

Visual Storytelling I

Session Four

MVIS 5101 March–May 2023

Today:

- Share presentations (3-4 minutes)
- Designing for inclusion
- Description of our next assignment

Presentations

Break

Designing for Inclusion

“Exclusionary habits are the reason why we make mismatched designs. They stem from deep-seated assumptions about the people who receive our designs.”

- Kat Holmes

What is accessibility?

- How can we design for people who have a permanent disability?
- What considerations might there be?
- What considerations might someone with no disability be completely unaware of?



Rehabilitation Act of 1973

Section 508 requires all Federal agencies to develop, build, maintain, and use information and communication technology that is accessible to people with disabilities.

- Examples of information and communication technology includes websites as well as PDFs, hardware, software, and call centers.
- For website development and data visualization, this includes
 - Ensuring compatibility with screen readers to interpret charts and graphs
 - Ensuring proper size and contrast of visual elements
 - Creating alt-text to provide context for images.

Kat Holmes' approach

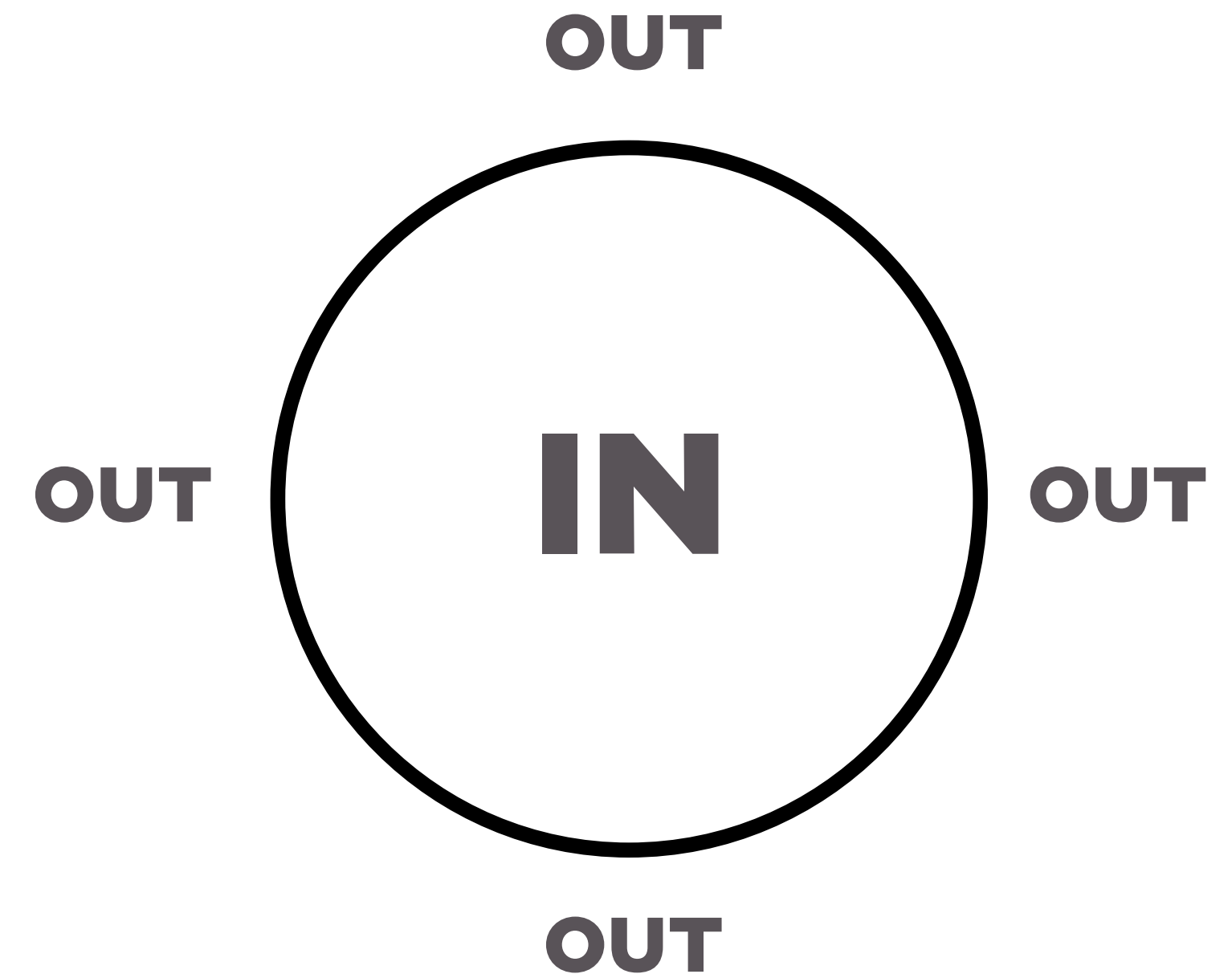
Designing for accessibility is about designing to account for lack of function in certain areas (such as wheelchair-accessible facilities).

Designing for inclusion is about accounting for mismatches between the designed environment and one's abilities.

“What happens when a designed object rejects us?”

How can we approach our designs?

- Recognize exclusion
- Learn from human diversity
- Solve for one, extend to many



Kat Holmes' approach

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Designing for inclusion is about accounting for mismatches between the designed environment and one's abilities.

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Unexpected benefits of inclusion

Curb cuts were advocated for by wheelchair riders. Once implemented, many others experienced the benefits, including anyone that's pushed a stroller or pulled a suitcase.

A [99% Invisible podcast episode](#) discusses this.



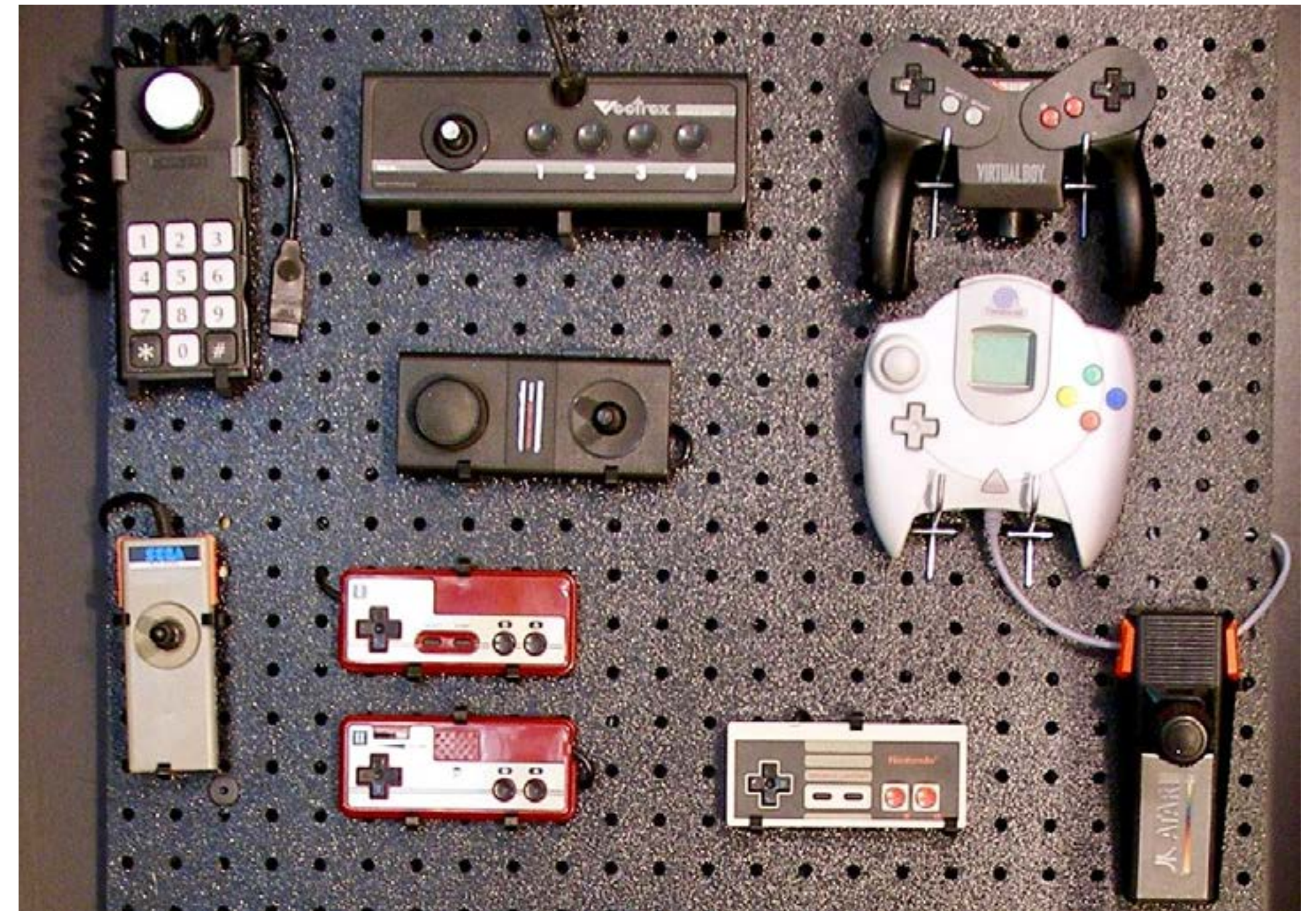
Mismatches

All of these video game controllers have one thing in common: they require two hands to play.

“Final Fantasy just wasn’t for me. ‘Sure it is,’ (my uncle) reassured me, as he picked up the modified controller, ‘we just need to stop this thing from getting in the way.’”

- John R. Porter, quoted in Kat Holmes’ Mismatch

How do we “make it for you”?

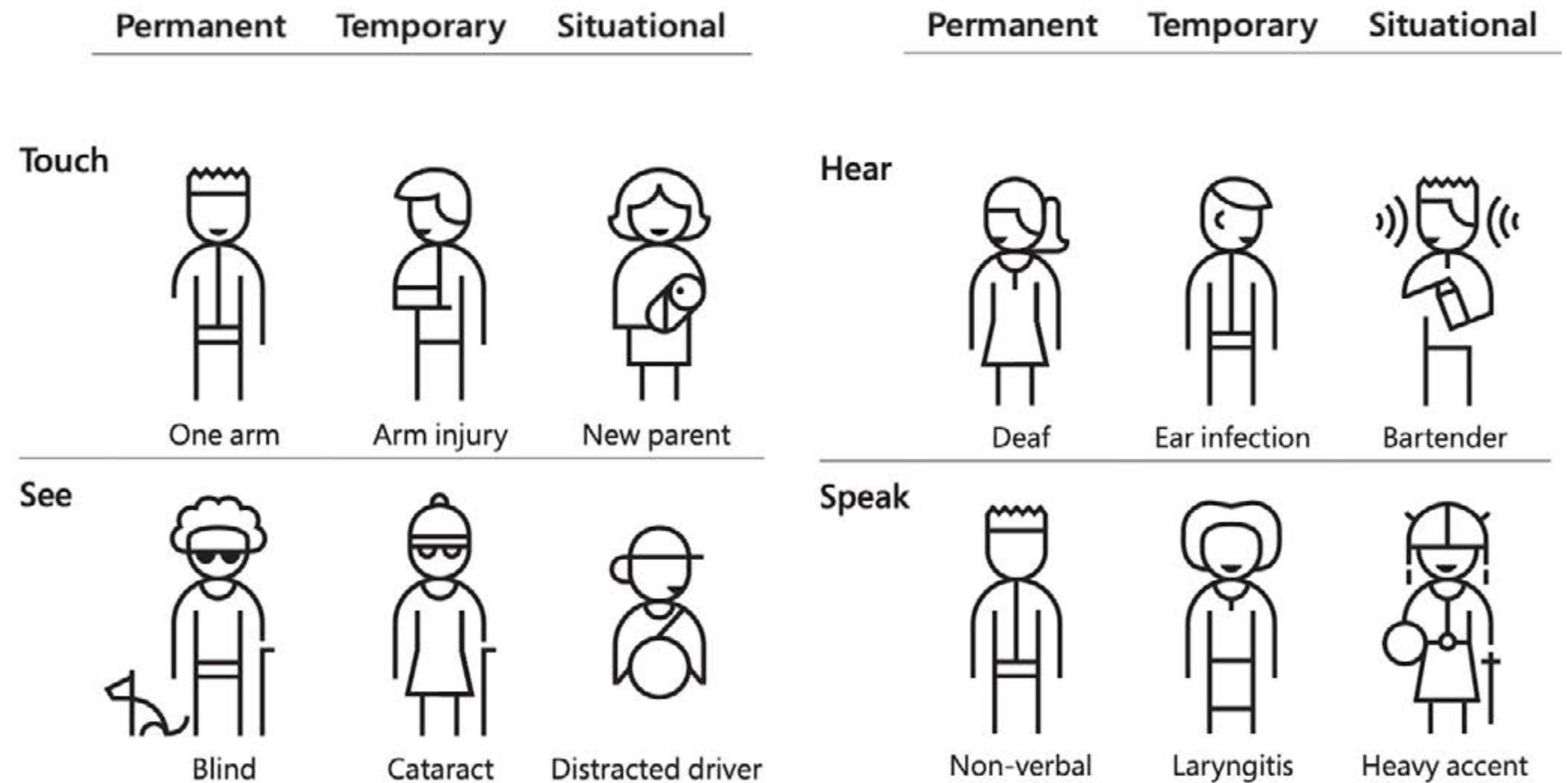


**Disability = mismatched
human interactions**

Spectrum of ability

Everyone can relate to the idea that abilities are limited and ever-changing. It rings true regardless of nationality, professional training, unconscious biases, or worldview.

Microsoft



Format constraints

We can think of situational abilities as extending to a particular format.

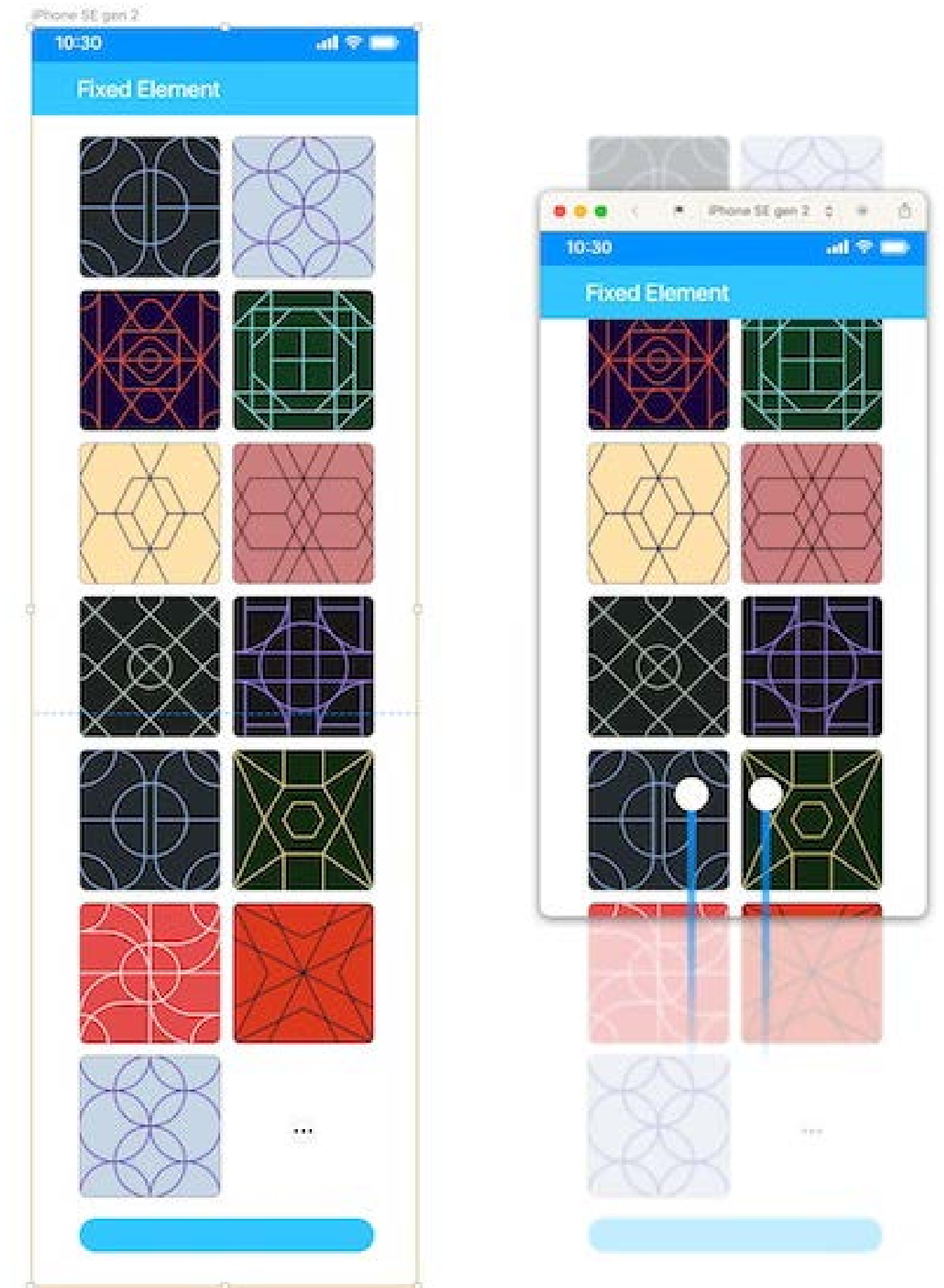
What are some constraints and considerations for different types of media?



Format constraints

We can think of situational abilities as extending to format type.

What are some constraints and considerations for different types of media?



“Designing with our own abilities as a baseline can lead to solutions that work well for people with similar abilities, but can end up excluding many more people.”

- Kat Holmes

Designing for inclusion

Addressing mismatches for the hearing impaired:

- Write in plain English
- Do not limit important information to audio only (ie: add contact methods other than just telephone numbers)
- For video, use subtitles or provide transcripts (and indicate when speakers are changing)

Designing for users who are Deaf or hard of hearing			
Do...		Don't...	
write in plain English	Do this.	use complicated words or figures of speech	
use subtitles or provide transcripts for videos		put content in audio or video only	
use a linear, logical layout		make complex layouts and menus	
break up content with sub-headings, images and videos		make users read long blocks of content	
let users request an interpreter for appointments		don't make telephone the only means of contact with users	

Designing for inclusion

Addressing mismatches for Physical or motor impairment

- Make sure there aren't tiny selectable areas
- Allow space between selectable items
- Design for keyboard use (intuitive flow)

Designing for users with physical or motor disabilities	
Do...	Don't...
make large clickable actions 	demand precision 
give form fields space 	bunch interactions together 
design for keyboard or speech only use 	make dynamic content that requires a lot of mouse movement 
design with mobile and touchscreen in mind 	have short time out windows 
provide shortcuts 	tire users with lots of typing and scrolling 

Designing for inclusion

Mismatches aren't just based on physical attributes. Think of:

- Training and education (assuming an understanding of math, statistics, etc.)
- Interests and preferences (knowledge of subject areas, etc.)
- Culture (metaphors, cultural coding, etc.)

Personas can help identify and correct mismatches

Category	Attribute	Implication for design
Training and education	Focused on policy, but not analysis	Little tolerance for statistical concepts
Interests and preferences	Open-minded, but over-scheduled	Needs to be easily understood and explained
Culture	Grew up in Taiwan	Colors have different associations, avoid US-centric metaphors

Designing for inclusion

Addressing mismatches with low vision:

- Consider screen readers
 - [Intro to screen readers](#)
 - [Screen reader demo](#)
- Introductory description of what the visualization shows
- Direct labeling
- Translate data into clear language
- Use sufficient contrast

Designing for users of screen readers



Do...	Don't...
describe images and provide transcripts for video 	only show information in an image or video 
follow a linear, logical layout 	spread content all over a page 
structure content using HTML5 	rely on text size and placement for structure 
build for keyboard use only 	force mouse or screen use 
write descriptive links and headings 	write uninformative links and headings 

Designing for users with low vision



Do...	Don't...
use good colour contrasts and a readable font size 	use low colour contrasts and small font size 
publish all information on web pages 	bury information in downloads 
use a combination of colour, shapes and text 	only use colour to convey meaning 
follow a linear, logical layout 	spread content all over a page 
put buttons and notifications in context 	separate actions from their context 

Designing for inclusion

Addressing mismatches with low vision and screen readers:

- **Introductory description of what the visualization shows**
- Direct labeling
- Translate data into clear language
- Use sufficient contrast

Consumer Financial Protection Bureau

FIGURE 2A:

Breakdown of complaints in other financial services category
Fraud or scam is the most complained about topic in this category



Numbers add up to more than 100% due to rounding.

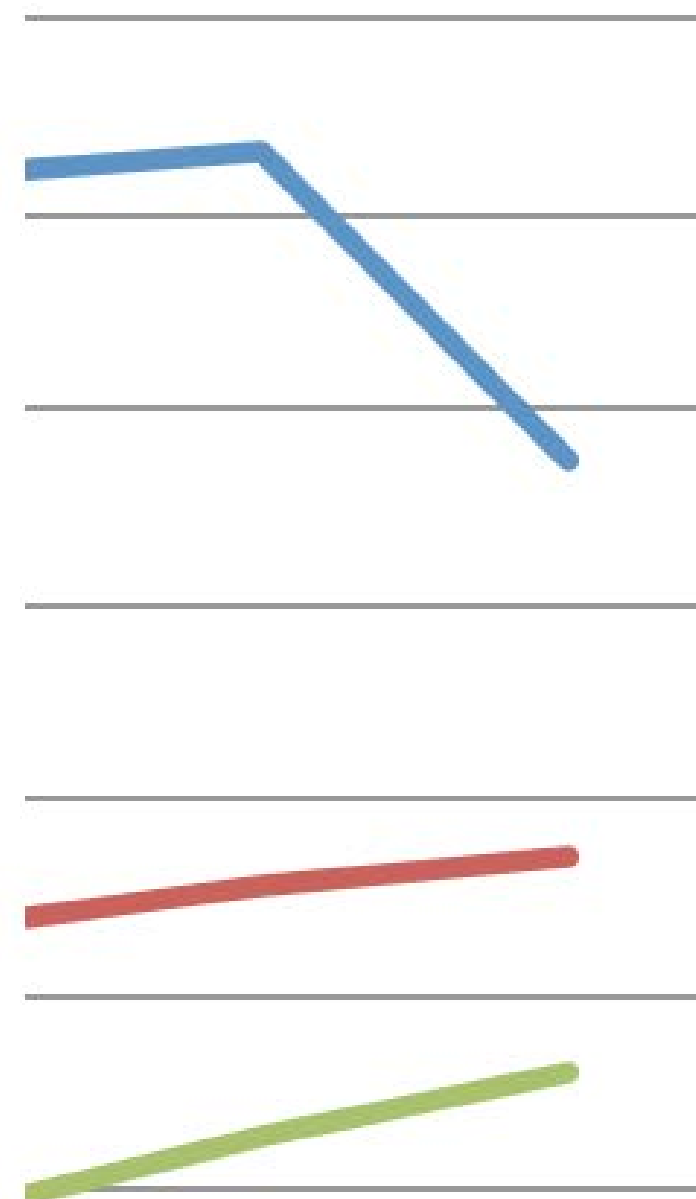
Source: <https://data.consumerfinance.gov/dataset/Consumer-Complaints/s6ew-h6mp>

Designing for inclusion

Addressing mismatches with low vision and screen readers:

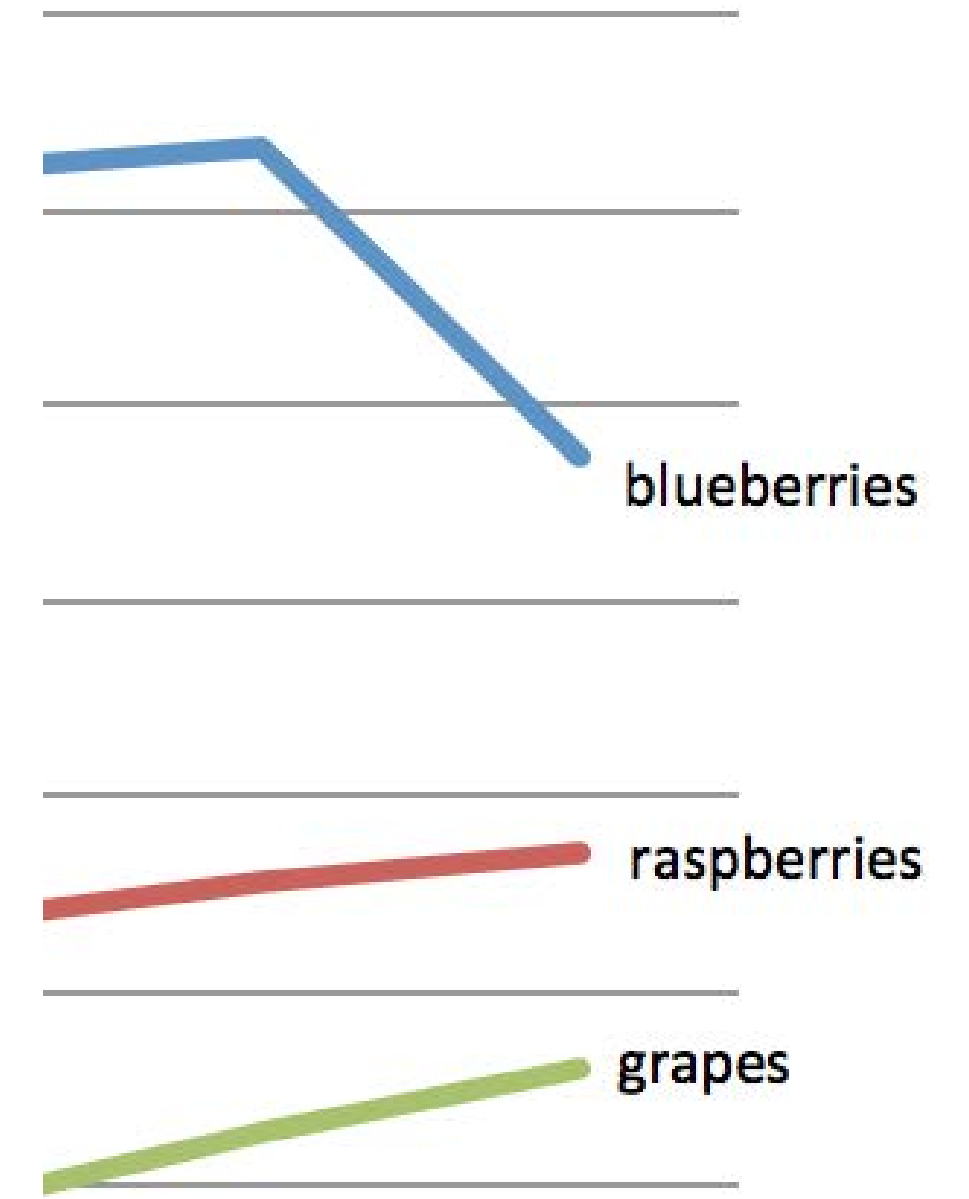
- Introductory description of what the visualization shows
- **Direct labeling**
- Translate data into clear language
- Use sufficient contrast

Legend



Cole Nussbaumer Knaflitz

Direct labeling



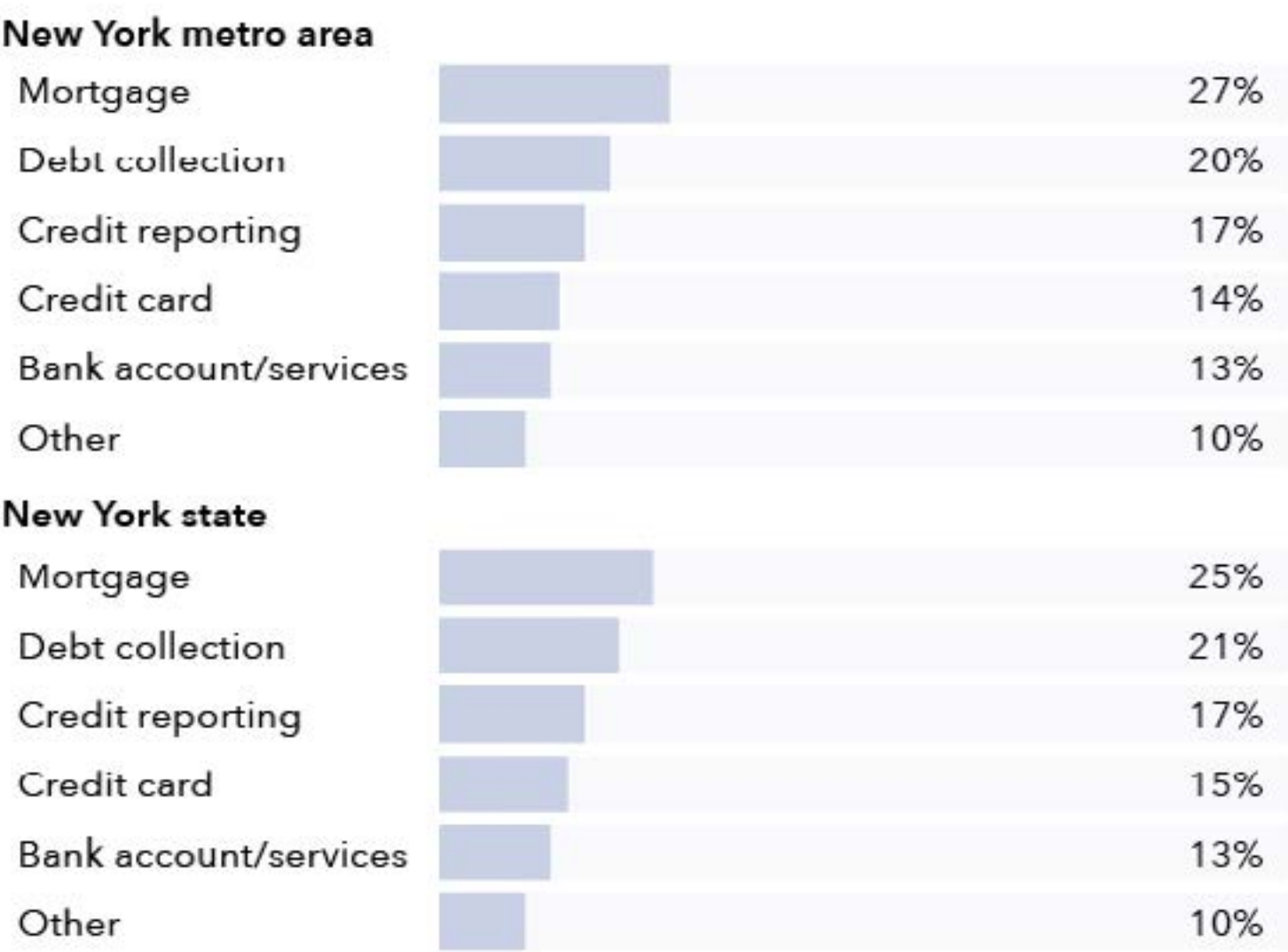
Designing for inclusion

Addressing mismatches with low vision and screen readers:

- Introductory description of what the visualization shows
- Direct labeling
- **Translate data into clear language**
- Use sufficient contrast

Consumer Financial Protection Bureau

FIGURE A7:
In New York, debt collection is a smaller percent of complaints than in the US as a whole.
Comparison of complaints from the past 5 years in New York metro area, New York state, and the US.

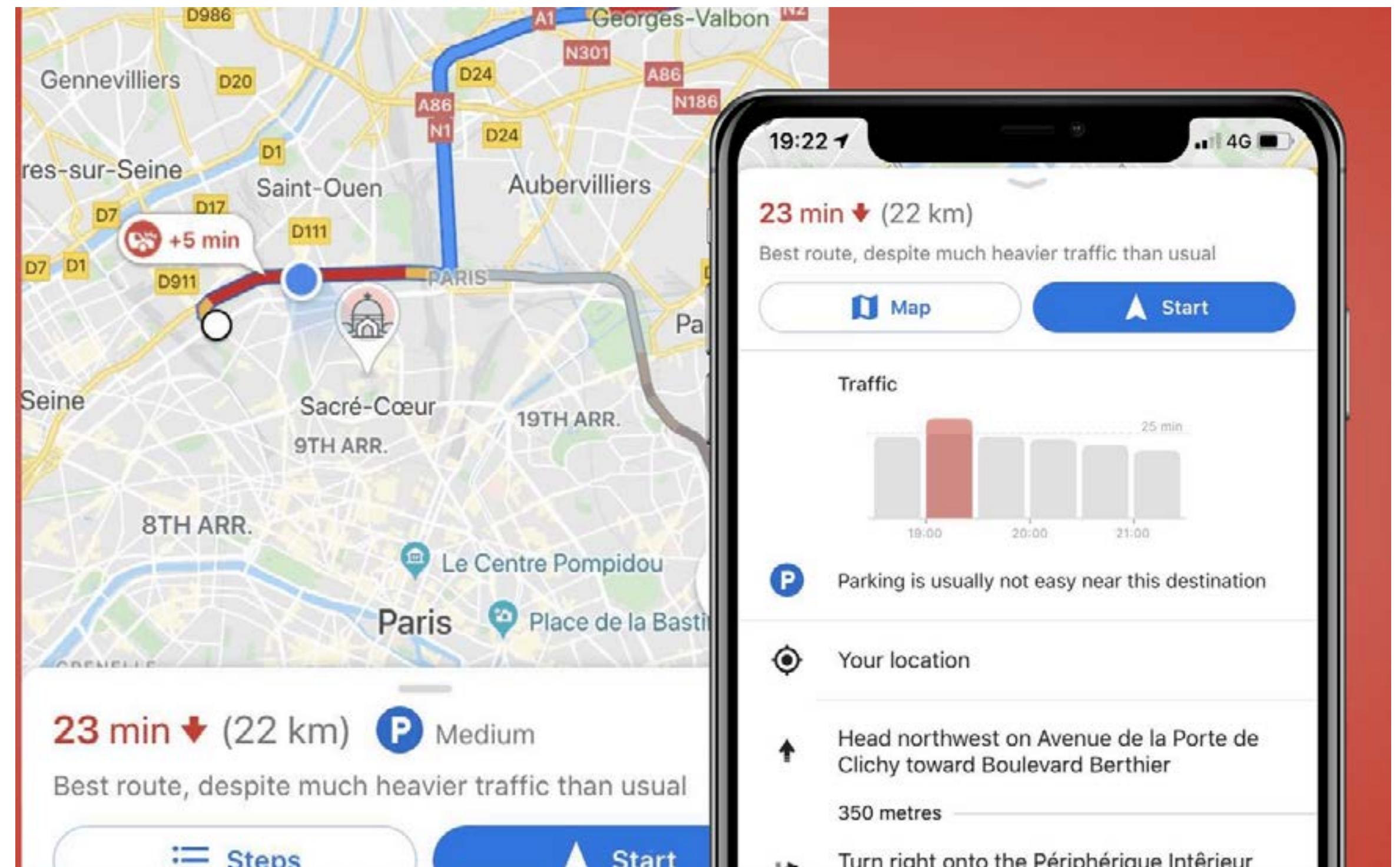


Designing for inclusion

Addressing mismatches with low vision and screen readers:

- Introductory description of what the visualization shows
- Direct labeling
- **Translate data into clear language**
- Use sufficient contrast

Sarah Fossheim



Designing for inclusion

Addressing mismatches with low vision and screen readers:

- Introductory description of what the visualization shows
- Direct labeling
- Translate data into clear language
- **Use sufficient contrast**

Cole Nussbaumer Knaflic

No line



White divider line



Designing for inclusion

Use sufficient contrast

- Soft tones are very difficult for some people to perceive
- Emphasis, highlighting can recede because of a background that's too similar
- [Contrast checker](#)

Foreground Color: #000000 Background Color: #ffffff Contrast Ratio: 21.00:1

WCAG Compliance Results

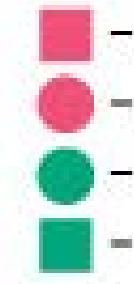
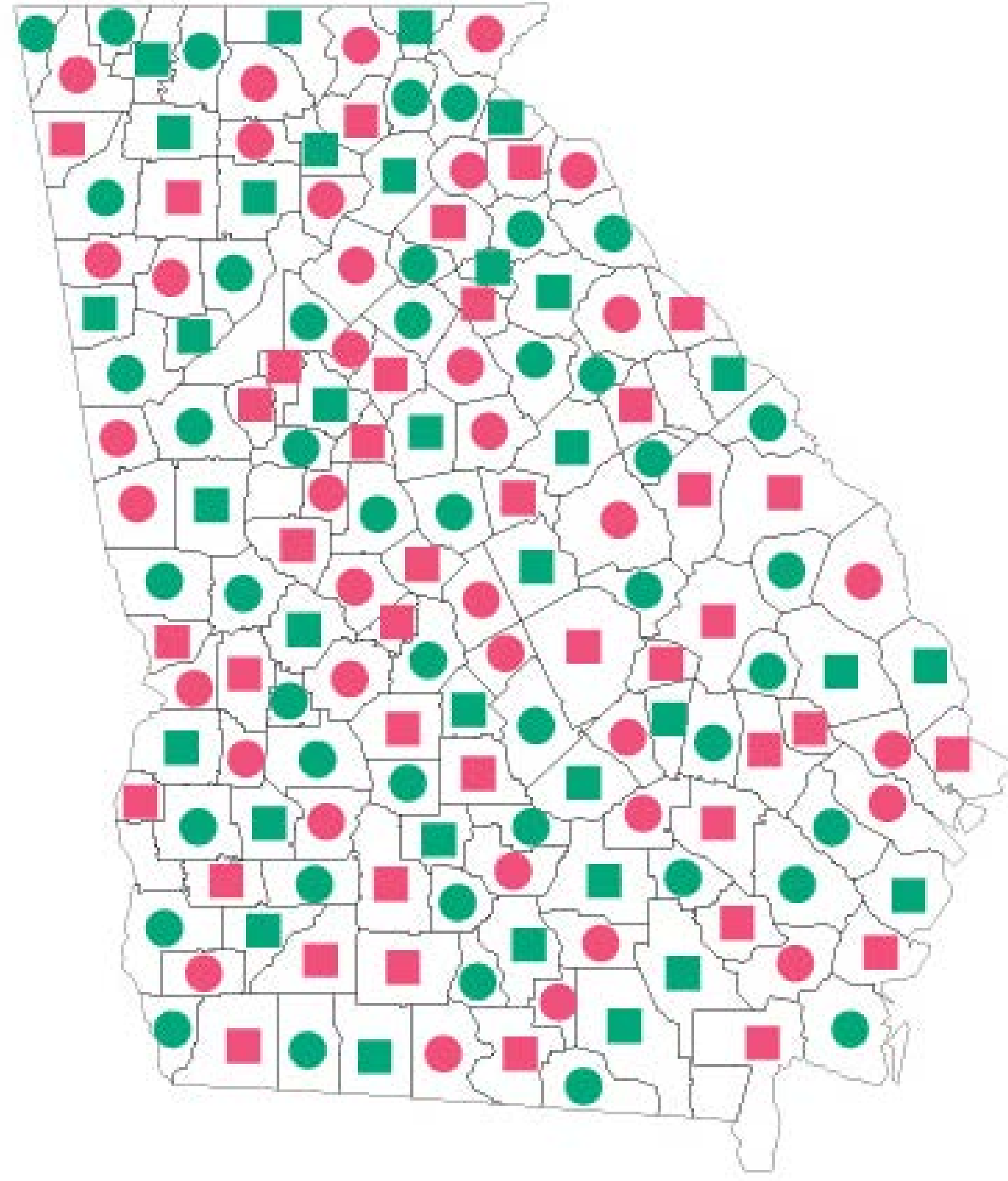
ELEMENT TYPE	AA	AAA
Small Text	✓ Pass	✓ Pass
Large Text	✓ Pass	✓ Pass
UI Components	✓ Pass	✓ Pass

SMALL sample text: 14pt (18.5px)
LARGE sample text: 18pt (24px)

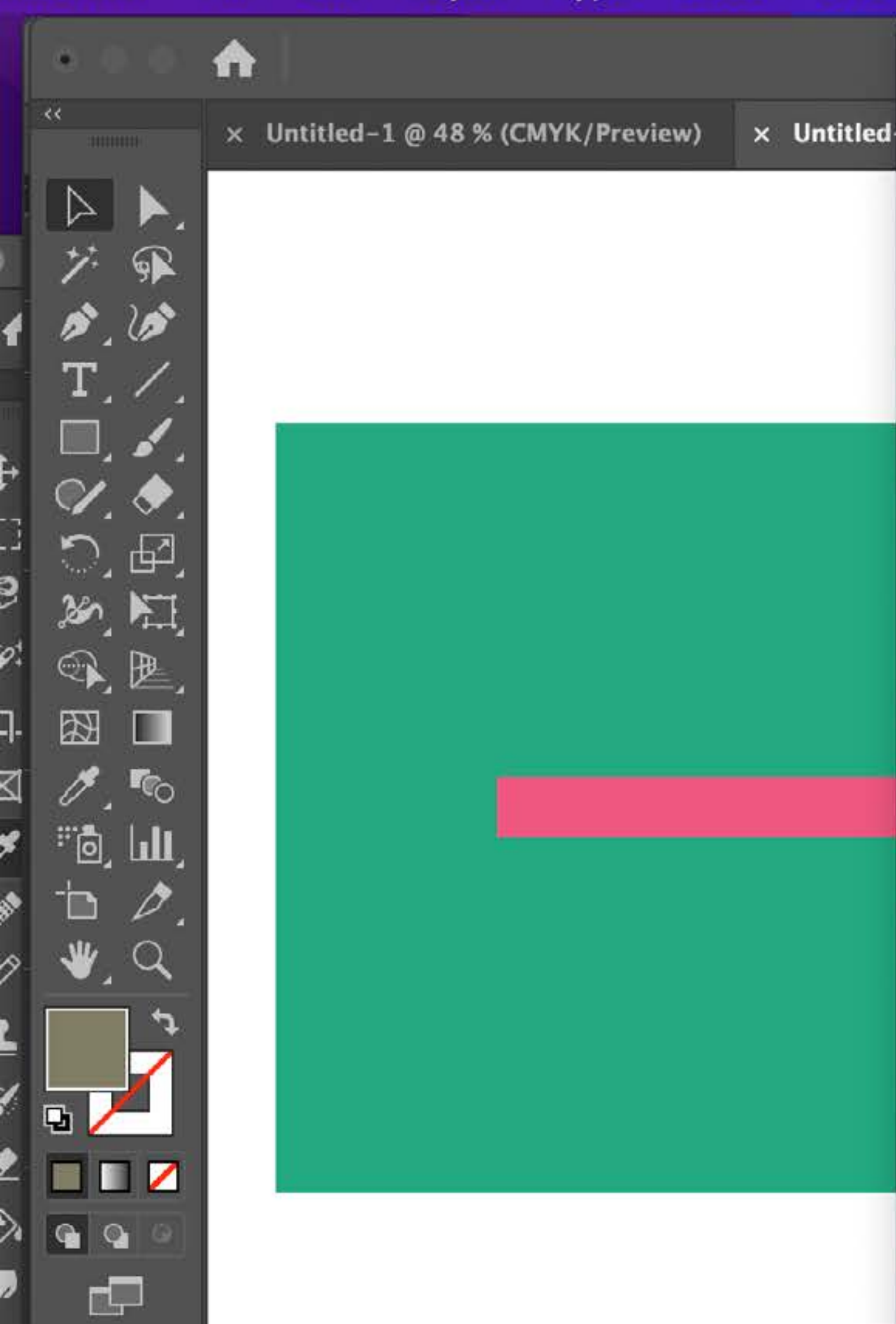
WCAG AA and AAA Results

Technically, you're
highlighting this phrase, but
it doesn't appear emphasized

Technically, you're
highlighting this phrase, but
it doesn't appear emphasized

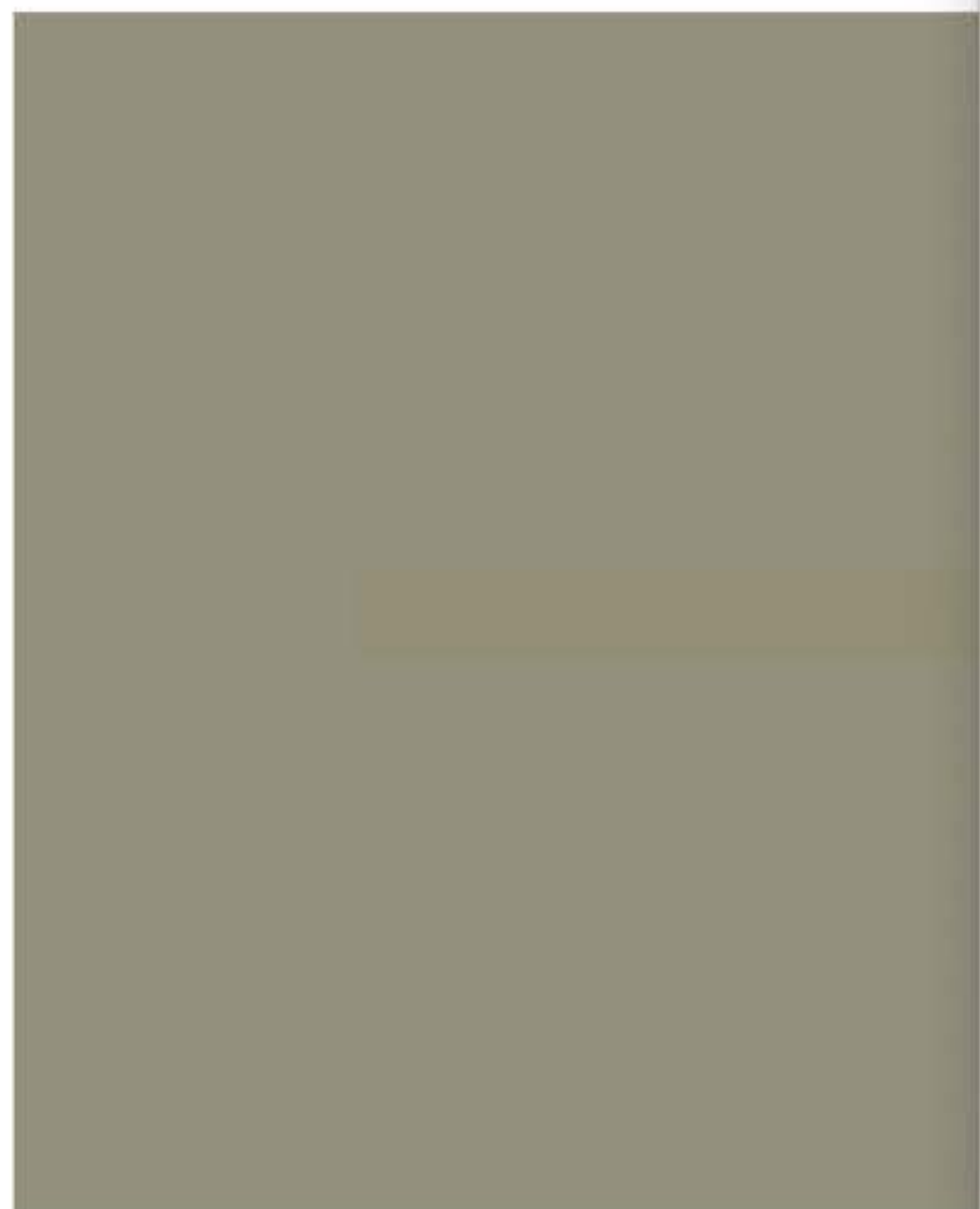
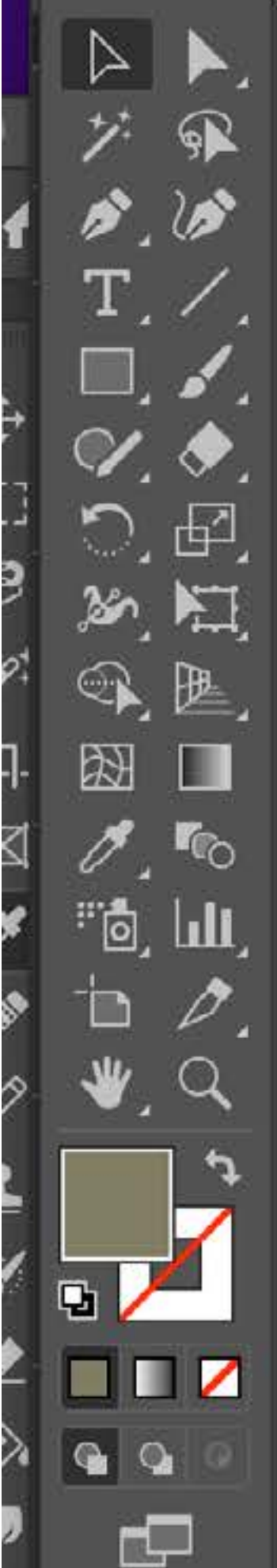






- View using GPU ⌘ E
- Outline ⌘ Y
- Overprint Preview ⇧⌘ Y
- Pixel Preview ⇧⌘ Y
- Trim View
- Presentation Mode
- Screen Mode >
- Proof Setup >
- ✓ Proof Colors
- Zoom In ⌘ +
- Zoom Out ⌘ -
- Fit Artboard in Window ⌘ 0
- Fit All in Window ⇧⌘ 0
- Rotate View >
- Reset Rotate View ⇧⌘ 1
- Rotate View To Selection
- Show Slices
- Lock Slices
- Hide Bounding Box ⇧⌘ B
- Show Transparency Grid ⇧⌘ D

- Adobe Illustrator 2022
- (SWOP) v2)
- ✓ Working CMYK: U.S. Web Coated (SWOP) v2
 - Legacy Macintosh RGB (Gamma 1.8)
 - Internet Standard RGB (sRGB)
 - Monitor RGB
 - Color blindness - Protanopia-type
 - Color blindness - Deuteranopia-type
 - Customize...

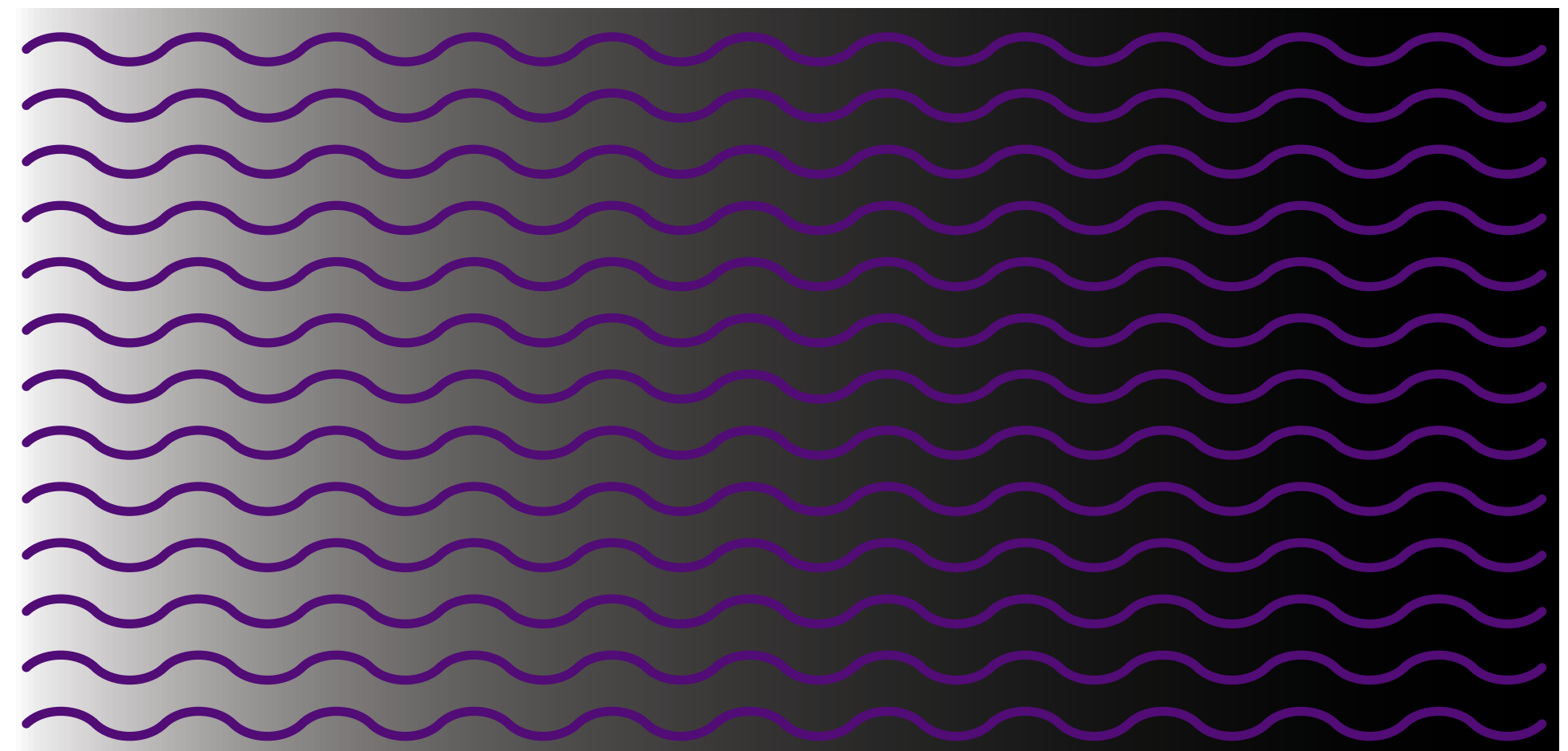
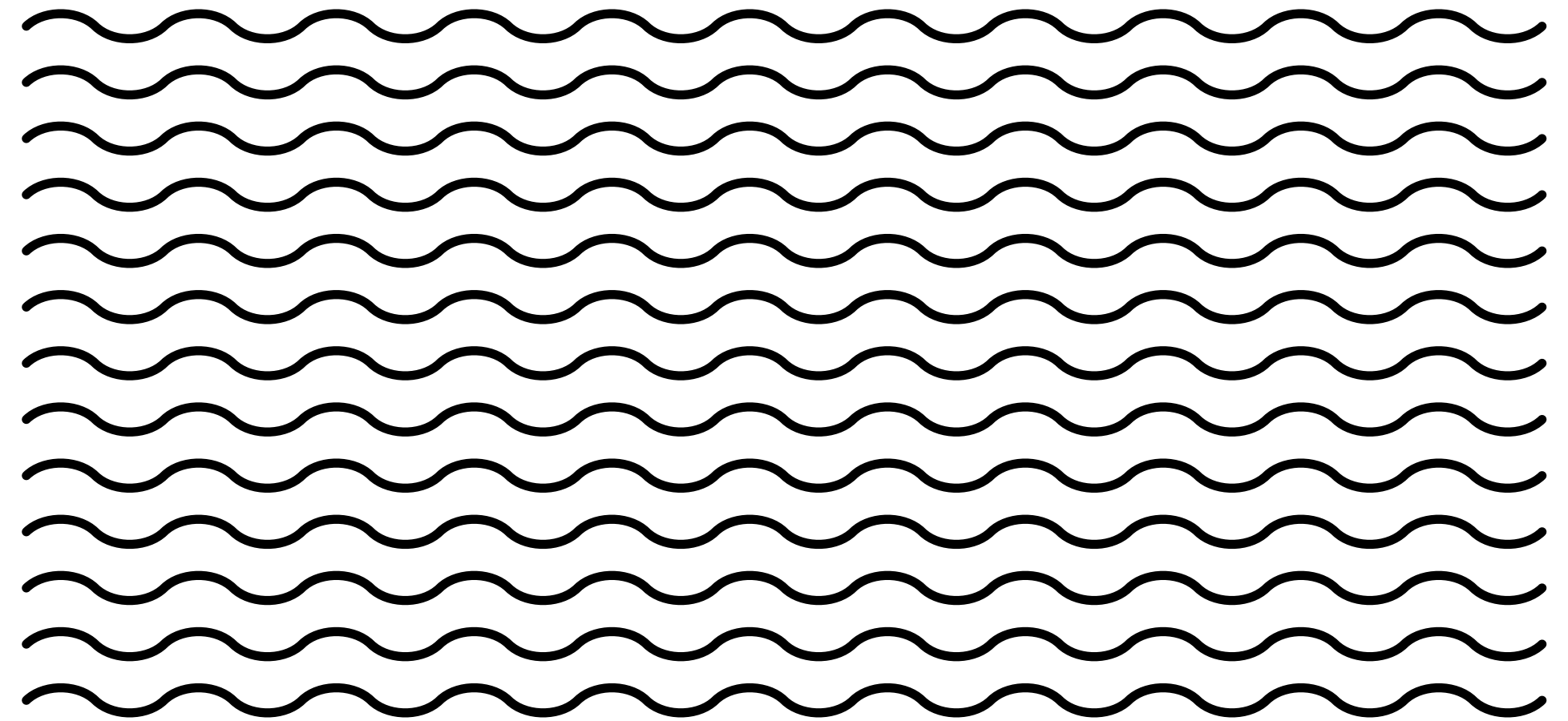


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- Screen Mode >
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- Zoom In ⌘ +
- Zoom Out ⌘ -
- Fit Artboard in Window ⌘ 0
- Fit All in Window ⇧ ⌘ 0
- Rotate View >
- Reset Rotate View ⇧ ⌘ 1
- Rotate View To Selection
- Show Slices
- Lock Slices
- Hide Bounding Box ⇧ ⌘ B
- Show Transparency Grid ⇧ ⌘ D
- Actual Size ⌘ 1

- Working CMYK: U.S. Web Coated (SWOP) v2
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- Customize...

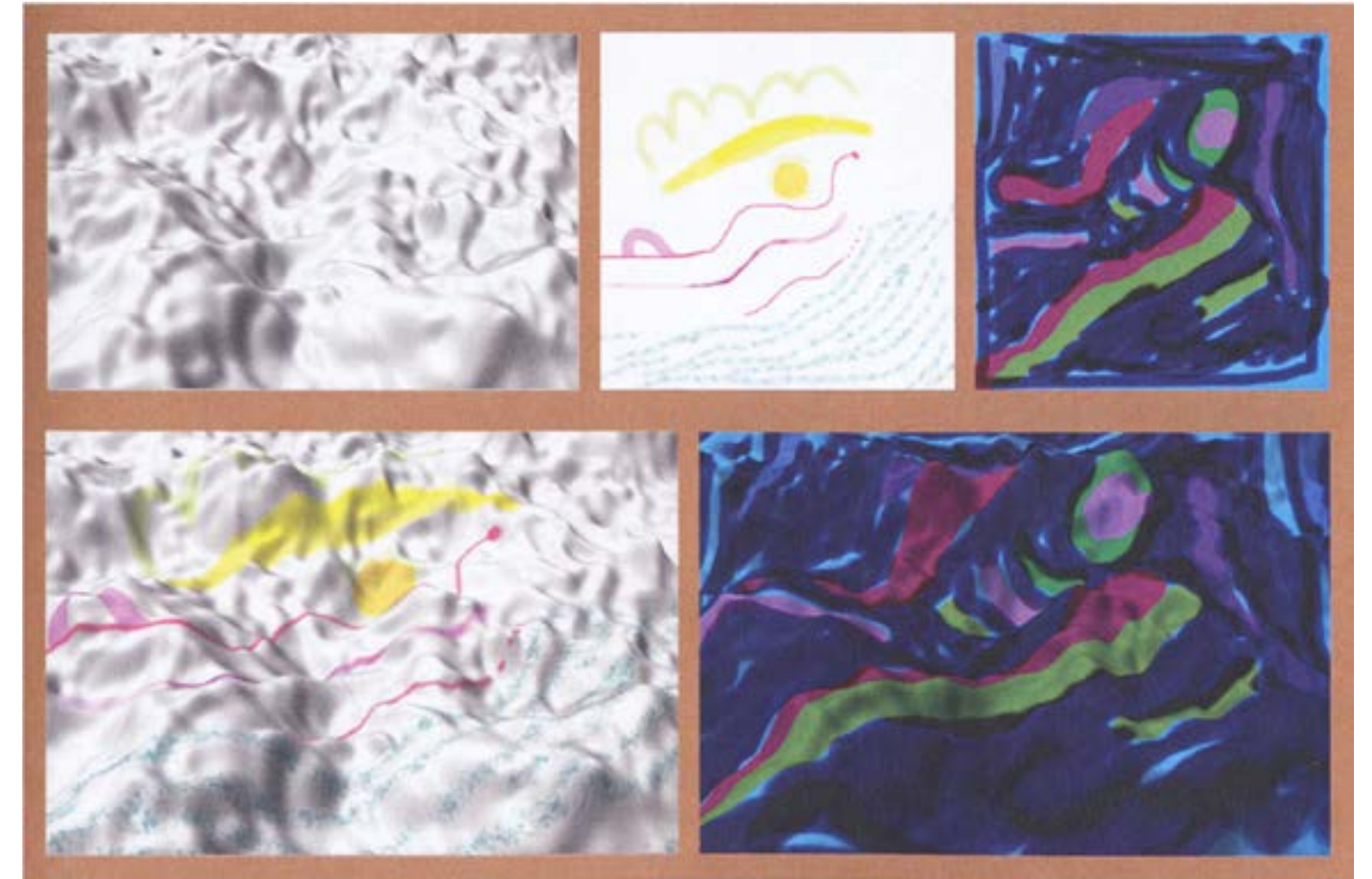
Luminance

Black and white (or high contrast) is better for identifying spatial detail than hues.



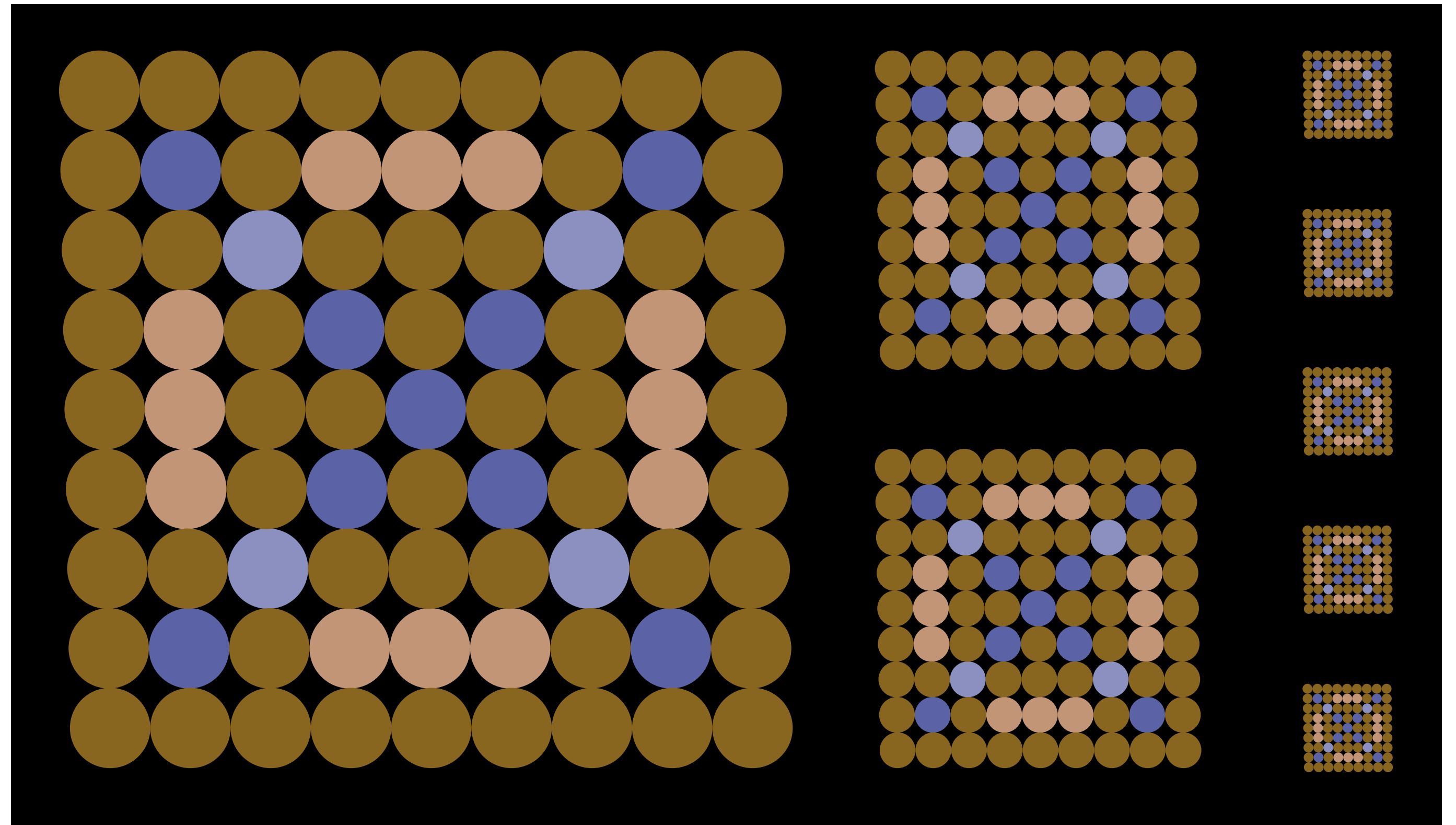
Patterns on shading

Patterns on shaded surfaces are hard to distinguish. This is why car manufacturers use patterns to conceal the design of concept cars when they are being road tested.



Showing detail

In the larger version of this pattern, the colors are most important and the “x” is prominent. At smaller sizes, contrast is most important and the “o” is prominent.

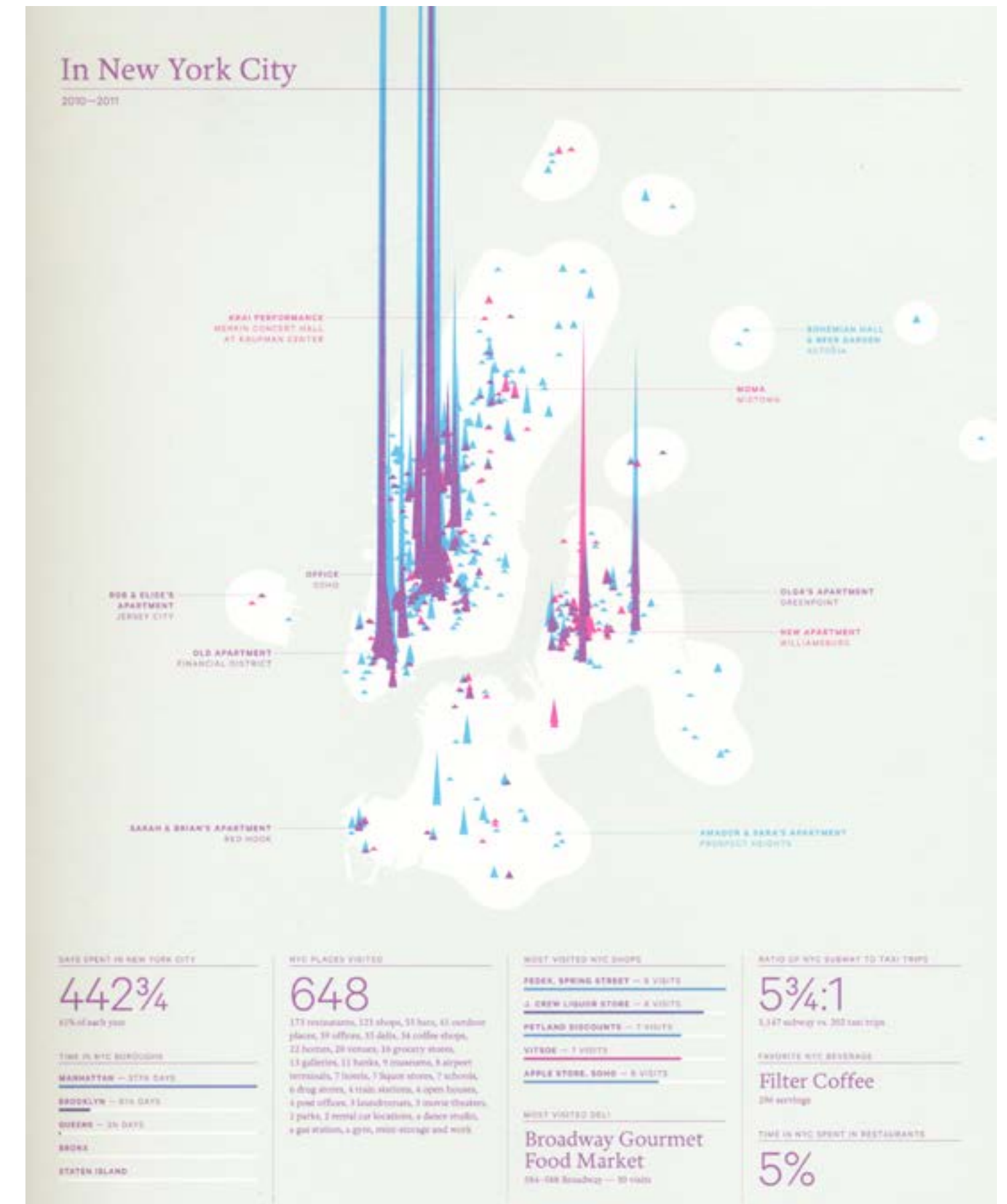


Color segmentation

Nicholas Felton

Colors must be visually distinct to support visual search and learnability.

A strong pop-out effect depends both on the other colored objects and on the background color.



Human vision

“It is because the brain is sensitive to differences and not absolute values that we can reproduce a reasonable facsimile of a beach scene at the movie theatre, despite the fact that there may be one-hundredth the amount of light reflecting from the screen compared to the real world scene.” -Colin Ware



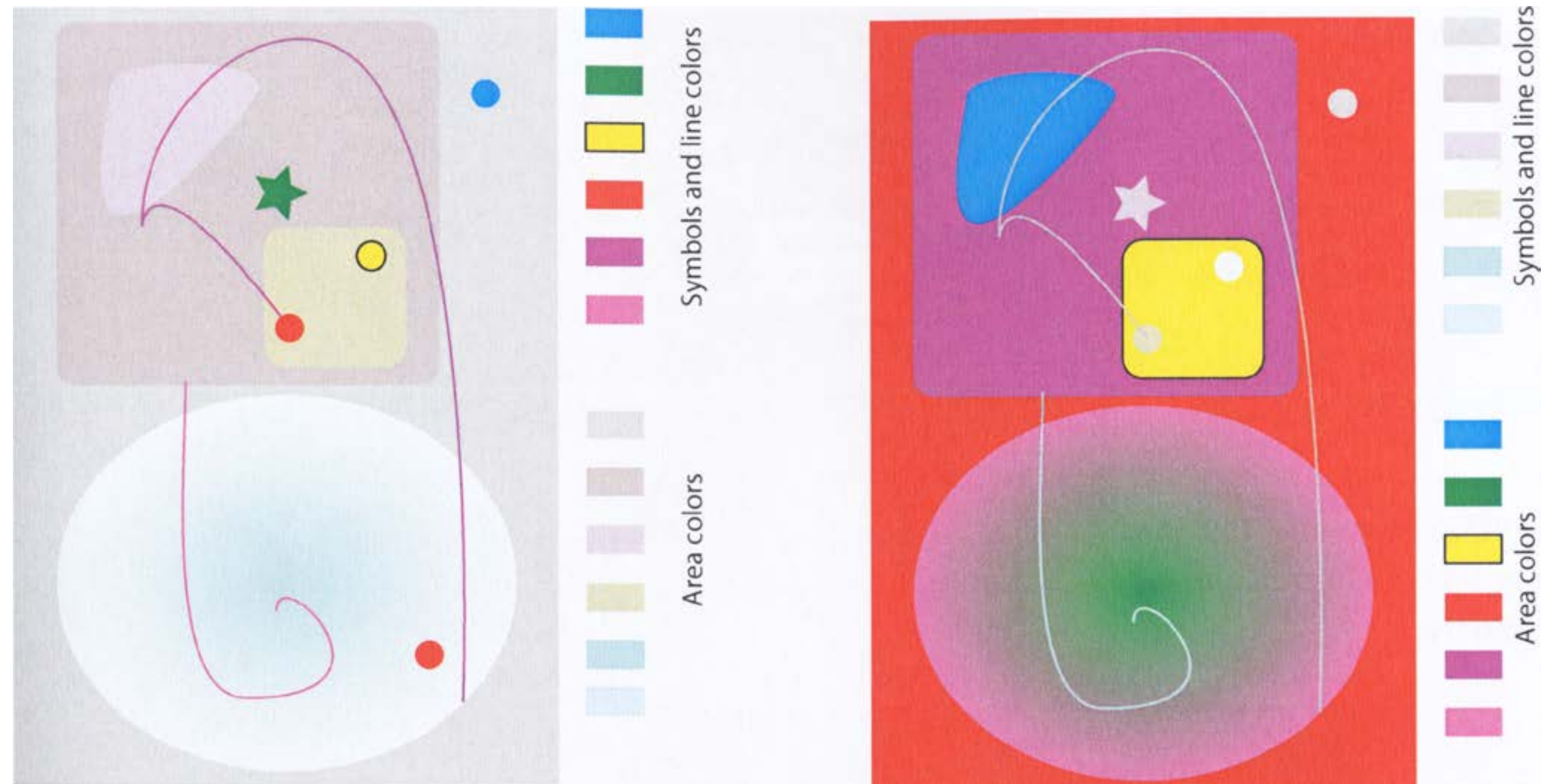
Human vision

The same is true for chromatic contrast.



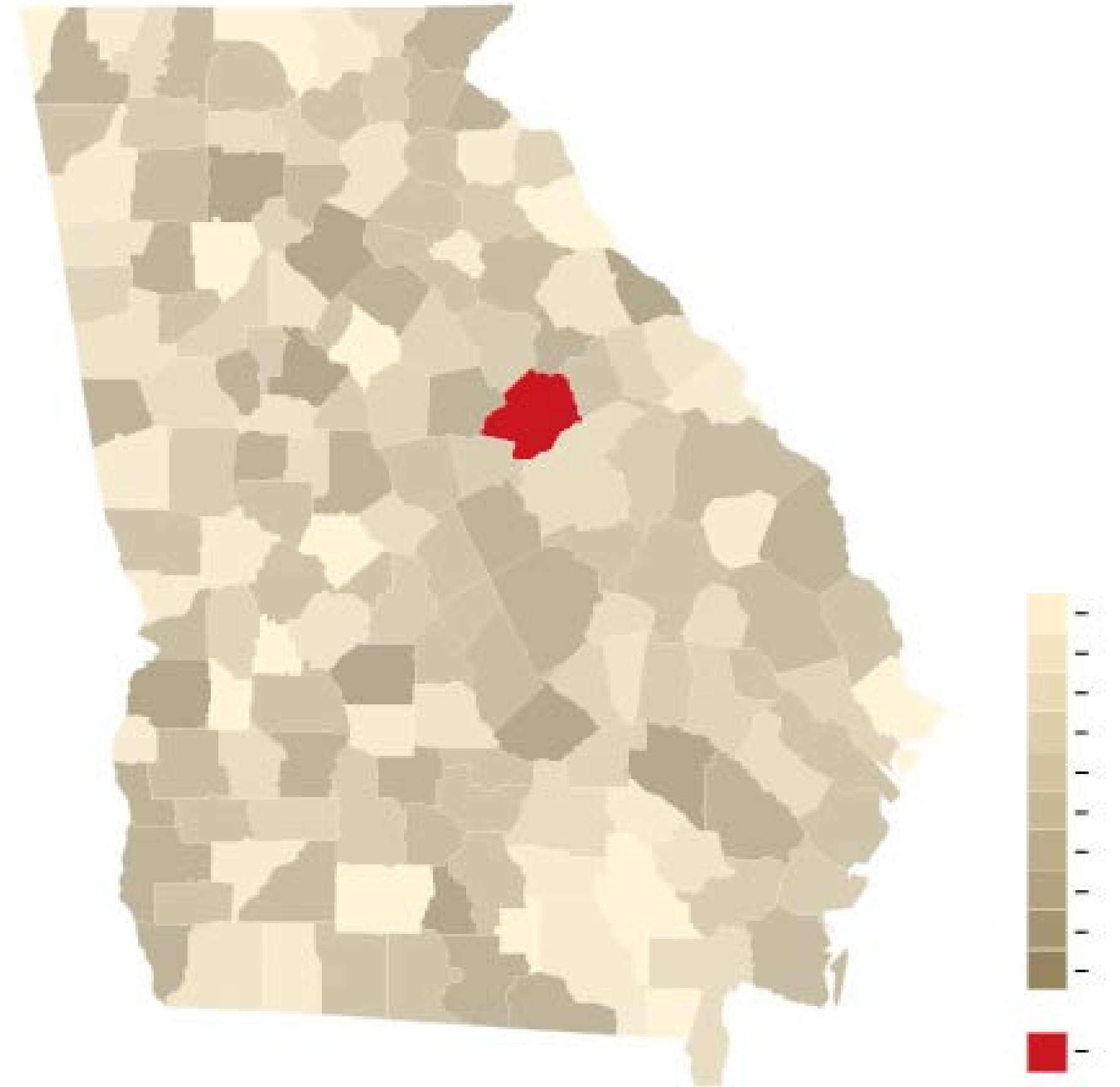
Saturation

Use high saturation in small areas. Because we are far more sensitive to seeing color differences in large areas, strong color differences are unnecessary for large objects and backgrounds.



Saturation

The zero-point should be more neutral, less saturated. Greater quantities should be more saturated.



Questions?

For next week

Reading

- Effective Data Storytelling chapter 4 (pdf)
- Narrative Visualization (pdf)
- 2 short articles about disabilities (linked)

Discussion

- **2 short articles about disabilities**

The first is about the ADA. The American Disabilities Act (ADA) defends the rights of people with a variety of disabilities to participate in activities enjoyed by people without disabilities. This article discusses ADA-based lawsuits of art galleries. The second article is about disabled artists and how they are interacting with the art world.

Think about the various points of view involved and present your own. Please make your entry short and to the point. Also, please respond to at least one other comment in the discussion this week.

Assignment

Make a visualization more inclusive

Pick a previously made visualization and remake it to be more inclusive. Think about the situations your visualizations may be present in, both because of your chosen format, and diversity of the audience.

Format: Choose a specific format and create an artboard (or artboards) that reflects the relative proportions. Examples of formats: Mobile device (vertical, scrollable layout or swipeable slides), Poster, Pamphlet, or Booklet, etc. Your design may need to change significantly to make it more inclusive. Submit this assignment as a PDF.

Assignment

Make a visualization more inclusive

Content: You may pick a visualization you've previously made, or use another existing one that appears exclusionary. Some methods to make it more inclusive:

- Descriptive introduction of what the visualization shows, clear labels
- Direct labeling
- Include values along with visual representations of them
- Sufficient contrast and color segmentation
- Appropriate text size and clear hierarchy
- Optionally, choose a different visualization type