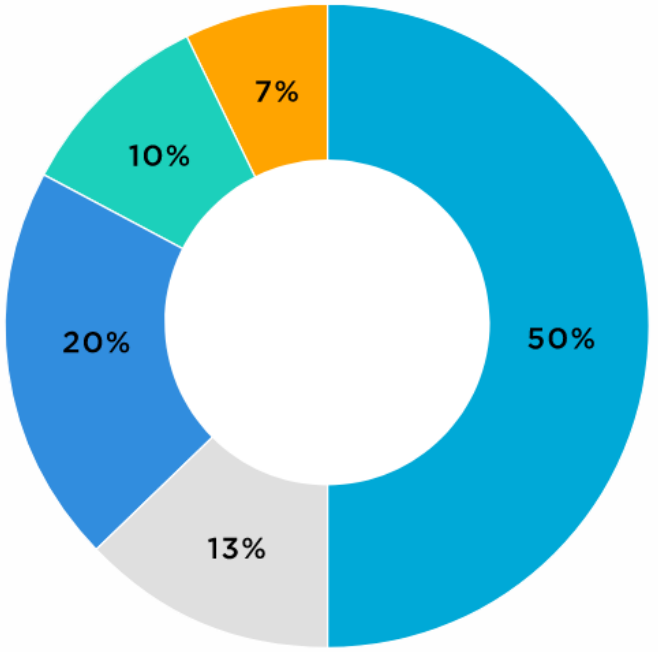


Use a Clustered Column Chart instead



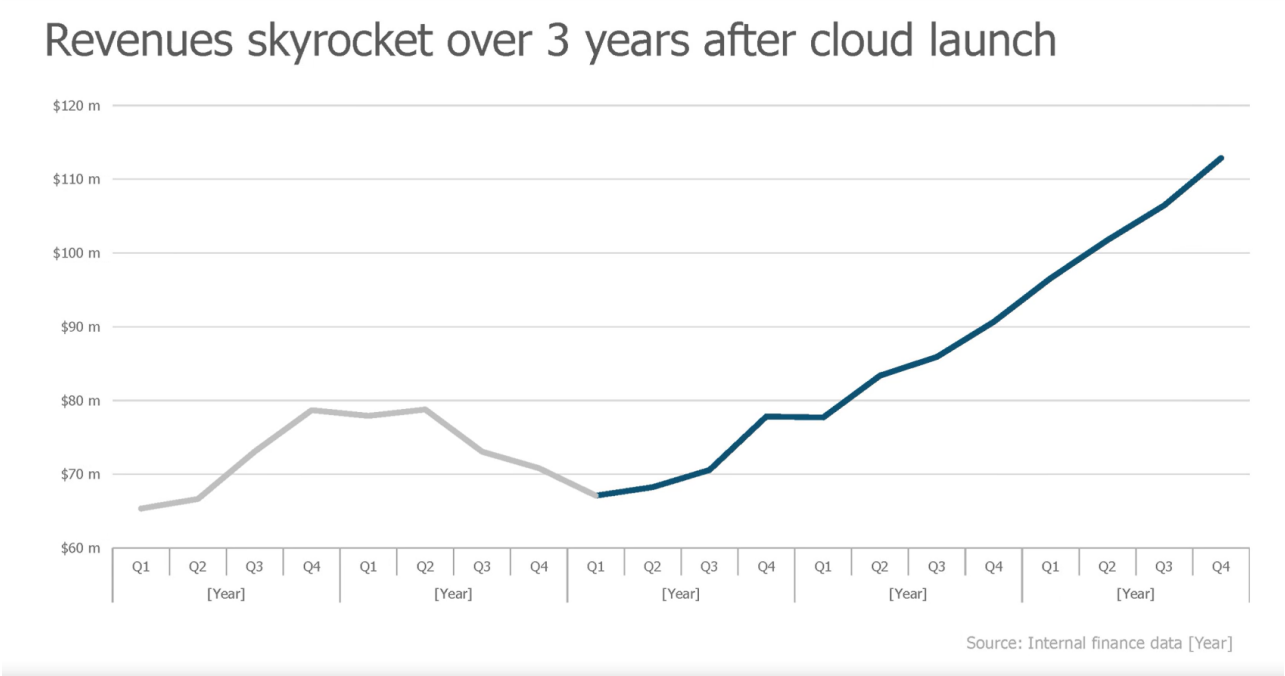
If you must use a pie chart... Use a donut chart instead!

- The human brain can make out arc lengths better than pie slice areas
- Show a maximum of 5 categories
- Label the chart with percentages, and quantities if possible
- Make sure the pieces add up to 100%!

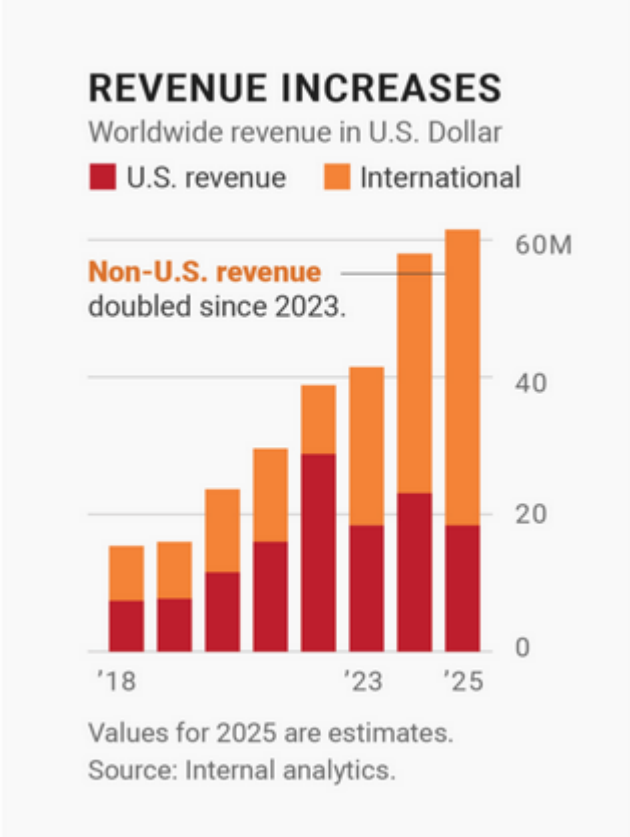


Guide viewers to the evidence that supports your assertion

Use text, icons, colors, and lines to point viewers to the most important information



Source: https://www.presentation-company.com/blog/data-visualization-video-series-pt-3/



Source: https://blog.datawrapper.de/text-in-data-visualizations/

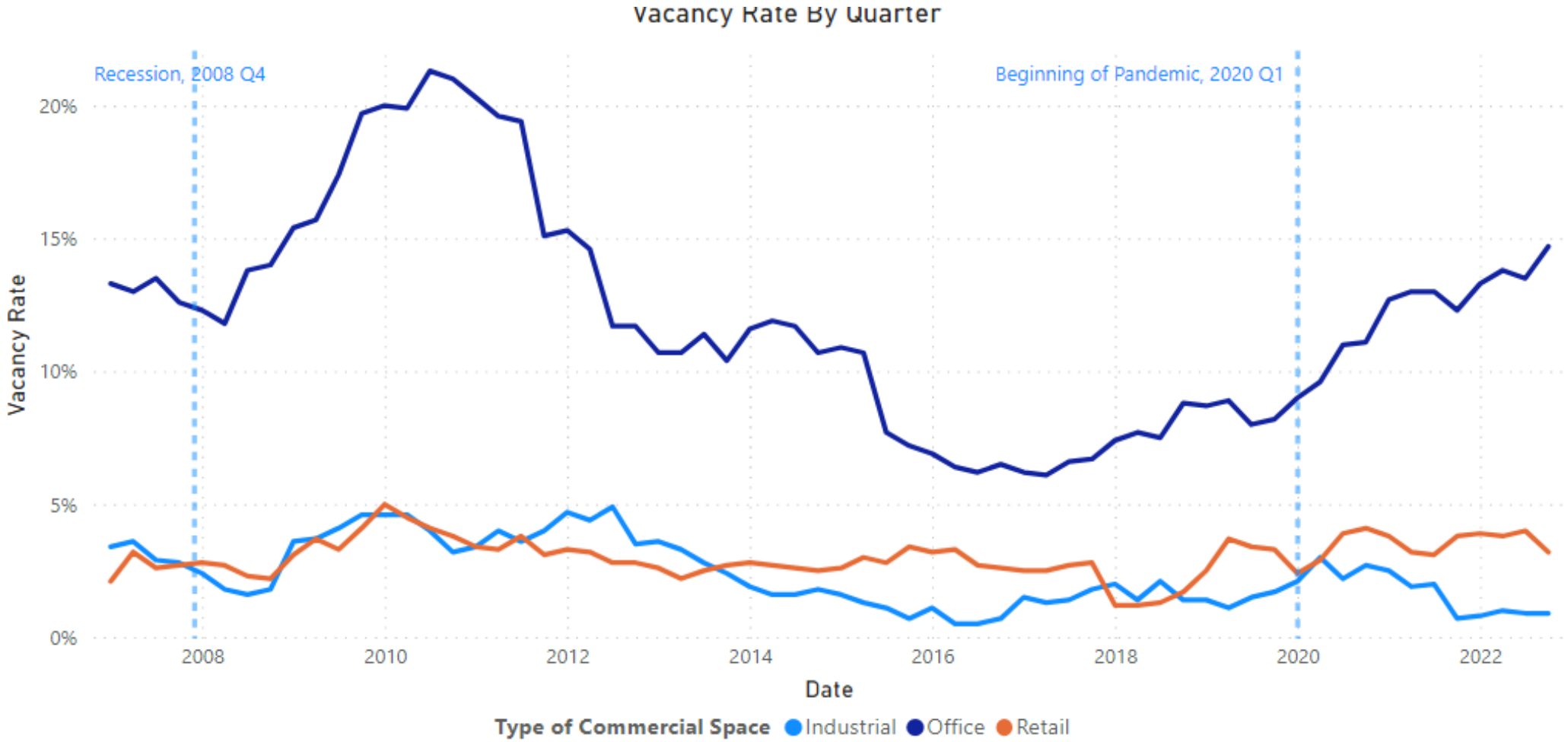
To add callouts:

It's easiest to add text callouts to charts in PowerPoint. To do this:

1. Make your charts in excel
2. Paste them into PowerPoint, either as an image or linked with original formatting
    - A linked chart is dynamic – you can change the data and the slide will change
3. Add callouts as text boxes
4. Select the chart and all text box elements and group them together
5. Save as an image and paste into a report, or keep as is in a presentation
6. When resizing, do not distort the aspect ratio of the image

Vertical and Horizontal Lines

- Helpful to point out important events that you want to viewer to compare to



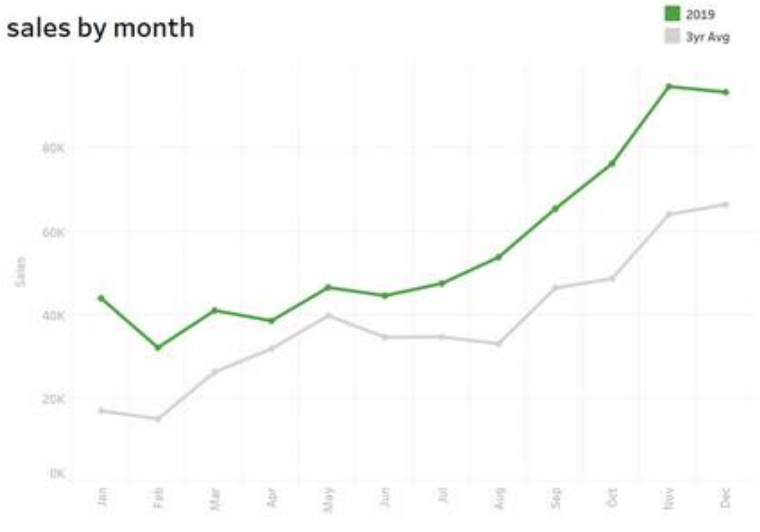
To add lines to your charts:

- If you want to add one line at an obvious point, you could use PowerPoint
- However, it's best to do this in excel, so the line adjusts dynamically when you move or resize your chart
- Excel doesn't make it easy to add lines to charts, you have to hack your way through it
- Demo (if time)
- Directions:
  - See https://www.exceldashboardtemplates.com/3-ways-to-create-vertical-lines-in-an-excel-line-chart/

Keep it simple. Less is more.

- Remove information that doesn't have meaning to your audience
- Don't clutter the visualization with extra elements
- 3D elements never help

ineffective

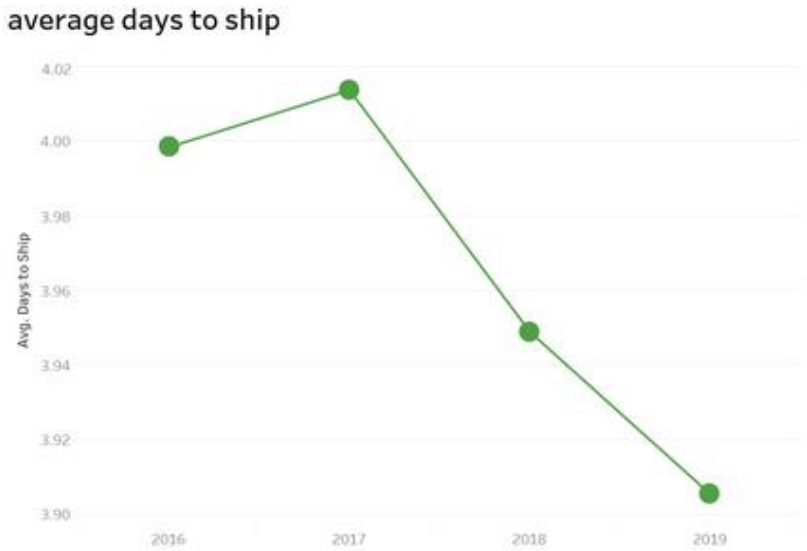


effective

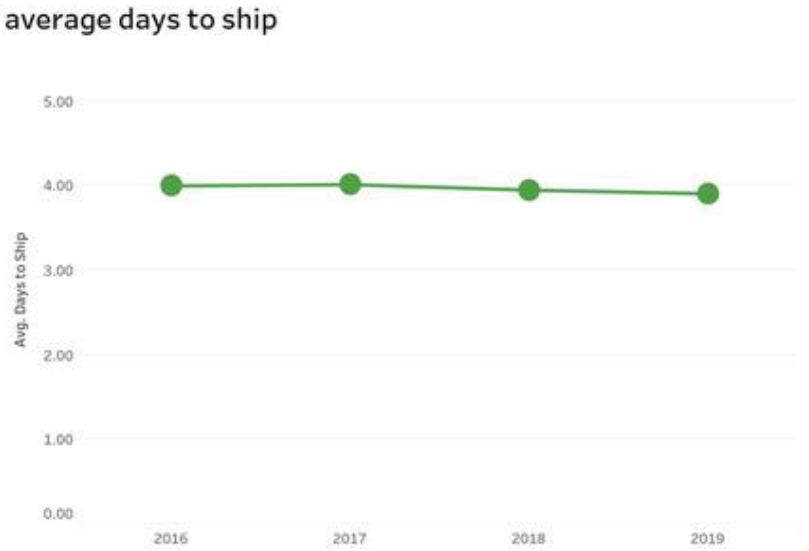
Source: https://blog.csgsolutions.com/6-tips-for-creating-effective-data-visualizations

Avoid misleading visualizations

- **Always start with 0 on your axis**
- **Don’t change the aspect ratio of your visualization**
  - If you insert an image of your data into PowerPoint or a report, don’t change the length without changing the width – only resize the image diagonally – don’t make it longer or wider. Doing so can make the visualization inaccurate and dramatize trend lines.
- **Don’t leave out important data**
- **Don’t provide too much data either**



ineffective



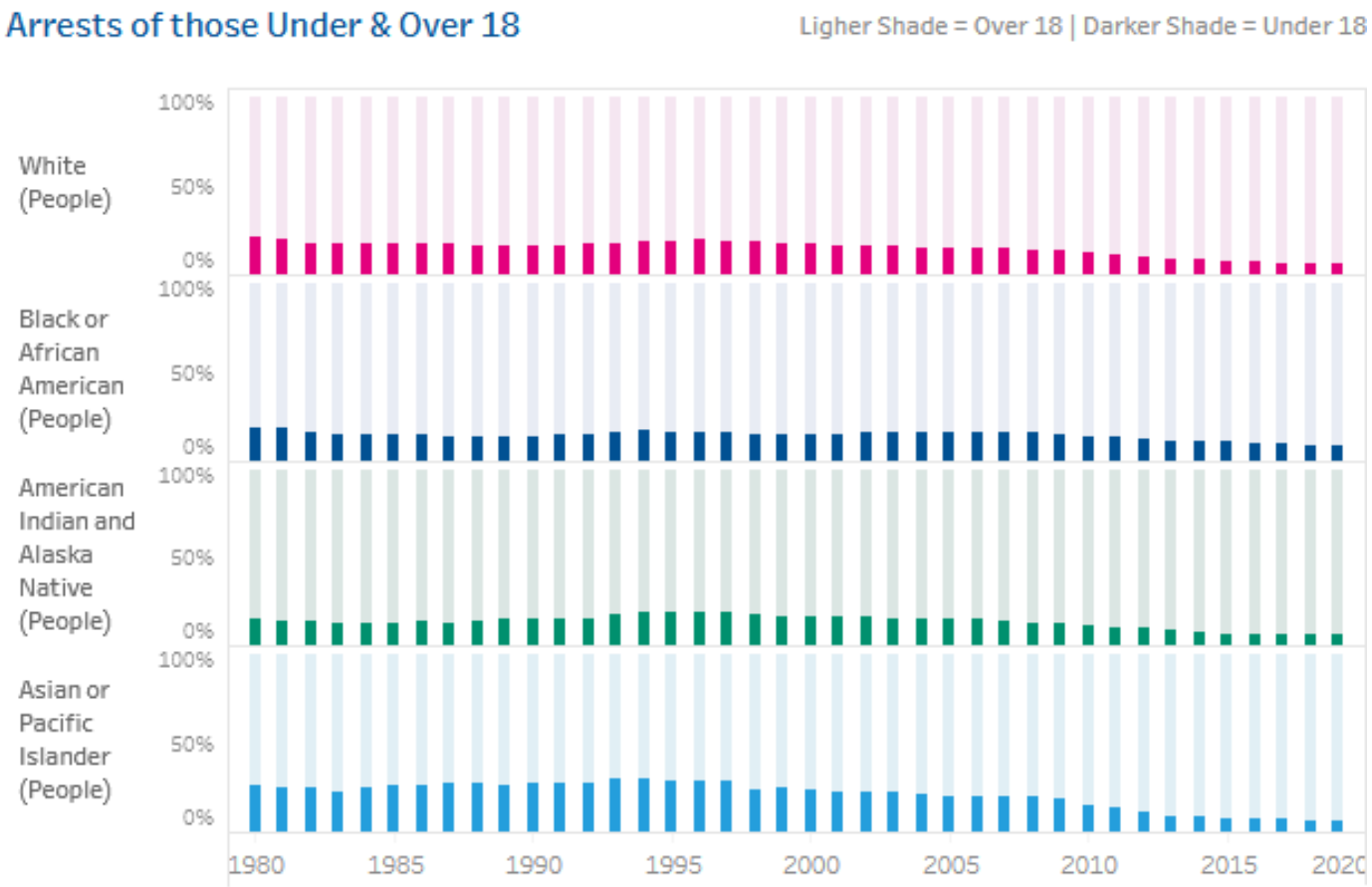
effective

Source: https://blog.csgsolutions.com/6-tips-for-creating-effective-data-visualizations

Do No Harm: Equity Awareness in Data Viz

Ask yourself: If I were one of the data points on this visualization, would I feel offended?

- **Use people-first language**: Start with people, not characteristics
  - Label your data “Black people” instead of “Black” or “Percentage of people in poverty” instead of “more poverty” if space allows
- **Order labels and responses purposefully**
  - Rather than using orders that reinforce “white” and “male” as norms, consider ordering your data by magnitude of results



Source: https://www.urban.org/research/publication/do-no-harm-guide-applying-equity-awareness-data-visualization

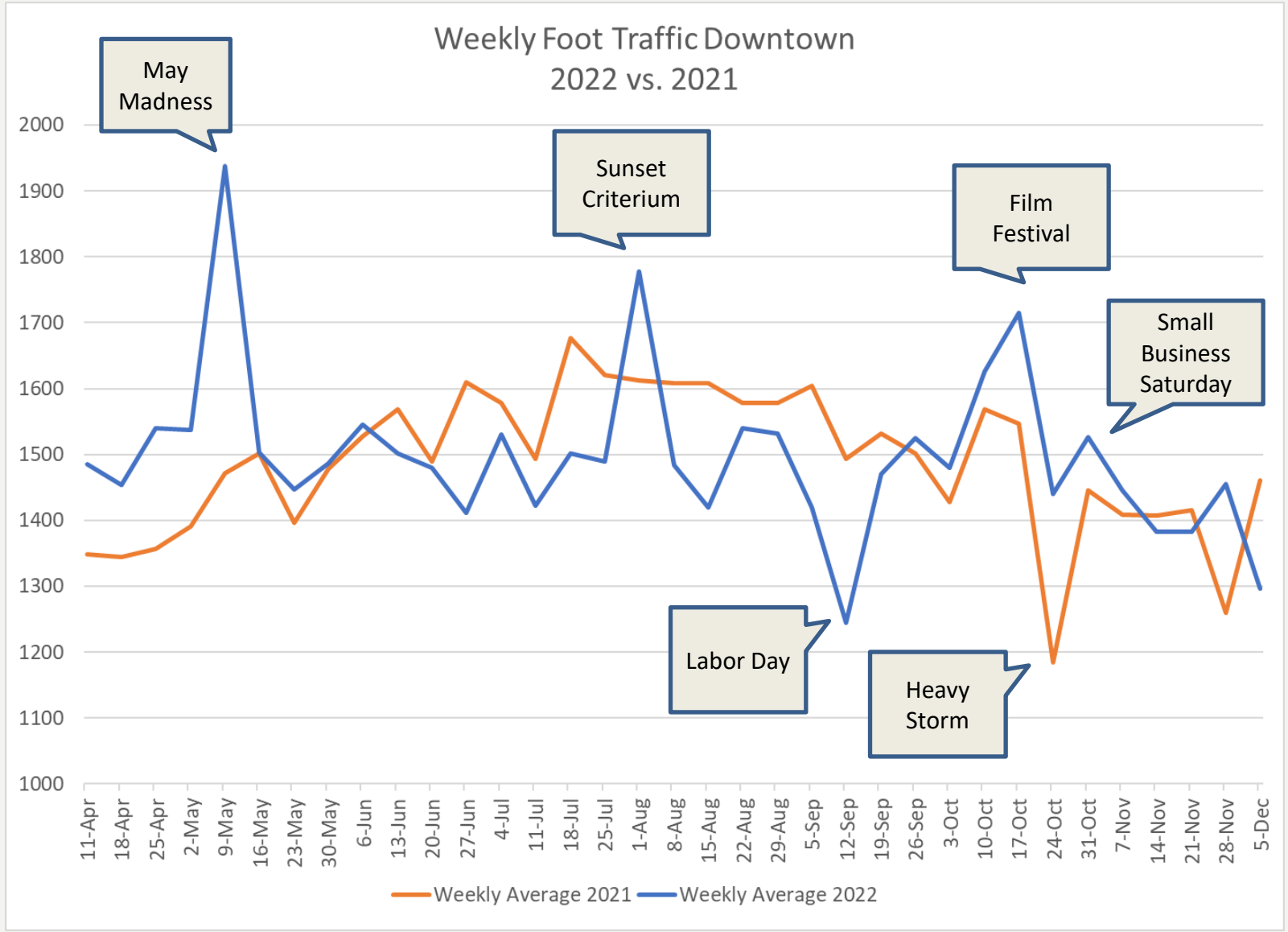
Equity Awareness in Data Viz cont.

- **Carefully consider colors, icons, and shapes:** Avoid reinforcing stereotypes
  - Avoid using colors that are associated with stereotypes (ie. Pink for women, blue for men)
- **Consider missing groups**
  - Consider using terms like “Another”, “Another race”, “Additional groups”, “Identity not listed” instead of “Other”
  - Consider adding a note to highlight how the data are not inclusive or representative

Source: https://www.urban.org/research/publication/do-no-harm-guide-applying-equity-awareness-data-visualization

Let’s spot the issues with the following slide

Foot Traffic in 2021 vs. 2022



- Foot traffic in summer 2021 was slightly higher than in 2022 on non-event weeks
- Foot traffic was higher in 2022 during event weeks
- Winter traffic dropped in both years, but is slightly higher in 2022
- Traffic dropped around Labor Day more in 2022

The previous slide had the following issues:

- There are too many assertions on the slide – it's not clear what the viewer should understand from the chart
- There are too many callouts on the chart
- The y-axis does not start at 0
- It's hard to see the legend

The chart on the next page is a little better!

Foot traffic was higher during event weeks in summer 2022 compared to summer 2021