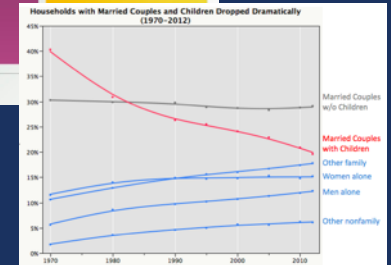
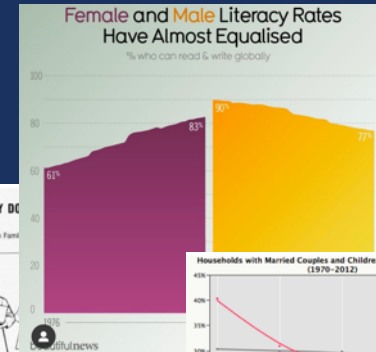
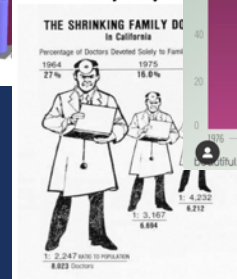
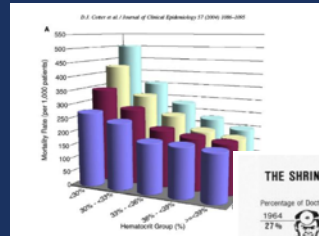


RESEARCH DATA VISUALIZATION FOR POLICYMAKERS & PRACTITIONERS

March 30, 2020



MARCI MCCOY ROTH

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OBJECTIVES

1. Discuss elements of effective graphs
2. Learn how to avoid confusing your audience with data
3. Use a cheat sheet for checking your charts and graphs.
4. Elements of effective data presentations for policymakers

POLL: WHICH GRAPH IS BETTER-A OR B?

A

How rich is rich? The higher your income, the higher you set the bar

Figures shown are the % of people in each personal income group who consider an individual earning the amounts shown below (before tax) to be "rich"

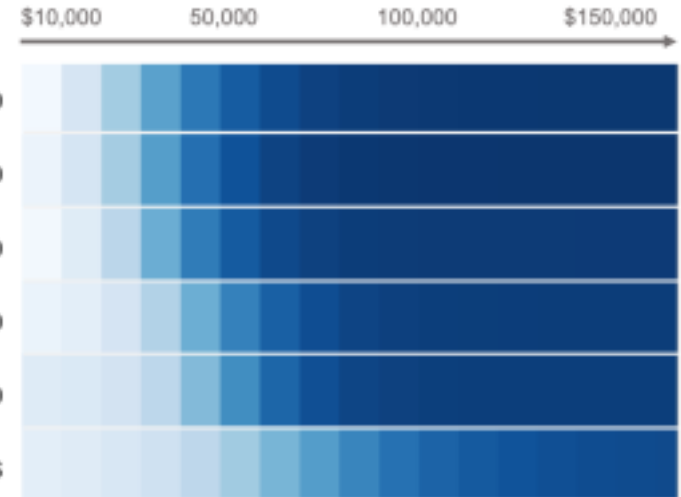


YouGov

30 April - 2 May 2017

B

Deeper colors represent higher *proportion* describing income level as "rich"



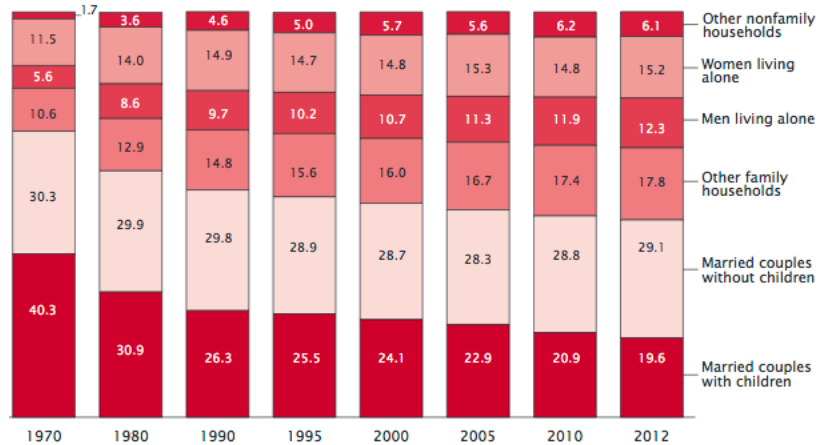
Data: YouGov.uk

Kaiser Fung | Junk Charts

POLL: WHICH GRAPH IS BETTER-A OR B?

A

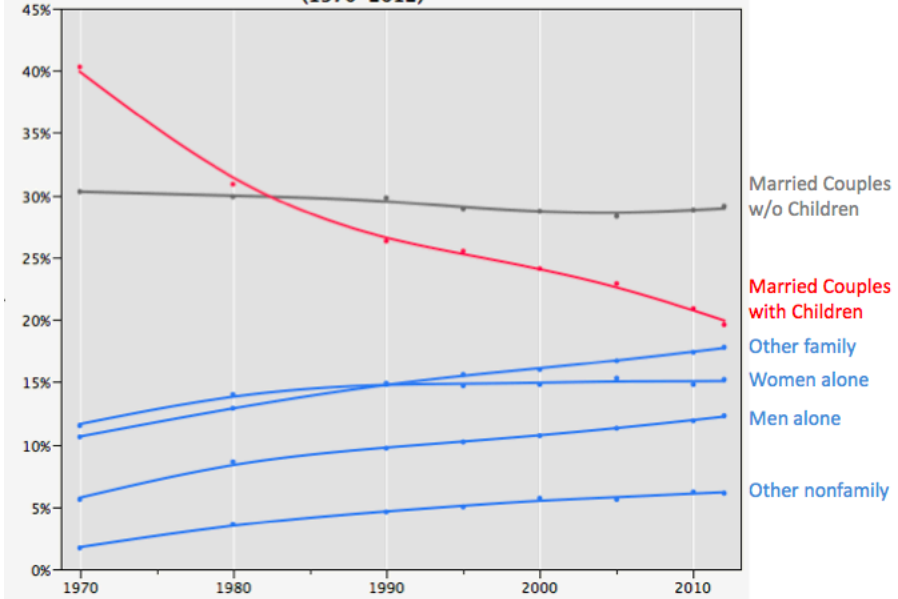
Households by Type, 1970 to 2012: CPS
(In percent)



Source: U.S. Census Bureau, Current Population Survey, Annual Social and Economic Supplement, selected years, 1970 to 2012.

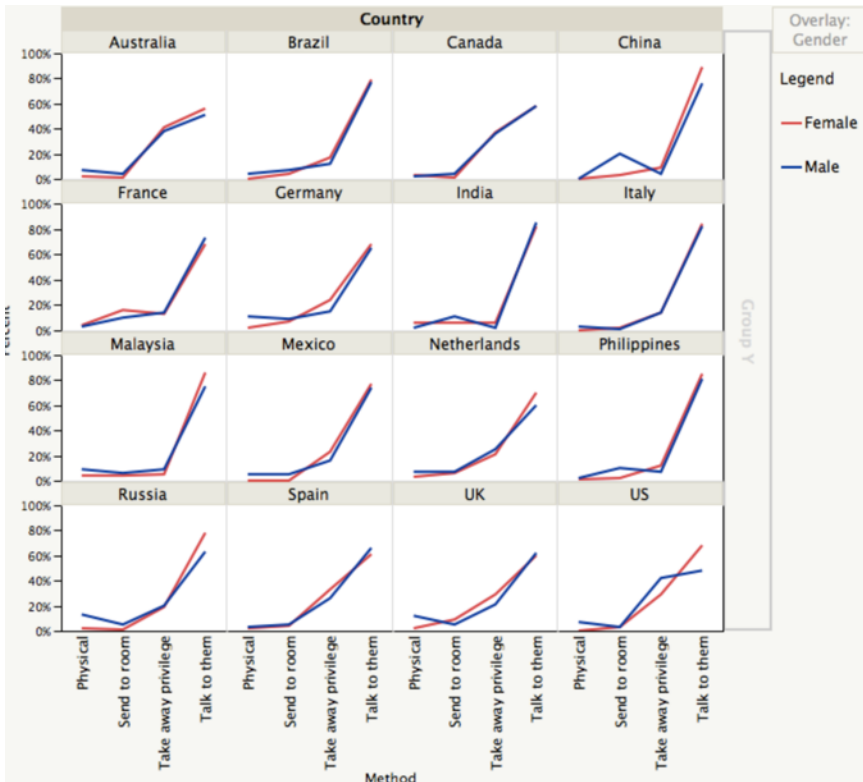
B

Households with Married Couples and Children Dropped Dramatically (1970-2012)

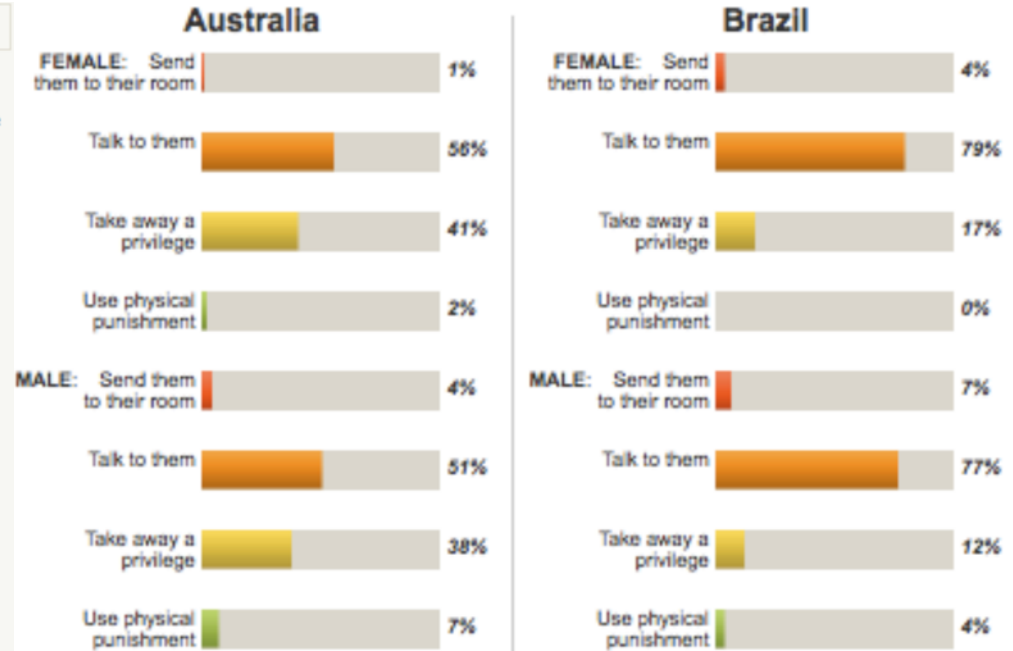


POLL: WHICH GRAPH IS BETTER-A OR B?

A



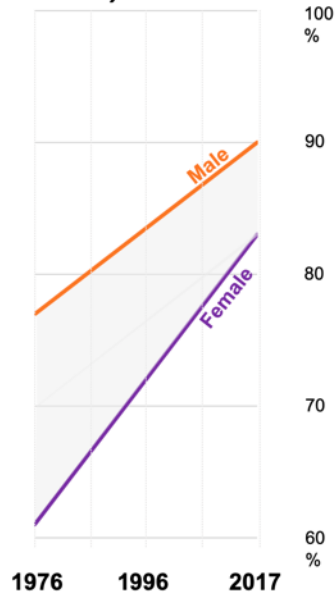
B



POLL: WHICH GRAPH IS BETTER--A OR B?

A

Females Steadily Catching Up to Males in Literacy in Last 40 Years

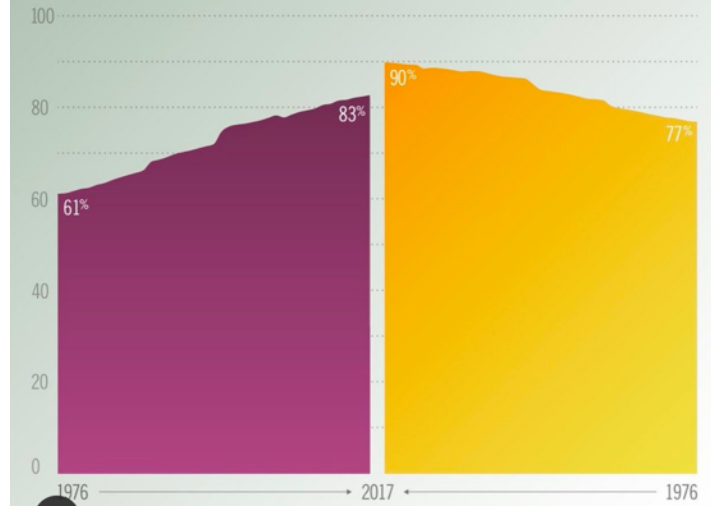


Data: World Bank Kaiser Fung | Junk Charts

B

Female and Male Literacy Rates Have Almost Equalised

% who can read & write globally



beautifulnews

source: World Bank

TODAY'S TOPICS

- Objectives
- Recap of Webinar Highlights
- Creating Effective Graphs
 - Data Do's
 - Data Don'ts



QUICK RECAP ON PRESENTING RESEARCH FINDINGS TO POLICYMAKERS



QUICK RECAP

- Webinars (Ask Sommer for links!):
 - Why Research Matters to Policymakers
 - Communicating Research to Policymakers
 - Making Research Matter: Creating Policy Briefs
- Highlights
 - Your role in presenting research to policymakers
 - Preparing for policy briefing: elevator speech, talking points, and leave behind
 - Structure of a Research Policy Brief
 - Talking Points
 - During and after a policy briefing

YOUR ROLE IN POLICY PRESENTATIONS

Your role, when corresponding or meeting with policymakers is to:

- **Educate.** Present information
- **Identify.** Define and articulate relevance to policy, describe a new or existing problem and why it's important
- **Analyze.** Bring your analysis skills to an issue
- **Motivate.** Spark interest in policymaker to consider your findings in future policies

PREPARING FOR A POLICY BRIEFING

- Craft elevator speech – this is the essence of what you have to say / top line points in less than 2 minutes.
 - Highlight 1-3 key facts/stats
 - Use them and tell a story
 - Help connect the dots
- Develop talking points (to guide your remarks, also good for media interview)
- Prepare a one-page leave behind, consistent with talking points

STRUCTURE OF A RESEARCH POLICY BRIEF

Four essentials in a research policy brief:

1. Catchy, clear title
2. Abstract
3. Body/Chart
4. Takeaways

TALKING POINTS

1. Establish relevancy in talking points
 - Why this matters/Make the connection to policy
 - Share key findings
 - Share a prepared anecdote to help contextualize the findings / tell a story
 - Note any disagreement with findings
2. Ask questions. Have one or more prepared questions
3. Make recommendations, as appropriate
 - “Based on the research, we believe activity Z yields the best opportunities for young children.”
 - Don’t say, we need more research as your only recommendation. This is what policymakers most often hear from researchers.

DURING AND AFTER THE POLICY BRIEFING

1. Relax. You are the expert, and policymakers want to hear from you.
2. Use your talking points.
3. Leave something short for them to read later.
4. Offer to be a resource – you've established your expertise; invite the policy maker to contact you
5. Follow up in writing to share additional materials and to provide your contact information

THE MAGIC OF EFFECTIVE GRAPHS

In text, information arrives one nugget at a time, in a prescribed sequence.

In pictures, our eyes wander, foraging for information along multiple dimensions at once.

Cognition is guided by design elements such as reference lines, legends, data labels, and annotations.

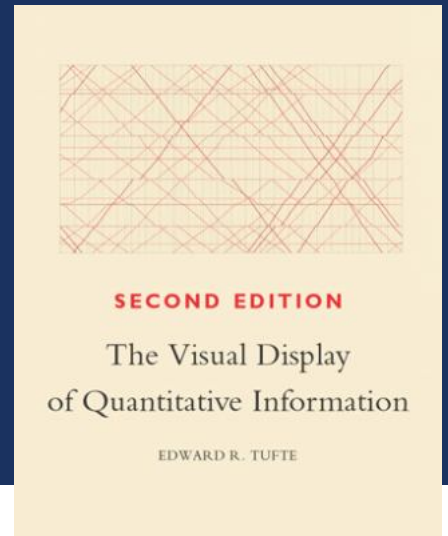


<https://datajournalism.com/read/longreads/the-unspoken-rules-of-visualisation-and-when-to-break-them>



GRAPHICAL ELEGANCE
IS OFTEN FOUND IN
SIMPLICITY OF DESIGN
AND COMPLEXITY OF
DATA.

-EDWARD TUFTE



KEY TACTICS FOR MAKING EFFECTIVE GRAPHS/CHARTS/TABLE

1. What is your graph trying to say?
2. The title is your translation opportunity for the audience
3. Match your data to chart type
 - 3a. Avoid Pie Charts? To Pie or Not to Pie
4. Reduce amount of ink
5. Use color with care
6. Try not to mislead the reader
7. Squint test

I. WHAT ARE YOU TRYING TO SAY?

- Decide what your message is before you begin making the chart
- How do you want the chart to be used?
- What is its role in your presentation or brief?

2. STATE CONCLUSION IN TITLE

- If a policymaker reads only one thing, let it be the title of your chart.
- Now is not the time to bury your lead. Suspense is not your friend.

3. MATCH DATA TO CHART TYPE

FOUR TYPES OF DATA

NOMINAL: Data sorted into categories

ORDINAL: Arbitrary numerical scale

DISCRETE: Represents units

CONTINUOUS: Can be measured on a continuum

MATCH DATA TO CHART TYPE

FOUR TYPES OF DATA


NOMINAL: Data sorted into categories


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TYPES OF CHARTS

→ Bar chart 

→ Pie chart, bar chart 

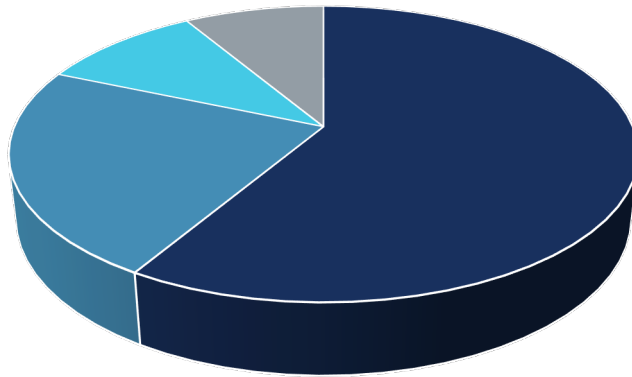
→ Arrays, Pie chart, Bar chart 

→ Line chart 

WAIT, WHY AVOID PIE CHARTS?

Pie chart users deserve same suspicion and skepticism as those who mix up its/it's, there/their... Edward Tufte

Nonsense Pie

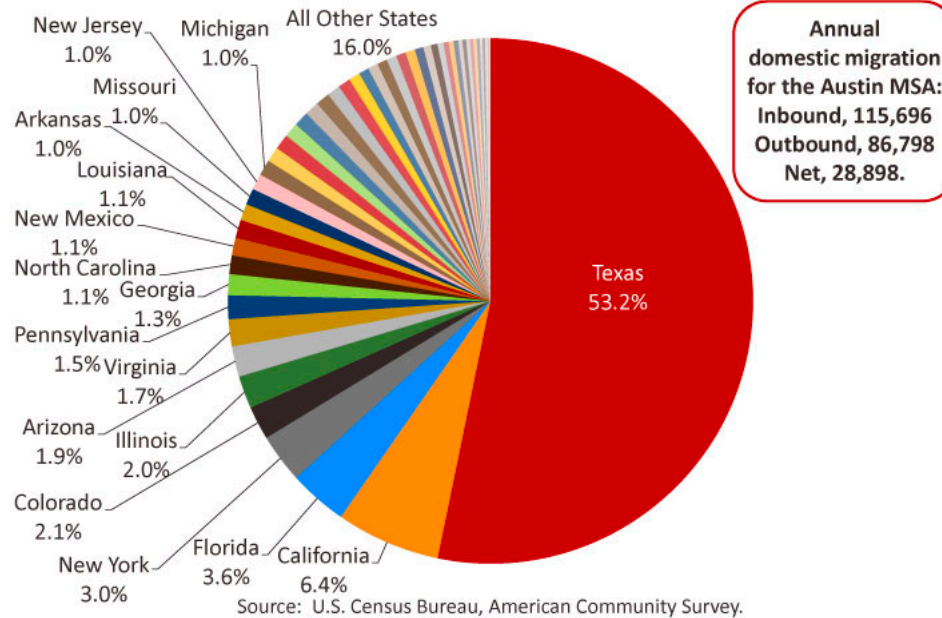


- Kids' brains
- Researcher brains
- Your brain
- Dolphin brains

- Overused and not especially helpful for communicating data
- The brain is not very good at comparing sizes of angles. Especially two pie charts next to one another.
- Lack of scale, makes reading accurate values difficult.
- Labels don't line up, making things cluttered and hard to read
- Too many colors without meaning.
- If you must use pie charts, do not use 3-D which exacerbates all these problems.

TOO MANY COLORS, TOO MUCH INFORMATION

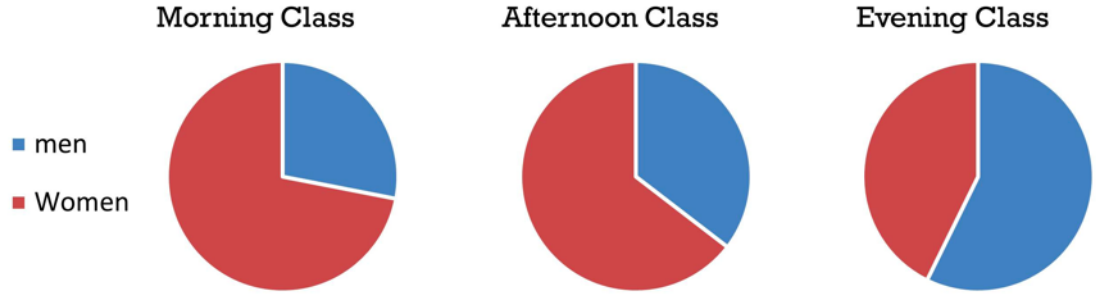
In-Migration to Austin MSA
by State of Origin • 2012-2016



BUT I LOVE PIE! IF SO, USE PIE CHARTS....

- When you want to compare settings or something over time and have only a couple categories
- When you want to quickly communicate a part-to-whole relationship
- When approximate values are enough to have a productive discussion

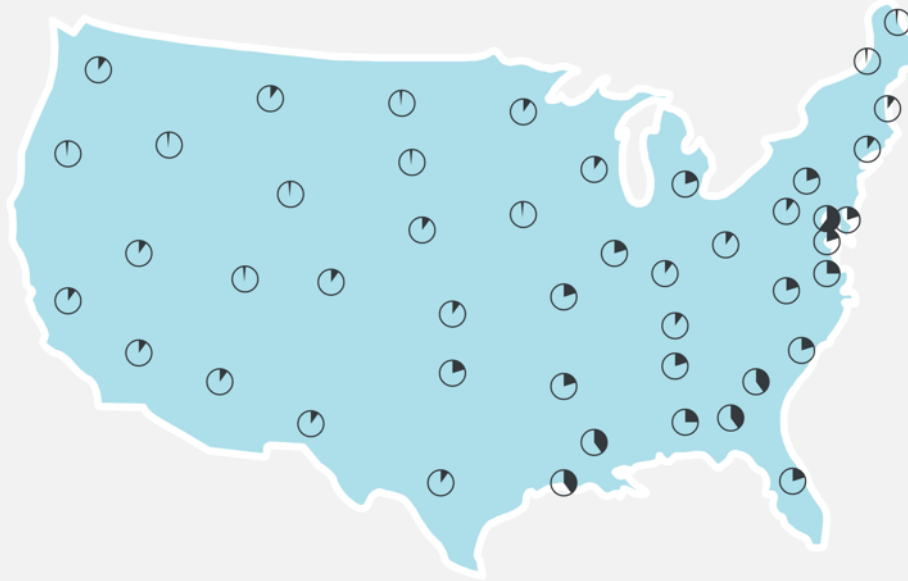
Women are more likely to attend the day classes, while men are more commonly found in the evening class



COMPARISON WITH A COUPLE CATAGORIES

African-Americans are more heavily represented in the Southeastern states

%African-Americans, by state, 2002



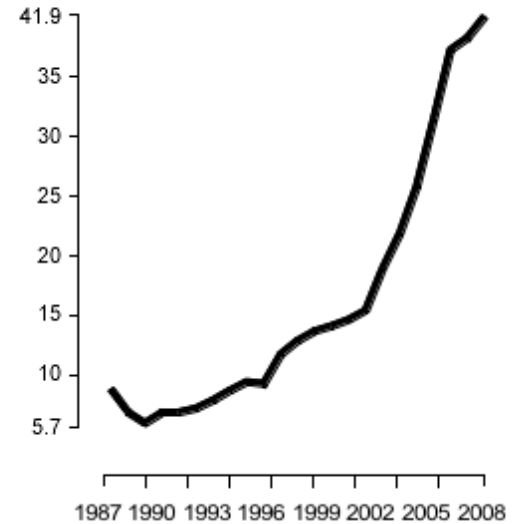
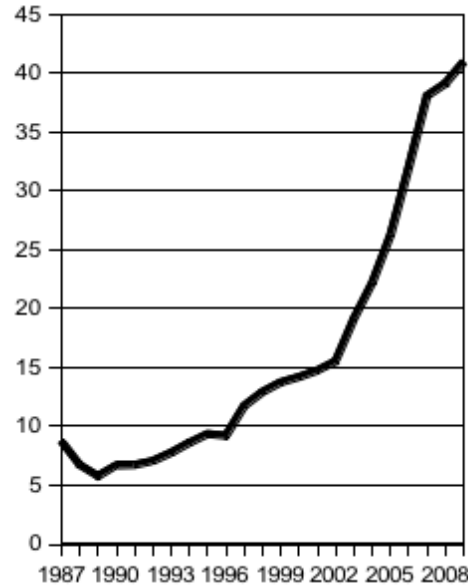
Approximate Values to Drive a Conversation

4. REDUCE THE INK ON YOUR CHART

Edward Tufte developed a data ink ratio

Remove certain chart elements to increase readability

- Don't draw a box around the chart
- Remove grid lines
- Use the ends of axis lines to display the minimum and maximum value in the data.

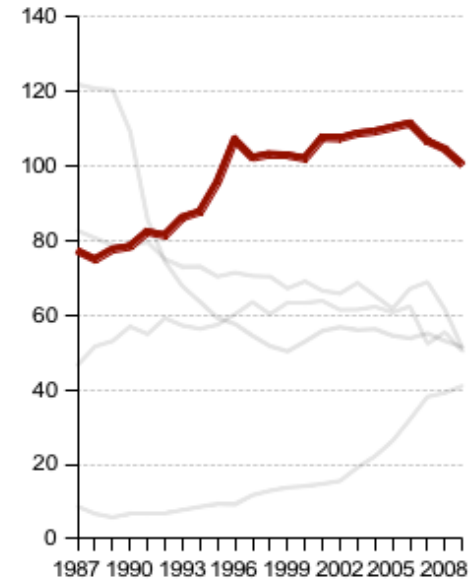
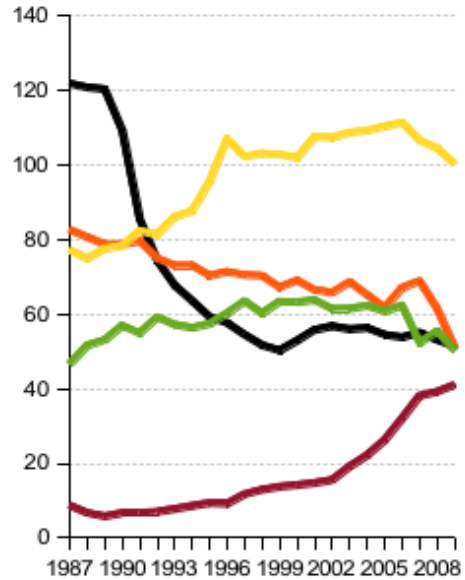


5. USE COLOR WITH CARE

1. Color is tricky because colors have meanings
2. Some people are color blind; look at your charts in grayscale
3. When used well, colors can speak without words.
4. Make background of charts clear or transparent.
5. Put cap on number of colors
6. Don't assign arbitrarily.
7. Use grey to contrast with another accent color for the key finding.

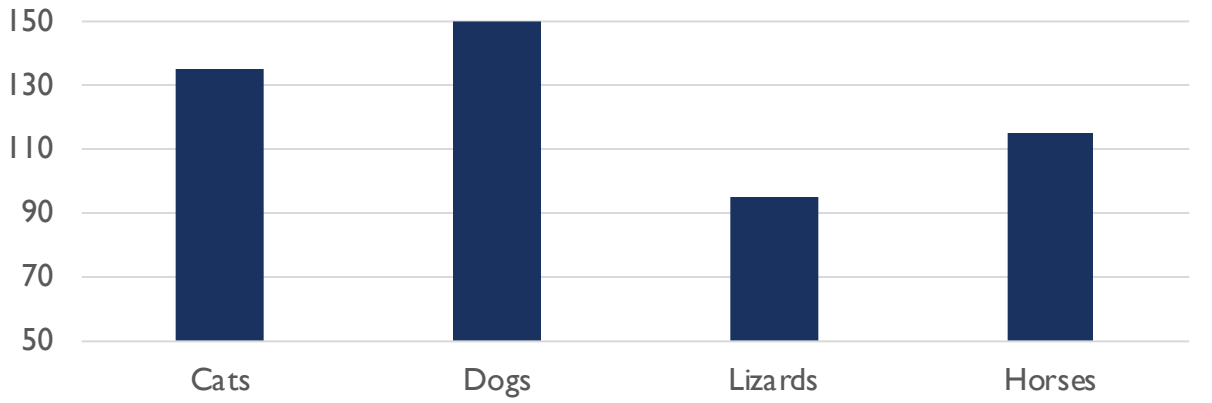
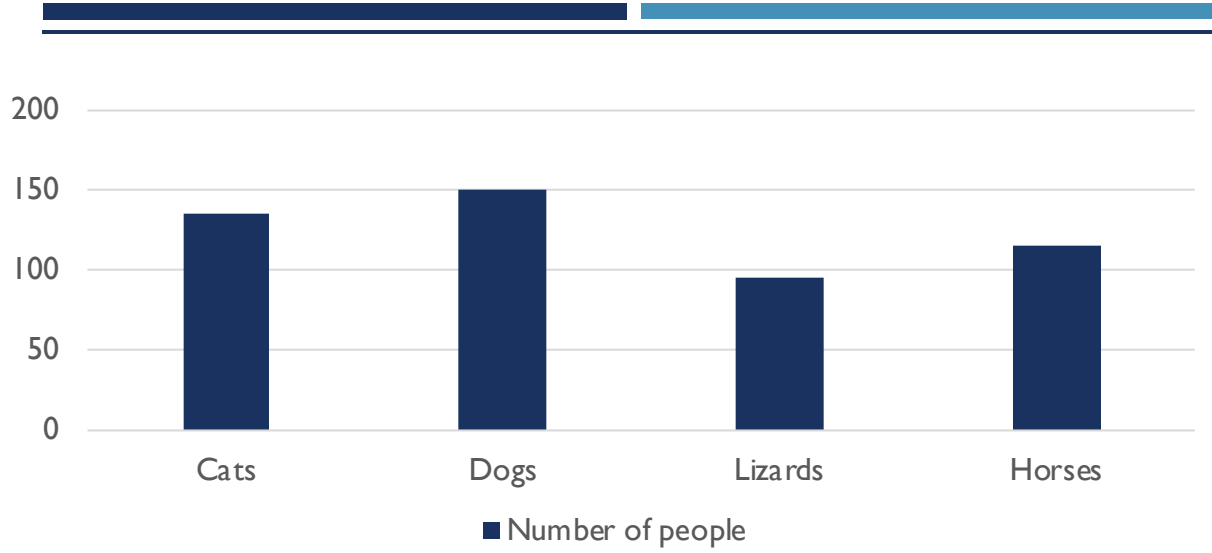
GREY + ACCENT COLOR

- Use Grey for unimportant trends or comparison trends, and pick an accent color for the data you want to highlight.



6. TRY NOT TO MISLEAD THE READER

- Choose settings of graphs carefully.
- Stick with conventions (don't reverse the time trends along the horizontal axis, don't go from higher to lower on the y axis)
- Use proportional spacing

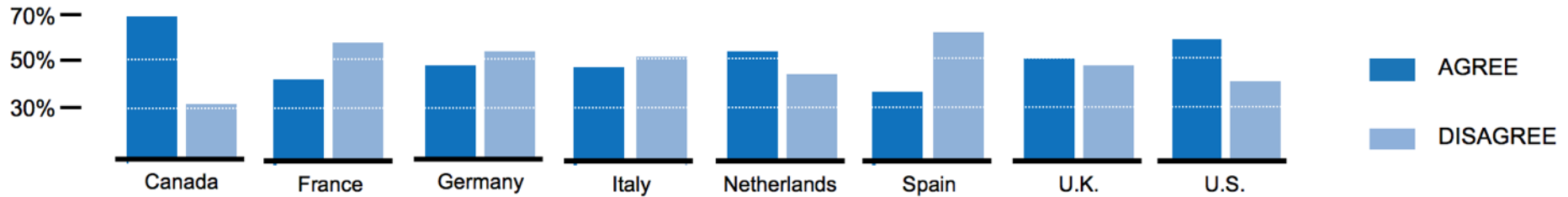


EXAMPLE: BE
AWARE OF
YOUR CHART
SETTINGS

PEOPLE'S
FAVORITE
ANIMALS
(SAME DATA)

STICK WITH CONVENTIONS

Q: Immigrants help create jobs as they set up new businesses

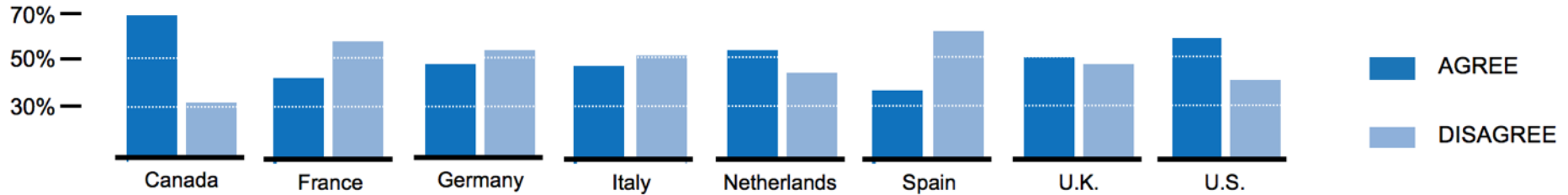


Adapted from National Post, 3 February 2011

Kaiser Fung | Junk Charts

STICK WITH CONVENTIONS

Q: Immigrants help create jobs as they set up new businesses

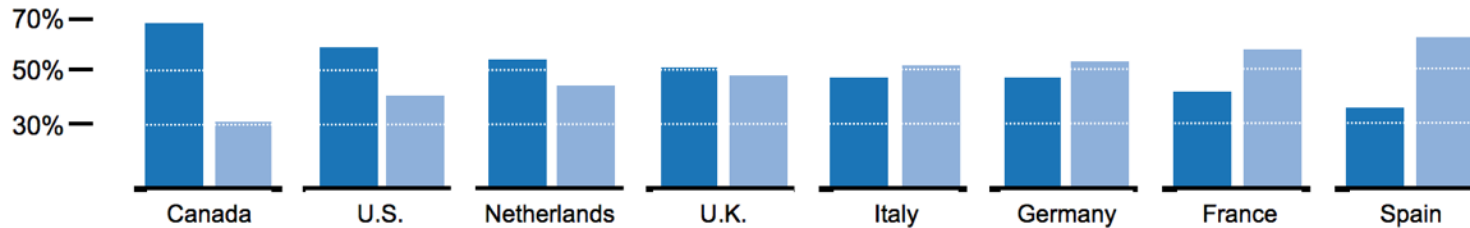


Adapted from National Post, 3 February 2011

Kaiser Fung | Junk Charts

Q: Immigrants help create jobs as they set up new businesses

AGREE DISAGREE

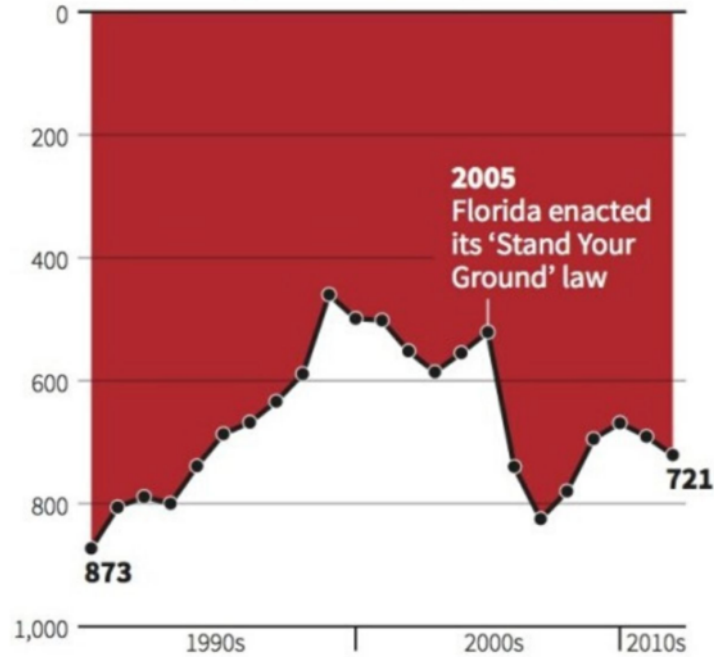


Adapted from National Post, 3 February 2011

Kaiser Fung | Junk Charts

Gun deaths in Florida

Number of murders committed using firearms



Source: Florida Department of Law Enforcement

C. Chan 16/02/2014

REUTERS

WHAT'S
WITH THIS
CHART?

Image: A chart showing the effect of Florida's Stand Your Ground law on gun deaths.

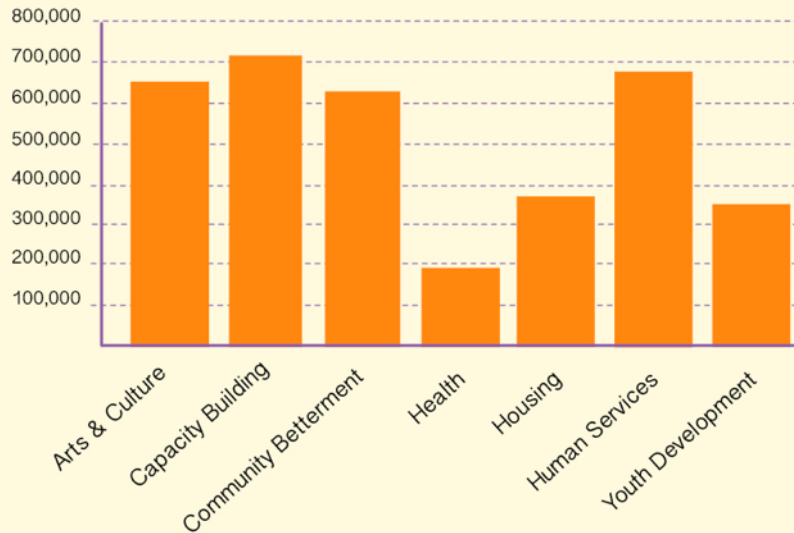
HORIZONTAL BAR GRAPHS CAN INCREASE READABILITY

+ Arrange data from greatest to least in descending order.



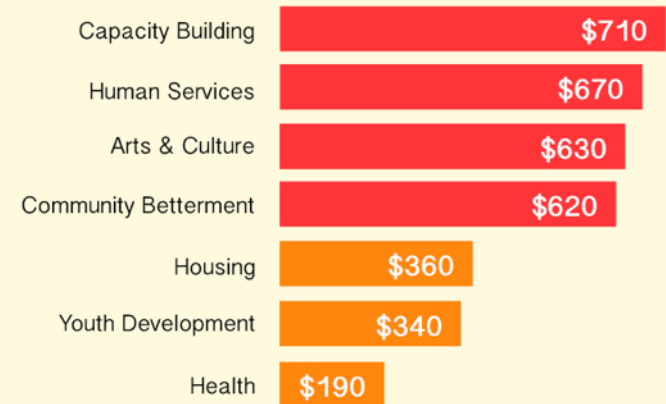
Investment by area of impact

2006-Present



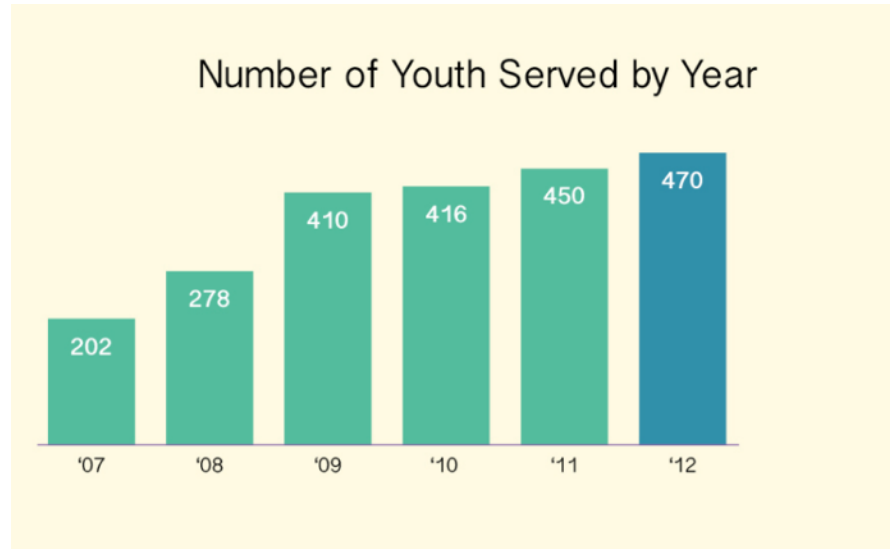
Investment by area of impact

2006-Present / Dollars in '000s



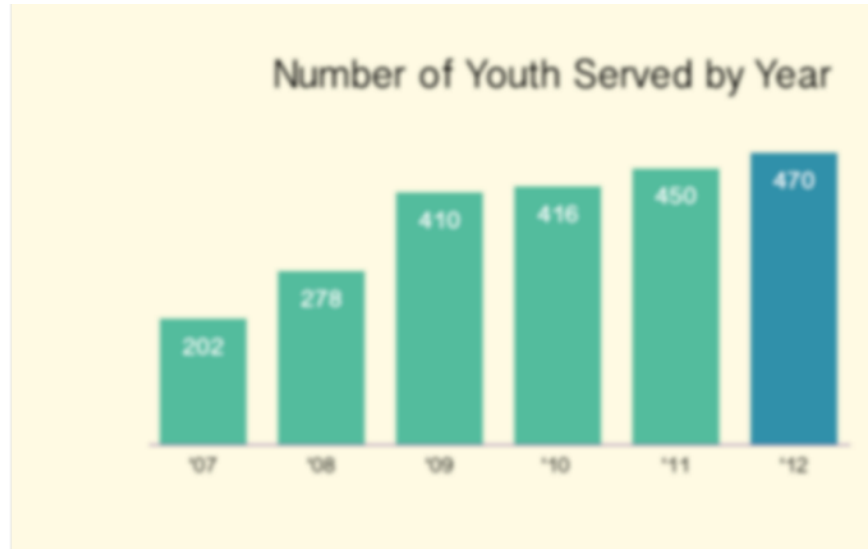
SQUINT TEST (A LA TUFTE)

When you squint at your chart, and the words and numbers blur, can you still get something out of it?



SQUINT TEST (A LA TUFTE)

When you squint at your chart, and the words and numbers blur, can you still get something out of it?



CHEATSHEET ON CHART CONVENTIONS

Pie charts

- Use a reasonable number of slices
- Aggregate minor categories into one 'Other' slice
- Order slices by size from largest to smallest
- Place the 'Other' slice at the end of the sequence, regardless of the order
- Position the first and largest slice against the upper vertical radius
- Arrange slices in a clockwise fashion
- Vary colors only if the colors are encoding data
- Don't do 3d

Bar charts

- Start value axis at zero

Scatter plots

- Place explanatory variable on horizontal axis
- Place outcome variable on vertical axis
- If adding a regression line, assign an outcome variable

Time-series plots

- Plot time on the horizontal axis
- Time runs left to right
- If time intervals are uneven, tick marks should be uneven in the same way

Color encoding

- Limit the total number of colors

Axes

- Use canonical directions (*ie.* larger values to the right of smaller values)
- Time goes on the horizontal axis
- Place an outcome variable on the vertical axis
- Choose limits to remove excessive white space
- Tick marks should fall on easily interpretable increments and values

Legends

- Use direct labels if feasible
- Colors in the legend should correspond one-to-one to the colors on the chart
- Colors in the legend should be presented in the same order as they appear on the chart
- Place legend on top below the title 5. Embed legend into chart titles or subtitles

Order

- Place values in the natural order when it is available
- Avoid the default alphabetical order unless it is justified by the context
- Retain the same order across all plots in a panel of charts

Annotation

- Use informative chart titles
- Explain all acronyms and jargon
- Include the source of data in a footer



POLL: WHAT'S SOMETHING YOU LEARNED TODAY THAT YOU
MAYBE DIDN'T KNOW BEFORE OR THAT YOU WOULD LIKE TO TRY?

ADDITIONAL RESOURCES

- Presenting Data Effectively, Stephanie Evergreen
- People, Please Stop Using Pie Charts:
https://www.entrepreneur.com/article/239932?__ga=2.238084102.722855897.1585580313-1812087682.1585580313
- How to communicate research for policy influence
<https://assets.publishing.service.gov.uk/media/57a08a15ed915d622c00055b/Guia-02-serie-3-ingles.pdf>
- Designing Effective Poster sessions: <https://www.youtube.com/watch?v=IRwJbhkCA58>
- Deeper dive: [The Art of Data Visualization, PBS, Edward Tufte](#)

THANKS!



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