Data Viz for IMPACT

Presented by: Tracy, Candy, Heidi, Agustina & Fred

Re:imagine retail

Who we are?

Tracy Ruggles

Staff, UX designer

Candy Avila Baca

Staff, UX designer

Fred Kim

Senior UX designer

Heidi Ng

UX designer

Agustina Leske Thorpe

UX designer

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Goals

We want you to get a few things out of our time together:

- Reshape how you approach data
- Quick tips on various visualization types
- New ways of thinking about data, with AI in mind
- Get inspired for the future of data visualization!

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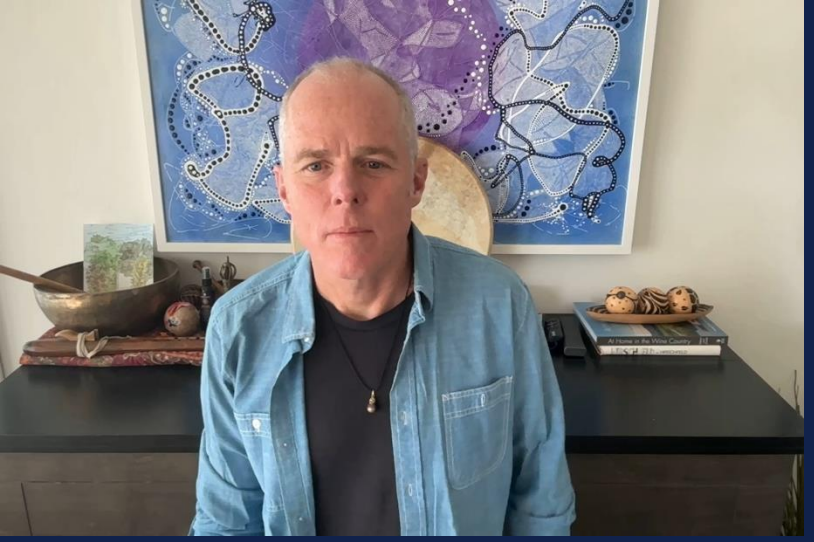

Where you think is how you think.

– Anonymous

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3 short stories

Consequential design choices and the real-world emotional impact those choices can make.

- 1986 – The space shuttle Challenger
  Communication within mission-critical designs

- 2016 – The New York Times
  Vote-meter
  Narratives gone awry; the colors of emotion

- 2014 – Lupi & Prosavec: Dear Data
  Listening, empathy, creativity

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The challenger

"Information displays should serve the analytic purpose at hand."
– Edward Tufte

Photo (from left to right):

- Sharon Christa McAuliffe
- Gregory Jarvis
- Judith A. Resnik
- Francis R. (Dick) Scobee
- Ronald E. McNair
- Mike J. Smith
- Ellison S. Onizuka

Image credit: NASA
https://www.flickr.com/photos/gsfc/12191288154

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January 28, 1986

Plot of previous tests for O-ring failures…

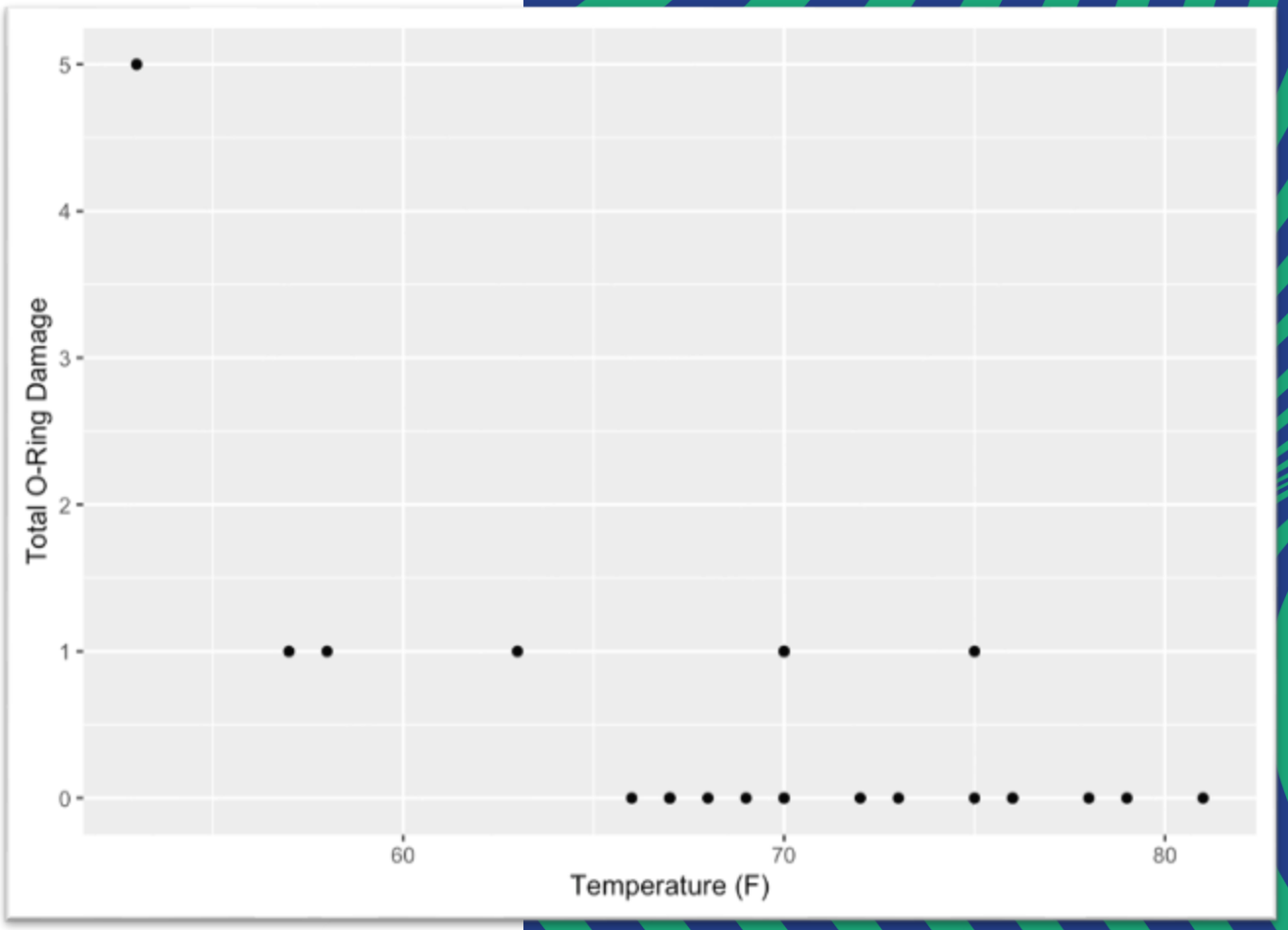

Image credit: NASA
https://p4a.seas.gwu.edu/2019-Fall/challengerExplosion.html

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Method of delivery

PowerPoint as a medium for obfuscation…

Review of Test Data Indicates Conservatism for Tile Penetration

- The existing SOFI on tile test data used to create Crater was reviewed along with STS-87 Southwest Research data
  - Crater overpredicted penetration of tile coating significantly
    - Initial penetration to be described by normal velocity
      - Vaires with volume/mass of projectile (e.?g. 200ft/sec for 3cu. Ln)
    - Significant energy is required for the softer SOFI particle to penetrate the relatively hanrd tile coating
      - Test results do show that it is possible at sufficient mass and velocity
    - Conversely, once tile is penetrated SOFI can cause significant damage
      - Minor variations in total energy (above penetration level) can cause significant tile damage
  - Flight condition is significantly outside of test database
    - Volume of ramp is 1920cu in vs 3 cu in for test

Image credit: NASA
https://mcdreeamiemusings.com/blog/2019/4/13/gsux1h6bnt8lqjd7w2t2mtvfg81uhx

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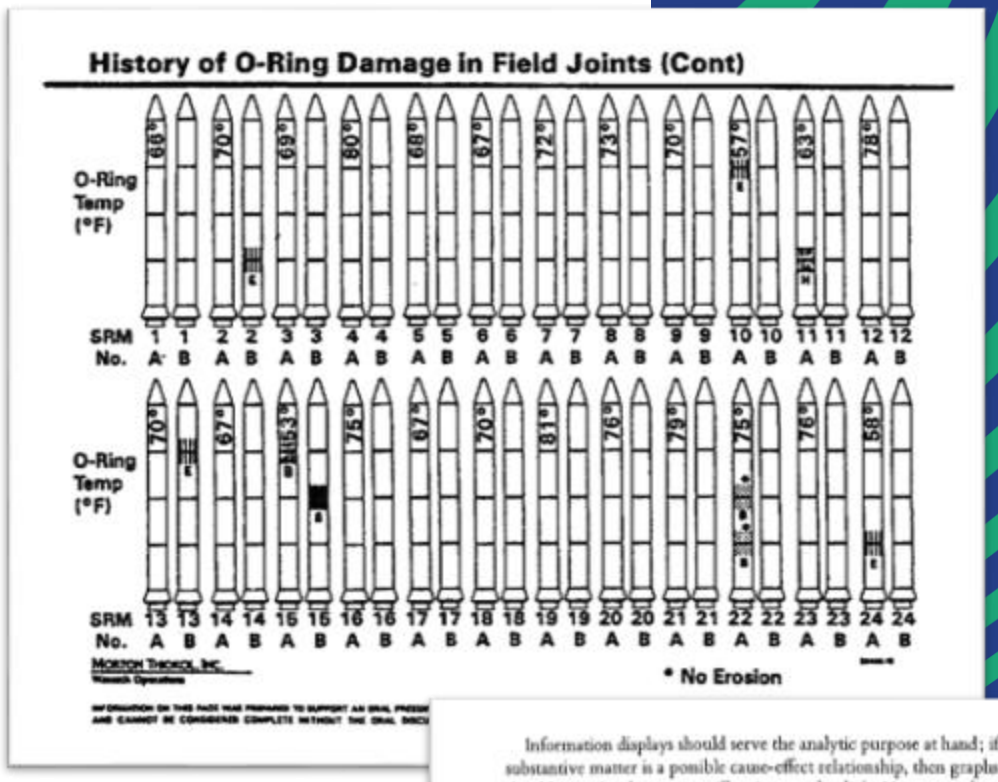
Audience & missing data

Who needs to see what information and how do you summarize it?



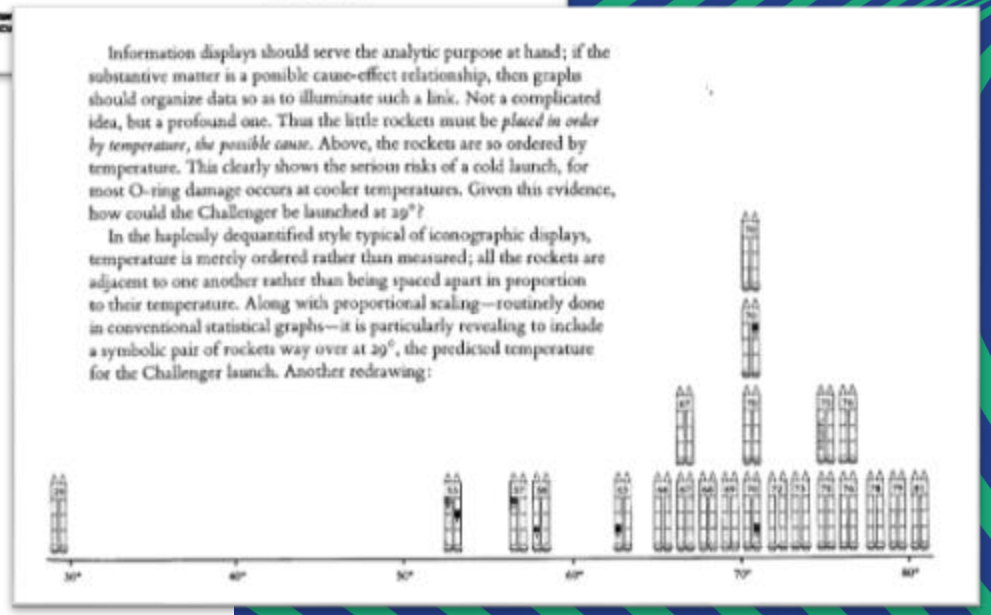


Image credit: NASA https://williamwolff.org/wp-content/uploads/2013/01/tufte-challenger-1997.pdf

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Context

- Clarity of critical information
- Context is key
- Simplification
- Tailoring visuals for the audience

Image credit: NASAImage: https://www.space.com/19436-columbia-disaster.html

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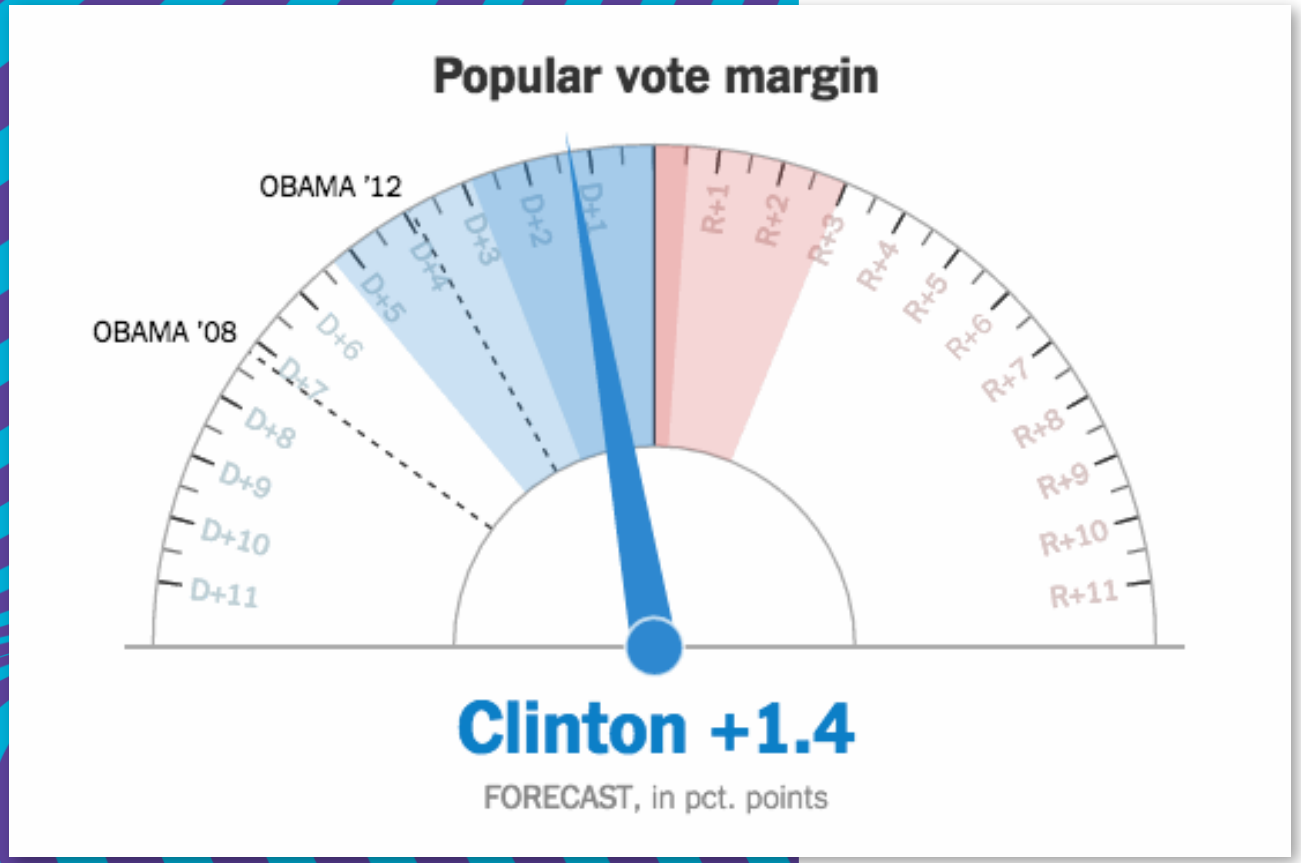

Image credit: NASAImage: https://www.space.com/19436-columbia-disaster.html

NY Times Vote-meter

Uncertainty, predictions, communicating the difficult unknowns

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The jitters

How do you visualize uncertainty?

Image: Visualizing Data
https://visualisingdata.com/2016/11/gauging-election-reaction/

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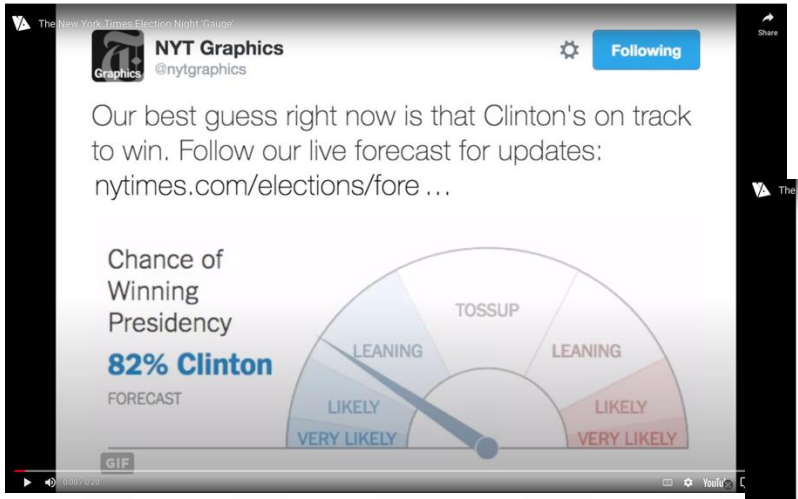
Certainty to disillusionment



Images: NY Times https://x.com/nytimes

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Context

- Creating narratives
- Conveying the messiness of data
- Misunderstanding the outcomes
- Cuteness as a distraction

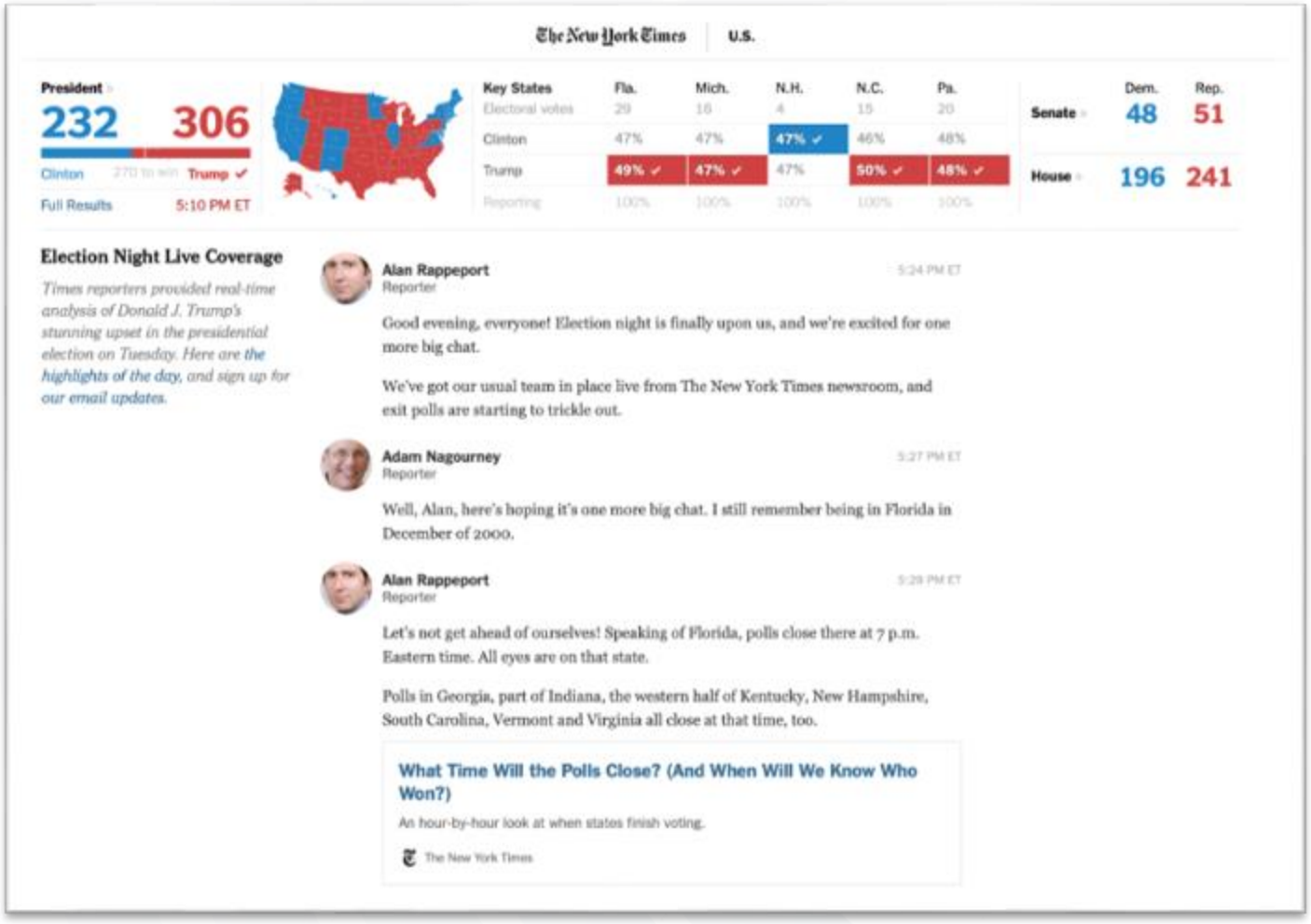

Image: NY Times: https://www.nytimes.com/interactive/2016/11/08/us/elections/trump-clinton-election-night-live.html

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Dear Data

Image credit: Lupi & Posaved:
http://www.dear-data.com/theproject

Giorgia Lupi & Stefanie Posavec
a year-long analog data drawing project

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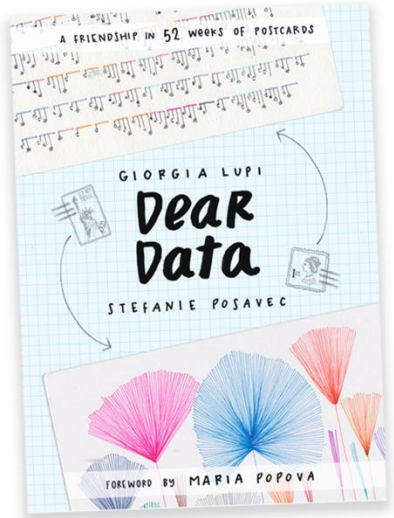
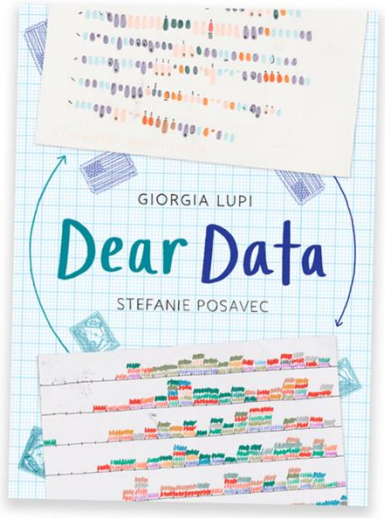
Human-scaled data

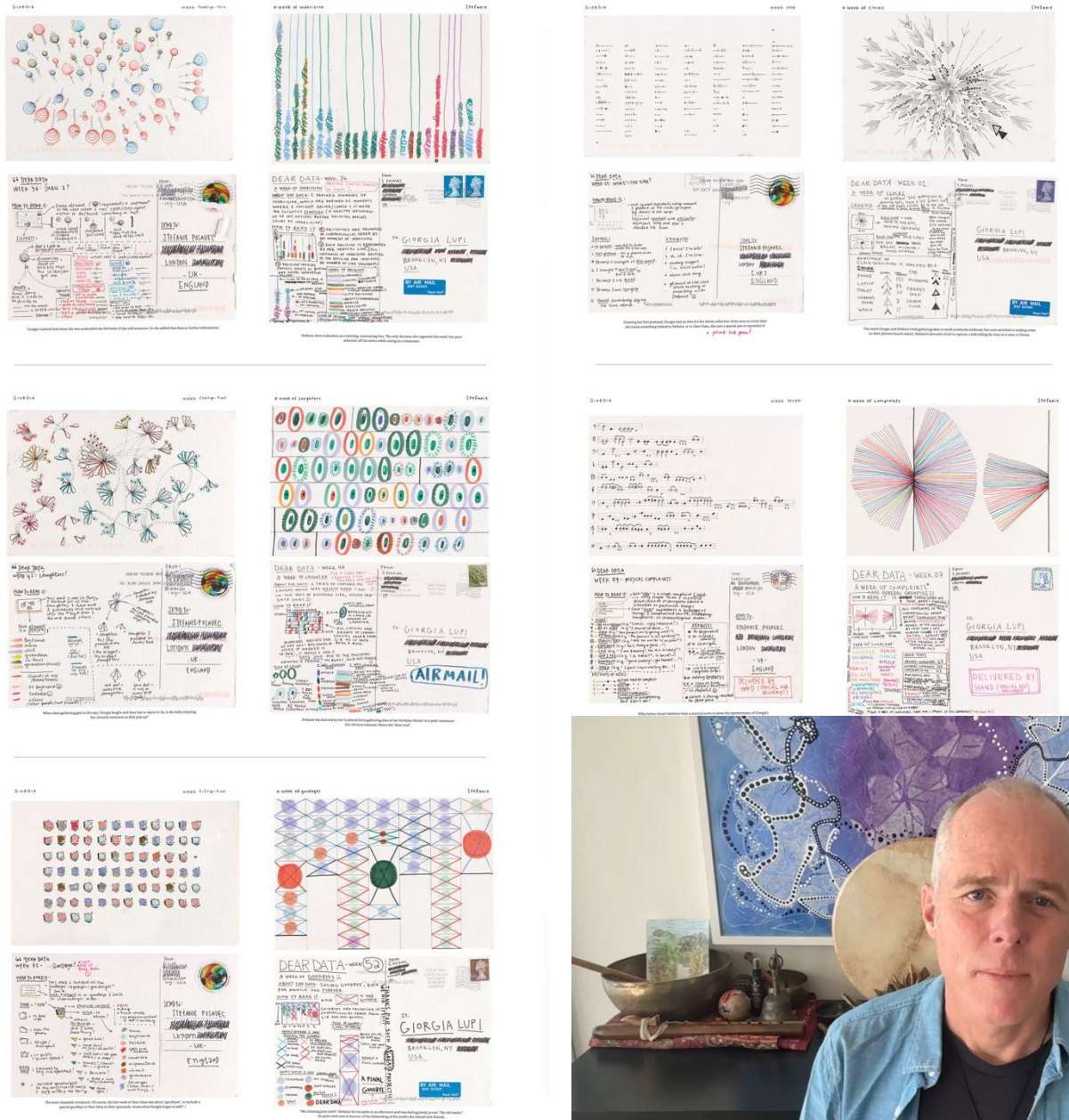


COVER BY GIORGIA



COVER BY STEFANIE

Image credit: Lupi & Posavec:
http://www.dear-data.com/theproject



The secret life of numbers... our lives move in mysterious ways. Make connections, stay heart-centered, and be open to delight.

How-to data viz

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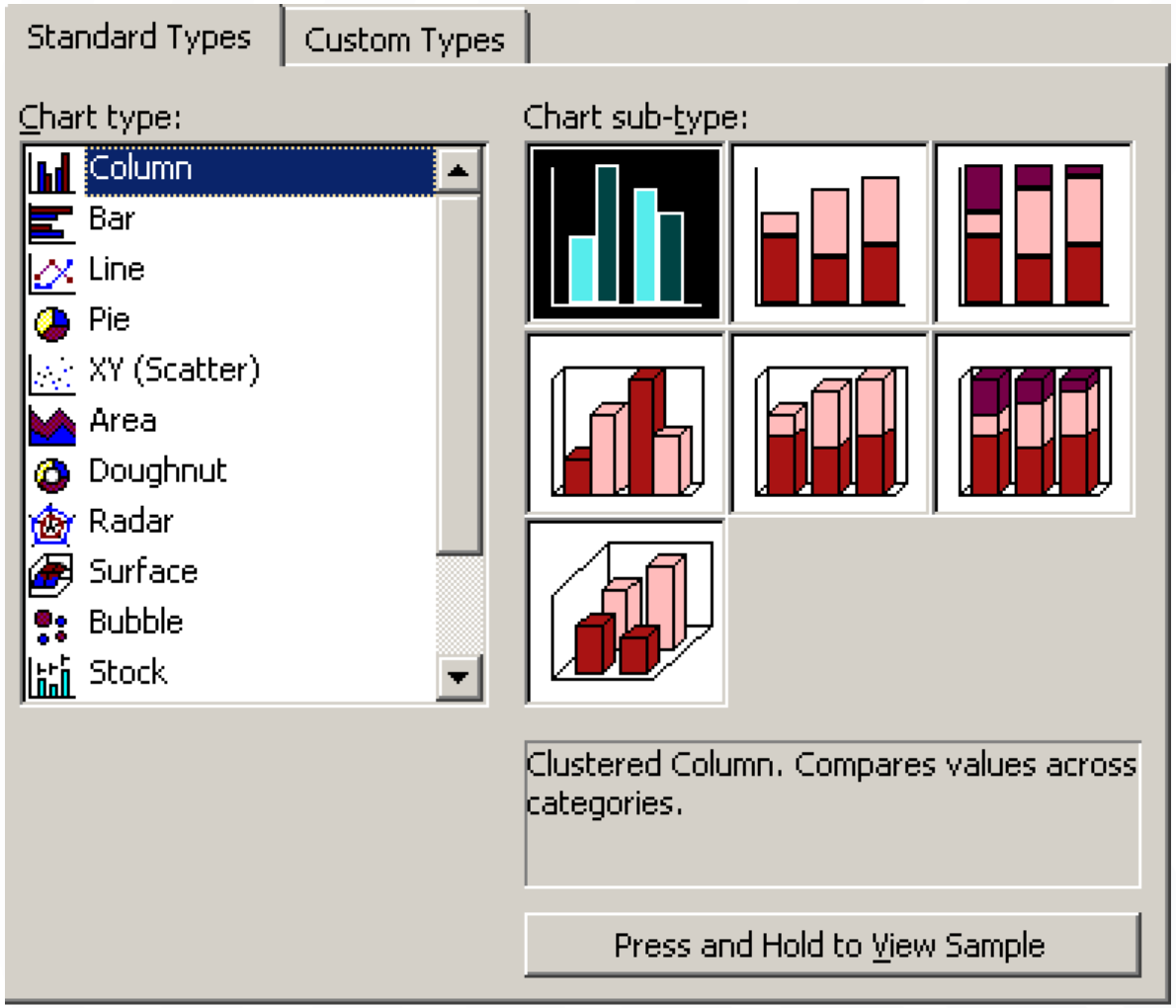

"*Using the Chart Wizard*", Better Solutions Limited. 2024.
https://bettersolutions.com/excel/charts/chart-wizard-2003.htm

How do we make the right decisions?

What story you want to tell?

What kind of data do you have?

How do you want to tell it?

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Data Types

Data types

Qualitative

Non numeric

Customer sentiments, qualities, observations

Quantitative

Measurable by number

Stock prices, page traffic, Instagram likes

Nominal

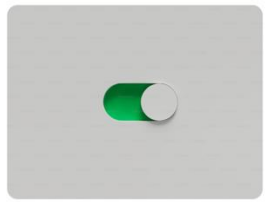
Groups or categories without inherent order

Product types, animal groups, political party

Ordinal

Categories with a natural order

Age brackets, frequency, spice levels



Binary

Only two options

Yes/no, active/inactive, on/off

Continuous

Any increment

Daily rainfall, temperature, stock price

Discrete

Whole numbers

Number of customers, votes, items sold

1. Osarugue Igbinoba. Untitled. Unsplash. January 15, 2023 https://unsplash.com/photos/a-green-and-black-background-with-a-lot-of-lights-hVm4zmZYnYg
2. Getty Images. Customers express their feelings through emoticon badges on blue background. Unsplash. April 23, 2023. https://unsplash.com/photos/customers-express-their-feelings-through-emoticon-badges-on-blue-background-customer-satisfaction-survey-satisfaction-feedback-for-positive-customer-products-and-services-3d-render-illustration-D6MBddmqL4
3. Tyler Easton. assorted numbers printed on wall. Unsplash. September 27, 2017. https://unsplash.com/photos/assorted-numbers-printed-on-wall-faixctm2YRQ
4. Nerfee Mirandilla. pile of green apples and orange fruits. Unsplash. October 21, 2019. https://unsplash.com/photos/pile-of-green-apples-and-orange-fruits-y7f-wjoiMW4
5. Viktor Forgacs. orange and green chili peppers. Unsplash. October 7, 2020. https://unsplash.com/photos/orange-and-green-chili-peppers-jKlzW7riLcU
6. Planet volumes. Logo. Unsplash. December 7, 2022. https://unsplash.com/photos/logo-dSgor-tKbig
7. Artur Solarz. black and white analog clock at 1000. Unsplash. April 6, 2021. https://unsplash.com/photos/black-and-white-analog-clock-at-10-00-hihmzc-TToc
8. Waldemar. black flat screen computer monitor. Unsplash. October 19, 2020. https://unsplash.com/photos/black-flat-screen-computer-monitor-GjAKNK4ocRc

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Nominal

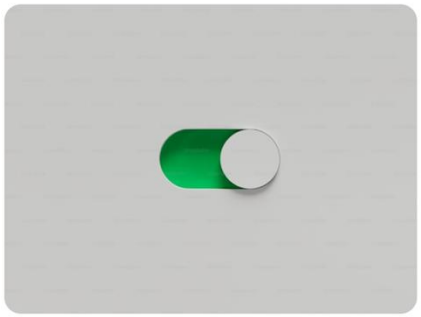
Groups or categories without inherent order

Product types, animal groups, political party

Ordinal

Categories with a natural order

Age brackets, frequency, spice levels



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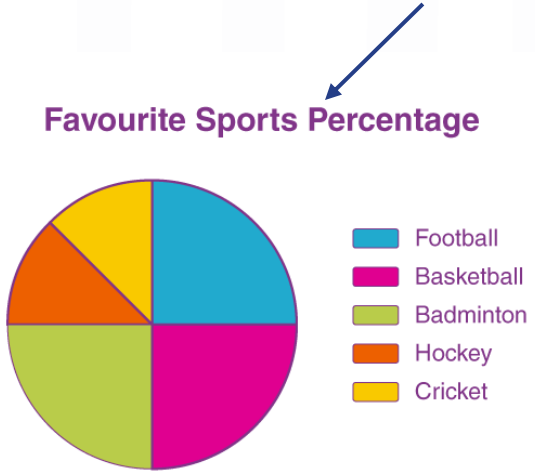
Yes/no, active/inactive, on/off



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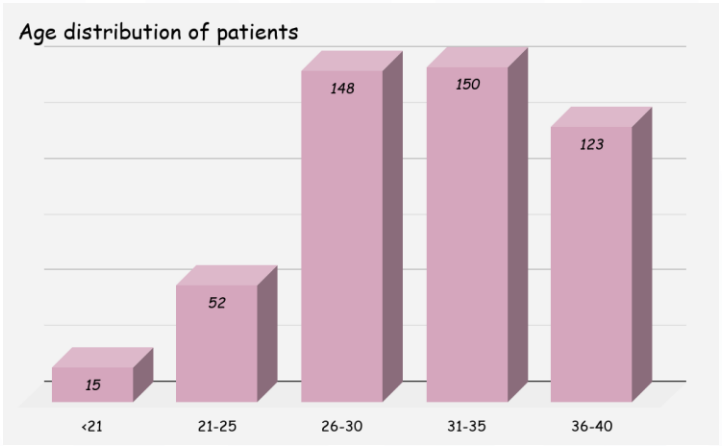

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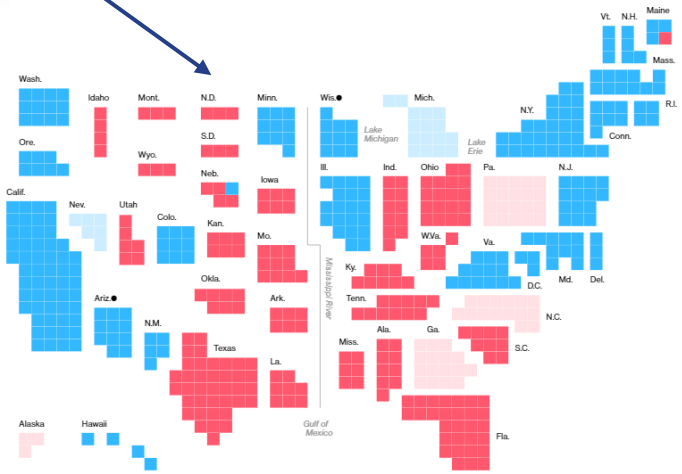

3

1. “Pie Charts”. Byju’s. 2024
https://byjus.com/maths/pie-chart/
2. Chang S.L. “Under 35? Is it safe not to biopsy benign looking solid lesions?”. EPOS 2020
https://epos.myesr.org/poster/esr/ecr2020/C-04303
3. The Learning Network. “What’s Going On in This Graph? | 2020 Presidential Election Maps”. The New York Times. 2020.
https://www.nytimes.com/2020/11/19/learning/whats-going-on-in-this-graph-2020-presidential-election-maps.html

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What story do you want to tell?

Data over time

Hess, Kosma. "*80 types of charts & graphs for data visualization (with examples).*" Datylon. (2022)
https://www.datylon.com/blog/types-of-charts-graphs-examples-data-visualization

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What story do you want to tell?

Comparison

Hess, Kosma. "*80 types of charts & graphs for data visualization (with examples).*" Datylon. (2022)
https://www.datylon.com/blog/types-of-charts-graphs-examples-data-visualization

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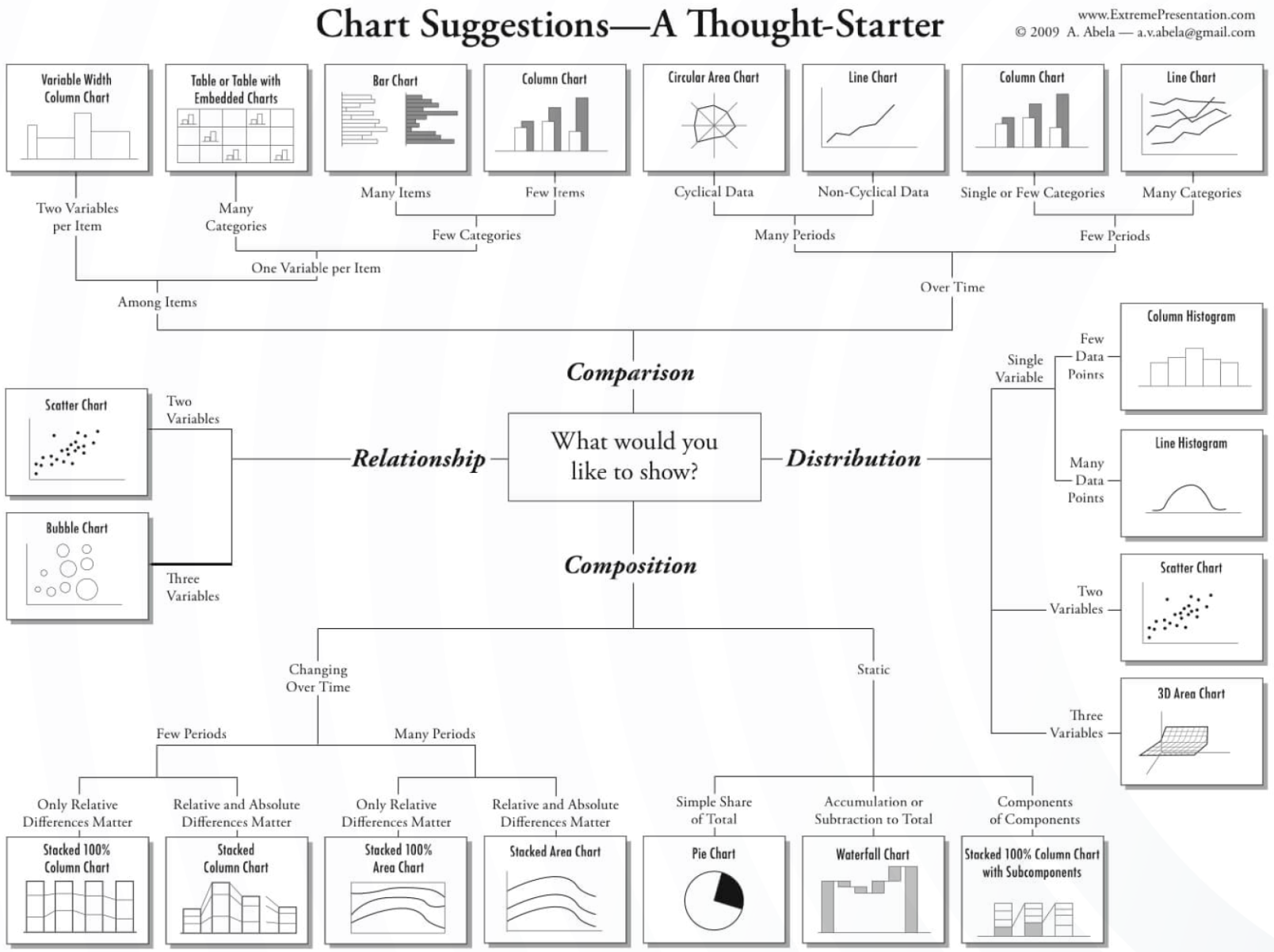

Abela, Andrew. "Charts". Extreme Presentation. (2020)
https://extremepresentation.com/design/7-charts/

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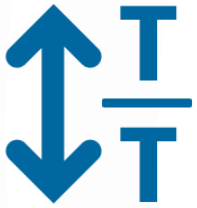
Key elements

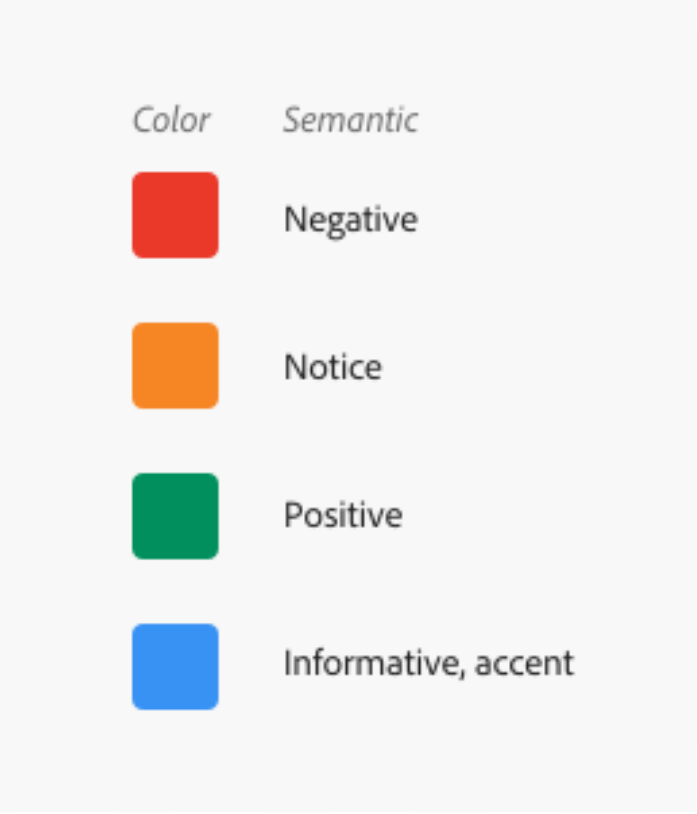
Color



Space

Accessibility

Color



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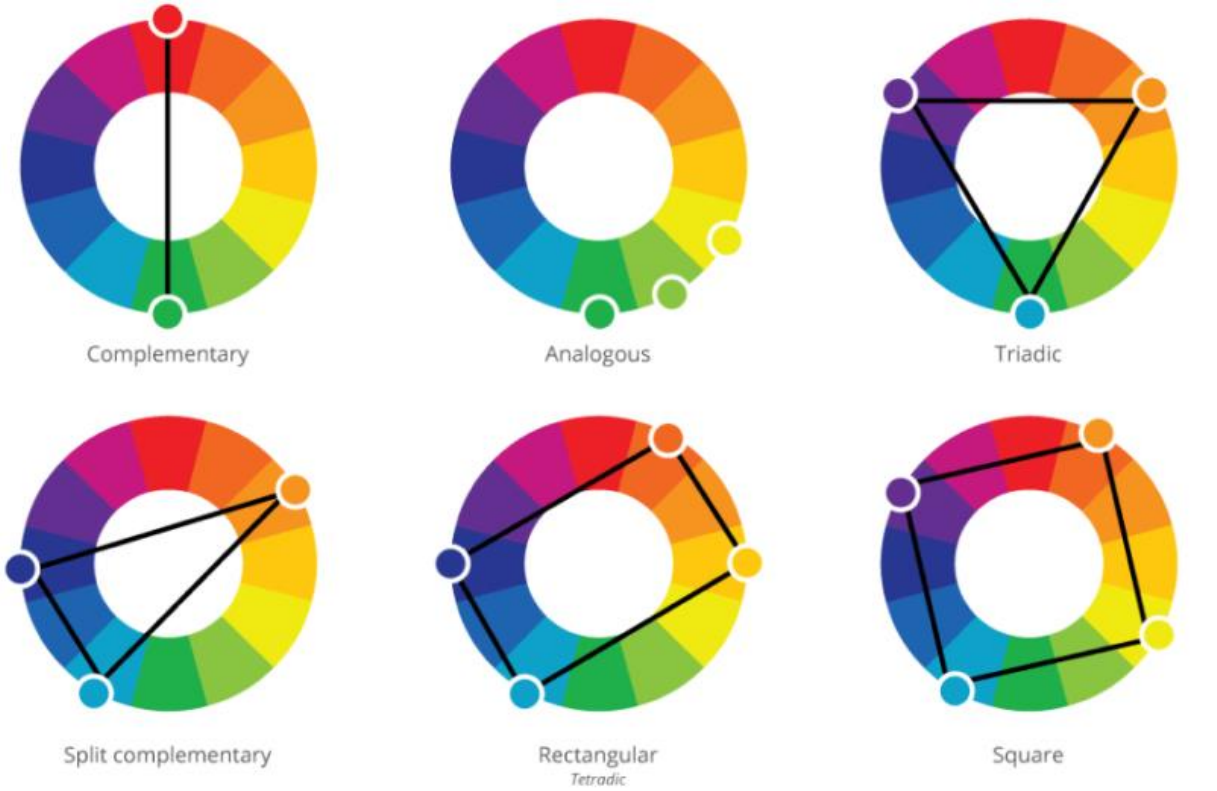


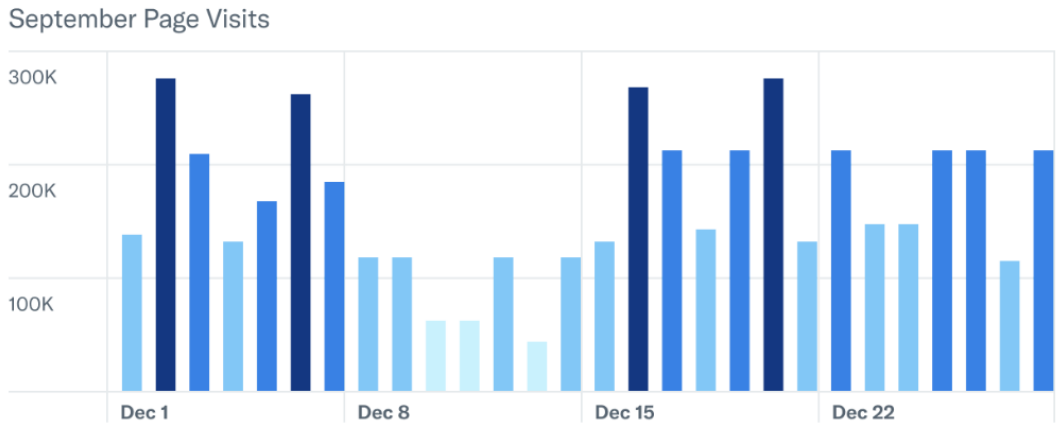
2

1. Adobe. “Color System”. 2024
https://spectrum.adobe.com/page/color-system/#Color-semantics

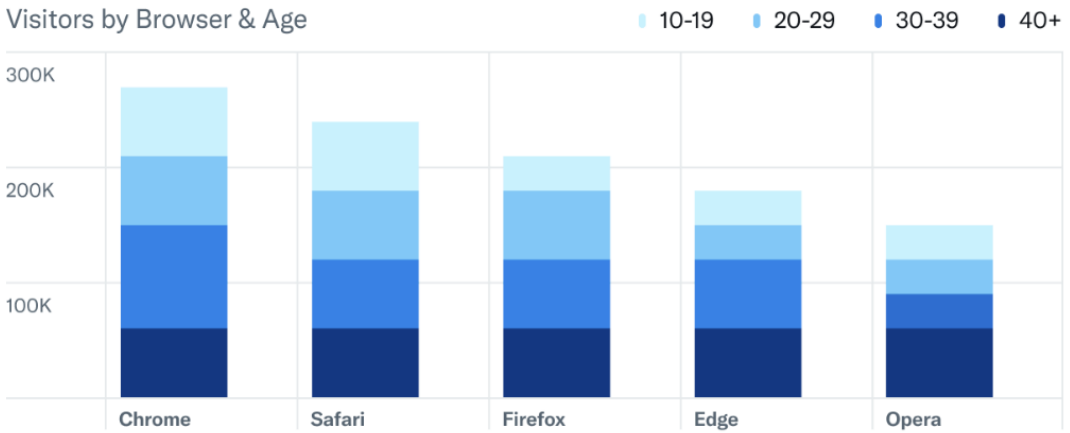
2. “Analogous & Complementary Colors - What's the difference and how do I use them in my Graphic Designs?”. Print Peppermint. 2019.
https://printpeppermint.com/blogs/graphic-design/analogous-complementary-colors-whats-the-difference-and-how-do-i-use-them-in-my-graphic-designs

Space

Sequential: The blue gradient is used to visualize increasing magnitude of visits over time



Sequential + Ordinal: The blue gradient is used to visualize increasing magnitude of age across multiple categories



Self created assets and documentation

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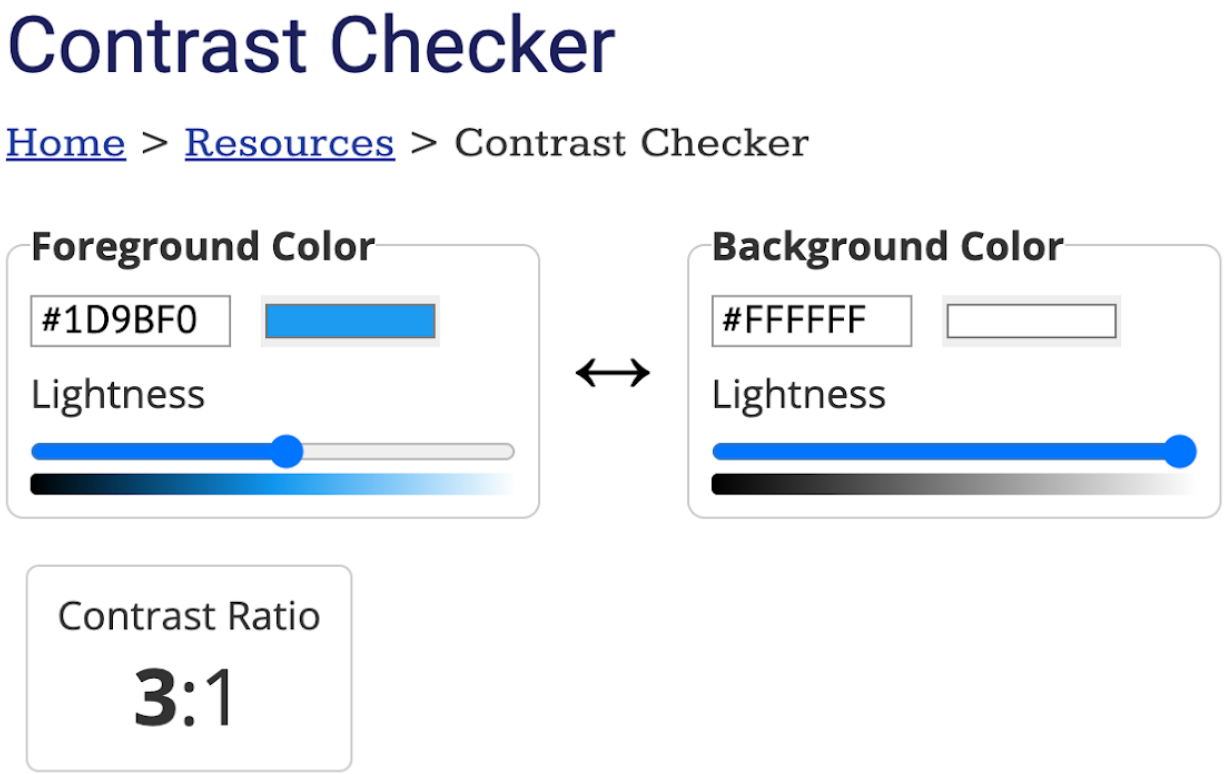
Accessibility



"Contrast Checker". WebAIM. 2024
https://webaim.org/resources/contrastchecker/

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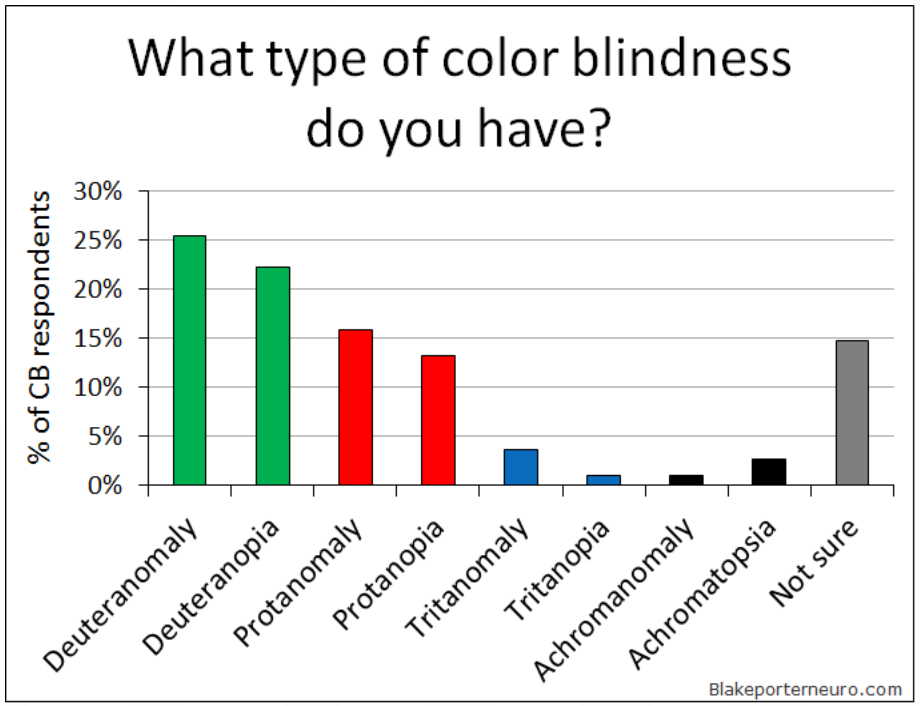
Accessibility



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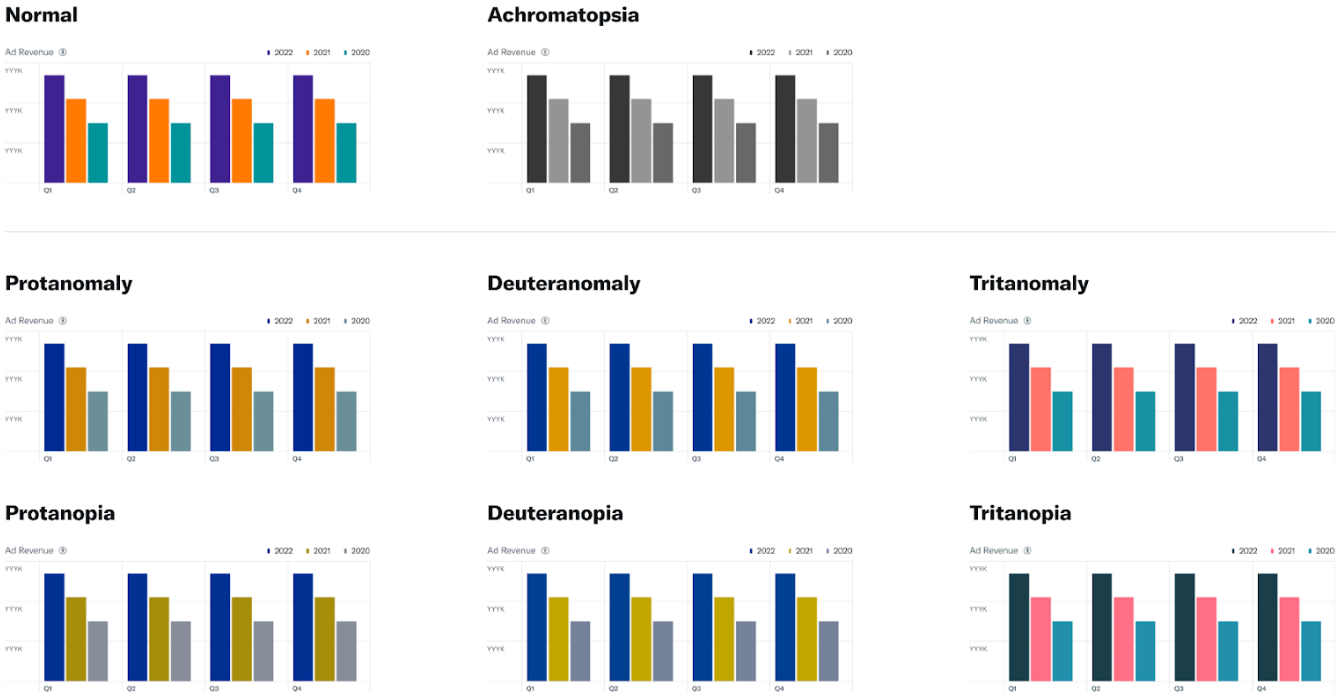

2

1. Dr. Blake Porter, Color Vision and the Efficacy of EnChroma Glasses
https://www.blakeporterneuro.com/color-vision-efficacy-enchroma-glasses/
2. Self created assets

Workshop

3 - 5 person per group

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Level 1 exercise: Comparing current room temperature and outside temperature

Step 1: Find out today's weather at www.weather.com or on your app

Step 2: Find out the room temperature

Step 3: Create a chart to show the difference between them. Be creative about it!

Level 2: Comparing 1 day by hour

Saturday, September 28

12:00 am	66°	Cloudy	1%	NNW 10 mph	
1:00 am	65°	Cloudy	1%	NNW 9 mph	
2:00 am	64°	Cloudy	1%	NNW 8 mph	
3:00 am	63°	Cloudy	2%	NNW 8 mph	
4:00 am	62°	Cloudy	3%	NNW 8 mph	
5:00 am	61°	Mostly Cloudy	4%	NNW 8 mph	
6:00 am	60°	Mostly Cloudy	4%	NNW 8 mph	
7:00 am	60°	Mostly Cloudy	4%	NNW 9 mph	
8:00 am	62°	Mostly Cloudy	3%	NNW 9 mph	
9:00 am	64°	Mostly Cloudy	2%	NNW 10 mph	
10:00 am	68°	Mostly Cloudy	1%	N 11 mph	
11:00 am	71°	Mostly Cloudy	0%	N 12 mph	
12:00 pm	74°	Mostly Cloudy	0%	NNW 13 mph	
1:00 pm	75°	Mostly Cloudy	0%	NNW 13 mph	
2:00 pm	77°	Mostly Cloudy	0%	N 13 mph	
3:00 pm	78°	Mostly Cloudy	0%	N 12 mph	
4:00 pm	78°	Mostly Cloudy	0%	N 12 mph	
5:00 pm	78°	Mostly Cloudy	0%	N 13 mph	
6:00 pm	78°	Mostly Cloudy	0%	N 12 mph	
7:00 pm	75°	Mostly Cloudy	0%	N 10 mph	
8:00 pm	73°	Partly Cloudy	1%	N 7 mph	
9:00 pm	72°	Partly Cloudy	1%	N 7 mph	
10:00 pm	71°	Partly Cloudy	1%	N 5 mph	
11:00 pm	69°	Partly Cloudy	1%	N 5 mph	

1. The Weather Channel
https://www.weather.com

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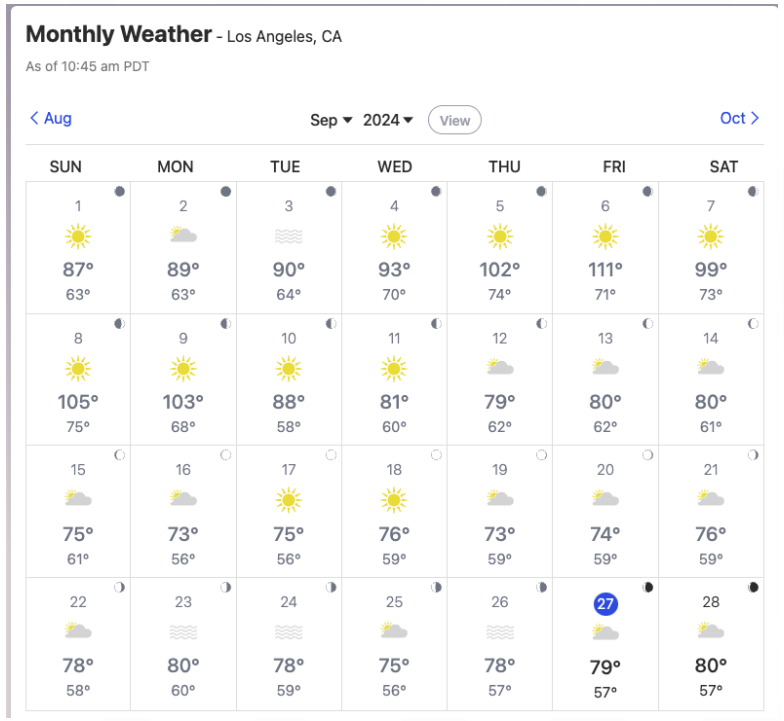
Level 3: Comparing September temperature for Los Angeles, Las Vegas and New York City

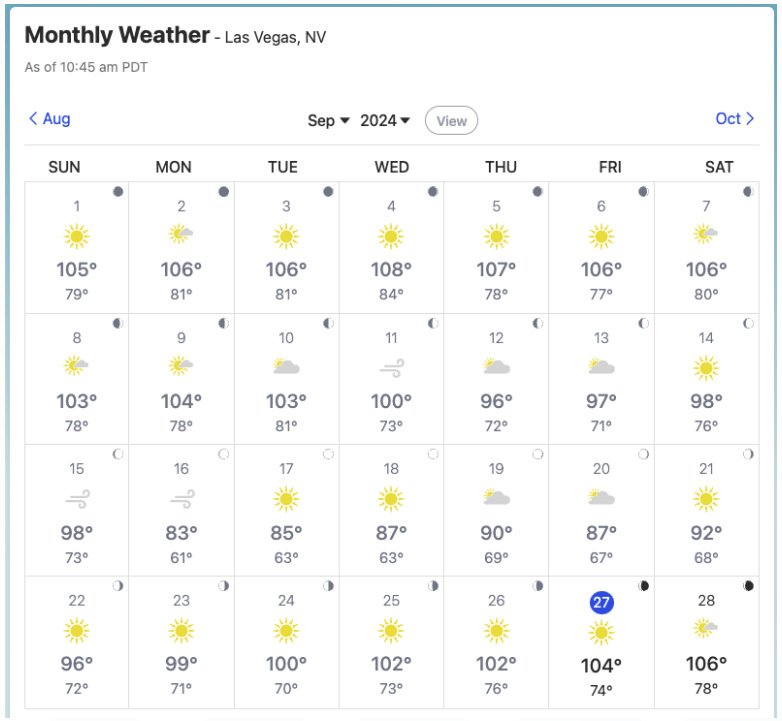


Monthly Weather - Los Angeles, CA

As of 10:45 am PDT

< Aug | Sep 2024 View | Oct >

SUN	MON	TUE	WED	THU	FRI	SAT
1 87° 63°	2 89° 63°	3 90° 64°	4 93° 70°	5 102° 74°	6 111° 71°	7 99° 73°
8 105° 75°	9 103° 68°	10 88° 58°	11 81° 60°	12 79° 62°	13 80° 62°	14 80° 61°
15 75° 61°	16 73° 56°	17 75° 56°	18 76° 59°	19 73° 59°	20 74° 59°	21 76° 59°
22 78° 58°	23 80° 60°	24 78° 59°	25 75° 56°	26 78° 57°	27 79° 57°	28 80° 57°

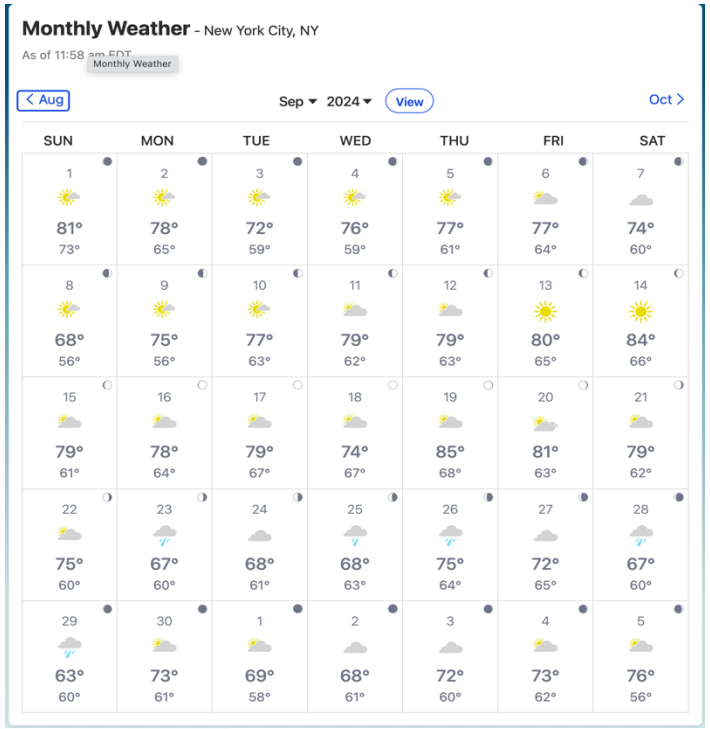


Monthly Weather - Las Vegas, NV

As of 10:45 am PDT

< Aug | Sep 2024 View | Oct >

SUN	MON	TUE	WED	THU	FRI	SAT
1 105° 79°	2 106° 81°	3 106° 81°	4 108° 84°	5 107° 78°	6 106° 77°	7 106° 80°
8 103° 78°	9 104° 78°	10 103° 81°	11 100° 73°	12 96° 72°	13 97° 71°	14 98° 76°
15 98° 73°	16 83° 61°	17 85° 63°	18 87° 63°	19 90° 69°	20 87° 67°	21 92° 68°
22 96° 72°	23 99° 71°	24 100° 70°	25 102° 73°	26 102° 76°	27 104° 74°	28 106° 78°



Monthly Weather - New York City, NY

As of 11:58 am EDT

Monthly Weather

< Aug | Sep 2024 View | Oct >

SUN	MON	TUE	WED	THU	FRI	SAT
1 81° 73°	2 78° 65°	3 72° 59°	4 76° 59°	5 77° 61°	6 77° 64°	7 74° 60°
8 68° 56°	9 75° 56°	10 77° 63°	11 79° 62°	12 79° 63°	13 80° 65°	14 84° 66°
15 79° 61°	16 78° 64°	17 79° 67°	18 74° 67°	19 85° 68°	20 81° 63°	21 79° 62°
22 75° 60°	23 67° 60°	24 68° 61°	25 68° 63°	26 75° 64°	27 72° 65°	28 67° 60°
29 63° 60°	30 73° 61°	1 69° 58°	2 68° 61°	3 72° 60°	4 73° 62°	5 76° 56°

1. The Weather Channel
https://www.weather.com

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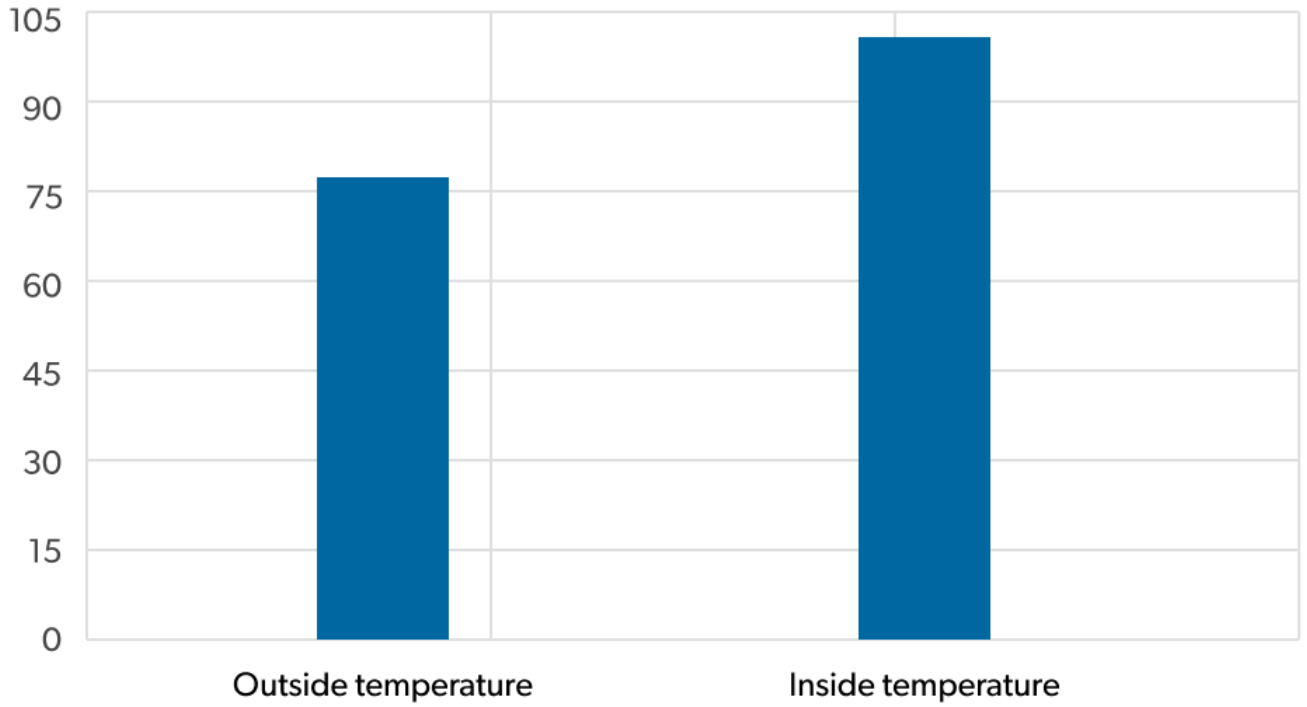
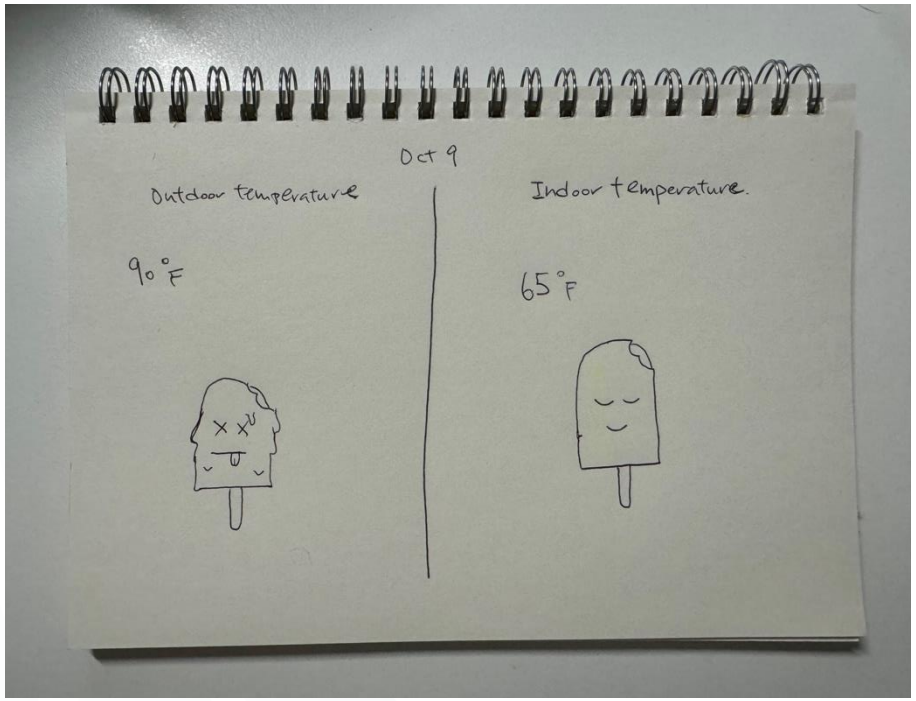
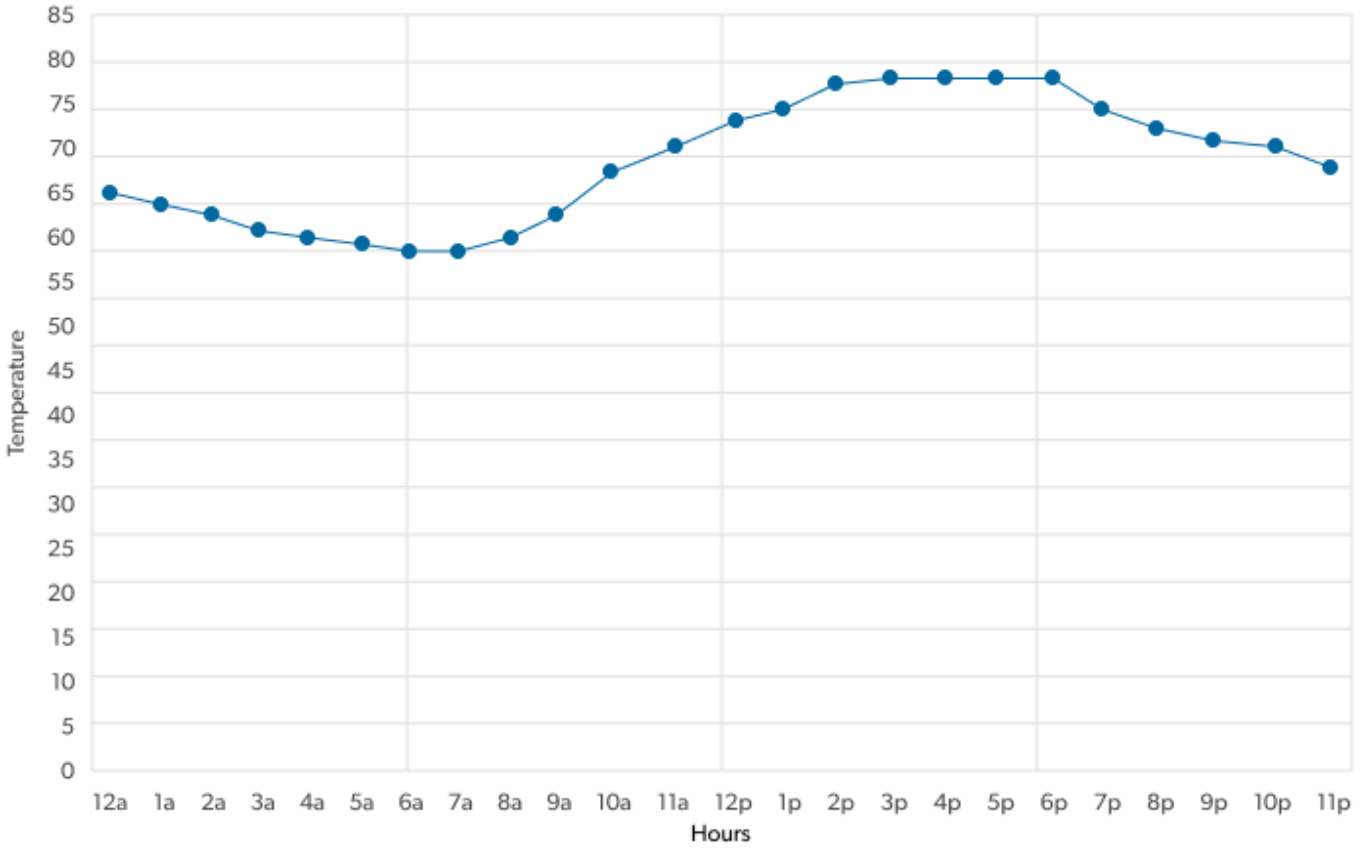
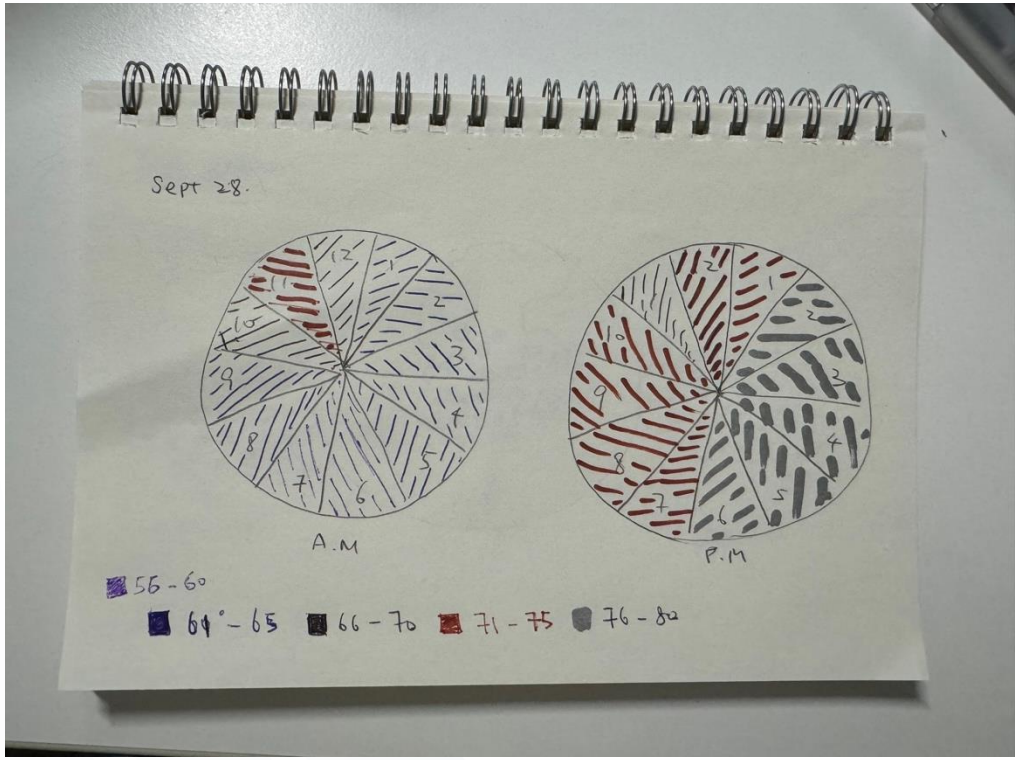
Level 1 – Our version, classic data viz





Level 2 – Our version, classic data viz





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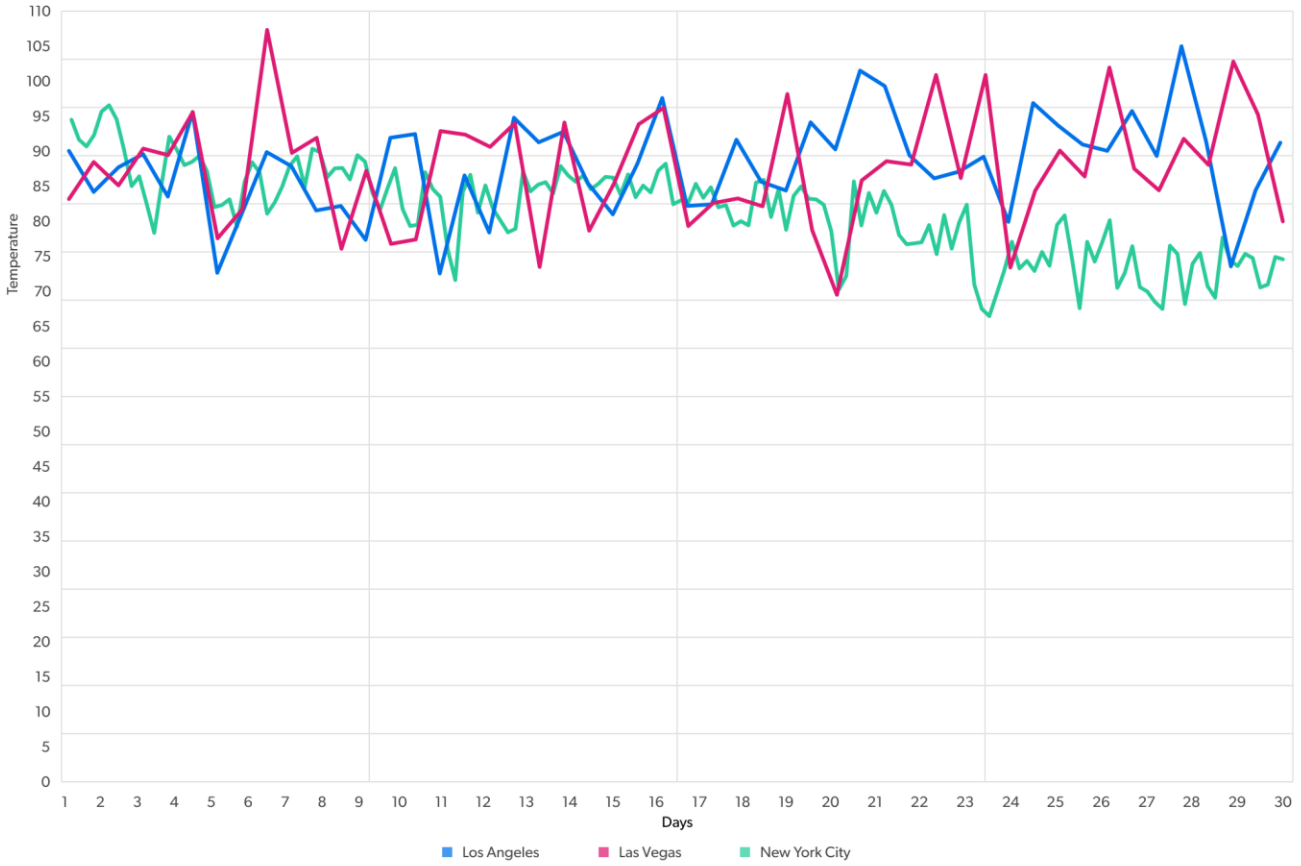
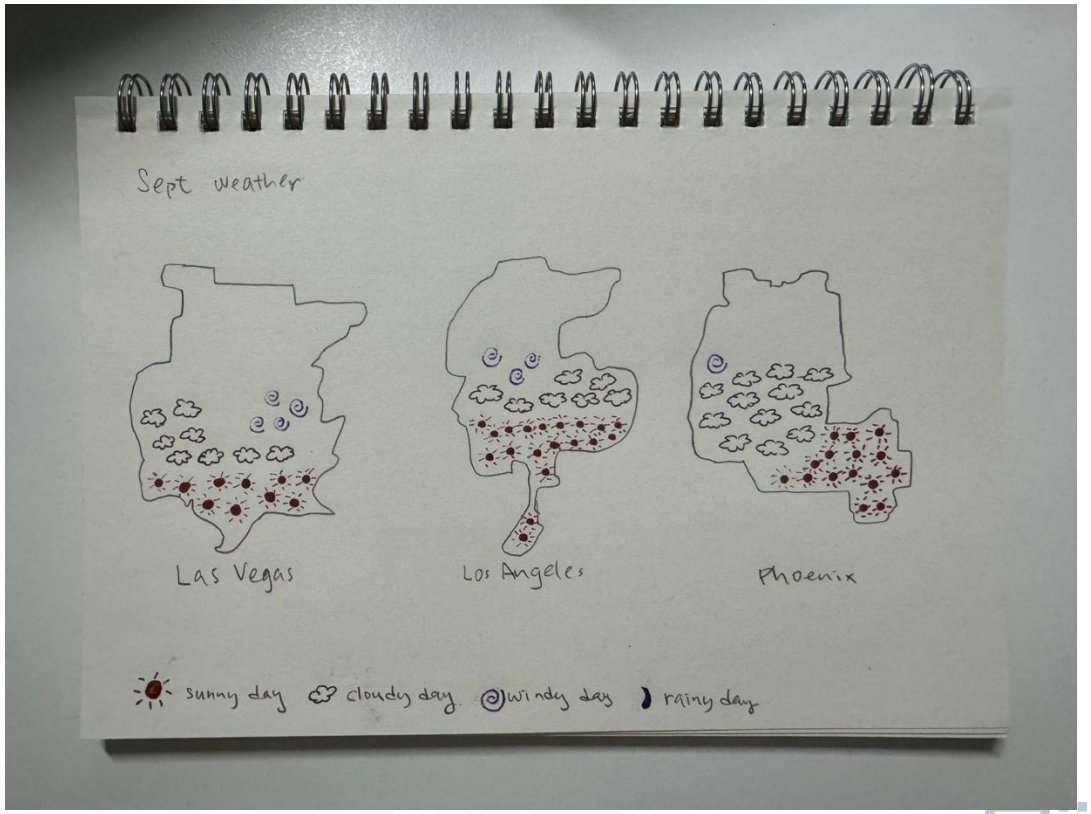
Level 3: September temperature for LA, Las Vegas and New York City





Best practices

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Approaching data viz

Who is your user?

Why do you need this?

How are you doing it?

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Best practices overview

Define the purpose and audience

Think critically about the data: Narrow or broaden based on needs

Choose the right type of visualization- based on the story you want to tell

Keep it simple- Focus on essential data, use color wisely, and keep accessibility in mind

Label and scale clearly, highlighting key insights or trends

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1. Define the audience and purpose

Audience

Who is your user, and what is their goal?

Can the user quickly view the information they need?

Purpose

Why do you need this? Does the visualization serve the story or experience?

Write acceptance criteria for every visualization

Best practice

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2. Think critically about the data

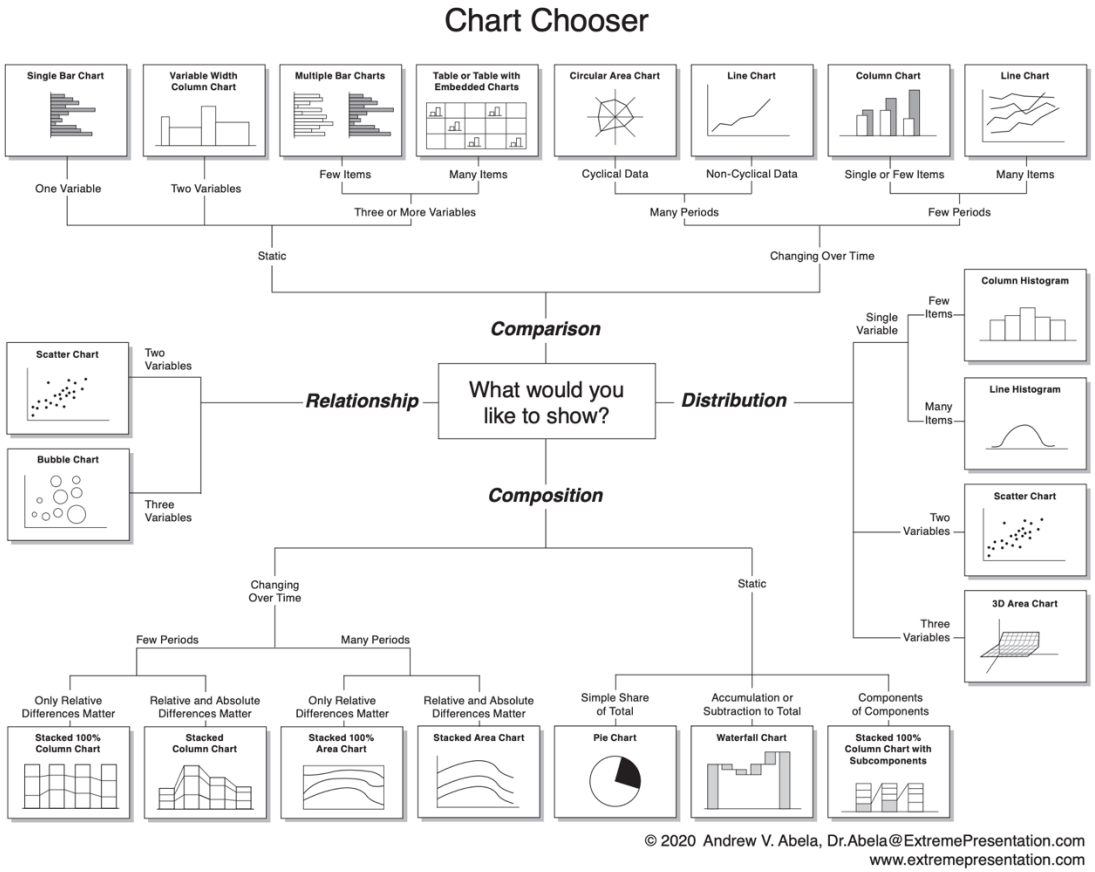
- Narrow or broaden based on user's needs
- Does the visualization add to or detract from the overall story and theme of the project?
- Beware of manipulating the data visualization to meet a certain narrative

3. Choose the right type of visualization

What is the story you would like to tell, what do you want to show?

You can use sources such as :

- Charts Extreme Presentation (left)
- The Data Visualization Catalogue



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Data viz catalogue (example)

Source: https://datavizcatalogue.com/search.html

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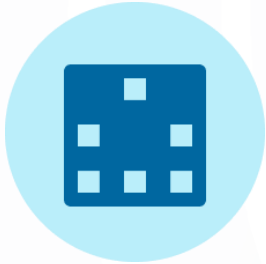
Basic data visualization types

Bar charts - compare quantities across categories

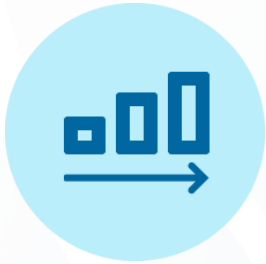
Line charts - compare quantities over time

Pie charts – comparing parts to the whole

Scatter plots- for correlations between variables



Heatmaps - showing data density or intensity



Histograms - displaying distribution of data

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4. Keep it simple

- Focus on essential data, be deliberate
- Use color wisely- too much color can distract from your point
- Keep accessibility in mind- accompany shapes and color with text
- Typography and information hierarchy should be used to emphasize clarity

5. Ensure accuracy and provide context

- Label clearly- Units and axes should be quickly understood
- Scale clearly- Avoid truncating or exaggerating the data
- Highlight key insights or trends

Looking ahead

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Looking ahead: Gen AI and data

- Use Gen AI as a design companion: Allows you to broaden or narrow your focus on the data you're working with.
- Simplifies data complexity transforming complex datasets into graphical representations
- Automates the analysis and interpretation of data – Can provide hidden patterns and facilitates a quicker analysis

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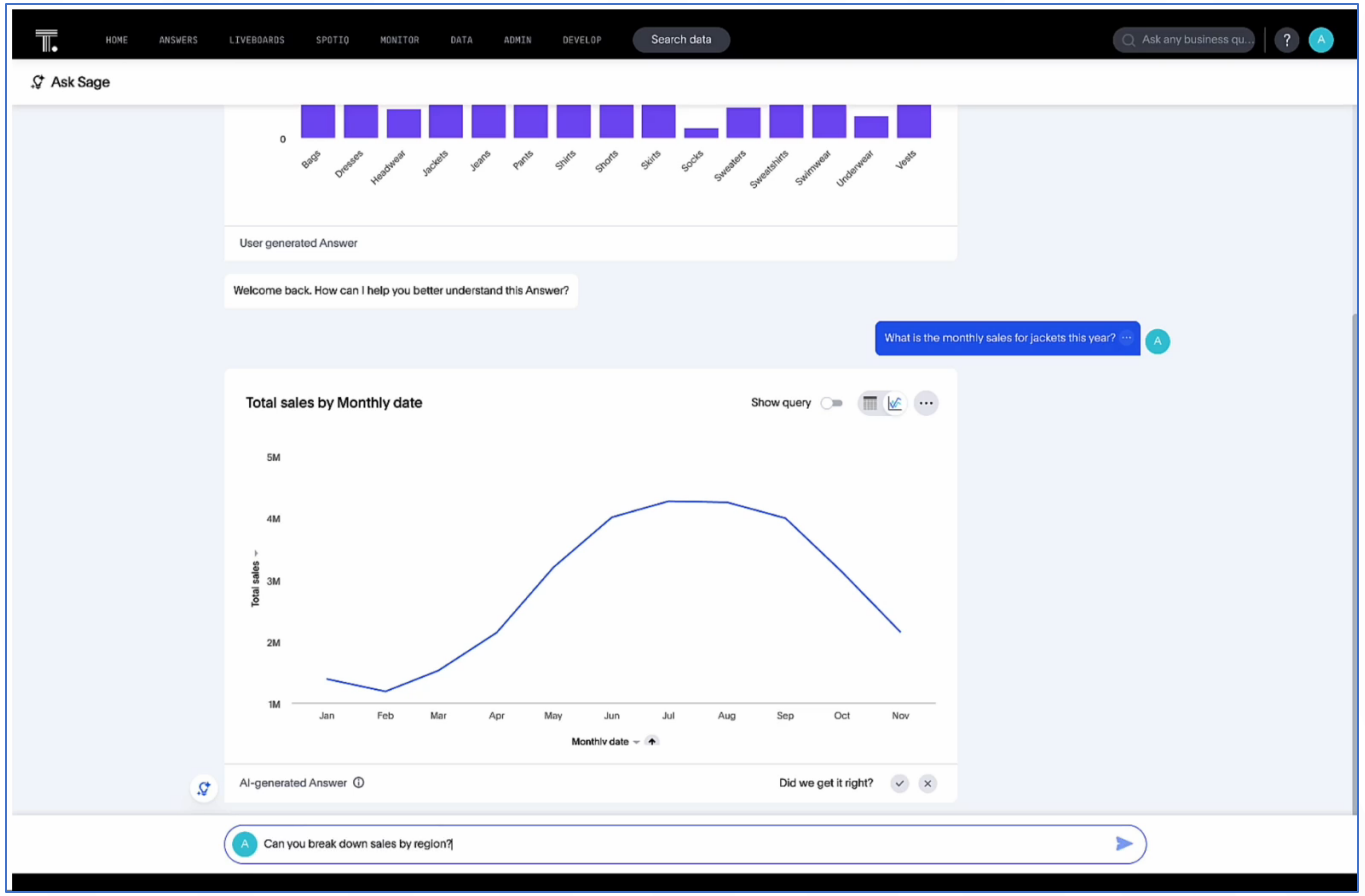
AI tool for data visualization



- Sage AI from Thoughtspot (shown here)
- Chart GPT
- Tableau AI

Source: Sage ai, from Thoughtspot

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Looking ahead: Explore more

Websites to explore on your own or with your teams, with coded data visualizations:

- Chart JS
- D3
- Google Charts

We’re here as a resource, feel free to reach out to us via email. You can also request this deck.

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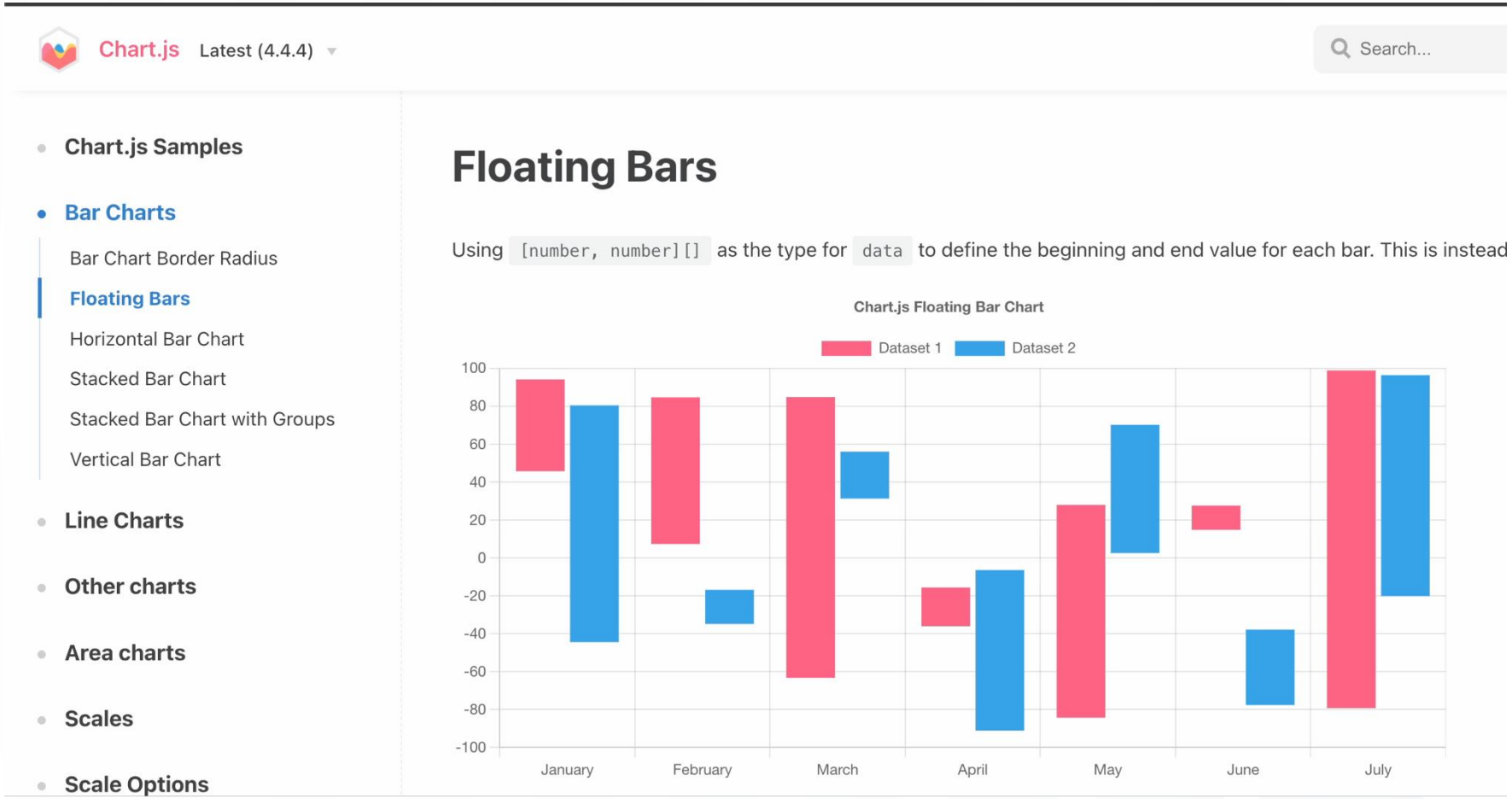
Chart JS



Source: https://www.chartjs.org/

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D3

D3
Bring your data to life.

Fork

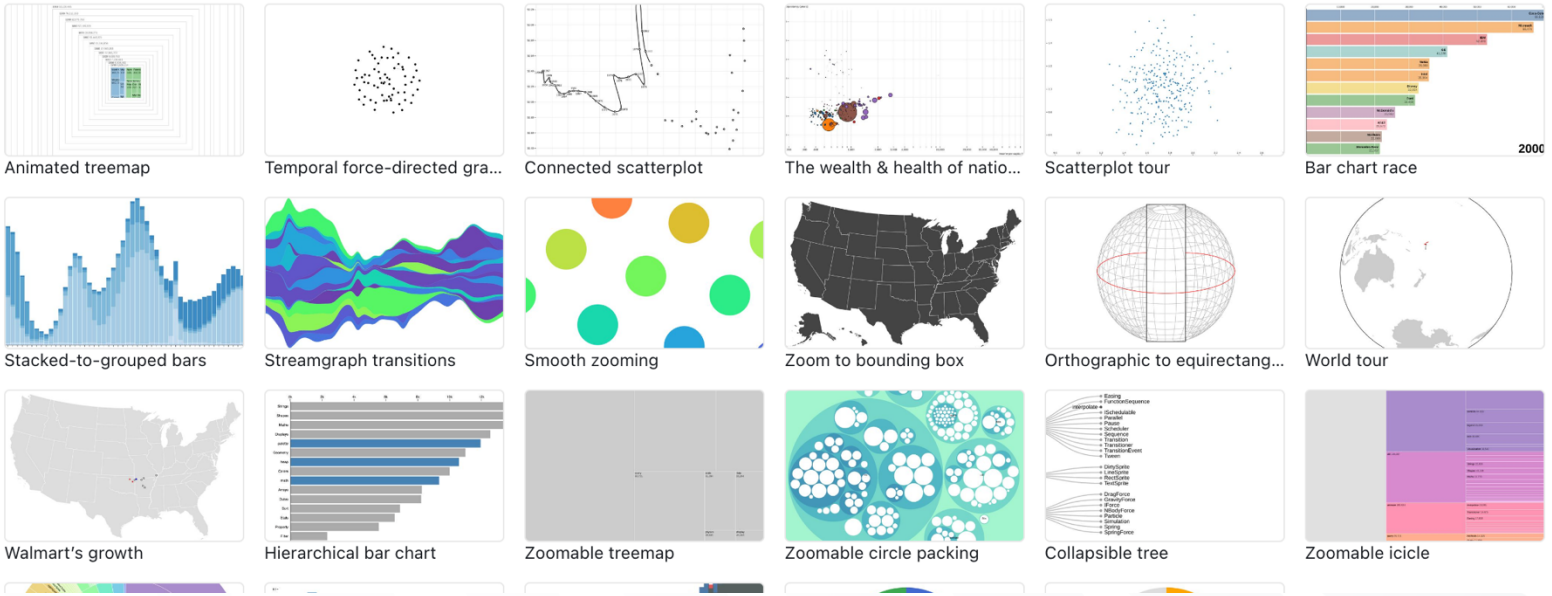
Public · 2 collections · By Mike Bostock · Edited Oct 1 · Paused · ISC · 184 forks · Importers · 928 stars

D3 gallery

Looking for a good D3 example? Here's a few (okay, 171…) to peruse.

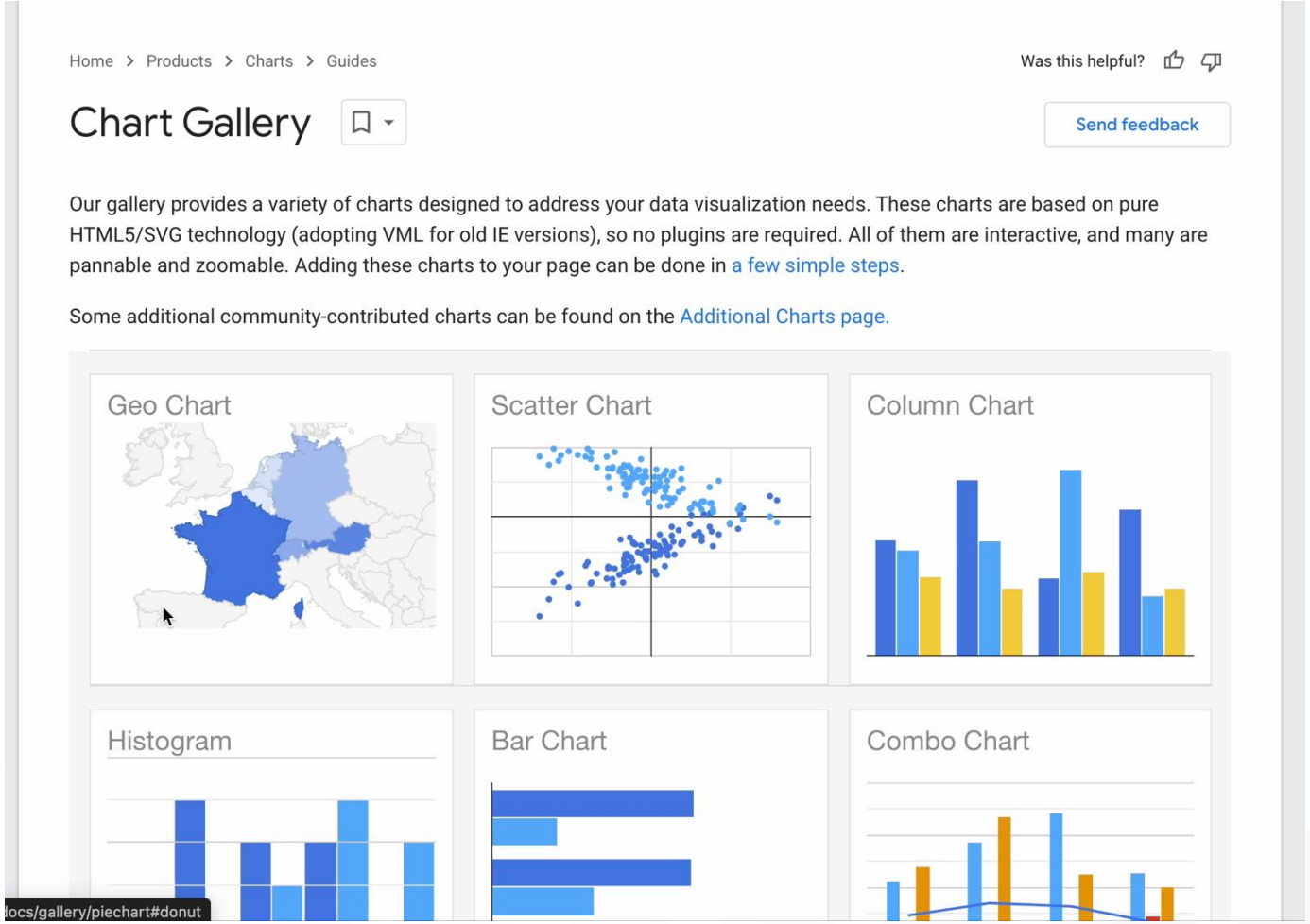
Animation

D3's data join, interpolators, and easings enable flexible animated transitions between views while preserving object constancy.



Source:
https://observablehq.com/@d3/gallery?utm_source=d3js-org&utm_medium=hero&utm_campaign=try-observable

Google charts



Source: https://developers.google.com/chart/interactive/docs/gallery

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Thank you!

Reach out if you have any questions!

- Tracy.ruggles@samsclub.com
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- Agustina.leskethorpe@samsclub.com
- Heidi.Ng@samsclub.com
- Candy.avila.baca@samsclub.com

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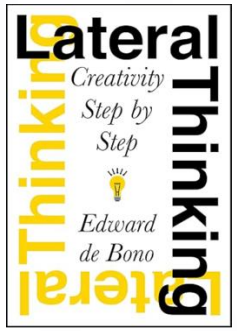
Thinking is a skill

Lateral thinking: think beyond the obvious

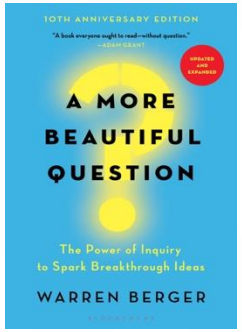
- Break out of traditional patterns and explore alternative perspectives
- Use creative techniques to generate fresh ideas



Lateral Thinking:
Creativity Step by Step
by Edward de Bono

Inquiry: ask the more beautiful question

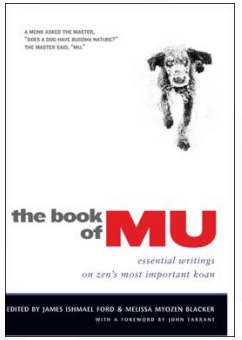
- Questions map the future
- Frame questions to challenge assumptions and spark curiosity
- Seek questions that open new pathways



A More Beautiful Question
by Warren Berger

Joshu's Mu: accept ambiguity and un-ask the question

- Recognize that not all problems have clear and logical solutions
- Ride uncertainty as a way to explore and find new insights



The Book of MU: Essential Writings on Zen's Most Important Koan edited by James Ford & Melissa Blacker

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Data viz in agile methodologies

“As a (type of user), I want (goal/desire) so that (benefit and value).”

- Are you writing acceptance criteria for your visualizations?
- Does the visualization add to or detract from the overall story and theme of the project?
- What business processes does your work participate in?
- Where are the decision made, who is making them, when do they make them?
- Do they have all the data they need?
- Can they see what is important to see?
- How does the experience assist them in their function within the larger context of the business?