

PLAN 590

February 7, 2025

Communicating with data

Week 4

Climate change is happening now in all regions of the US

Annual Temperature



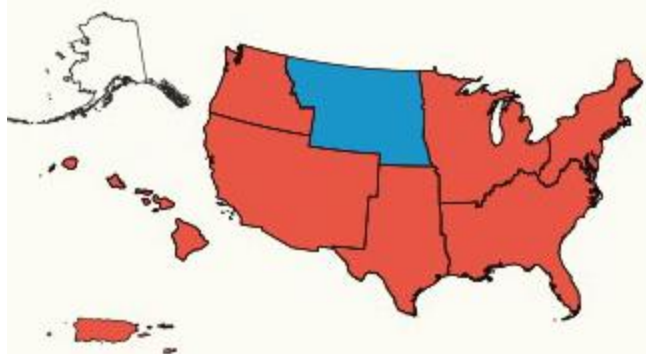
Annual Precipitation



Sea Level



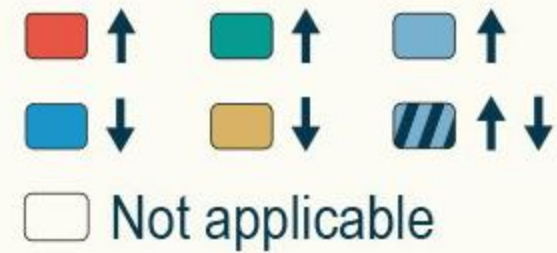
Warm Nights



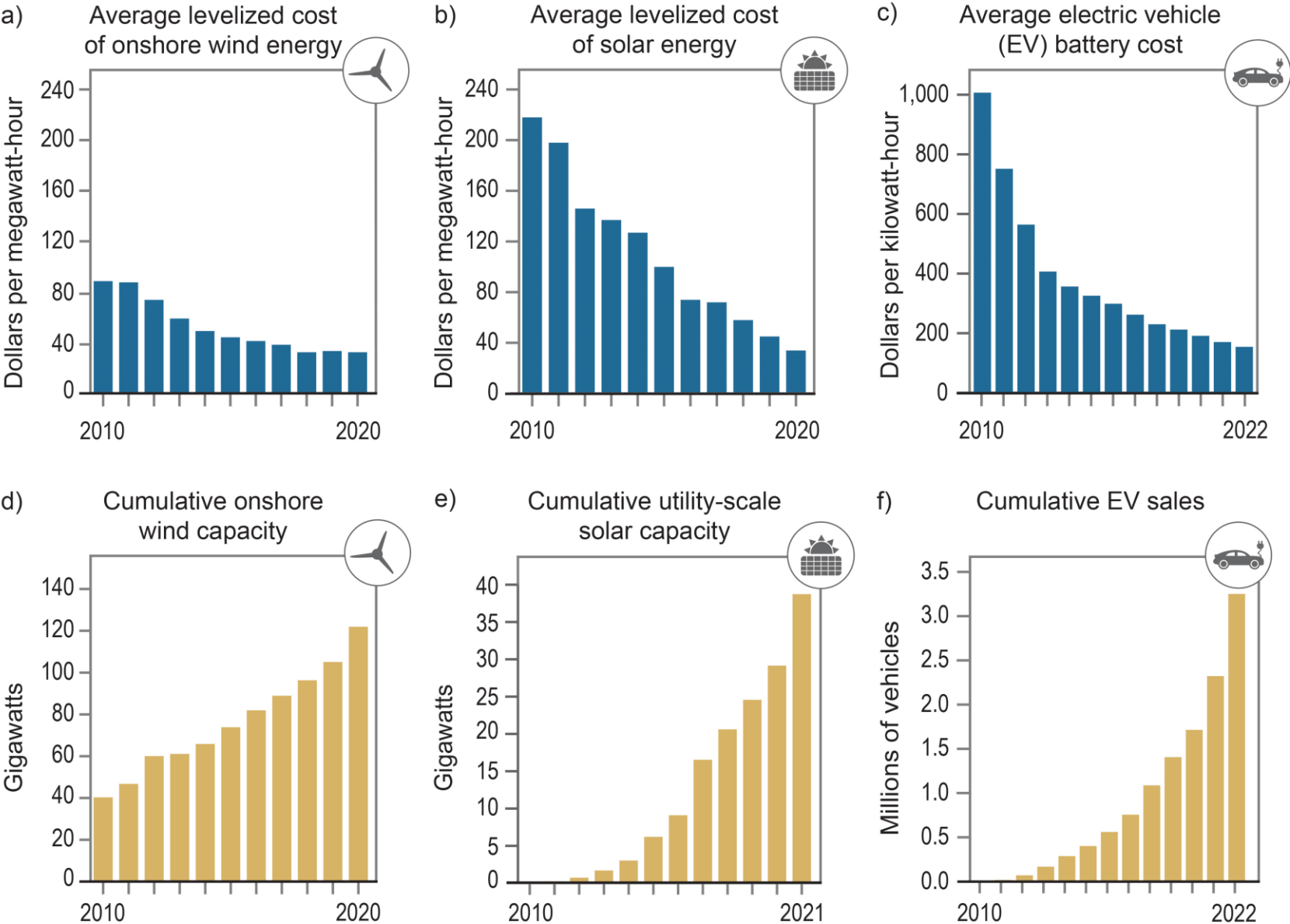
Heavy Precipitation



Direction of Change



Historical Trends in Costs and Capacity of Low-Carbon Energy Technologies in the United States



Source: National Climate Assessment

Schedule

Day 1: January 17

- Setting goals for your data visualizations
- Defining your audience
- Visual Processing & Cognitive Load
- How to choose the right visualization for your data (chart bootcamp)

Day 3: January 31

- Plain language: What it is, why it's important, and how to use it
- Writing about numbers
- What makes a compelling data story
- Mapping your data characters

Day 2: January 24

- XRAY discussion
- Data Visualization Research: What Works
- Enough color theory to get by
- Better legends in your data visualization
- Titles, annotations, and other texts
- “Fix my chart” exercise

Day 4: February 7

- Accessibility in data visualization
- Equity in data visualization
- Data visualization in the workplace
- Workshop time for memos

Final Memo

Choose an analytical topic and write a memo for a data stakeholder (e.g., a colleague, client, or elected official). Your memo should include:

1. **The question or problem** you are addressing.
2. **Your data sources** and the approach you used to analyze the data.
3. **Your findings** and any potential limitations.

Due Date: February 21

Word Limit: No more than 2,500 words.

Use as many charts or visuals as needed, but only include those essential to telling your data story.

Plain Language

Public Law 111–274
111th Congress

An Act

To enhance citizen access to Government information and services by establishing that Government documents issued to the public must be written clearly, and for other purposes.

Oct. 13, 2010
[H.R. 946]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

Plain Writing Act
of 2010.
5 USC 301 note.

SECTION 1. SHORT TITLE.

This Act may be cited as the “Plain Writing Act of 2010”.

SEC. 2. PURPOSE.

5 USC 301 note.

The purpose of this Act is to improve the effectiveness and accountability of Federal agencies to the public by promoting clear Government communication that the public can understand and use.

SEC. 3. DEFINITIONS.

In this Act:

- (1) AGENCY.—The term “agency” means an Executive agency, as defined under section 105 of title 5, United States Code.
- (2) COVERED DOCUMENT.—The term “covered document”—
 - (A) means any document that—
 - (i) is necessary for obtaining any Federal Government benefit or service or filing taxes;
 - (ii) provides information about any Federal Government benefit or service; or
 - (iii) explains to the public how to comply with a requirement the Federal Government administers or enforces;
 - (B) includes (whether in paper or electronic form) a letter, publication, form, notice, or instruction; and
 - (C) does not include a regulation.
- (3) PLAIN WRITING.—The term “plain writing” means writing that is clear, concise, well-organized, and follows other best practices appropriate to the subject or field and intended audience.

The easiest way to use plain language
is to **write like you talk.**

Use simple words and phrases

Don't turn verbs into nouns

To trace the missing payment, we need to carry out a review of the Agency's accounts so we can gain an understanding of the reason the error occurred.

If you cannot make the payment of the \$100 fee, you must make an application in writing before you file your tax return.

This means we must undertake the calculation of new figures for the congressional hearing.

The production of accurate statistics is important for the committee in the assessment of our homelessness policy.

Avoid hidden verbs

<p>To trace the missing payment, we need to carry out a review of the Agency's accounts so we can gain an understanding of the reason the error occurred.</p>	<p>To trace the missing payment, we need to review the Agency's accounts so we understand the reason the error occurred.</p>
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<p>The production of accurate statistics is important for the committee in the assessment of our homelessness policy.</p>	<p>Producing accurate statistics is important to the committee in assessing our policy on homelessness.</p>

Use active voice

✗ Passive voice	✓ Active voice
The lake was polluted by the company.	The company polluted the lake.
New regulations were proposed.	We proposed new regulations.
The following information must be included in the application for it to be considered complete.	You must include the following information in your application.
Bonds will be withheld in cases of non-compliance with all permits and conditions.	We will withhold your bond if you don't comply with all permit terms and conditions.
The permit must be approved by the agency's state office.	Our state office must approve your permit.

Add useful headings

Question headings

Question headings are useful if you know what questions your audience will ask. Most people come to government documents with questions. If you know those questions, use them as headings. They will help the audience find the information they are looking for quickly. Using the question-and-answer format helps your audience scan the document and find specific information.

Example:

Why do we use headings?

Use lists

✗ Before

Each completed well drilling application must contain a detailed statement including the following information: the depth of the well, the casing and cementing program, the circulation media (mud, air, foam, etc.), the expected depth and thickness of fresh water zones, and well site layout and design.

✓ After

With your application for a drilling permit, provide the following information:

- Depth of the well
- Casing and cementing program
- Circulation media (mud, air, form, etc.)
- Expected depth and thickness of fresh water zones
- Well site layout and design

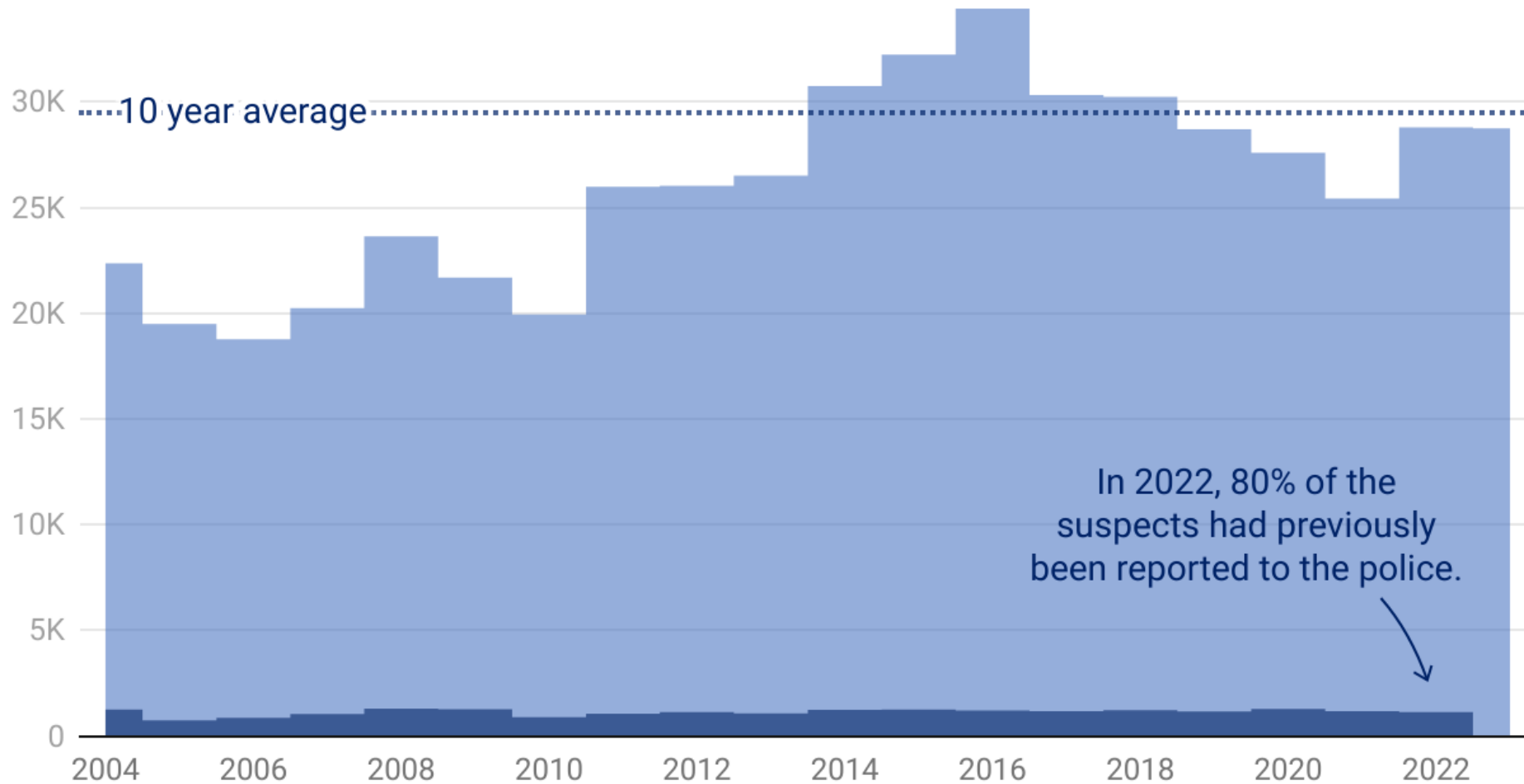
Tip: Statement + Evidence

Despite substantial job growth, housing construction in Jacksonville has lagged over the past decade.

According to Census estimates, Jacksonville permits the same number of units as Swansboro and North Topsail Beach, despite having more than ten times the population.

Berlin's Bike Theft Statistics

Only about 4-5% of Berlin's recorded bike theft cases get solved each year. The Berlin Police Department reports that bicycles are stolen particularly frequently in large parking areas, e.g. at train stations, in front of schools, sports and leisure facilities or in front of shopping centers.

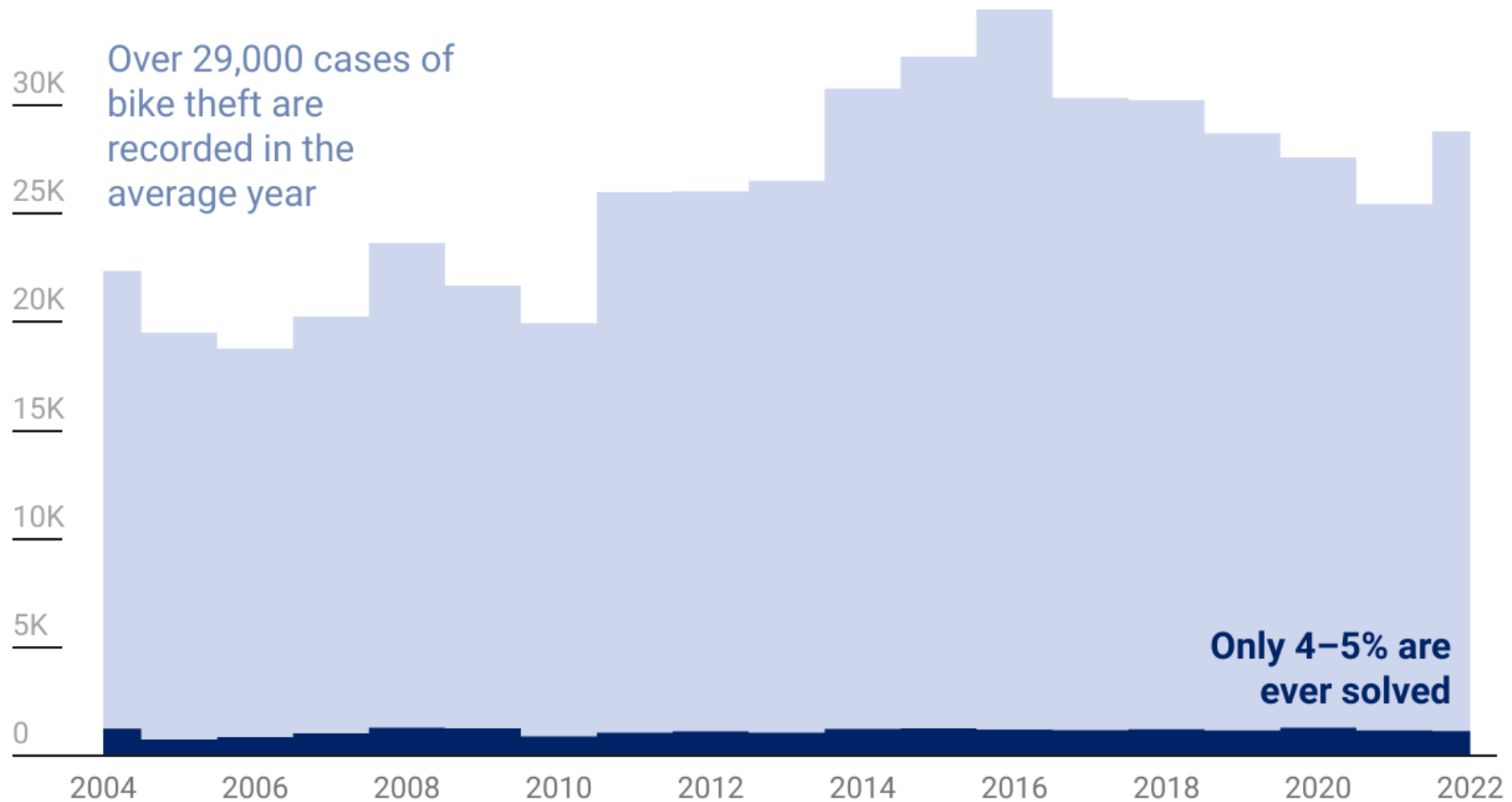


For more information on how to prevent bike thefts visit the website from the Berlin Police Department.

Source: Polizeiliche Kriminalstatistik Berlin • Created with Datawrapper

Berlin's unsolved bike thefts

Few thieves are caught immediately — in 2022, 80% of suspects had a prior police report.



Thefts are particularly frequent in large parking areas like those at train station, schools, or shopping centers. Read more in the [Berlin Police guide to preventing bike theft](#).

Source: Polizeiliche Kriminalstatistik Berlin • Created with Datawrapper

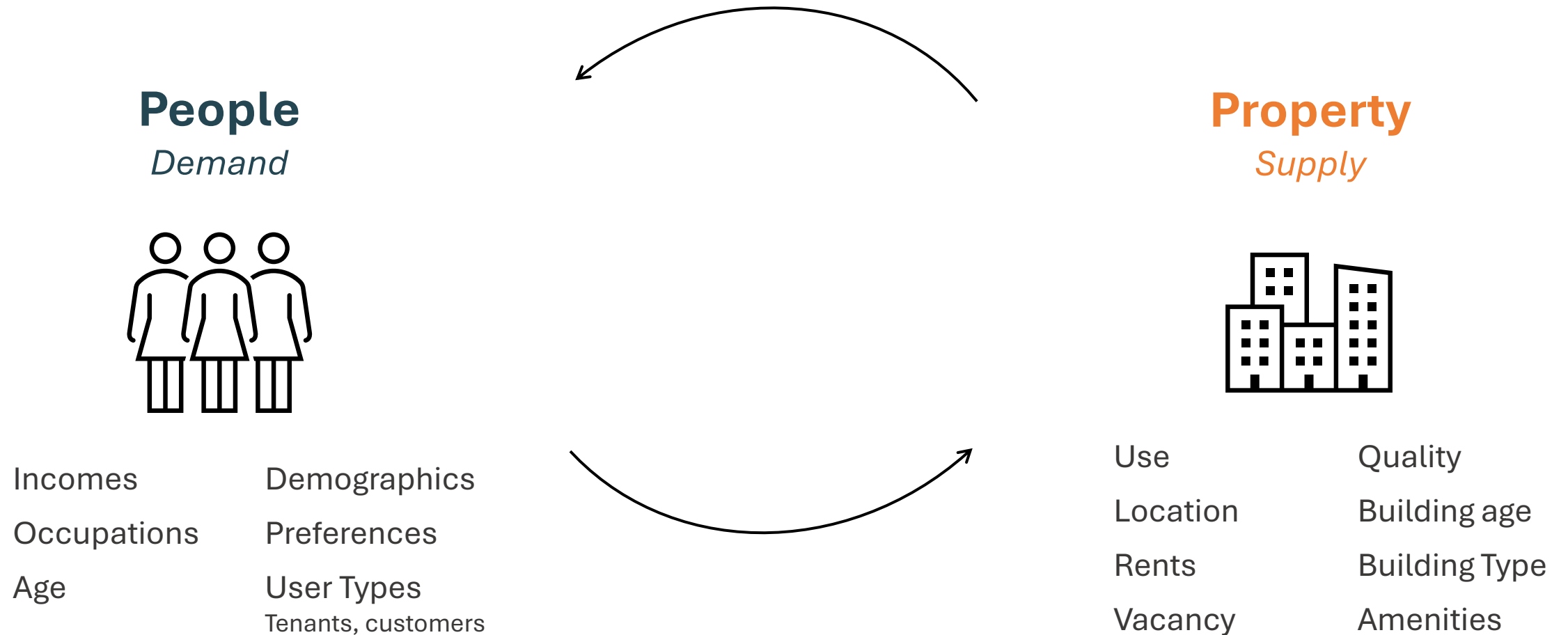
Writing about **markets**

An example

Market analysis fundamentals...

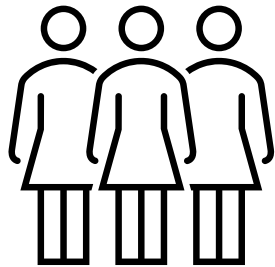


Real estate market analysis is about how **people** interact with **property**.



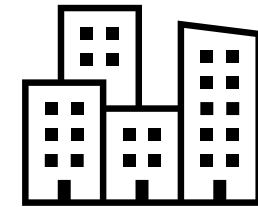
Real estate market analysis is about how **people** interact with **property**.

People
Demand



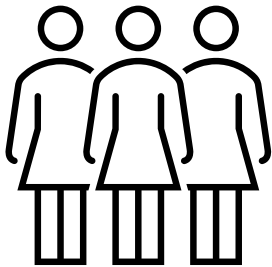
A third of **housing units are short-term rentals** and unavailable to **year-round renters**.

Property
Supply



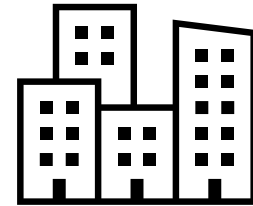
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People
Demand



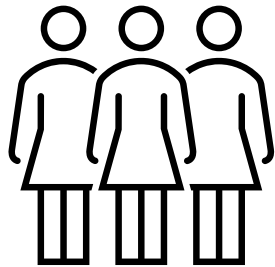
Every year, **shoppers spend** about \$300 million at **retail establishments outside of the market area.**

Property
Supply



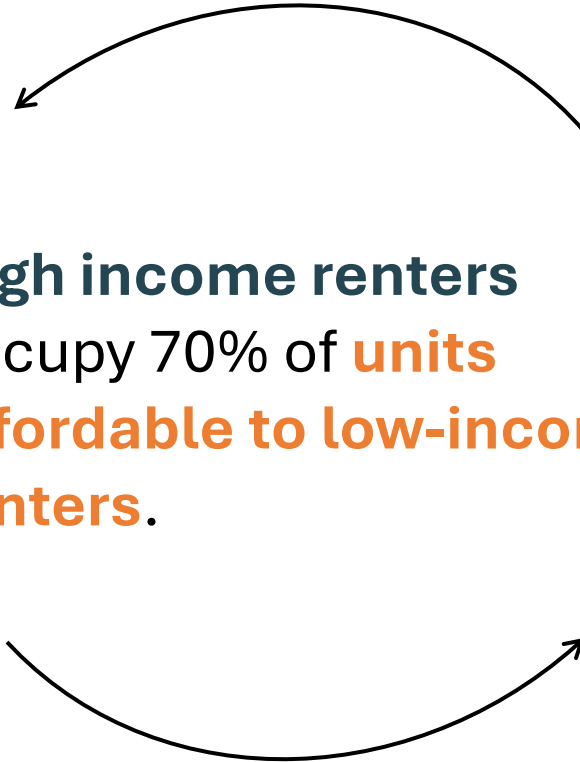
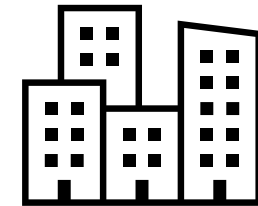
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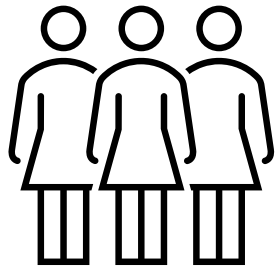
High income renters
occupy 70% of **units**
affordable to low-income
renters.

Property
Supply



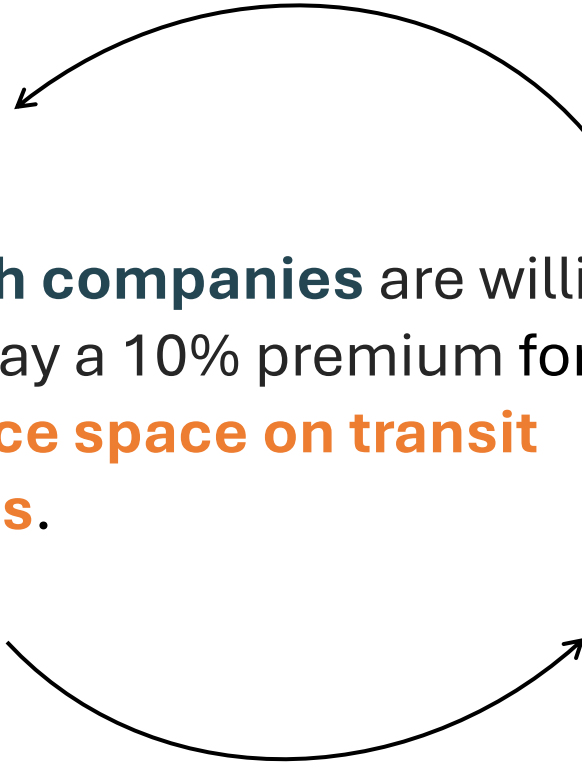
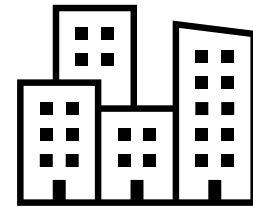
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People
Demand



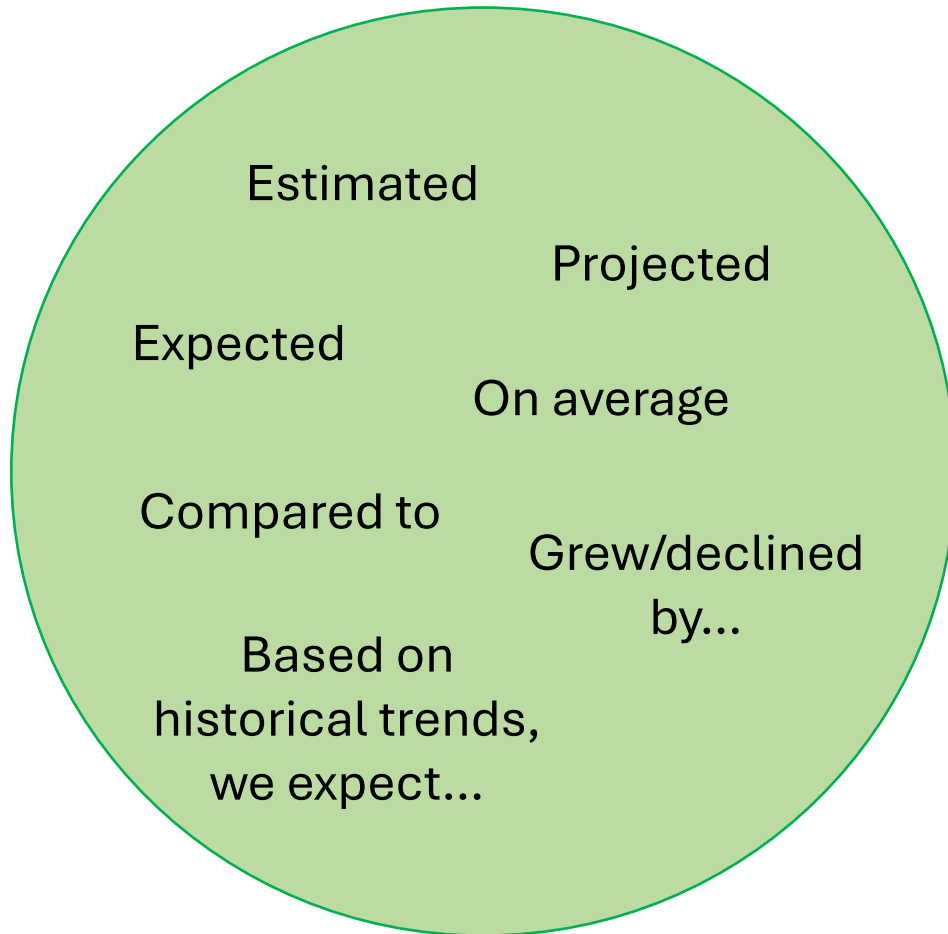
Tech companies are willing to pay a 10% premium for **office space on transit lines**.

Property
Supply

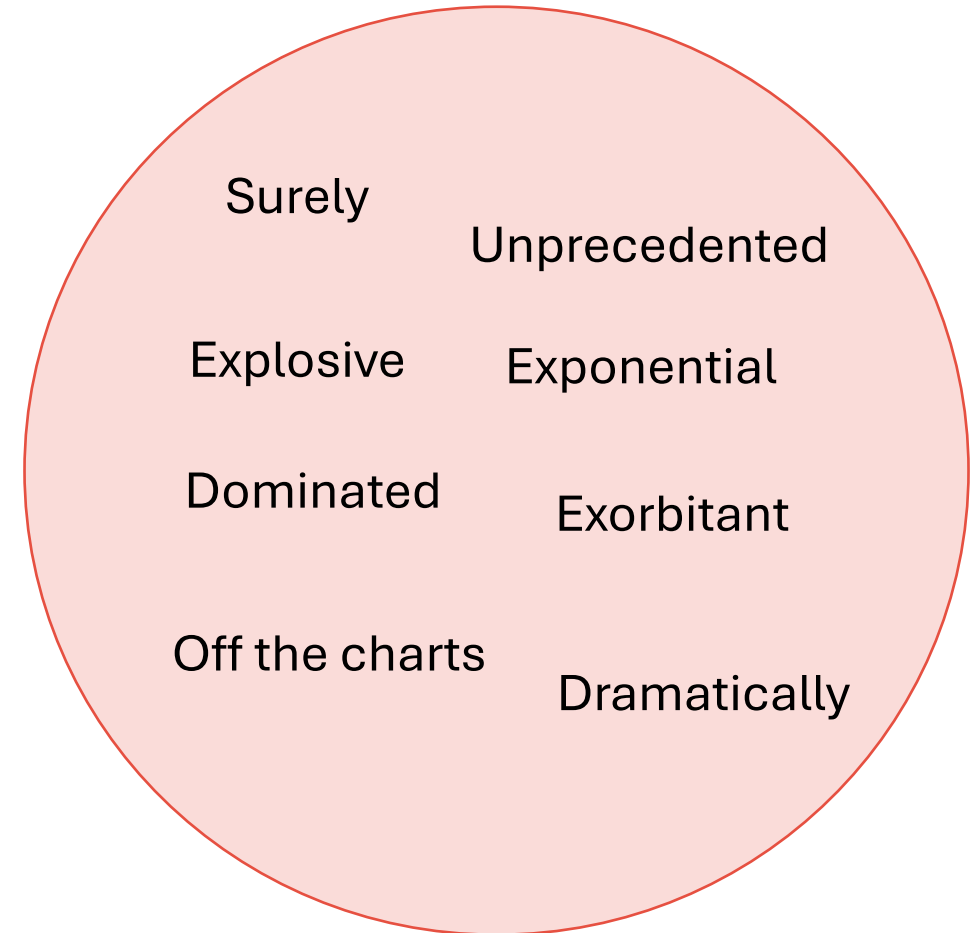
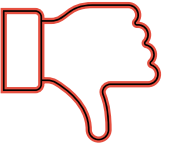


Effective market
communication must balance
uncertainty and **storytelling**.

Market analysis words

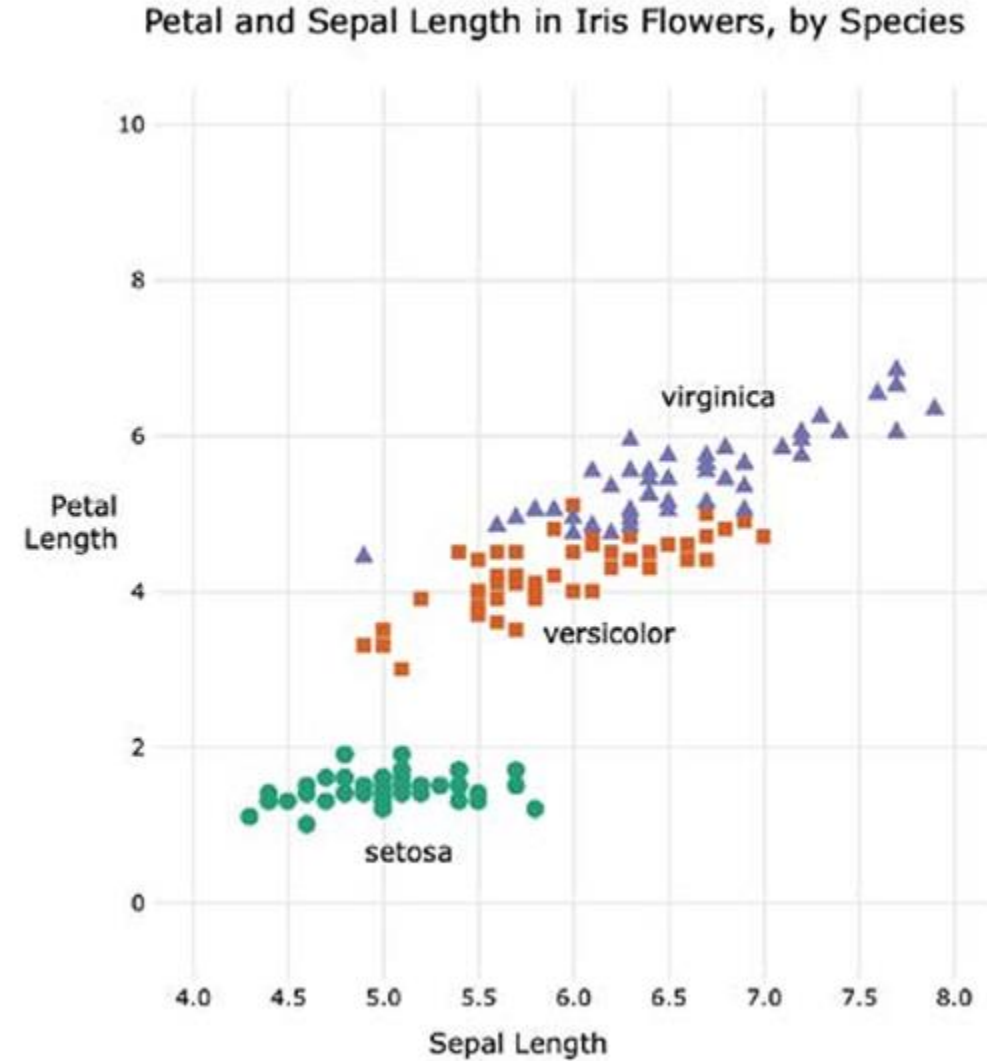
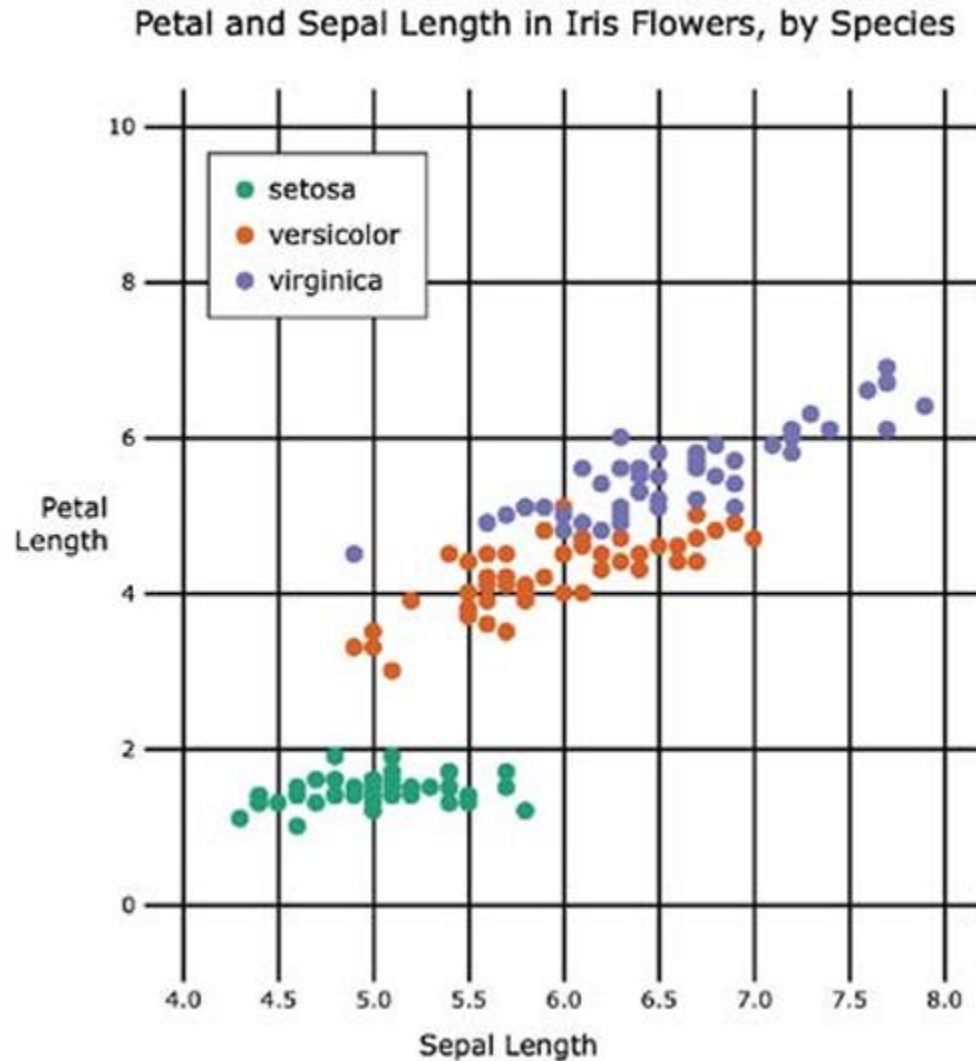


Used car salesman words



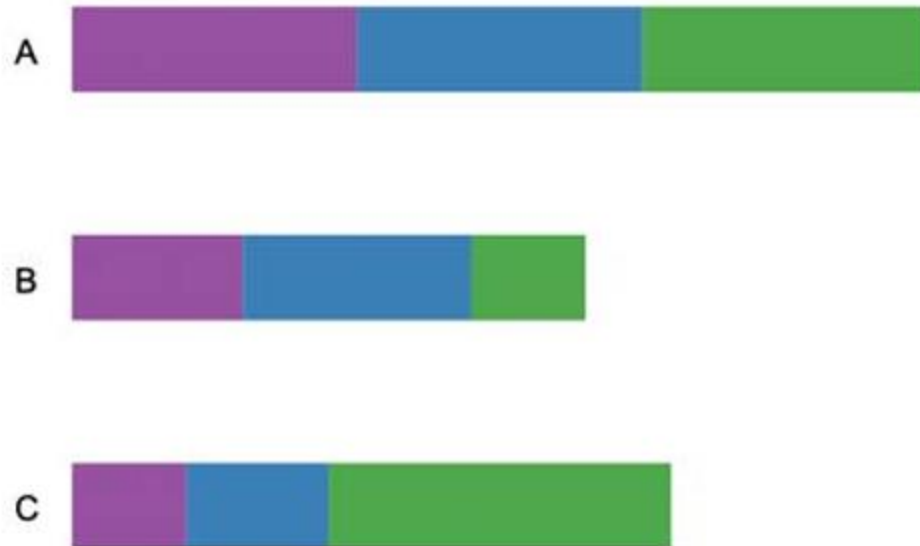
Accessibility in Data Visualization

Designing for cognitive load

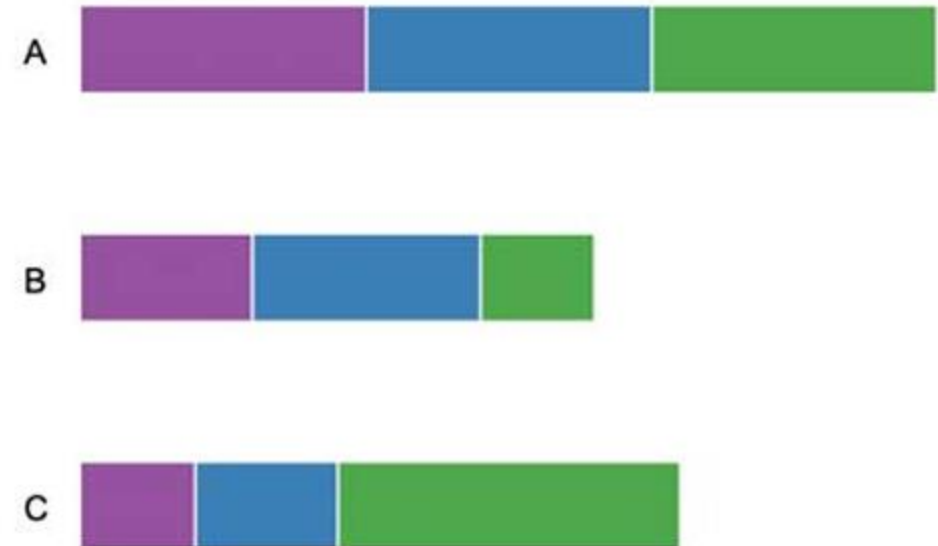


Designing for low vision

collapsed

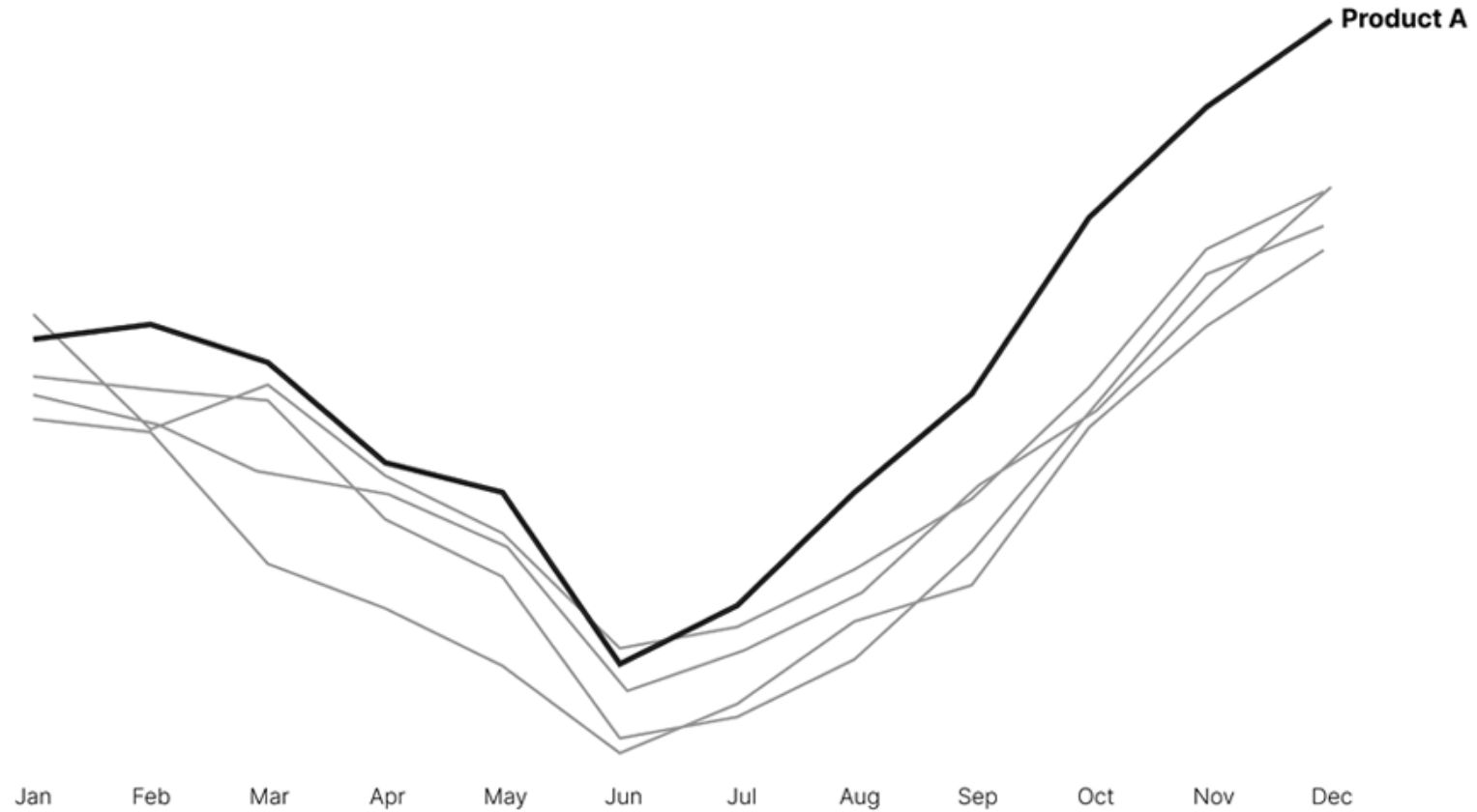


segment divider



Alt Text

Product Performance in 2021



Alt Text

1. **“Line chart.”** If this image appeared in the chart-picker interface of a tool like Excel or Tableau, the chart type is the only piece of information that matters.
2. **“A line chart with five lines, titled Product Performance in 2021.”** If the image appeared instead in a mockup made by a designer whose work is in progress, only the chart type and title would matter, because the data are made up and the design is likely to change.
3. **“Line chart. Product Performance in 2021. Product A is outperforming all other products.”**
In a presentation to a decisionmaker who wants to know which product is doing the best, both the data and design matter.
4. **“Line chart. Product Performance in 2021. All products trended down sharply from January until June and slowly stabilized back into positive territory by November.”** In a report to analysts who want to know about larger trends, the takeaways from the data are what matter most.
5. **“A minimalist, greyscale line chart with five lines titled Product Performance in 2021 using a full-width, bold-weight, sans serif typeface. Product A’s line is emphasized with a near-black charcoal color, thickened stroke, and direct label at its end. All other lines in the chart are shown with reduced importance and are thinner, unlabeled, and colored with a softened grey. There are no data labels, grid lines, or y-axis on the chart, but an x-axis shows abbreviated months of the year from January to December in a small, light, sans serif typeface.”** In a design portfolio or article that explains minimalist chart designs, the design details are what matters.



DO NO HARM GUIDE

Applying Equity Awareness in Data Visualization

JONATHAN SCHWABISH AND ALICE FENG

JUNE 9, 2021

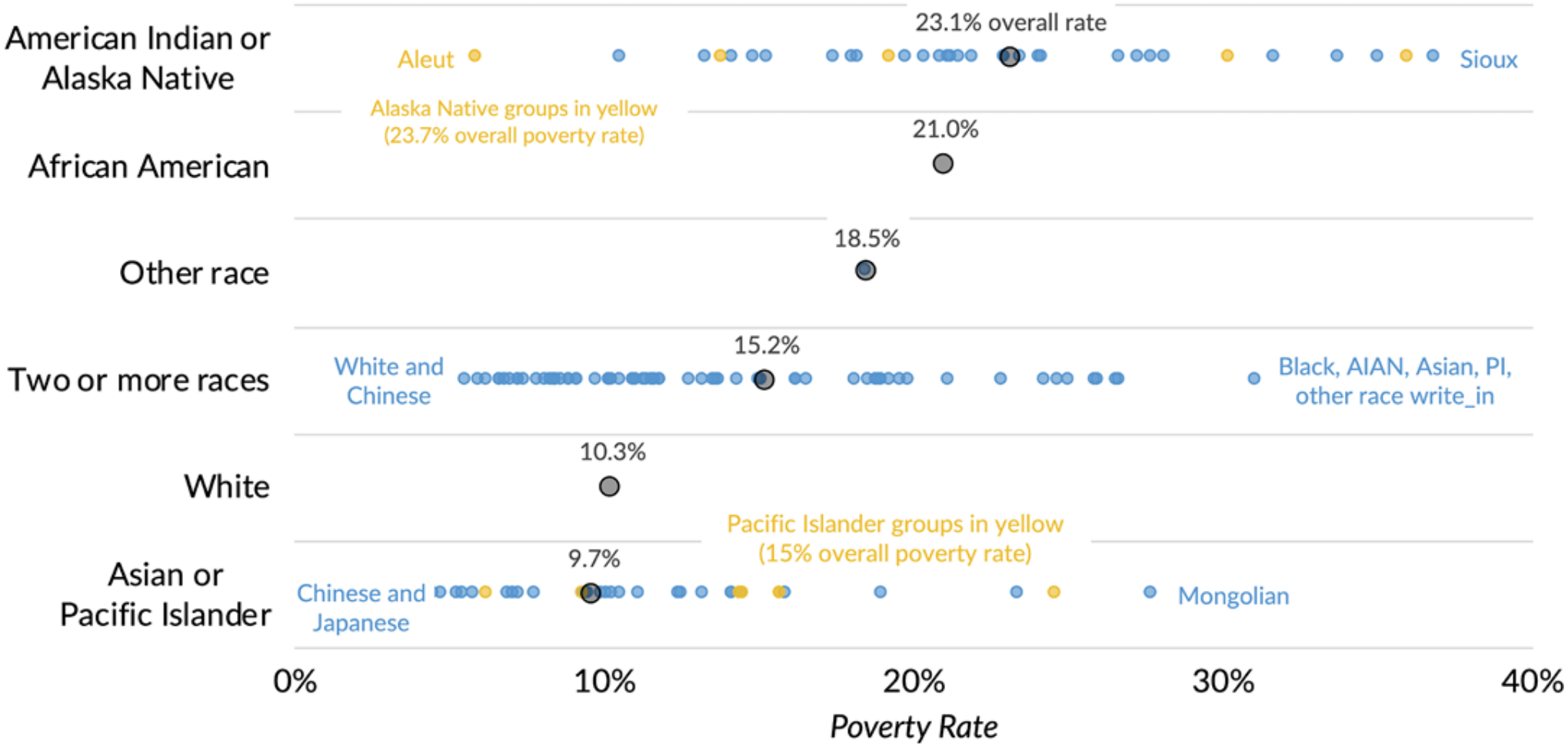


- How were these data generated?
- Are these data demographically representative?
- Who is included and who is excluded from these data?
- Whose voices, lives, and experiences are missing?
- How much can this data be disaggregated by race, gender, ethnicity, etc.?
- Why were these data collected?
- Who stands to benefit from these data?
- Who might be harmed by the collection or publication of these data?

FIGURE 08

Poverty rates across different racial groups when disaggregating data from the American Community Survey reveal variation that is missing when metrics are only presented for overall groups.

Variation in Poverty Rates



Source: Schwabish and Feng (2021).

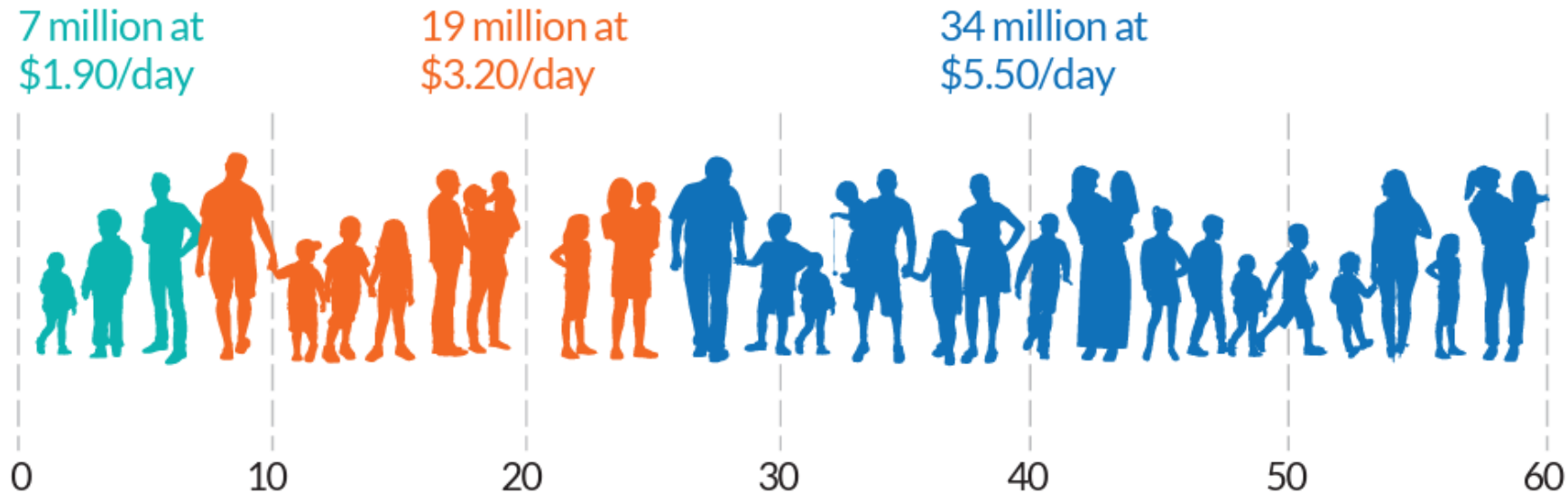
FIGURE 02

A comparison of a standard stacked bar chart and a unit chart with icons.

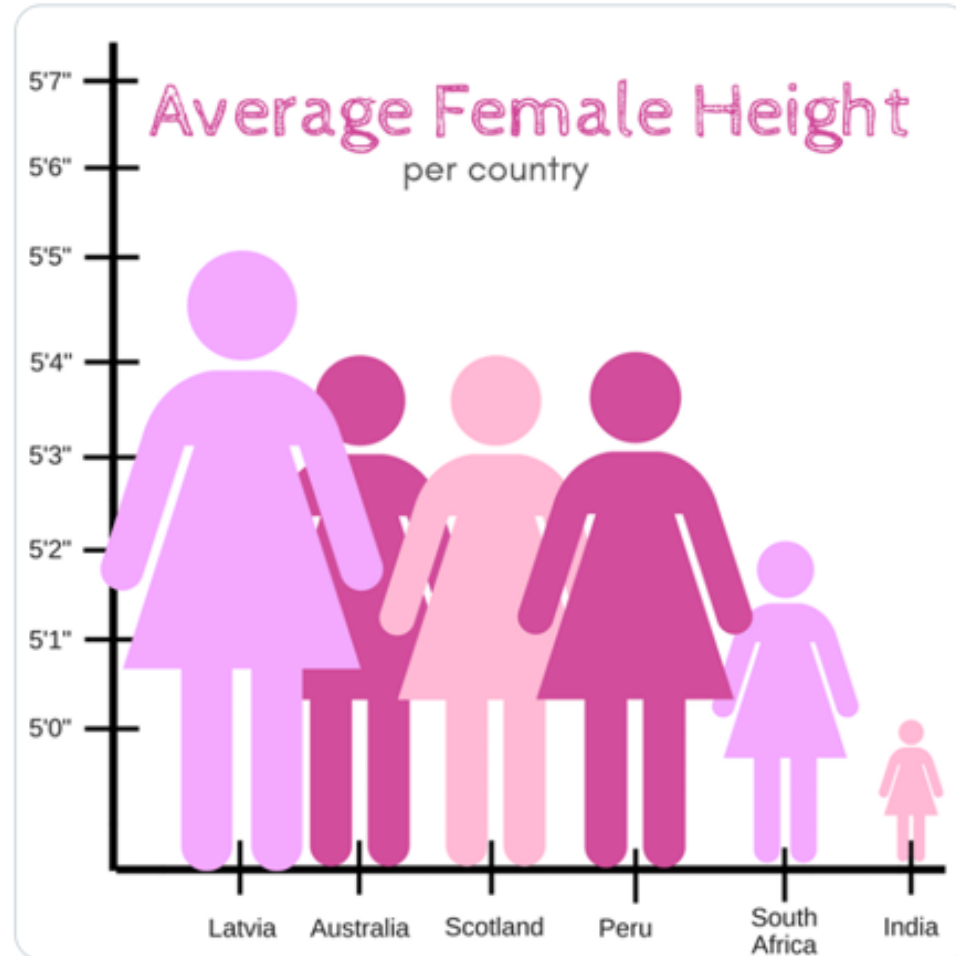
Millions of people in poverty



Millions of people in poverty



Source: Recreated based on Schwabish (2021).



6:58 PM · Aug 6, 2020 · Twitter Web App

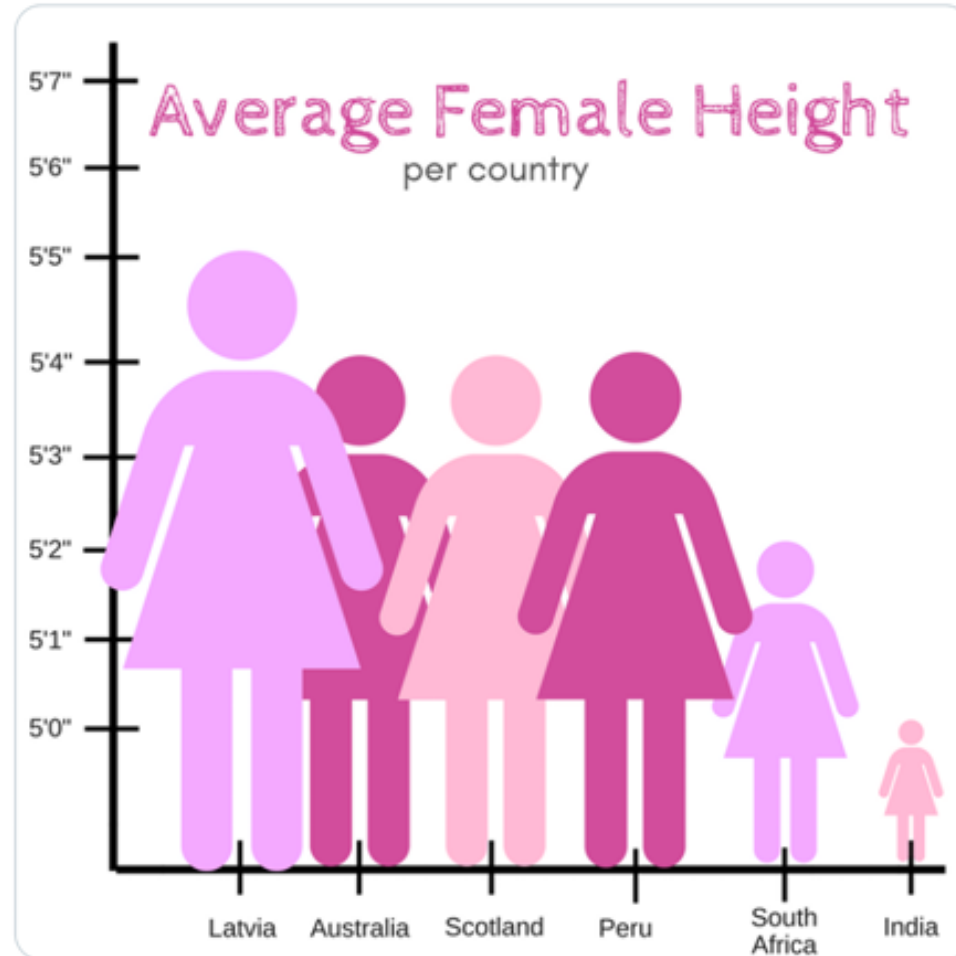
Source: Do No Harm Guide – Urban Institute



Sabah Ibrahim
@reina_sabah

...

As an Indian woman, I can confirm that too much of my time is spent hiding behind a rock praying the terrifying gang of international giant ladies and their Latvian general don't find me

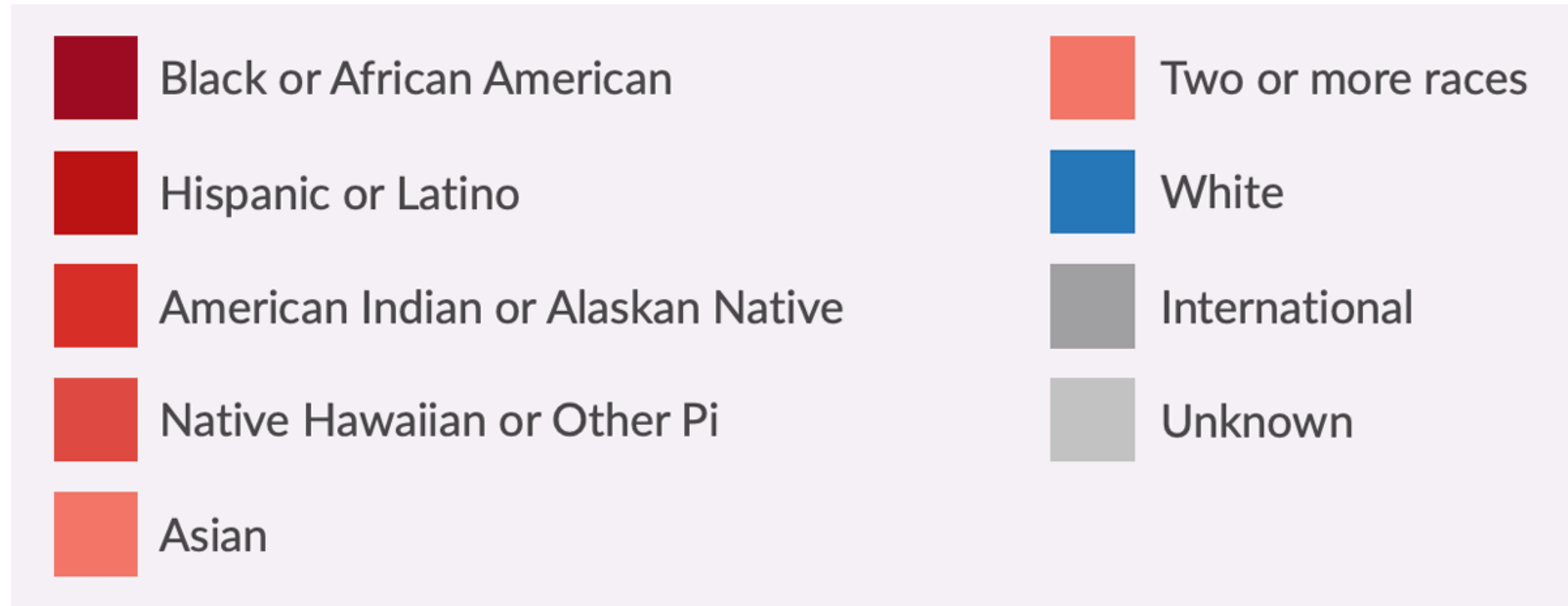


6:58 PM · Aug 6, 2020 · Twitter Web App

Source: Do No Harm Guide – Urban Institute

FIGURE 12

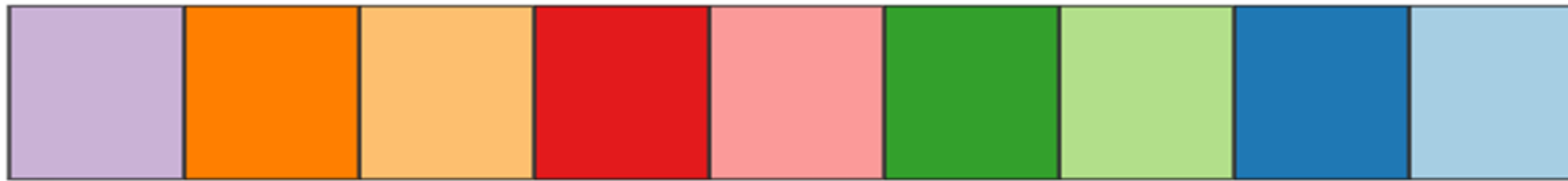
Legend showing a problematic color scheme applied to data on race and ethnicity.



Source: Recreated based on the June 2020 version of the *Diversity Dashboard* from the Massachusetts Institute of Technology, Office of the Provost.

FIGURE 14

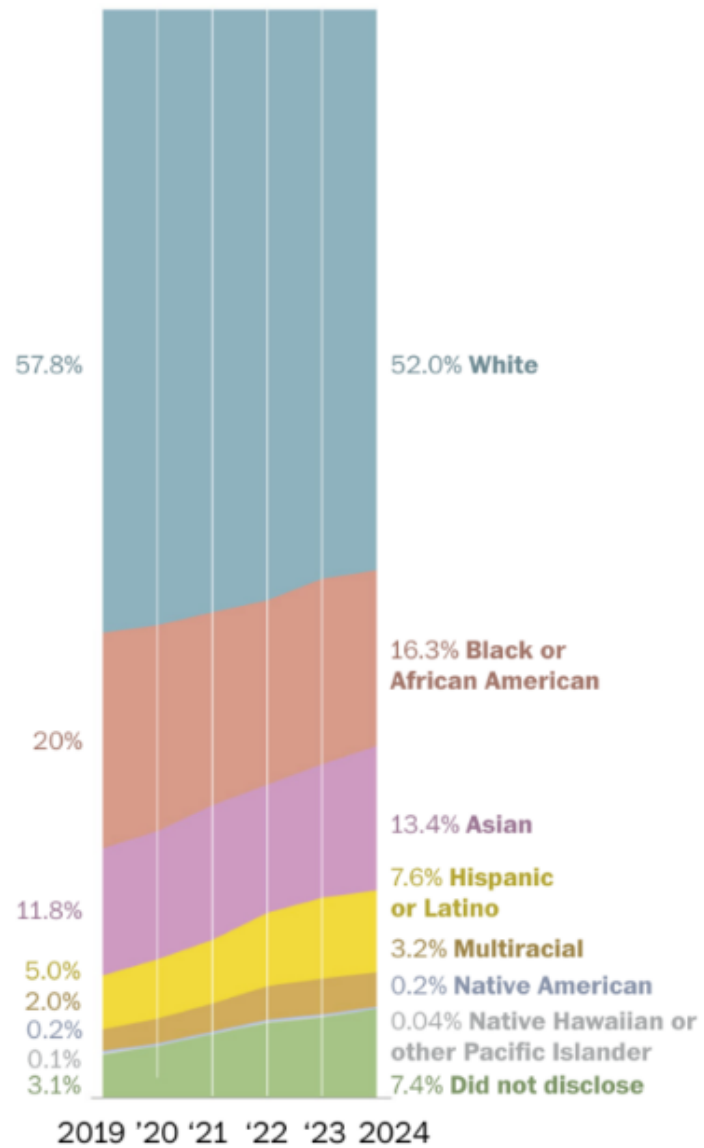
Example color palette that avoids gradients and hierarchies.



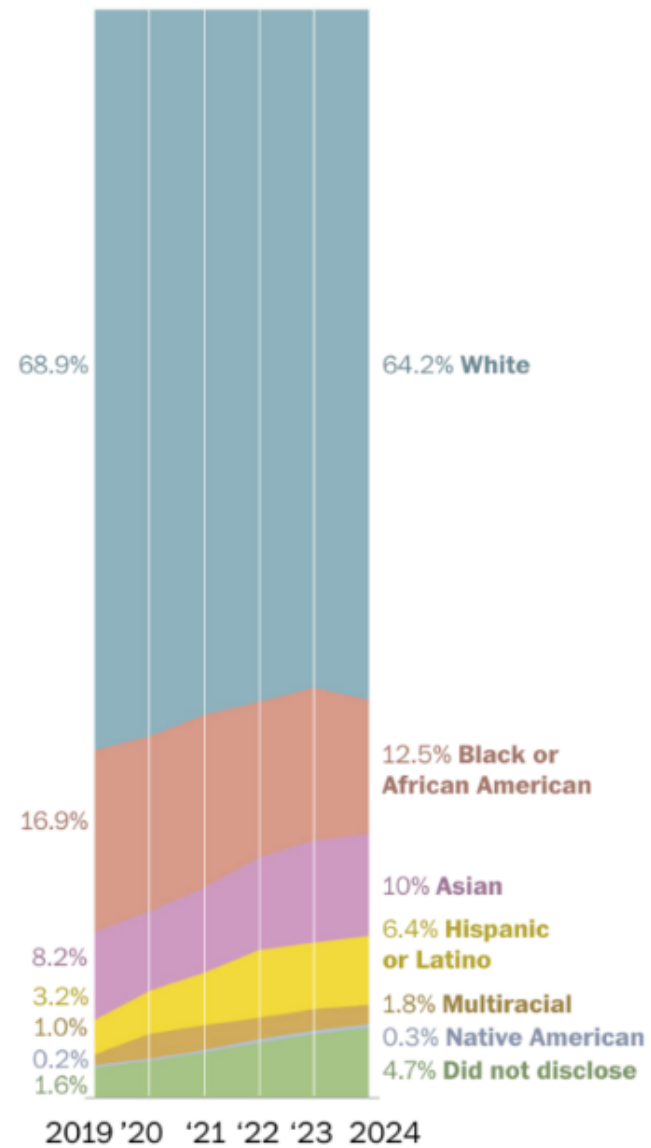
Source: Created with the ColorBrewer online tool.

Race and ethnicity

All employees



Leadership



The Washington Post, 2024: White ● | Black or African American ● | Asian ● | Hispanic or Latino ● | Multiracial ● | Native American ● | Did not disclose ●

4 How to choose colors: The Telegraph case

Out of curiosity as to how [The Telegraph](#) decided on their **purple for women** and **green for men**, I asked [Fraser Lyness](#), Director of Graphic Journalism at The Telegraph. His answer impressed me:



Creating more effective data visualizations in the workplace

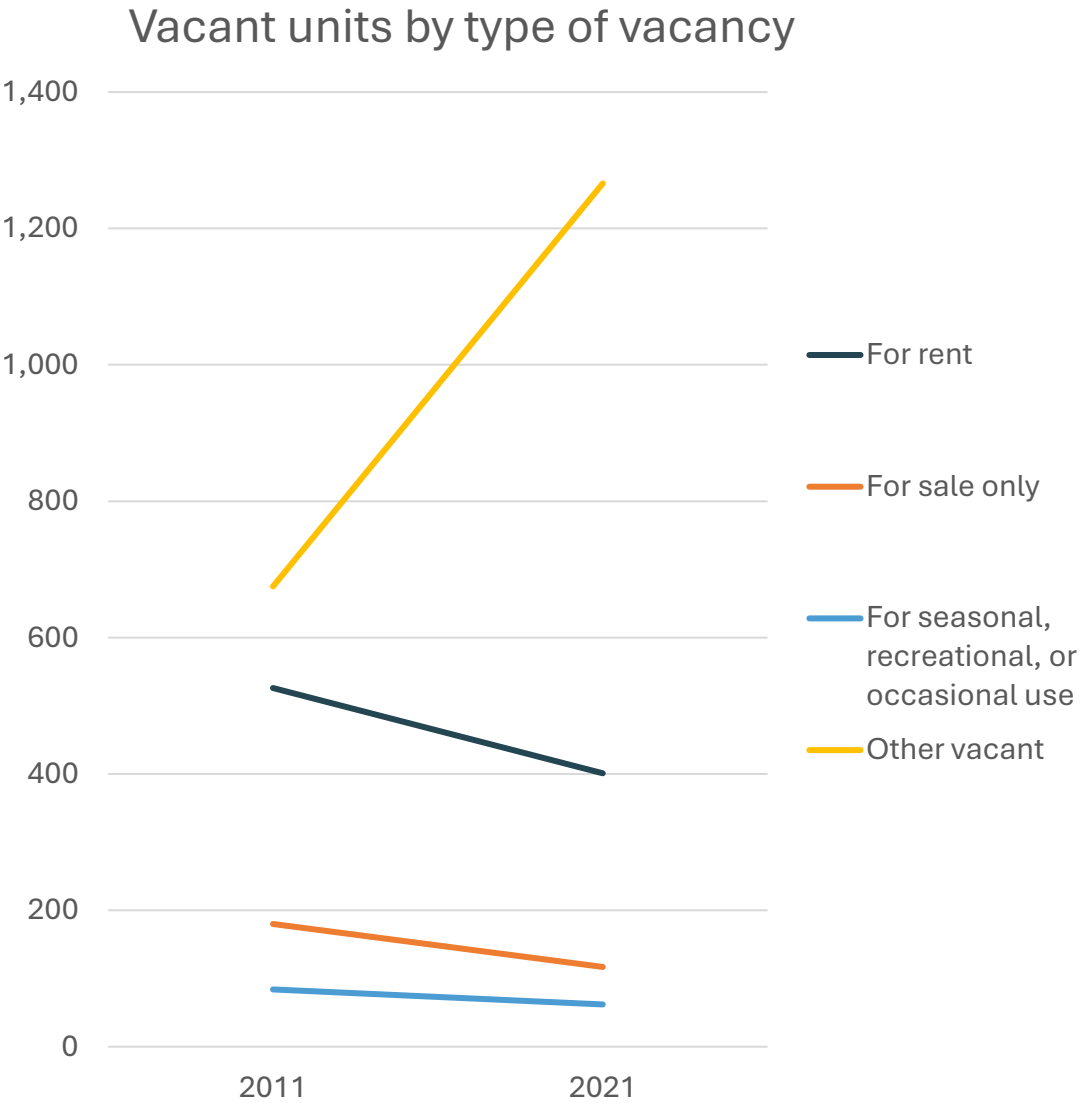
September 21, 2023

Better Data Visualizations at Work: A Guide to Winning Over Your Boss

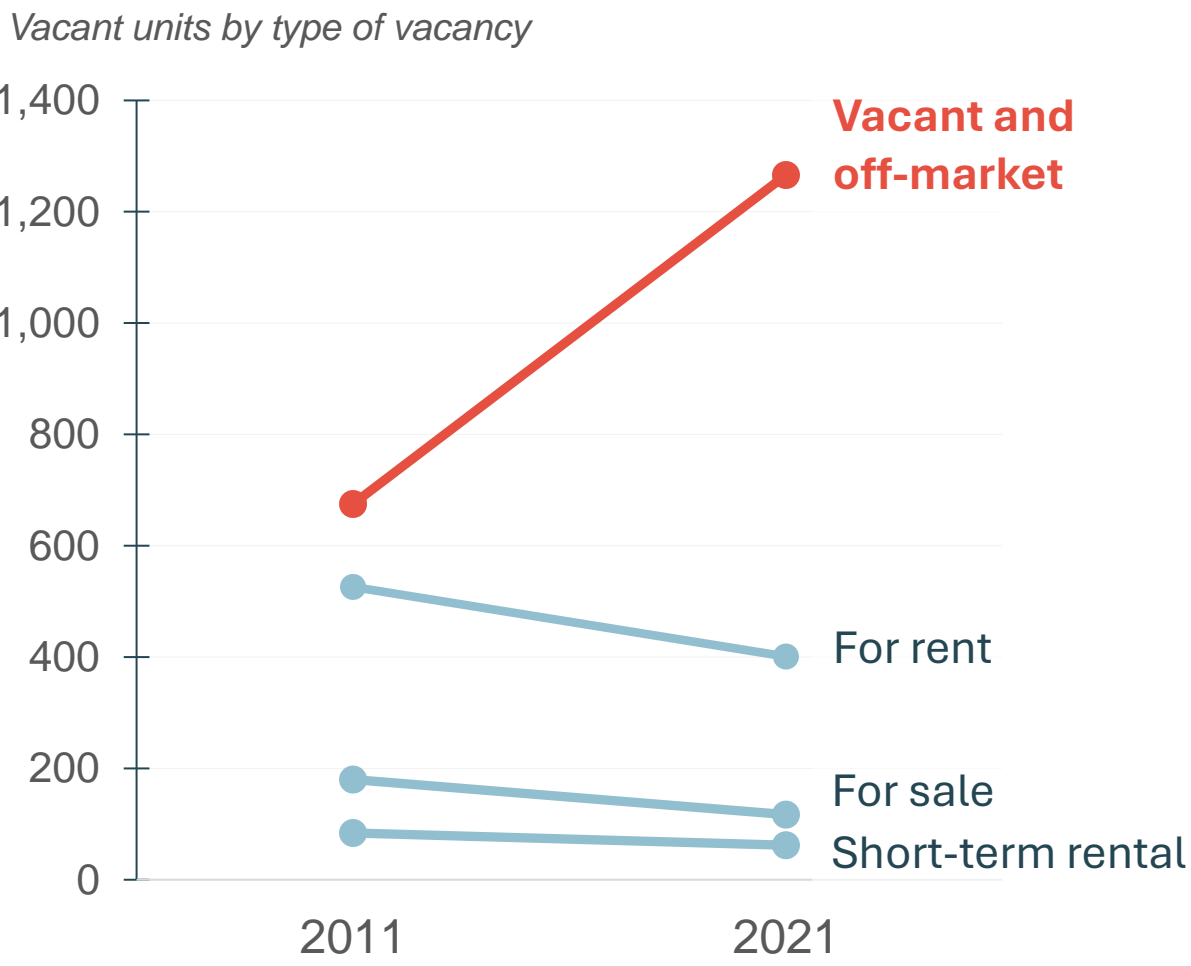
— in DATAVIZ COMMUNITY



Show comparisons



Off-market housing units have doubled since 2011



Source: ACS 2011, 2021 (5-year estimates)

Use real data

“Real data is messy. It’s too easy to make up data that works perfectly with the chart type I want to use. But with real data, there are outliers, extremes, or groups that don’t quite align. **Finally, real data helps people connect with the content.**”

Create a style guide

<https://urbaninstitute.github.io/graphics-styleguide/>

