TELLING YOUR DATA STORY:

An Introduction to Data Visualization

CHIME | CENTER *for* HEALTH INFORMATION, MONITORING & EVALUATION

JSI

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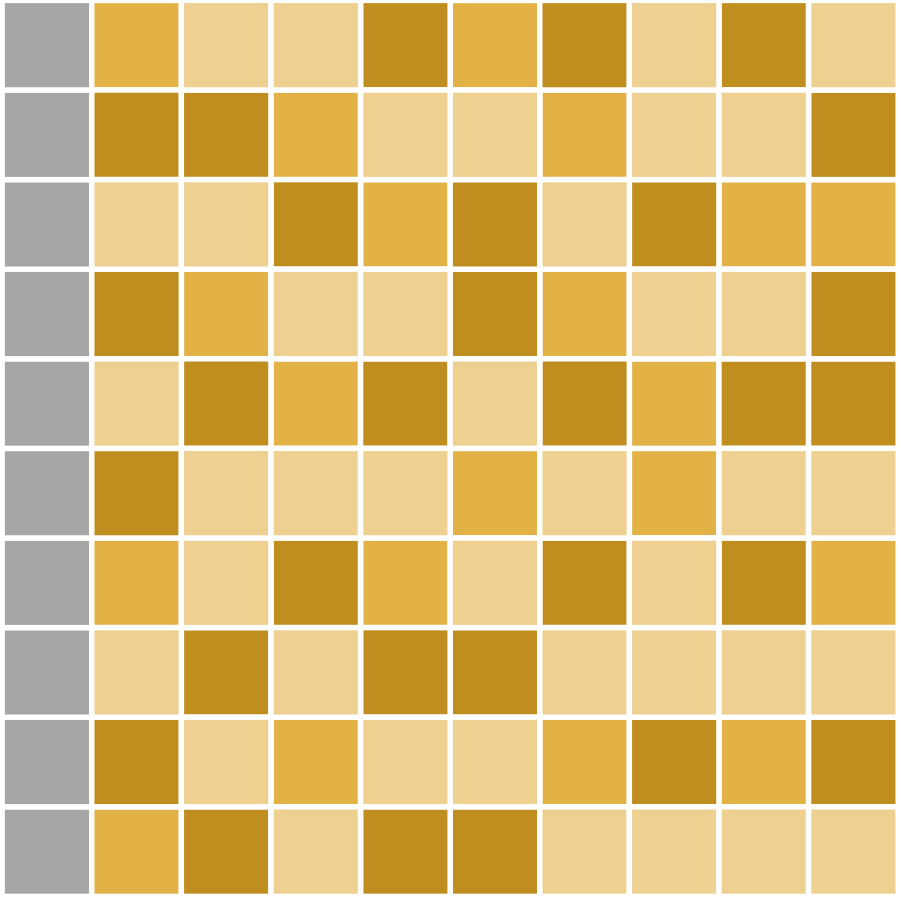
Passionate about telling stories with data

Session Objectives

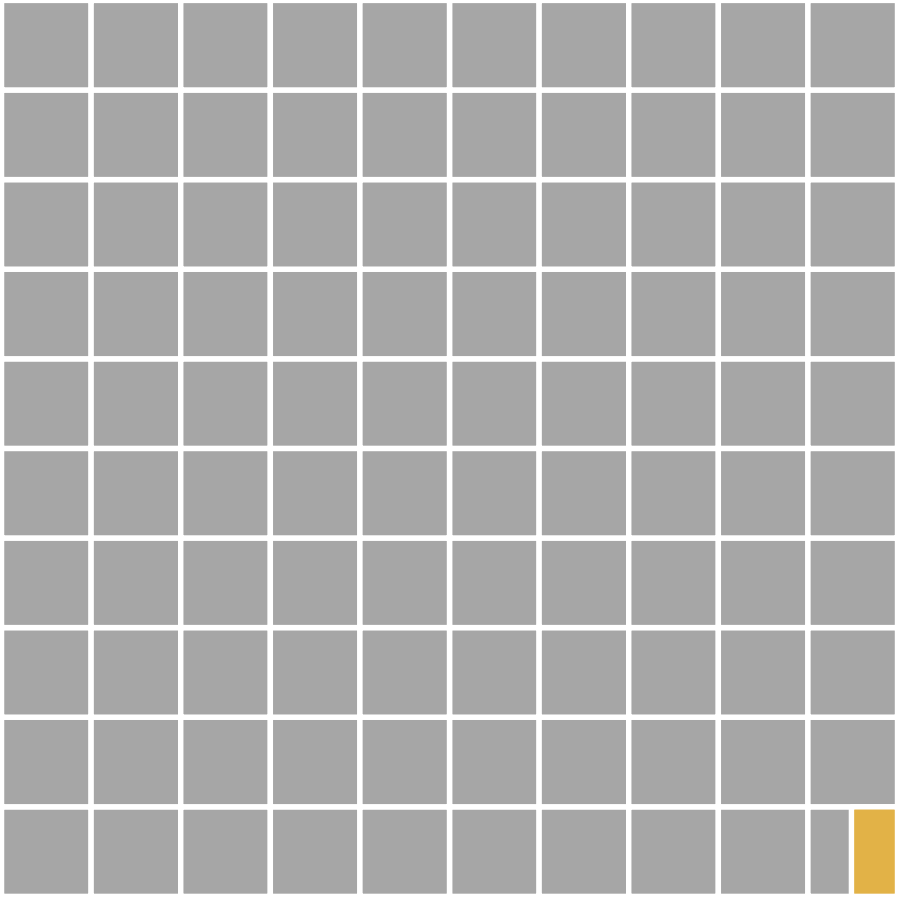
- Define data visualization and understand why they are effective
- Explore considerations for choosing a chart type
- Understand basic design principles
- Learn tips and tricks for improving charts and graphs

Why visualize?



90%

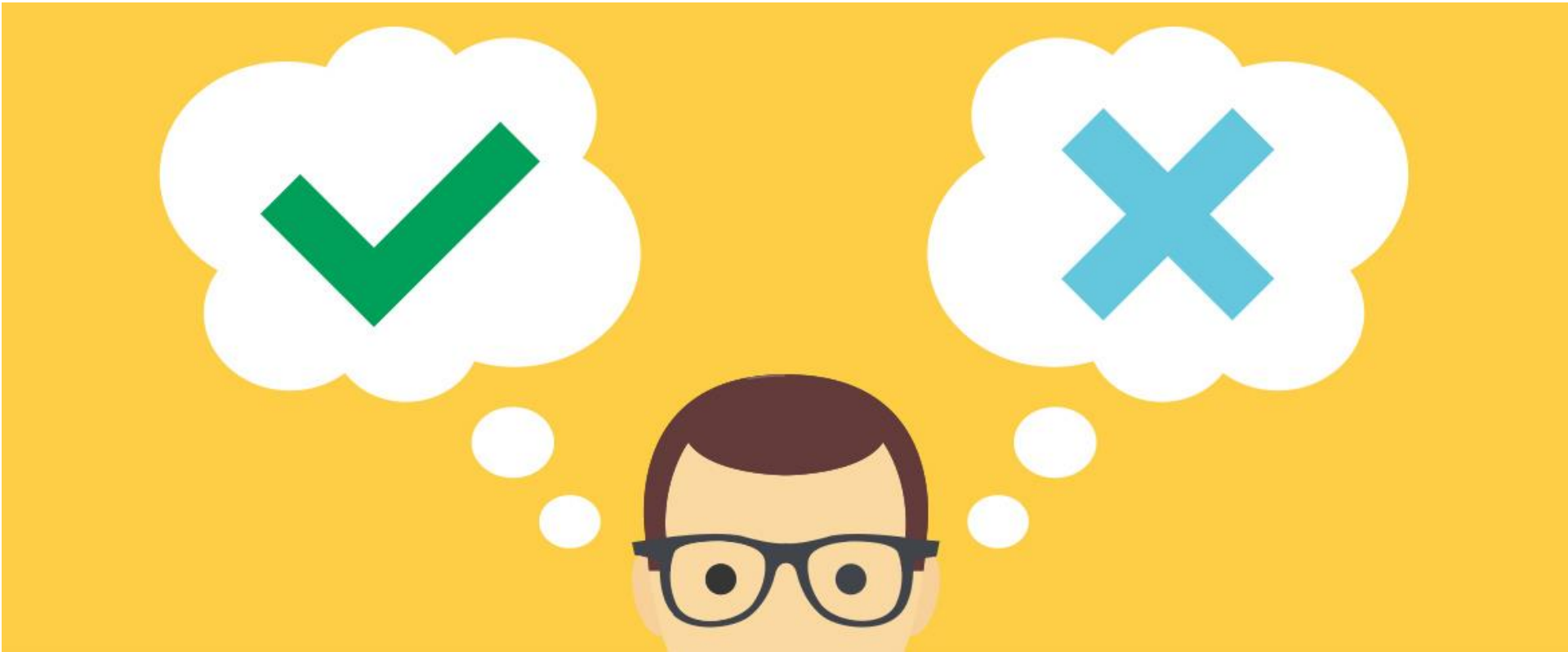
of the data
in the world
was generated
in the last
2 years



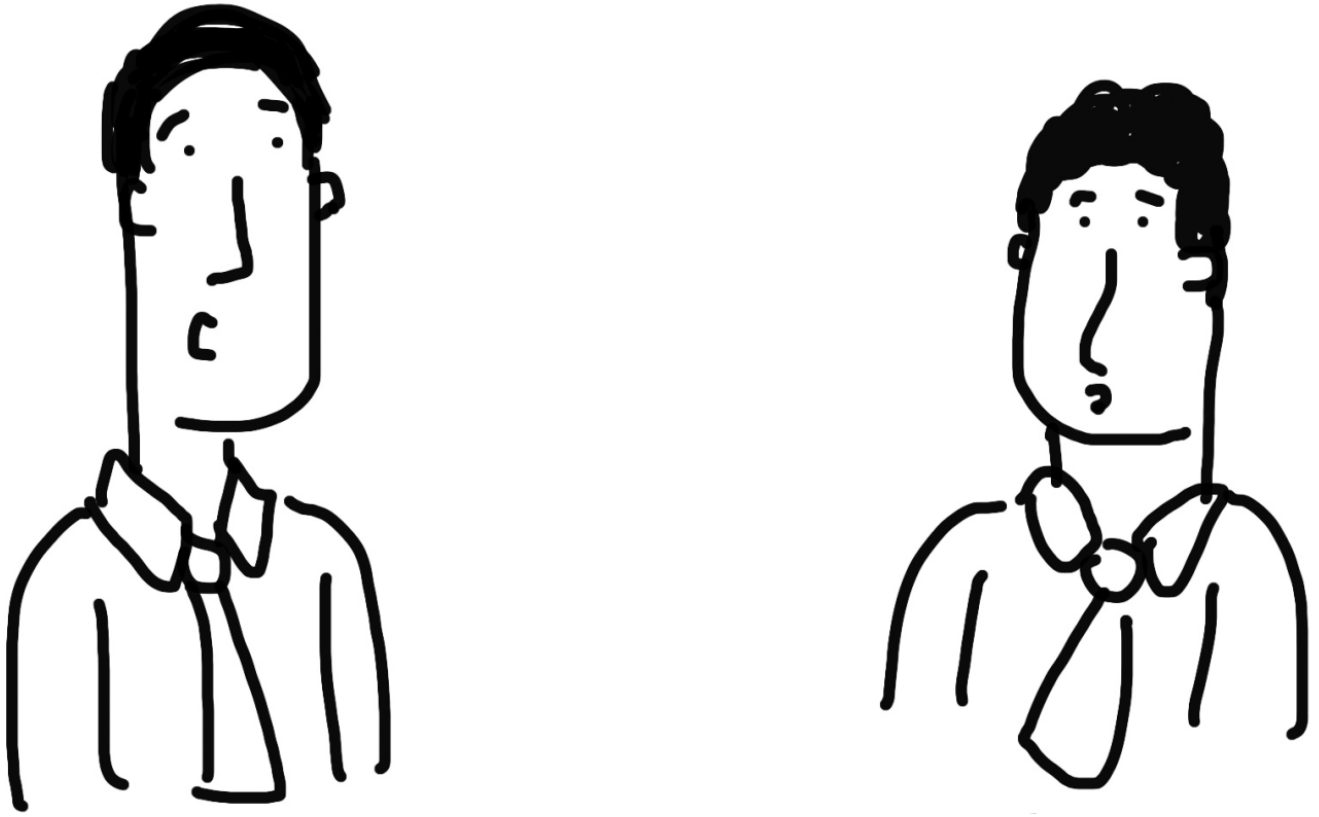
0.5%

of the data in the world has been analyzed

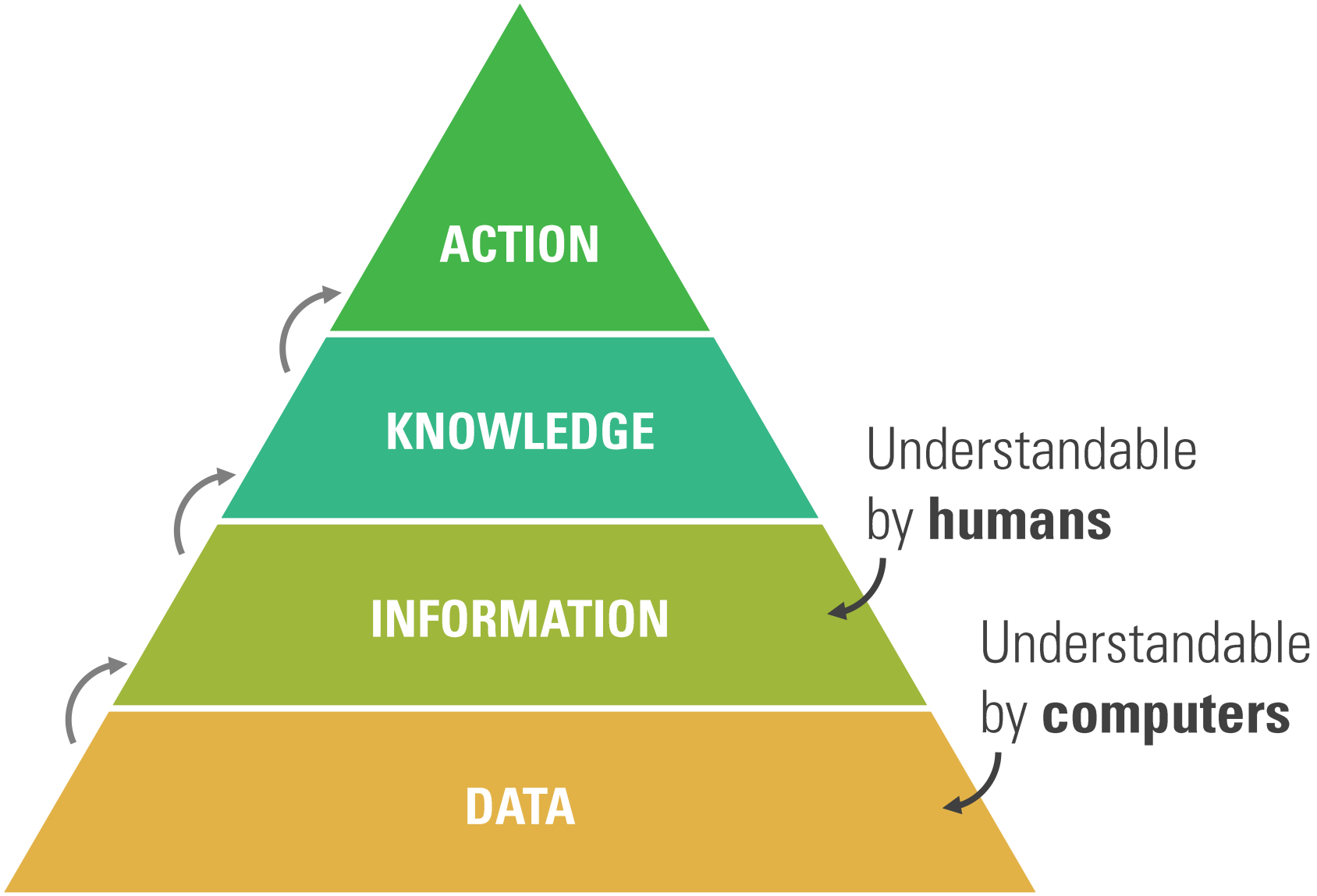
Today, content not distilled into easily consumable key points often fails to spark action by decision-makers.



I just put our long boring report up on a buried web page in a format that requires it to be downloaded. Yet for some reason, nobody is reading it.



freshspectrum.com


ACTION
KNOWLEDGE
INFORMATION
DATA
Understandable by humans
Understandable by computers

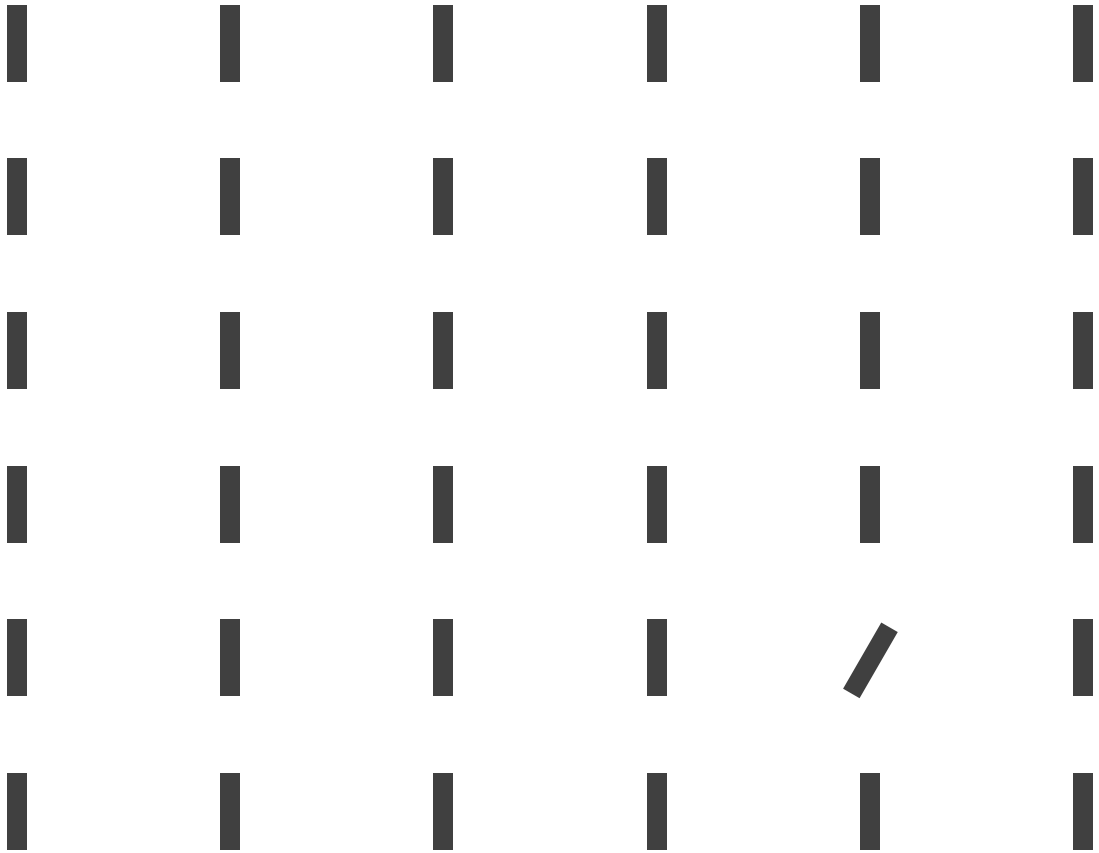
Research shows that we process visual information more easily than text, and it stays with us longer.

Pre-attentive processing is the subconscious accumulation of information from the environment.

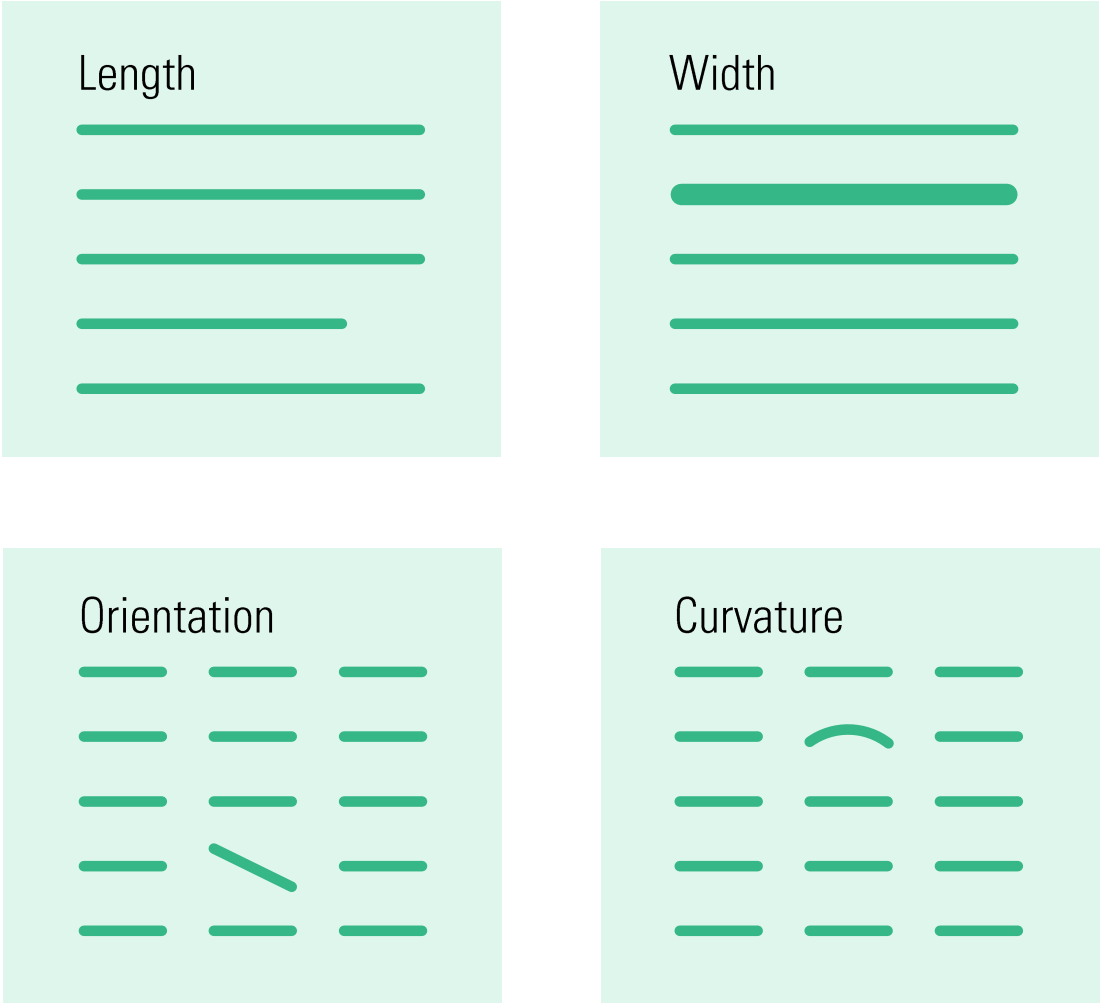
9	4	5	9	8	2
5	3	5	2	3	7
6	8	9	4	5	2
1	9	7	1	6	5
9	8	4	7	5	2
3	7	7	4	9	3

9	4	5	**9**	8	2
5	3	5	2	3	7
6	8	**9**	4	5	2
1	**9**	7	1	6	5
9	8	4	7	5	2
3	7	7	4	**9**	3

29	44	15	29	28	22
35	13	45	32	23	37
26	38	29	44	15	22
31	29	17	51	46	45
29	48	34	27	93	22
53	27	37	34	49	53



Preattentive Attributes



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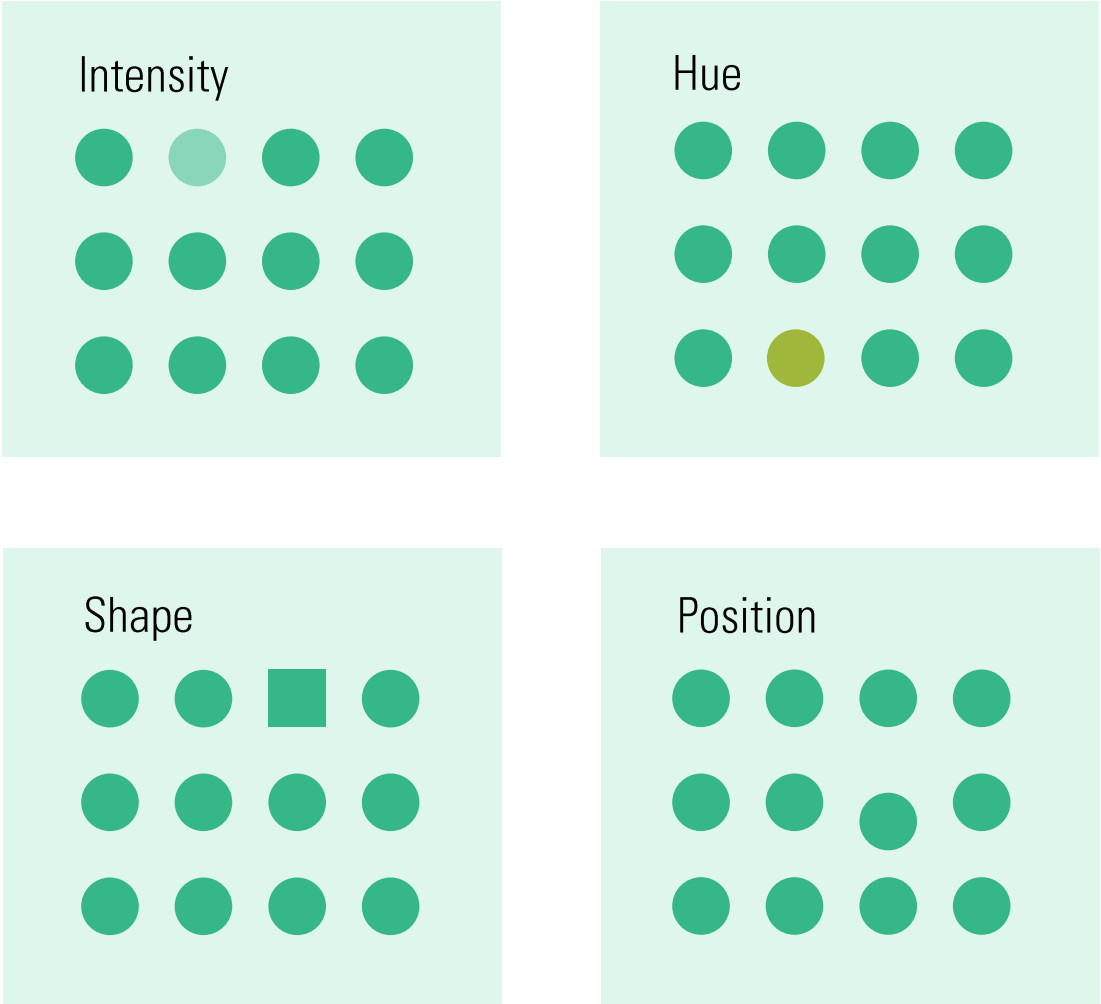
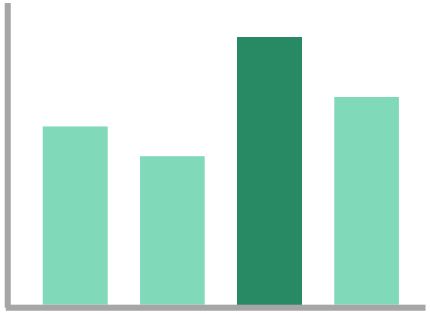
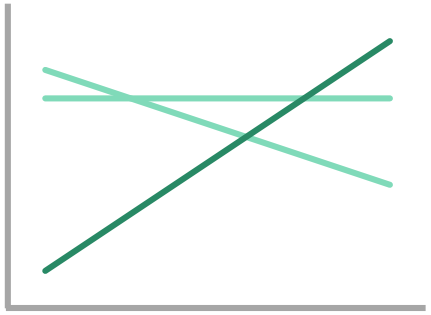


Preattentive Attributes

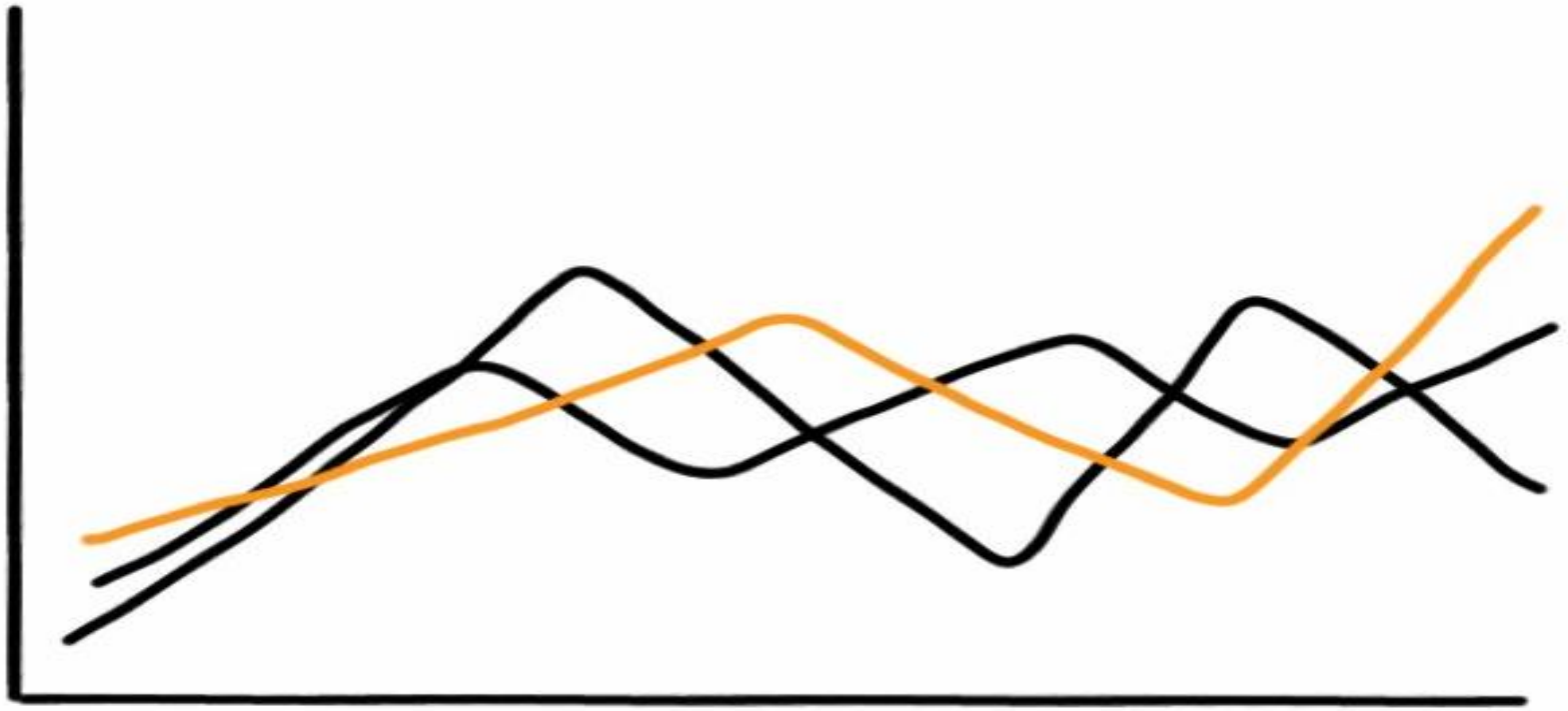
They are the building blocks of effective data viz



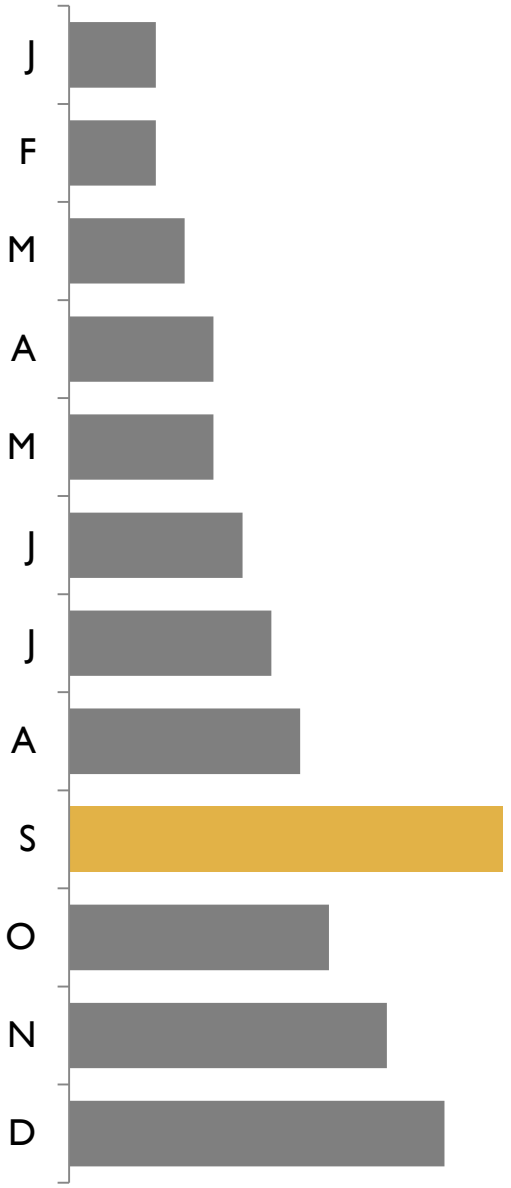


Defining data visualization

Data visualizations are any graphic representations of data.



Data visualizations can communicate huge amounts of data and help identify trends and areas of interest.



Types of data visualization

DECLARATIVE (static)

- Infographics
- Graphic reports
- Static maps

EXPLORATORY (dynamic)

- Dashboards
- JavaScript charting
- GIS maps

Basic charts
and graphs

Framing your data visualization

On the most common visualization mistakes:

"Time isn't adequately spent on is just what is the question that you're trying to answer and what does your audience need to know?"

Cole Naussbaumer
StorytellingwithData.com

From: http://cxcafe.maritzcx.com/storytelling-with-data-dashboarding-with-cole-nussbaumer/

The key questions:

WHO is your audience?

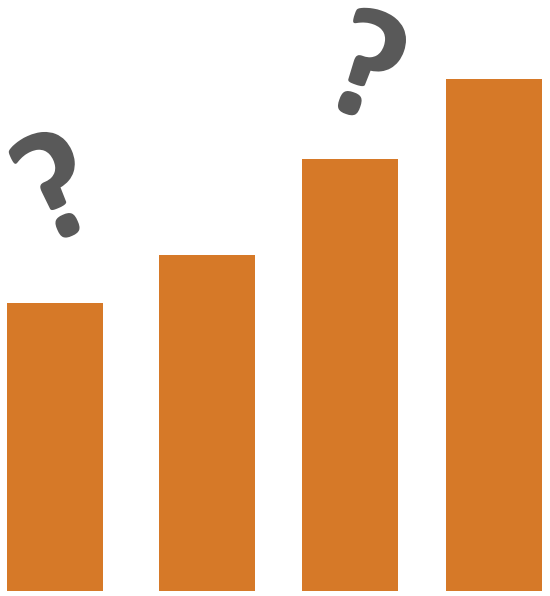
WHAT do they want to know?

HOW will you communicate it?

Different stakeholders have different data needs. Consider your stakeholders' literacy, numeric literacy, and what data they need to make decisions.

Selecting the right chart type

Picking the right chart type for your data story is critical to developing great visualizations.



Quantitative Data Types

Nominal/Categorical

Data that can be sorted according to group or category.

EXAMPLES → *Types of medications.*

Ordinal

Data of selected categories ordered along a numerical scale.

→ *Degrees of patient satisfaction from a Likert scale.*

Discrete

Numerical data that has a finite number of possible values/units.

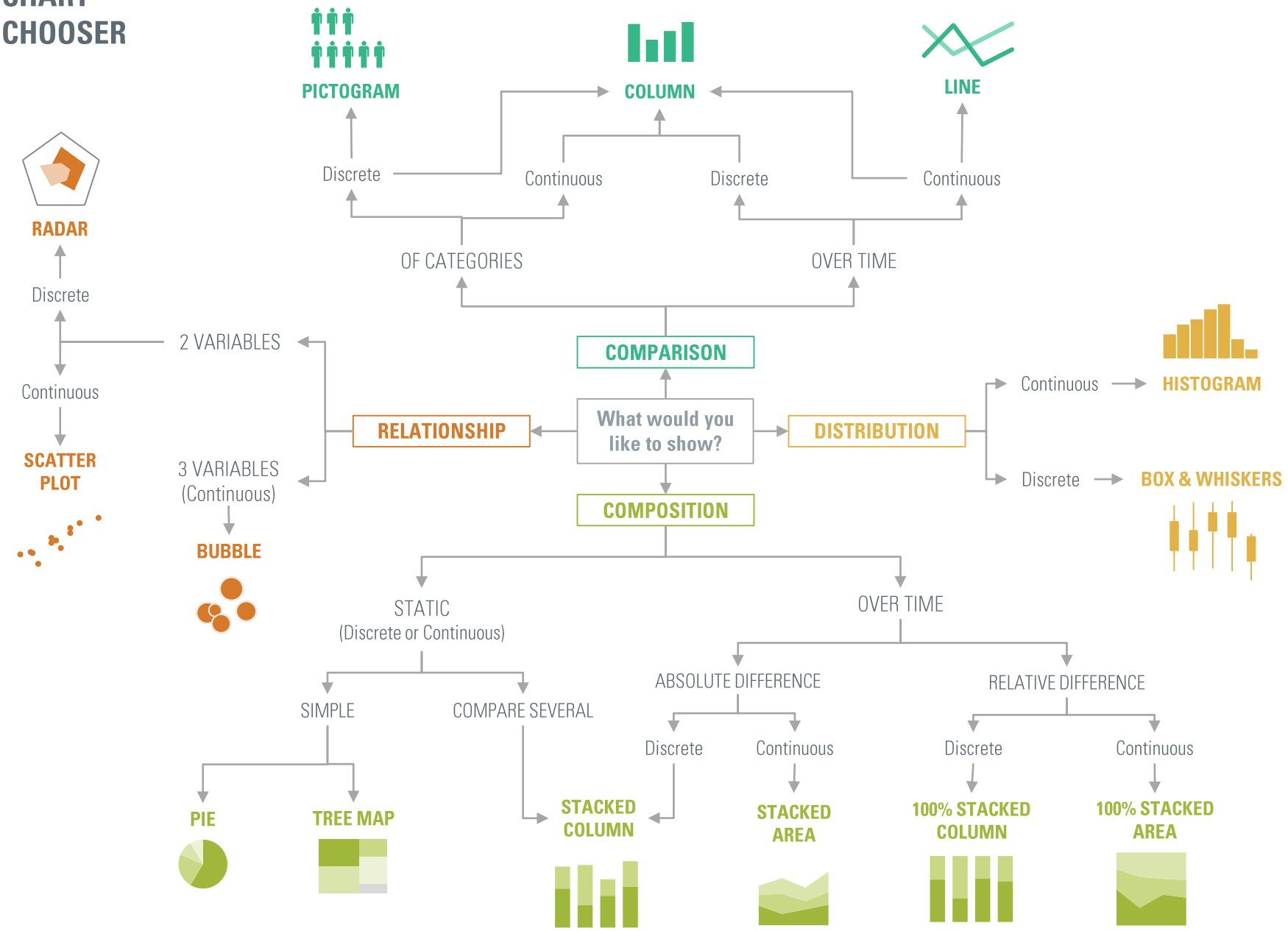
→ *Number of clinicians at a hospital.*

Continuous

Numerical data that is measured along a continuum.

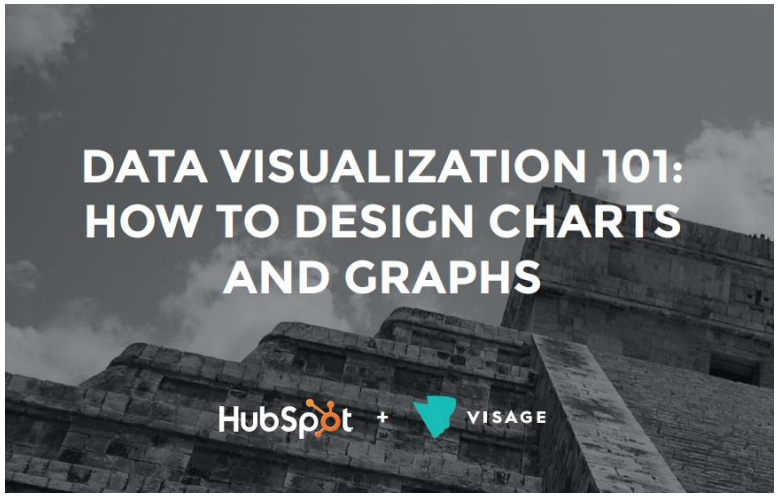
→ *Basal body temperature.*

QUANTITATIVE CHART CHOOSER

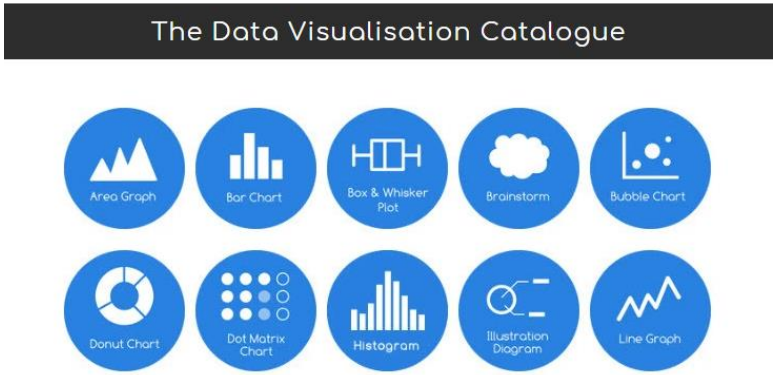


RESOURCES

Quantitative Chart Selection



visage.co/content/data-visualization-101



http://datavizcatalogue.com/

Design basics

A Few Design Principles

Color

Use color to emphasize or reinforce value. Avoid the "Skittles effect"

Font

Pick appropriate fonts for your audience. Stick to 2-3 at the most and be consistent in usage.

Balance

The eye tends to seek balance and will notice if your design is unbalanced. Use this principle to make your graphic visually pleasing.

Contrast

Use contrast (light/dark, big/small, thick/thin) to highlight/ emphasize.

Hierarchy

Give your audience visual cues of what is the most important part of your message.

Hierarchy

YOU WILL READ THIS BEFORE

You read this.

Or this.

Hierarchy

Facts about Penguins
Penguins are aquatic, flightless birds that are highly adapted to life in the water. Their distinct tuxedo-like appearance is called countershading, a form of camouflage that helps keep them safe in the water. Penguins do have wing-bones, though they are flipper-like and extremely suited to swimming. Penguins are found almost exclusively in the southern hemisphere, where they catch their food underwater and raise their young on land.
Diet Staples: Krill, fish and squid. In general, penguins closer to the equator eat more fish and penguins closer to Antarctica eat more squid and krill.
Population: The penguin species with the highest population is the Macaroni penguin with 11,654,000 pairs. The species with the lowest population is the endangered Galapagos penguin with between 6,000-15,000 individuals.
Location: Penguins can be found on every continent in the Southern Hemisphere from the tropical Galapagos Islands (the Galapagos penguin) located near South America to Antarctica (the emperor penguin).
Behavior: Penguins can spend up to 75% of their lives in the water. They do all of their hunting in the water. Their prey can be found within 60 feet of the surface, so penguins have no need to swim in deep water. They catch prey in their beaks and swallow them whole as they swim. Some species only leave the water for molting and breeding.

Hierarchy

FACTS ABOUT PENGUINS

Penguins are aquatic, flightless birds that are highly adapted to life in the water. Their distinct tuxedo-like appearance is called countershading, a form of camouflage that helps keep them safe in the water. Penguins do have wing-bones, though they are flipper-like and extremely suited to swimming. Penguins are found almost exclusively in the southern hemisphere, where they catch their food underwater and raise their young on land.

DIET

Krill, fish and squid. In general, penguins closer to the equator eat more fish and penguins closer to Antarctica eat more squid and krill.

POPULATION

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LOCATION

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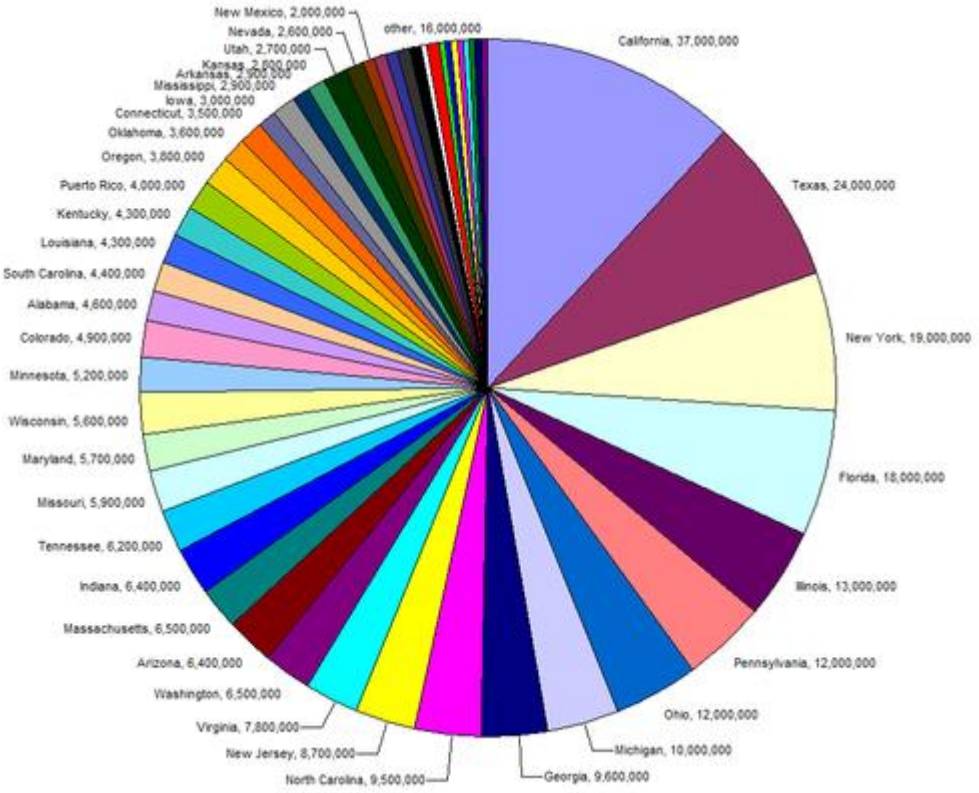
Color

Avoid using too many colors



Color

Incorporate white space to give the eye a break

Contrast

Communicating clearly with charts

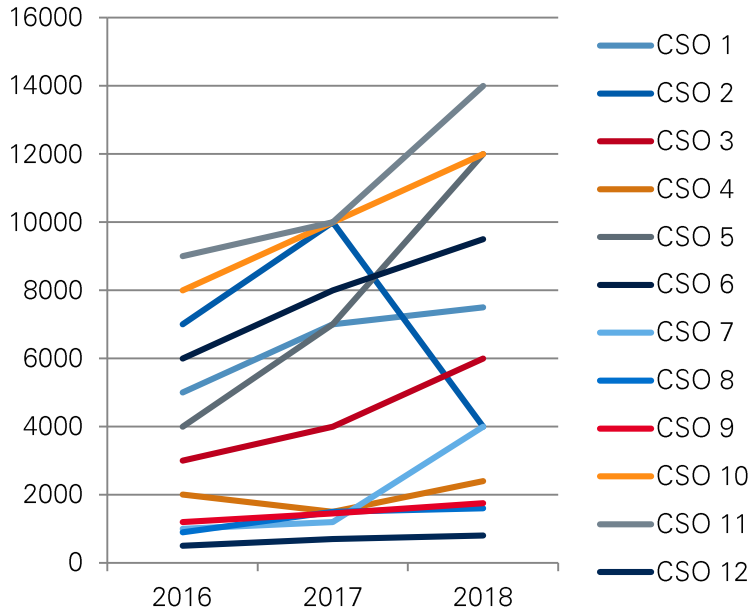
Declutter your chart

"**Erase non-data ink**, within reason."

Edward Tufte
from *The Visual Display of Quantitative Information*

Declutter your chart

Remove the default lines, borders & tick marks that distract your audience



BEFORE

AFTER

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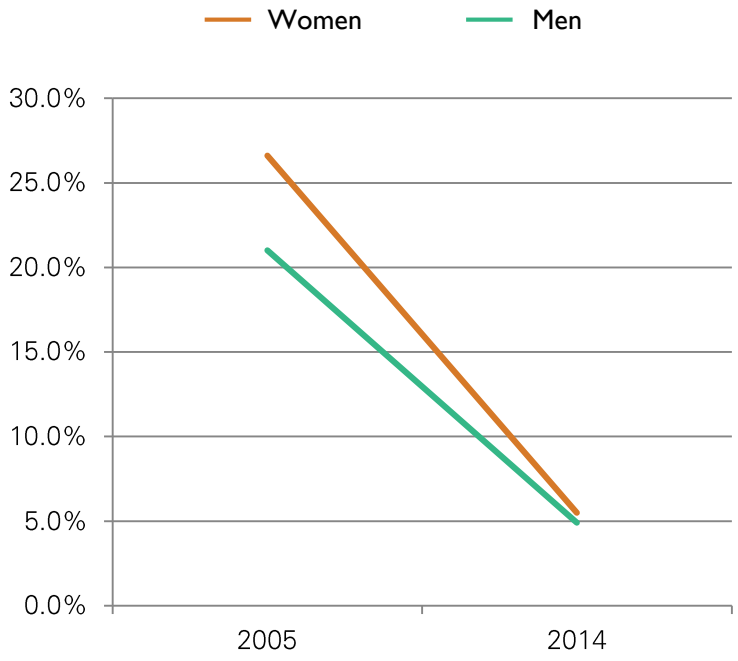

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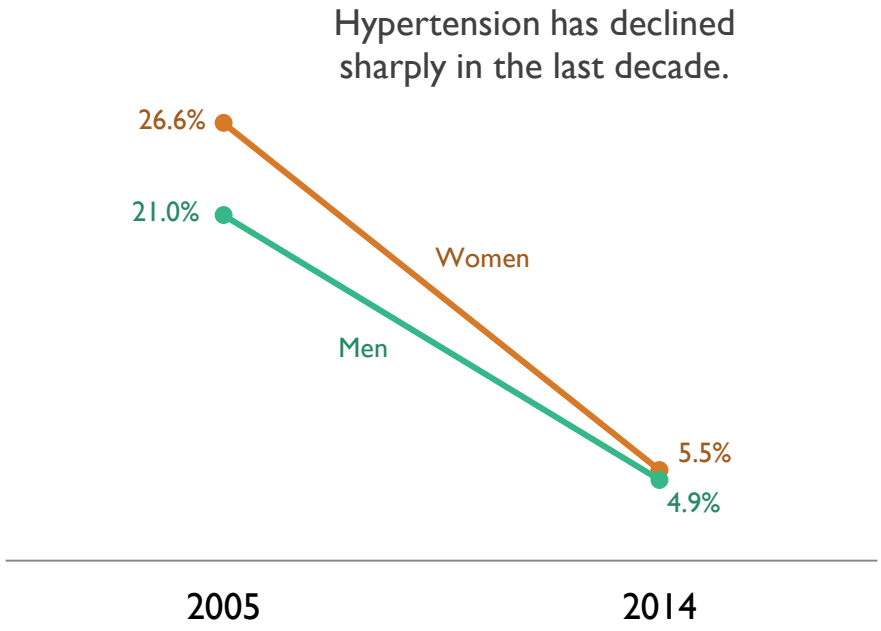
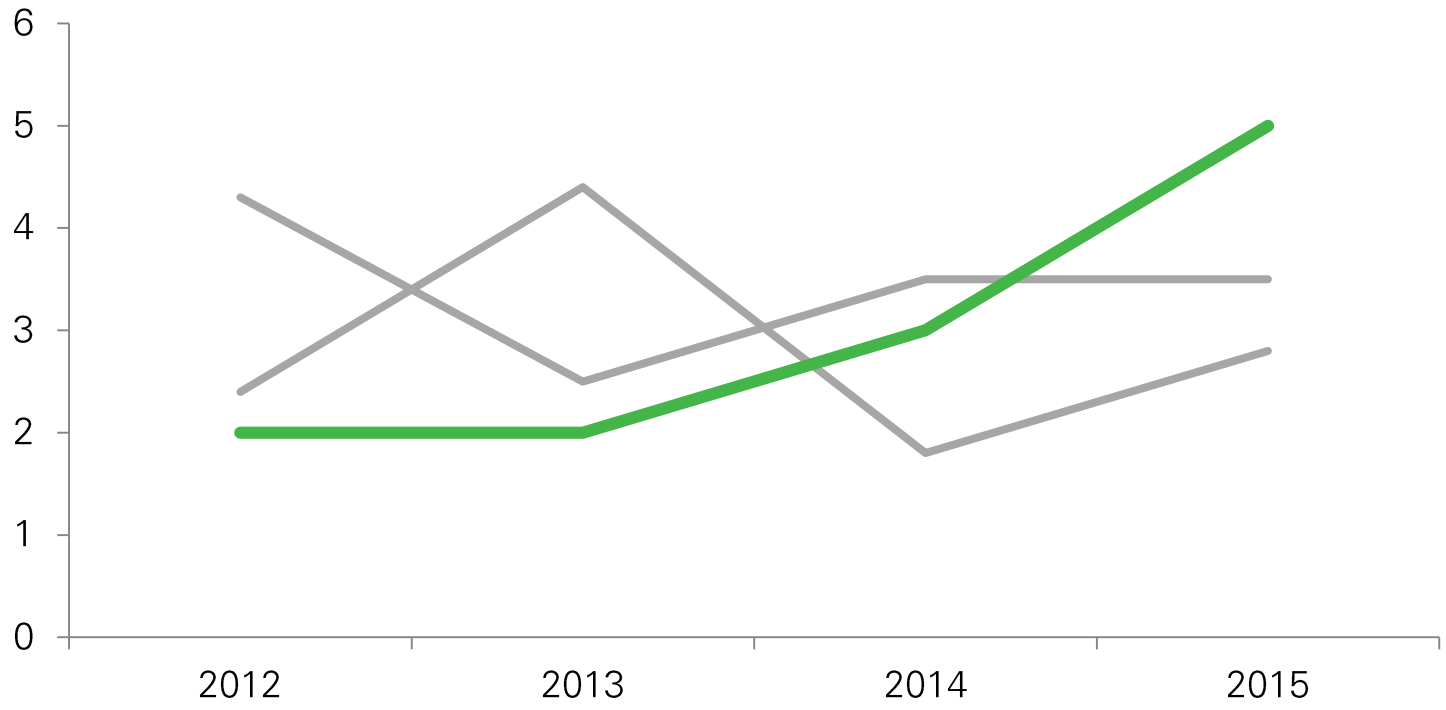


AFTER

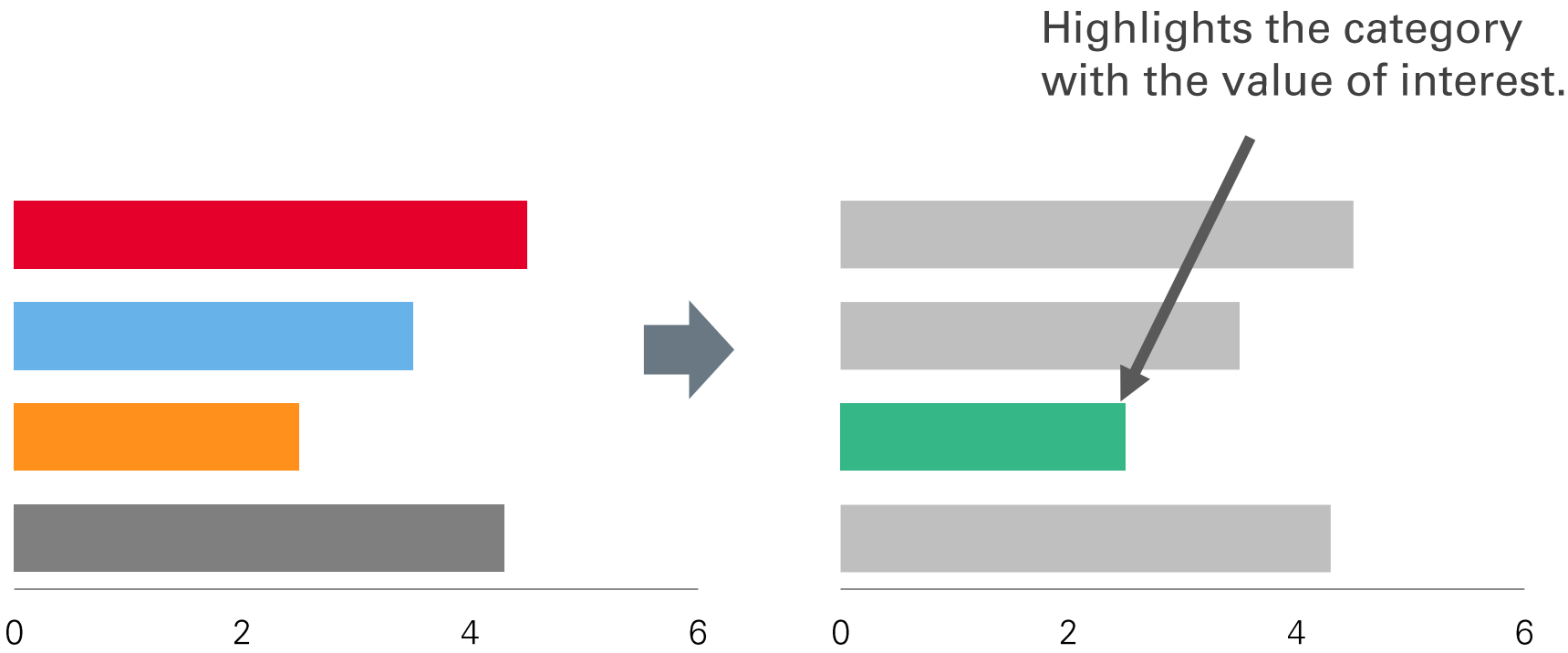
Use color to add impact

If you use color sparingly,
it becomes more powerful



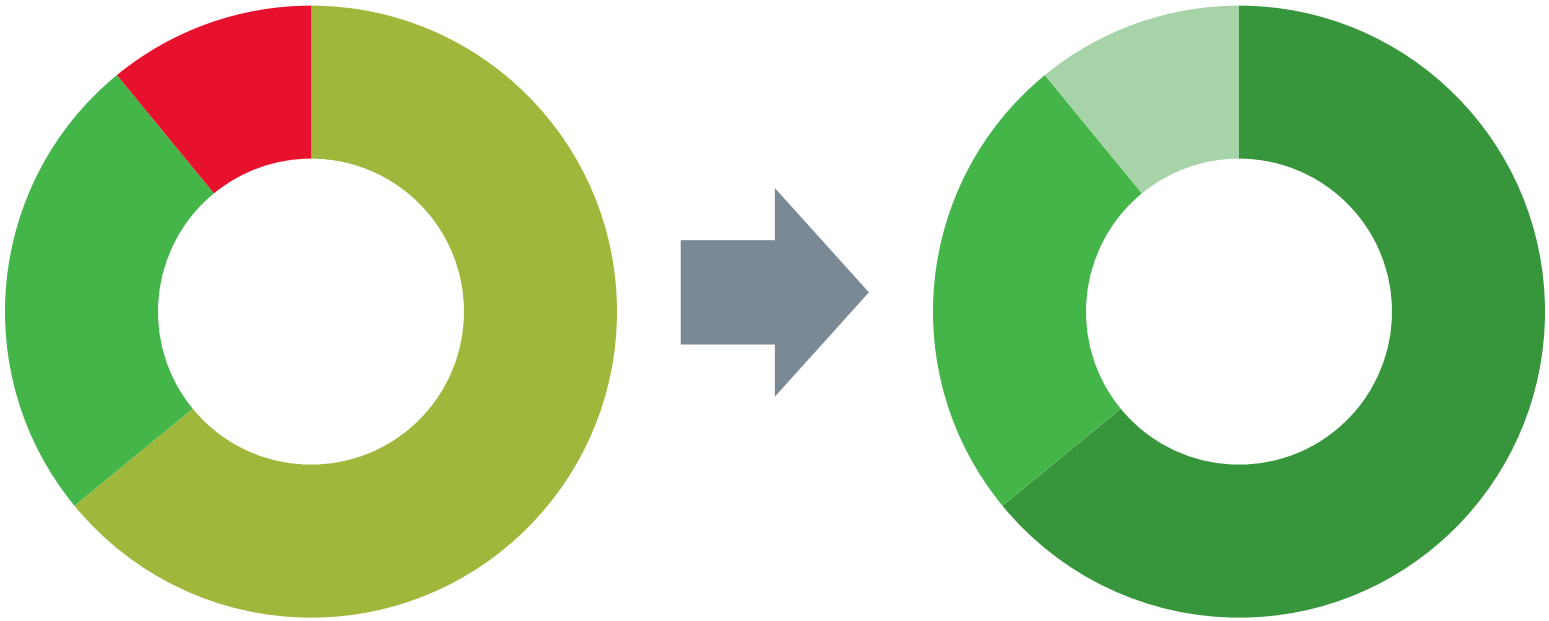
Use color to add impact

Selective use of color helps
the important points stand out



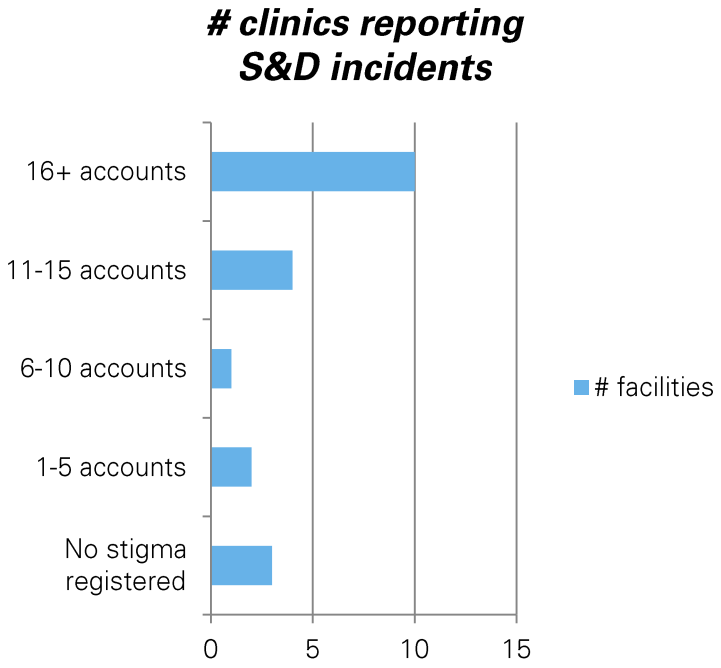
Use color to add impact

Consider black & white printing
and those who are colorblind



Create purposeful titles & labels

Are you clear and succinct, telling your reader the key takeaway?



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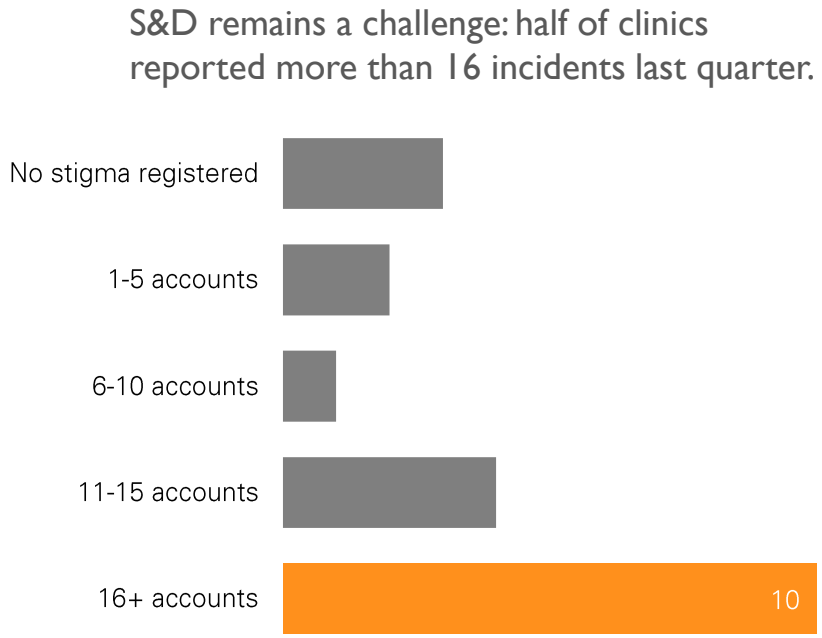
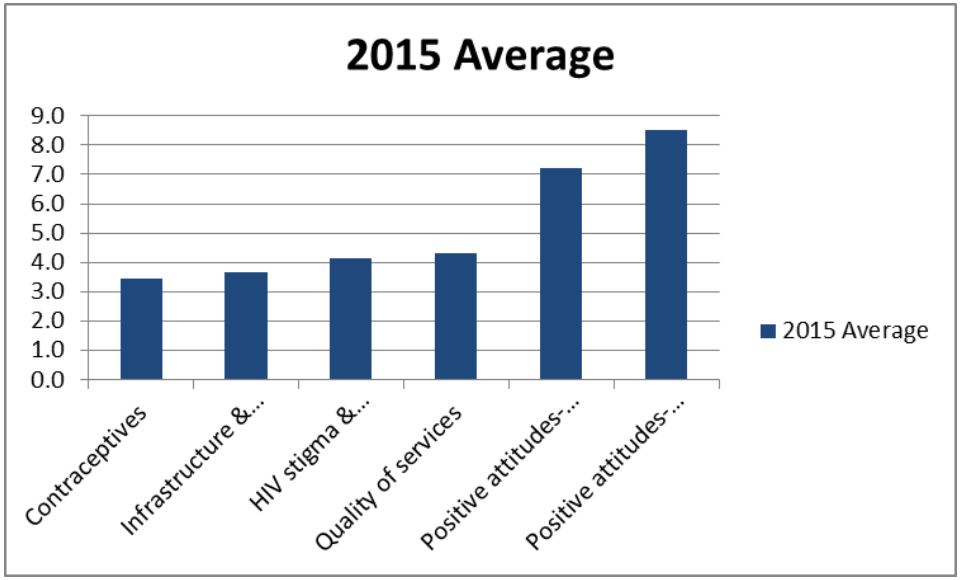


AFTER

Create purposeful titles & labels

Consider using data labels sparingly, reserving them for key data points



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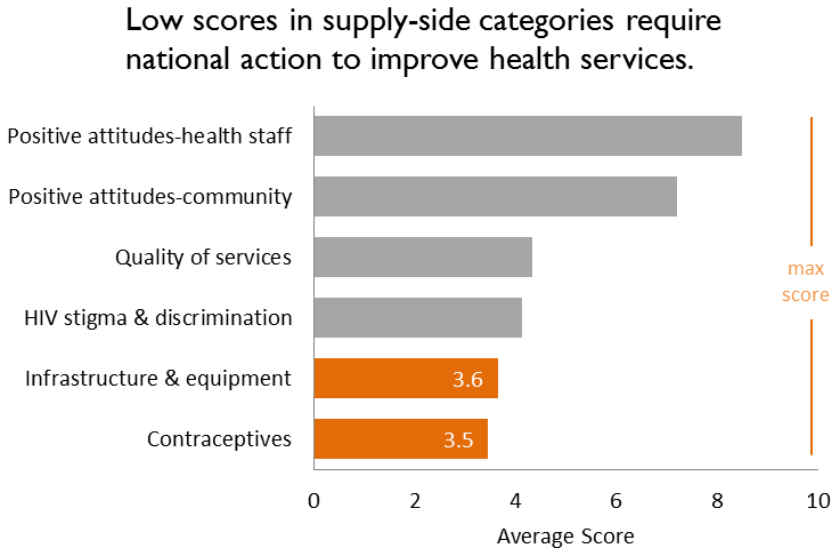
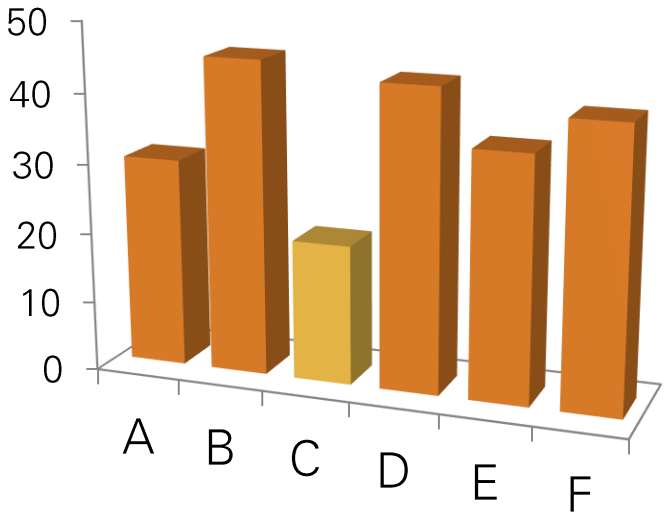


AFTER

Best practices

Avoid 3D charts; use ‘flat design’ instead



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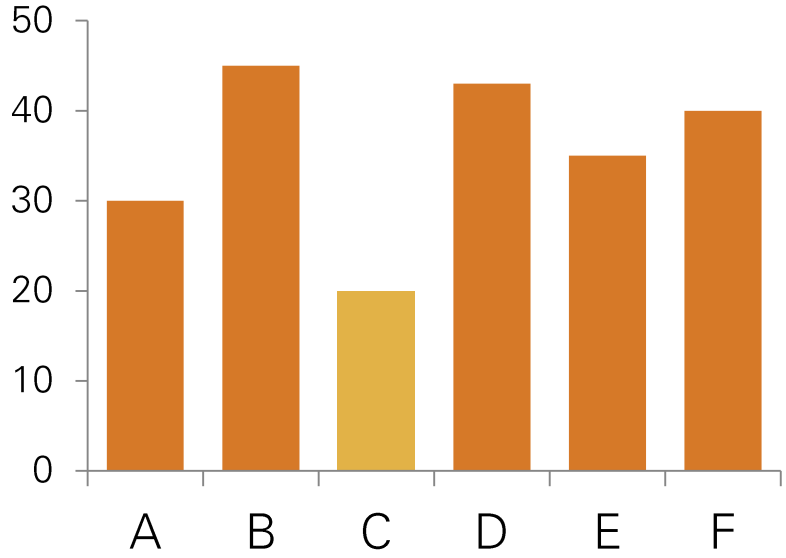
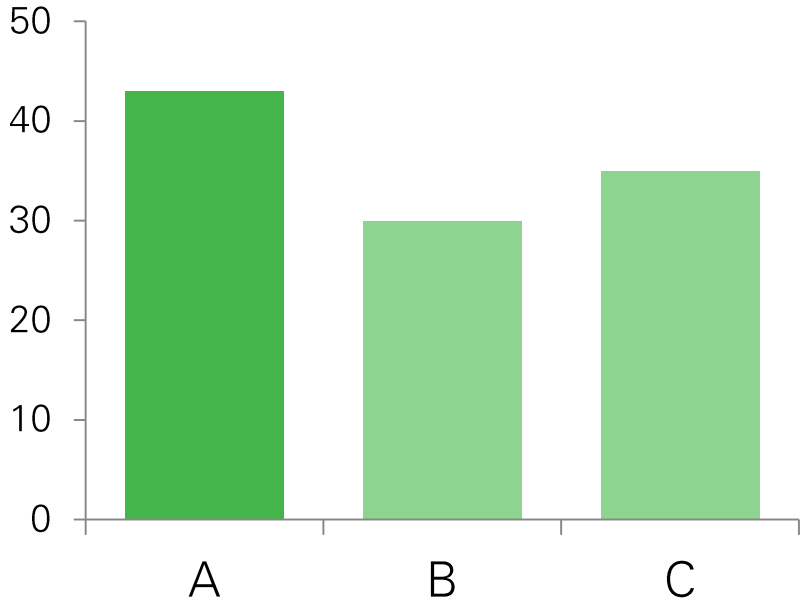
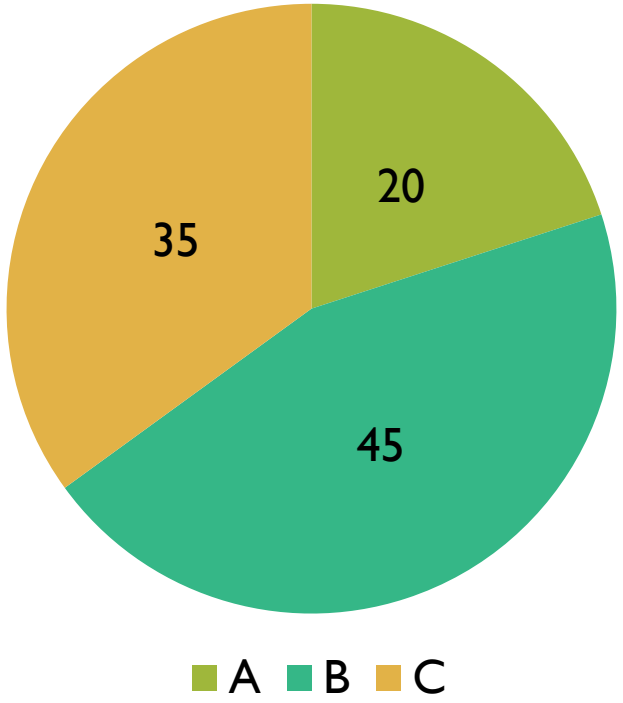


AFTER

Best practices

For comparing charts, keep the style consistent





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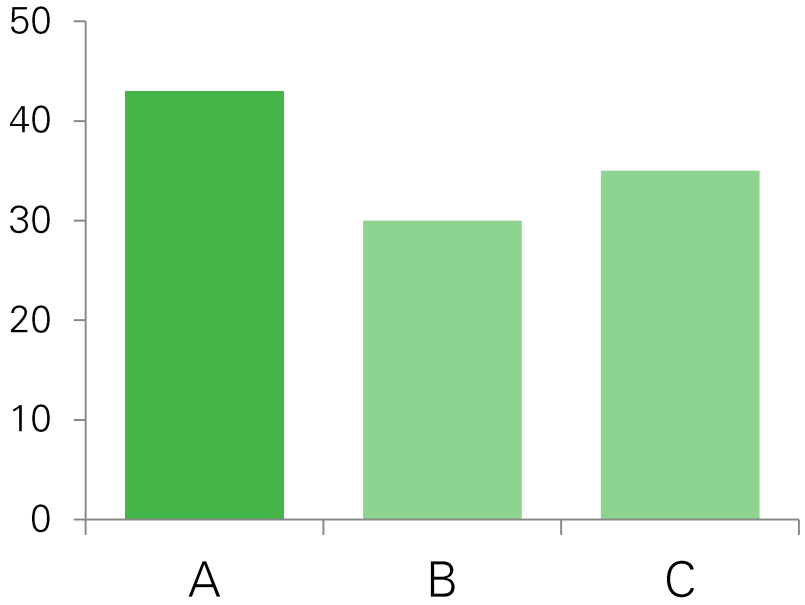
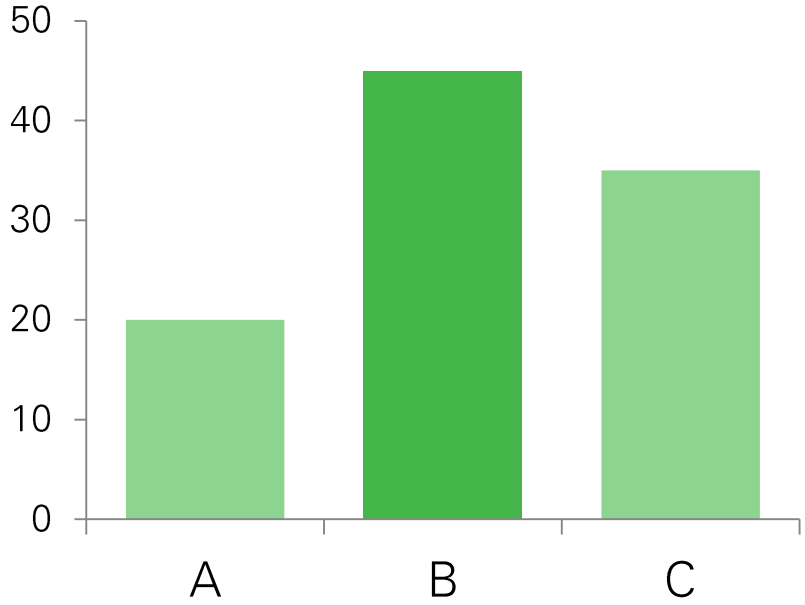
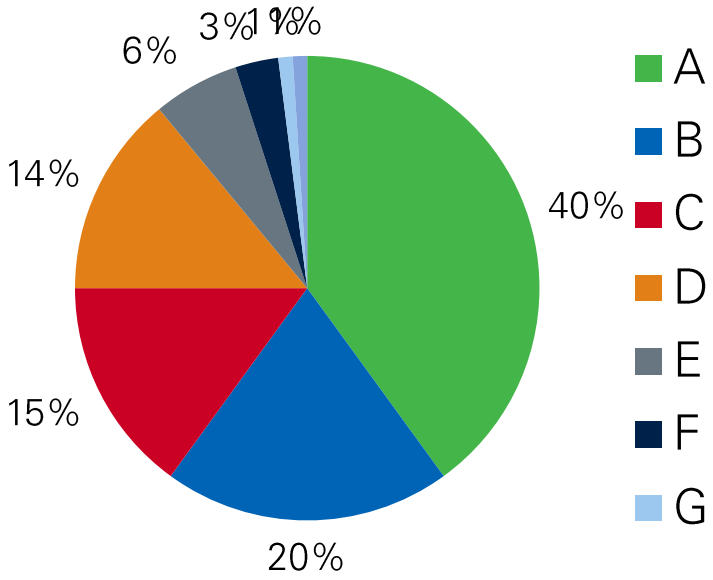




AFTER

Best practices

Avoid using pie charts if possible, especially for comparisons



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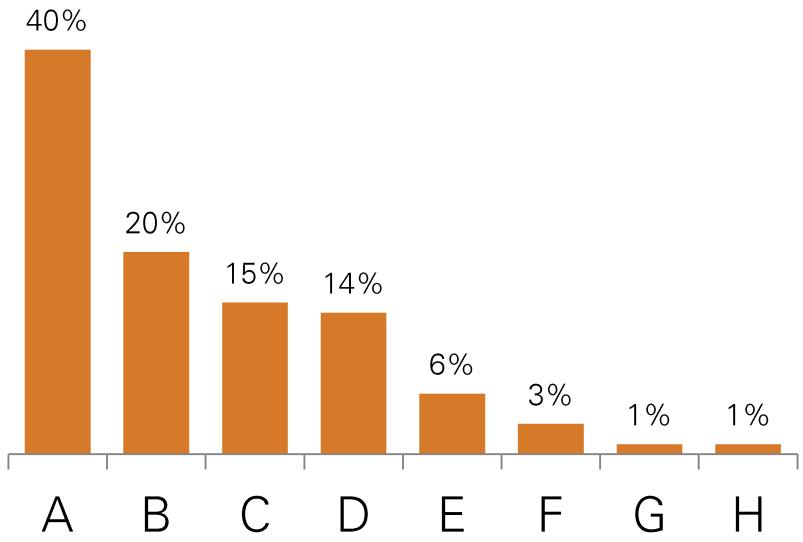
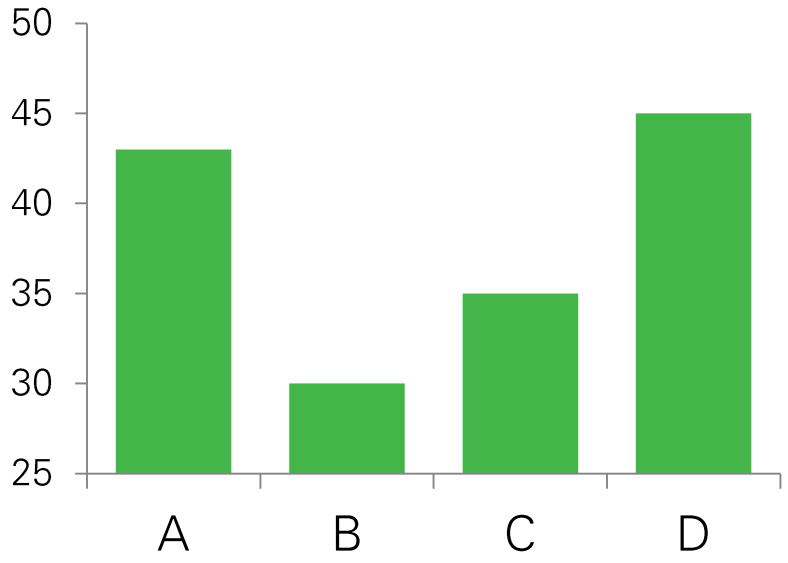


AFTER

Best practices

Use the full axis by starting at zero



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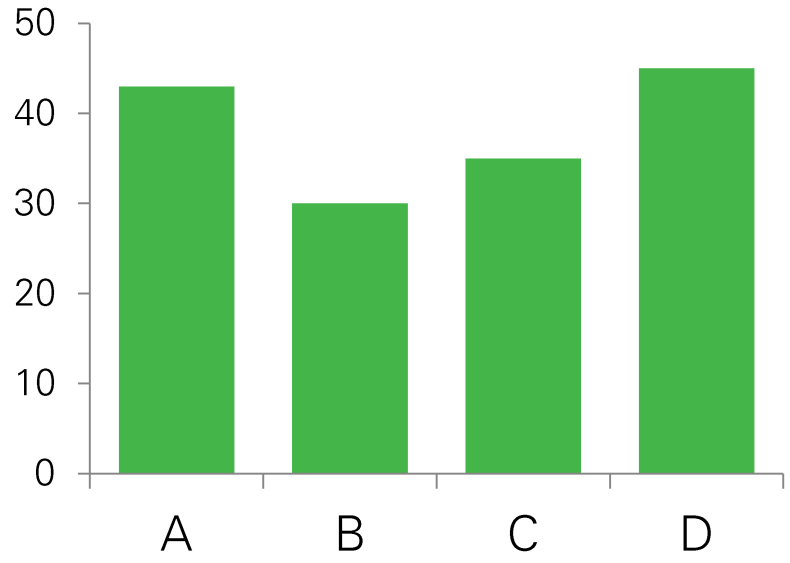
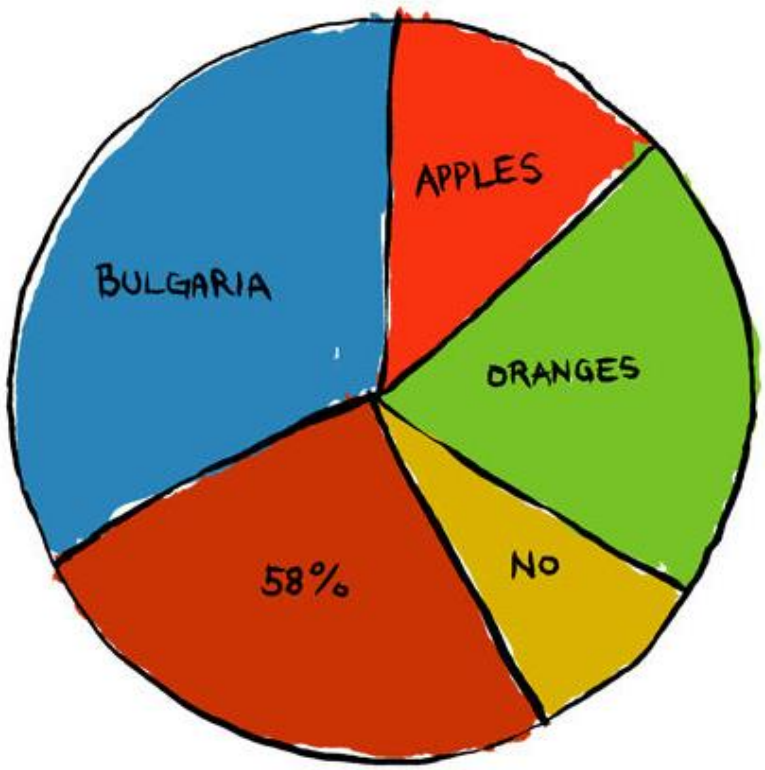


AFTER

Common Data Viz Mistakes



Avoid misrepresenting your data in the following ways…

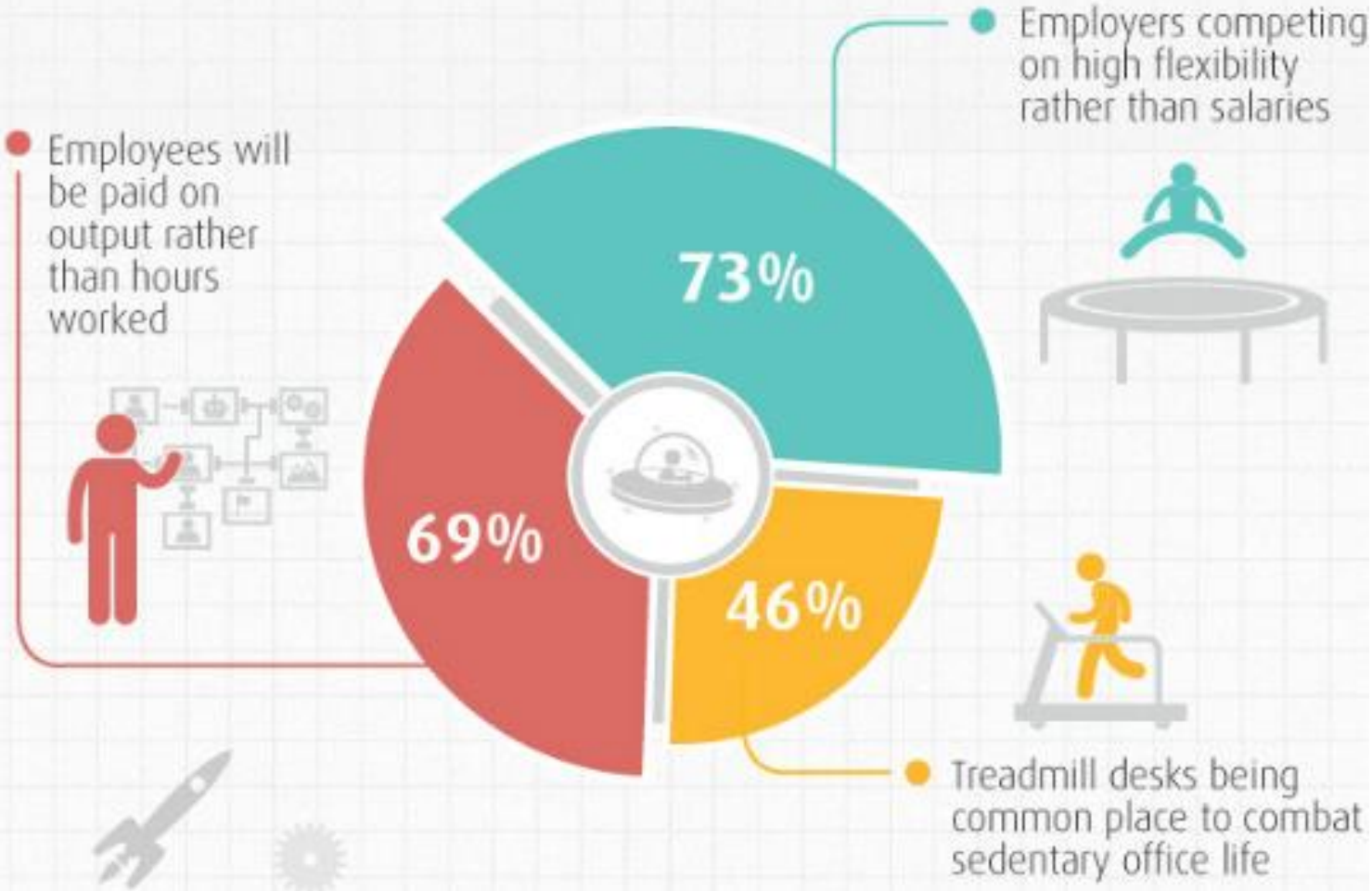
Source: http://io9.gizmodo.com/11-most-useless-and-misleading-infographics-on-the-inte-1688239674

1 The numbers don’t add up

Make sure your numbers make sense

BIGGEST FUTURE CHANGES IN THE WORKPLACE?

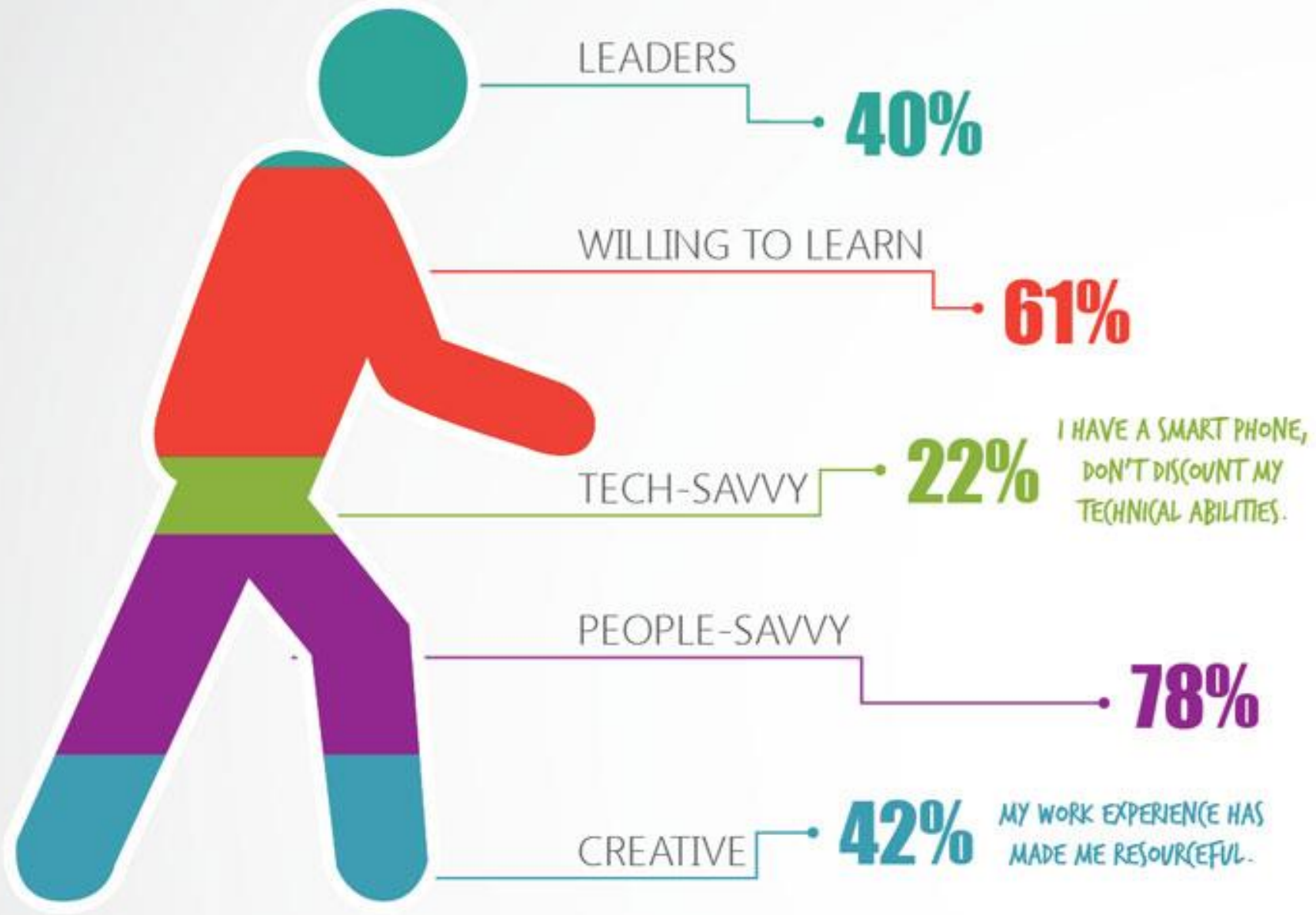
In a survey of HR professionals, changes forecasted in the workplace varied from:



2 The visual is complicated

Make sure your chart communicates your data

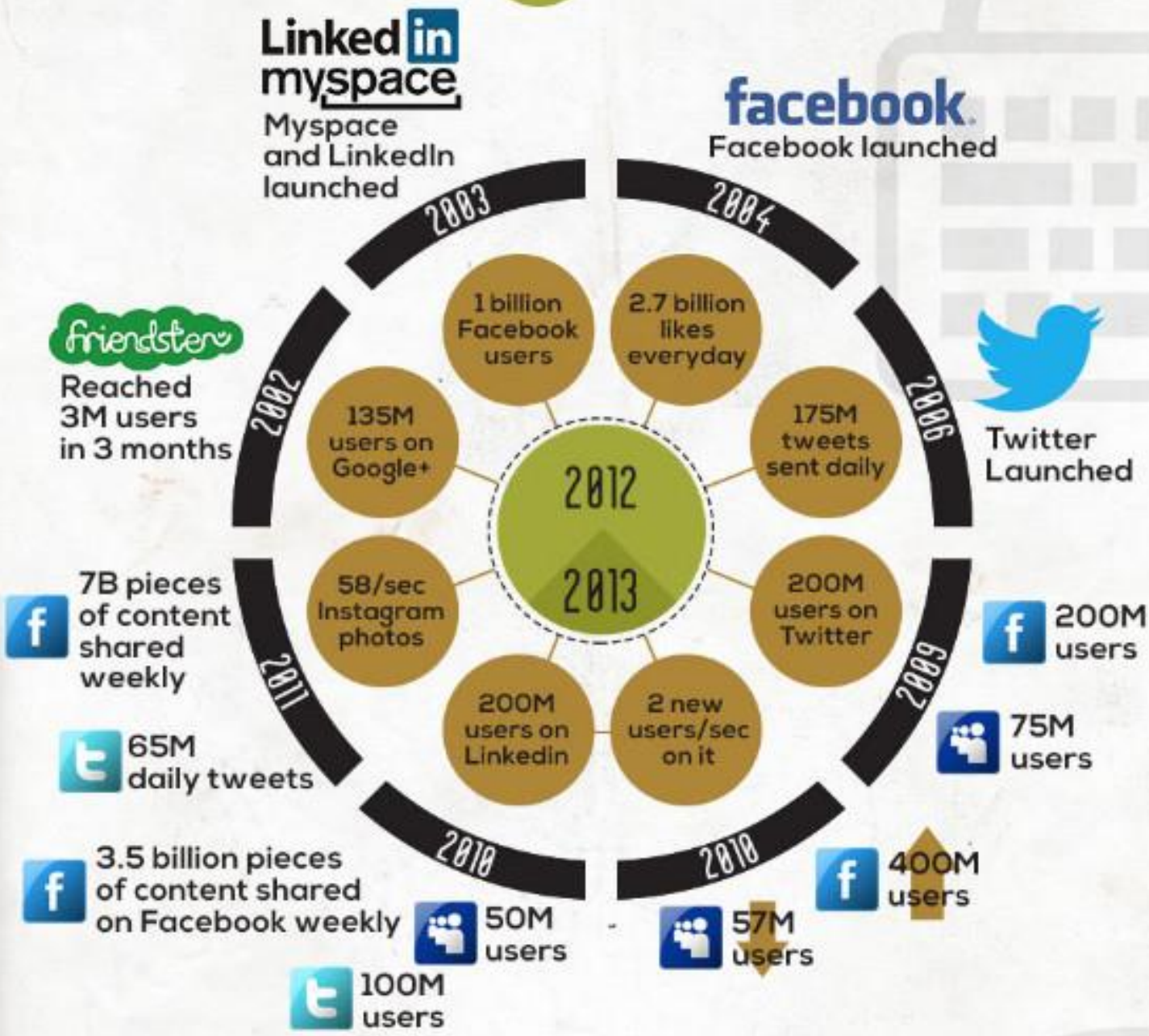
HOW **BABY BOOMERS** DESCRIBE THEMSELVES



3 Making the viewer work

Don’t overcomplicate things

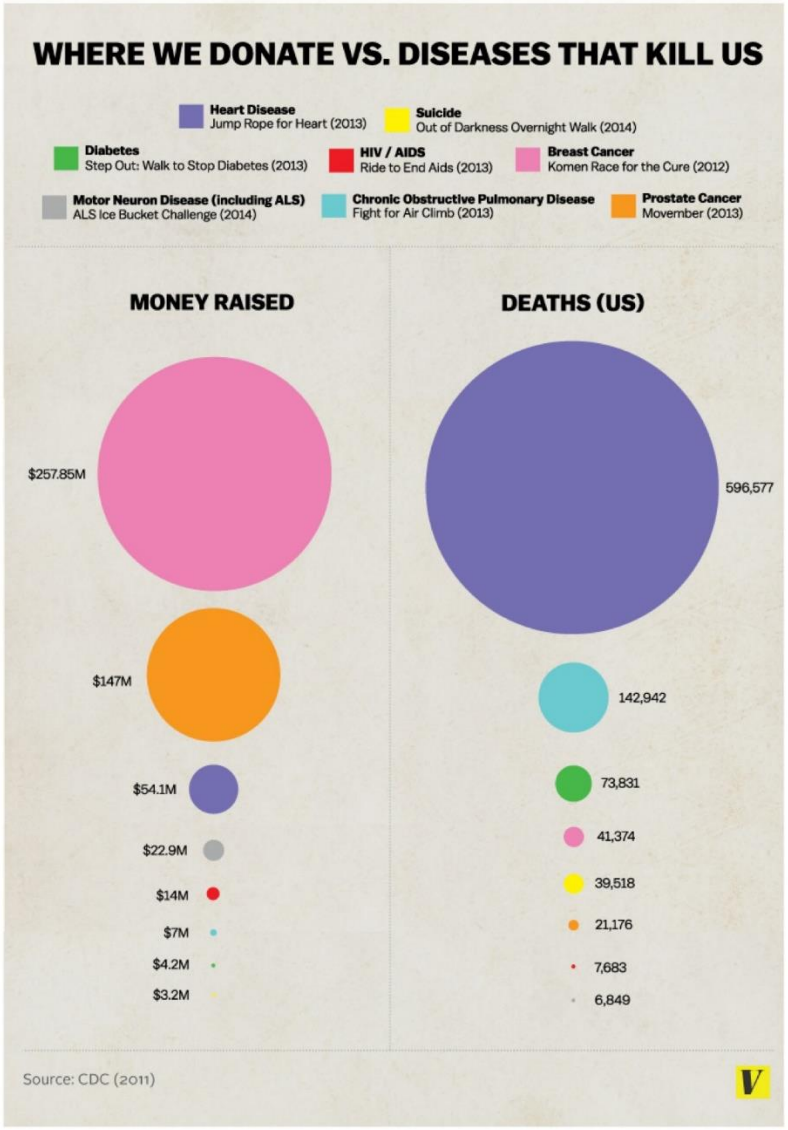
SOCIAL MEDIA USAGE



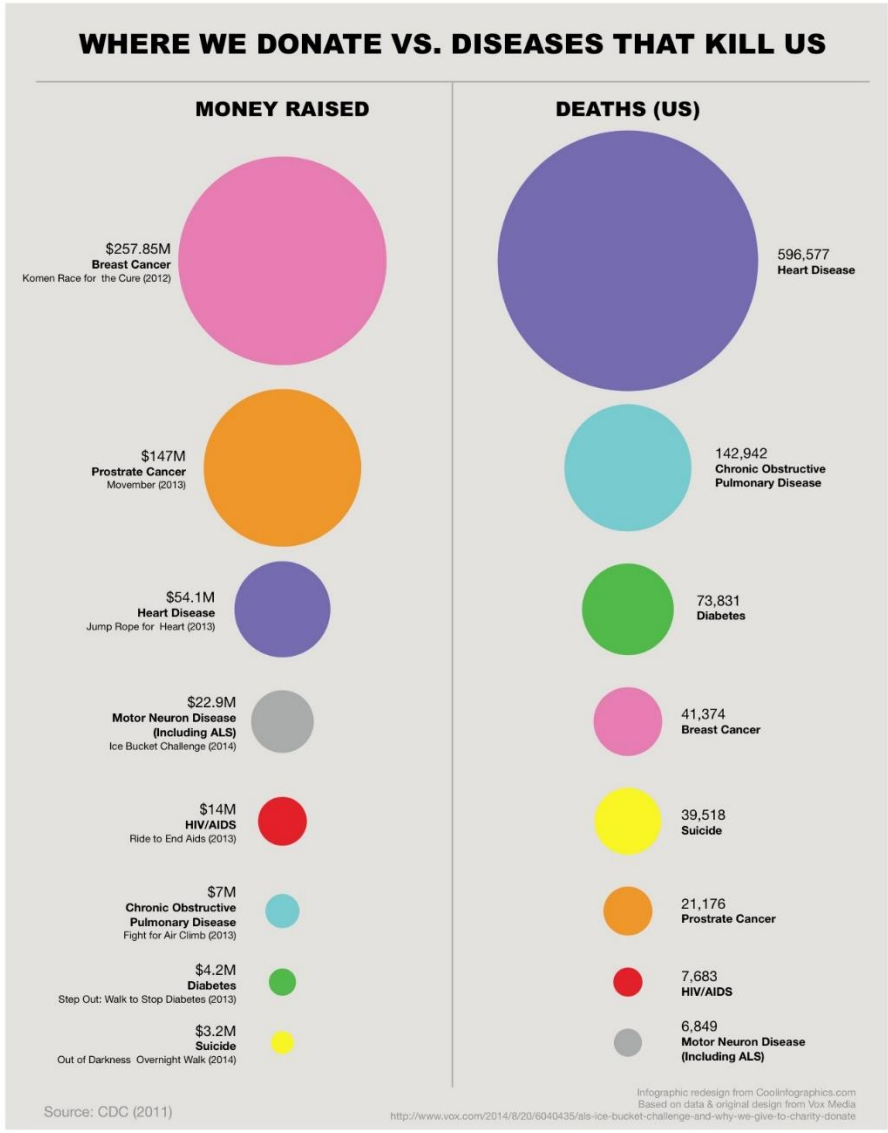
4 Inaccurate scales

To scale circles, increase by area instead of diameter

Original Design



Corrected Design

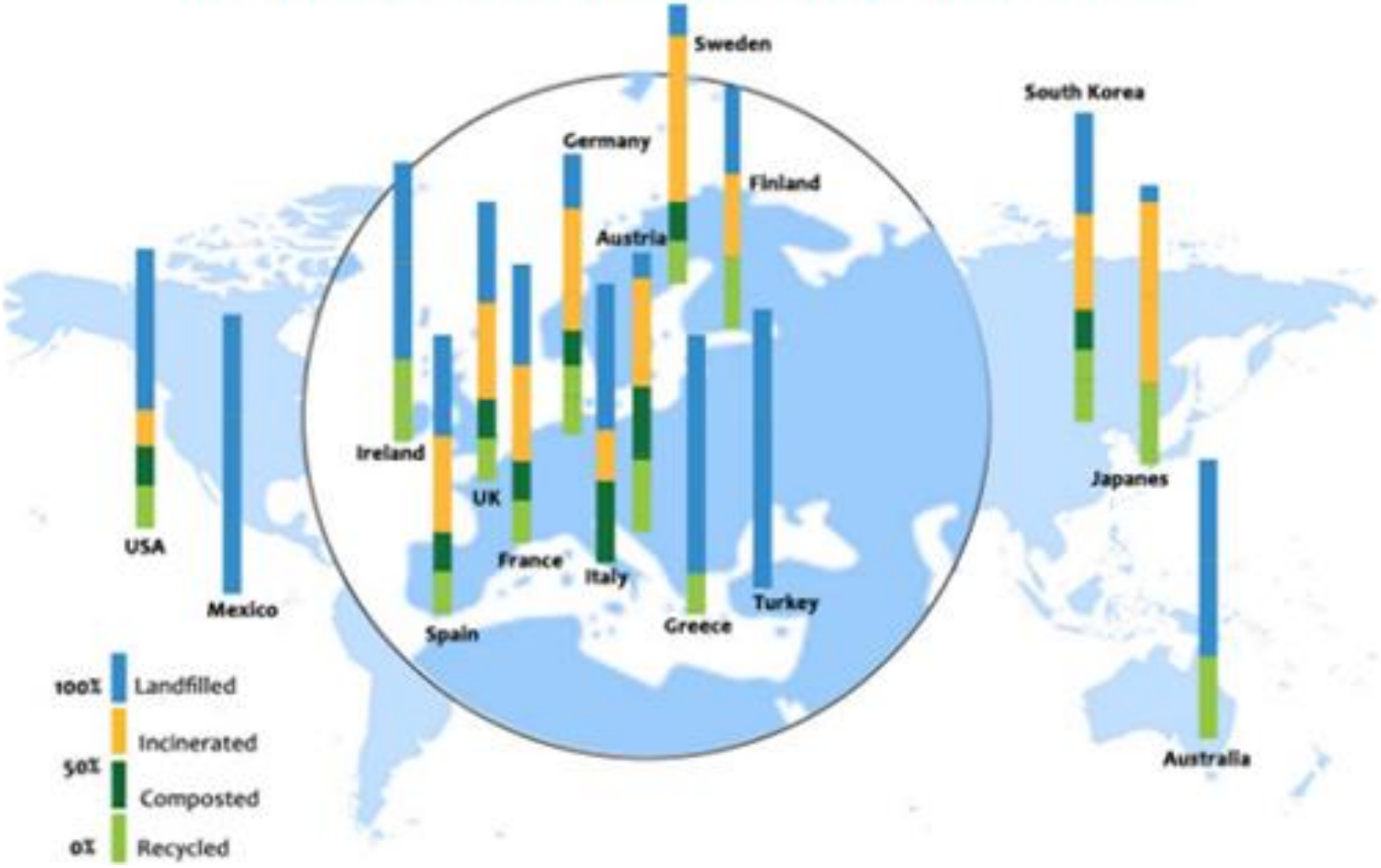


5 Incomparable comparisons

Keep graphs on the same plane

Waste Managment & Recycling of USA

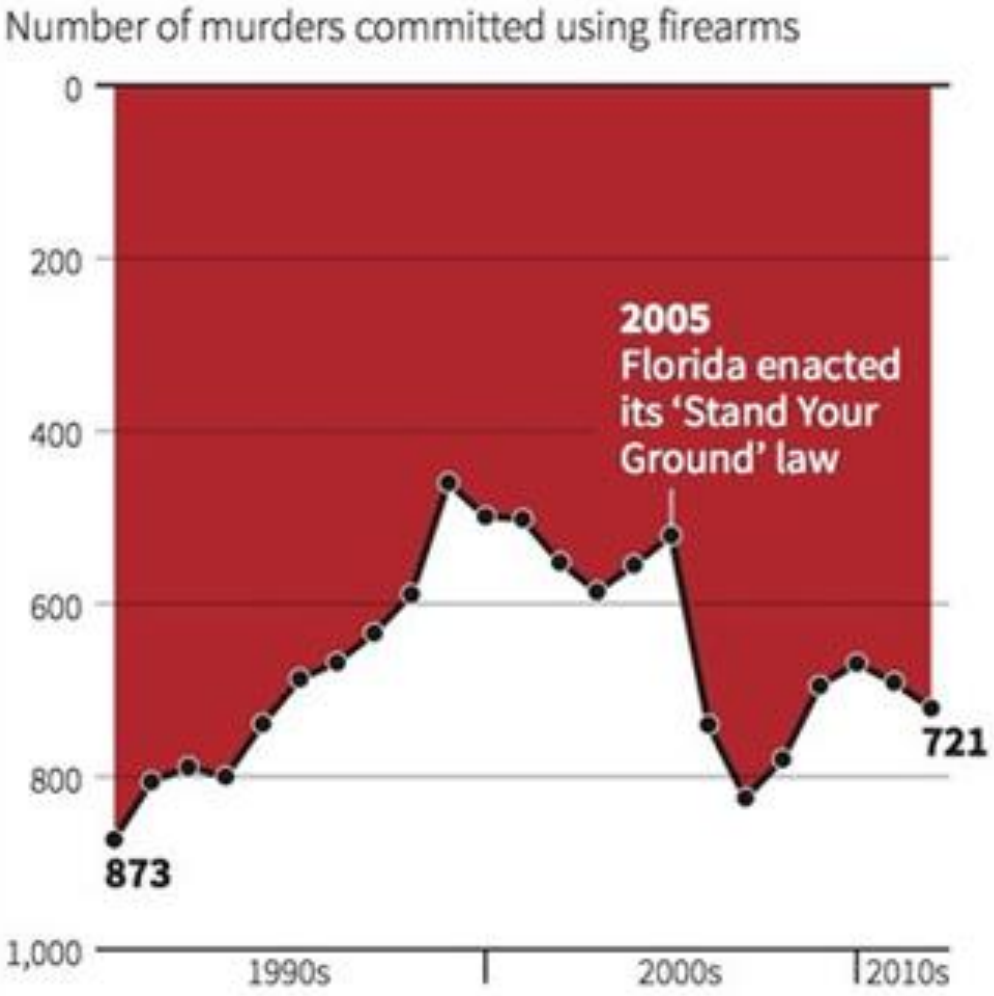
How do different countries dispose of their waste?



6 Incorrect axis placement

Unconventional orientation can mislead

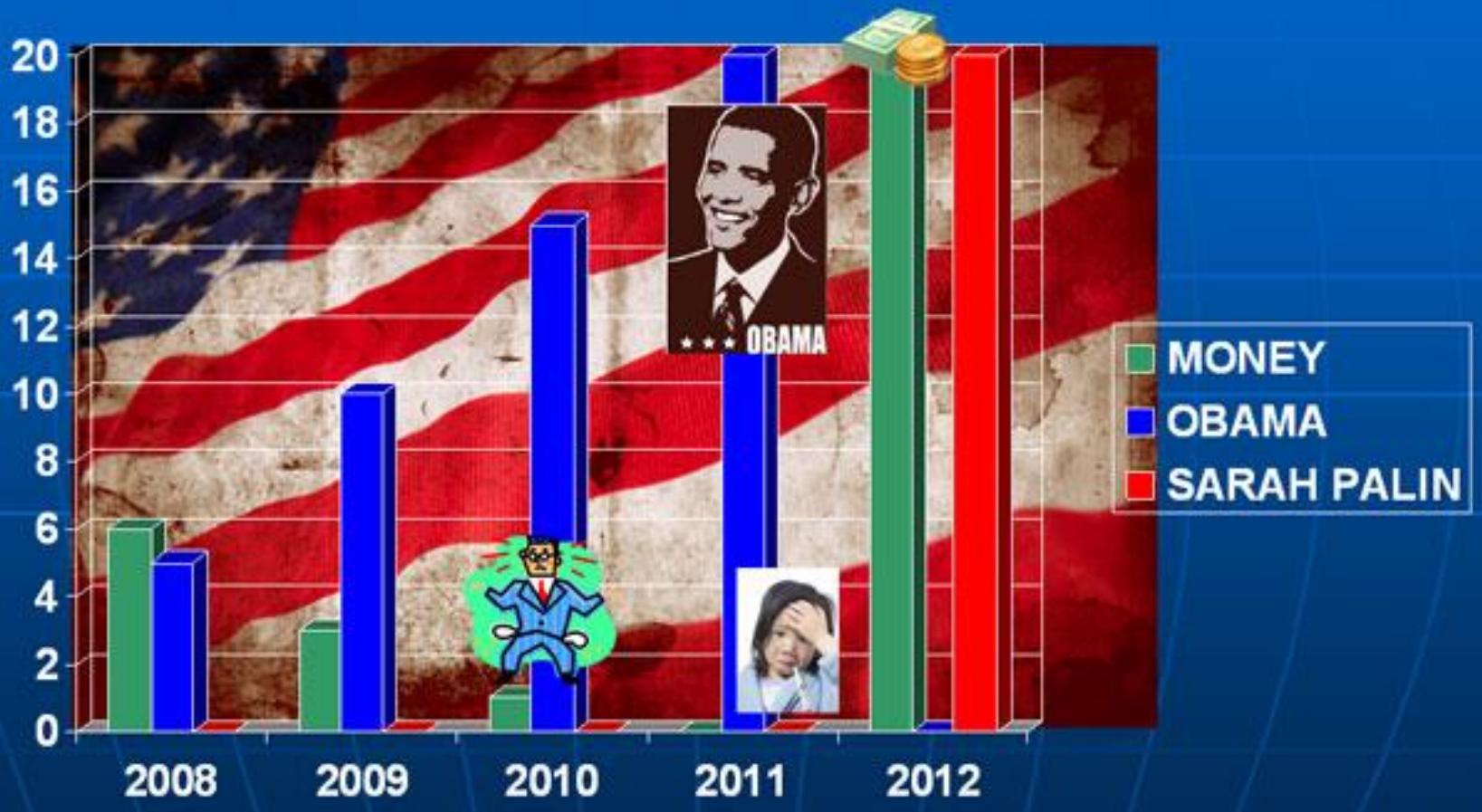
Gun deaths in Florida



Source: Florida Department of Law Enforcement

7 Generally disasterous design

So what does 2012 mean for the economy?!?!?

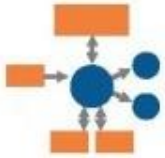


Questions?

Visualizing qualitative data

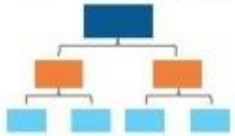
Cluster Map

Flow/ Path Diagram



Graphic Recording

Concept Mapping

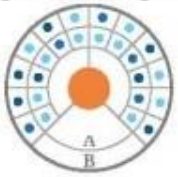


Quote and Picture

Indicator Dots

Venn Diagram

Spectrum Display



Network Mapping

Ripple Effect Mapping

Icons & Color Coding

Change Photos/Diagram

Mind Mapping

Dendrogram

Timeline

DIAGRAMS

PICTURES

Rating

QUOTES & WORDS

Callout Box

Phrase Net

Word Tree

Word Clouds

QUALITATIVE CHART CHOOSER 2.0

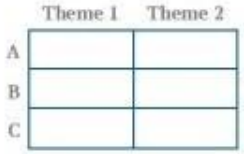
BY JENNIFER LYONS
& STEPHANIE EVERGREEN

FOR MORE SEE

STEPHANIEEVERGREEN.COM/BLOG
PRESENTING DATA EFFECTIVELY
EFFECTIVE DATA VISUALIZATION

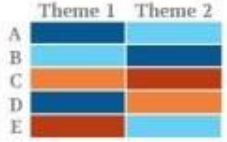
TABLES

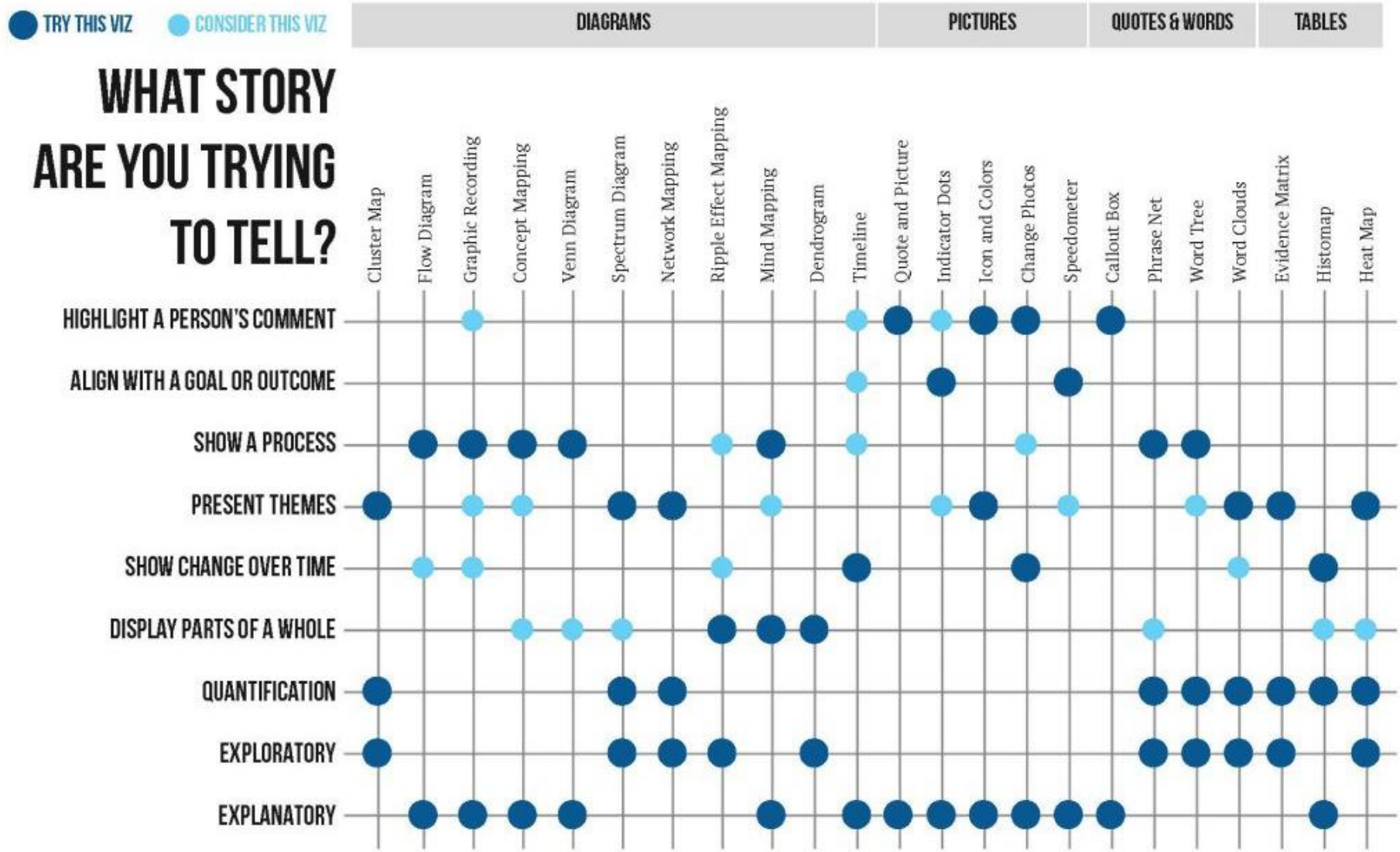
Evidence Matrix



Histomap

Heat Map




TRY THIS VIZ
CONSIDER THIS VIZ
DIAGRAMS
PICTURES
QUOTES & WORDS
TABLES
WHAT STORY ARE YOU TRYING TO TELL?
Cluster Map
Flow Diagram
Graphic Recording
Concept Mapping
Venn Diagram
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HIGHLIGHT A PERSON'S COMMENT
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SHOW A PROCESS
PRESENT THEMES
SHOW CHANGE OVER TIME
DISPLAY PARTS OF A WHOLE
QUANTIFICATION
EXPLORATORY
EXPLANATORY

RESOURCES

Qualitative Visualization

Qualitative Chart Chooser

stephanieevergreen.com/qualitative-chart-chooser/

THANK YOU.

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