

Formalizing Glyphs

A Samuel Pottinger
Stat 198: IDSV
Mar 3, 2025

End of the second section.

Cleveland and McGill + Others:

Today we are moving from meeting the ingredients to understanding when to use them.

> Cleveland and McGill: ranking of encodings.

Group activity: which graphic is more likely to be read accurately?

Working in limitations: shared axes, dual axes, and direct labeling.

Revisiting chart junk: how to keep channels clear.

Cleveland and McGill

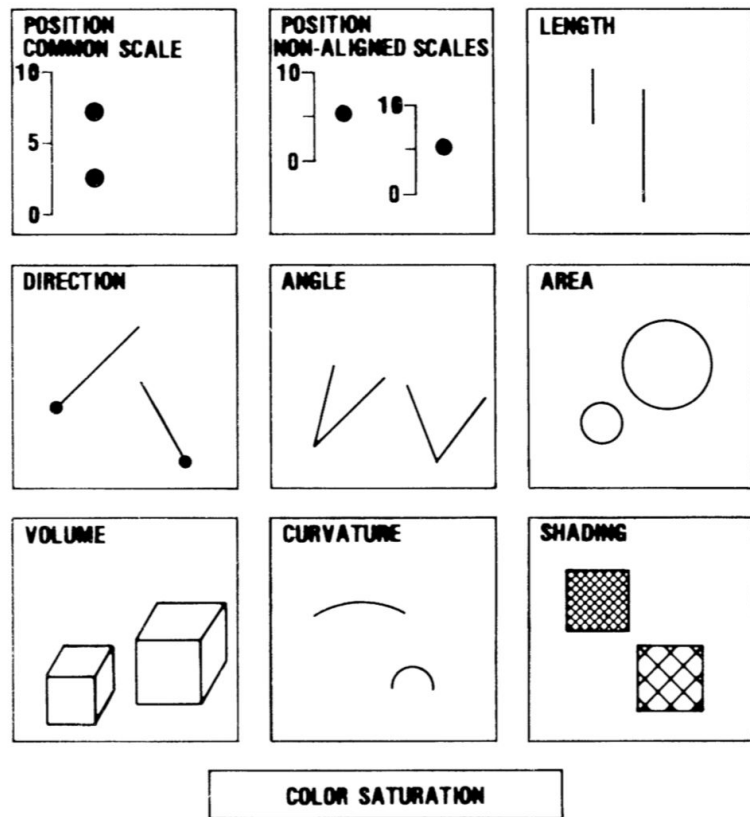


Figure 1. Elementary perceptual tasks.

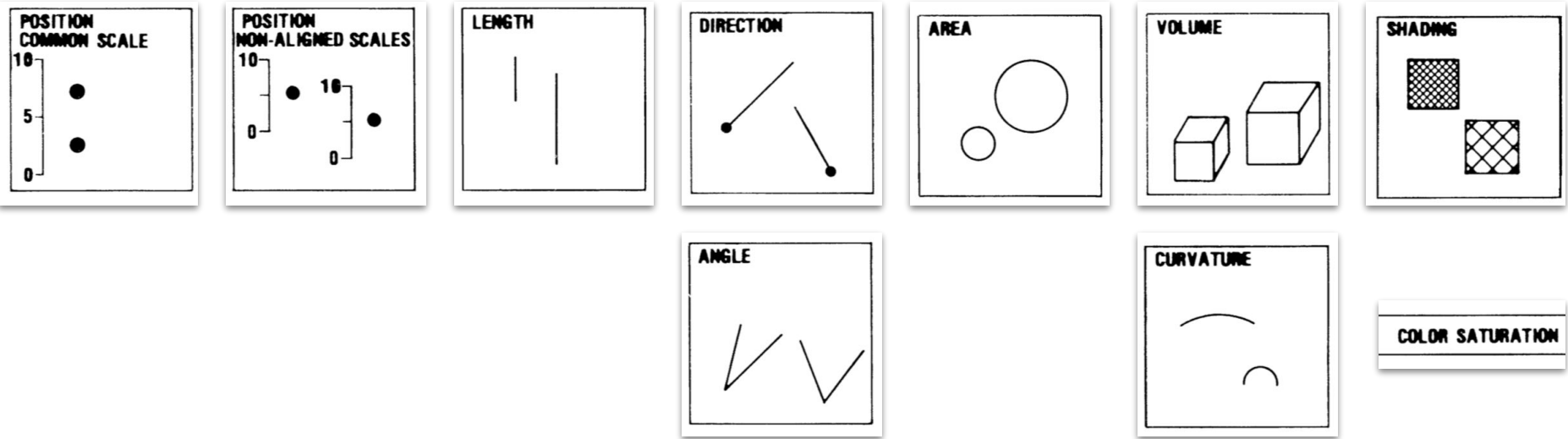
We've explored why pre-attentive features exist and how glyphs are processed.

However, what is the right design of glyphs?

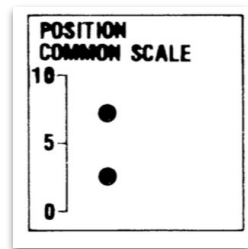
Presenting on Cleveland and McGill in addition to some work that came after as cited.

Fairly robust hierarchy

Higher Accuracy ————— Lower or Inconsistent

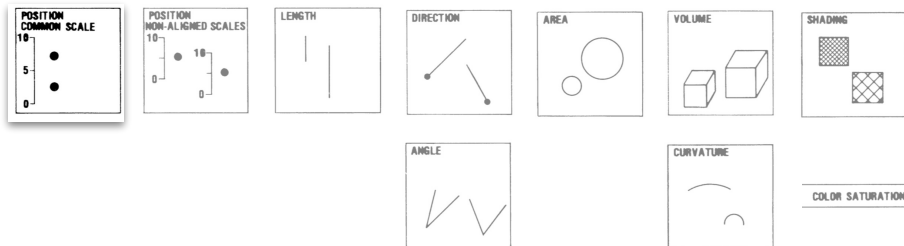


Fairly robust hierarchy

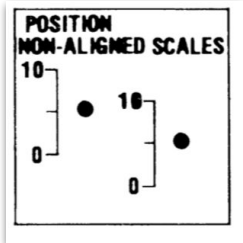


The highest accuracy encoding device is potentially not surprising as it underpins scatter plots.

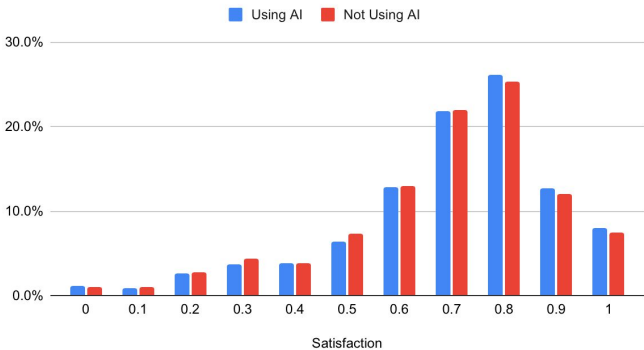
Going to back to preattentive features and the Gestalt Principles, position is really the first choice.



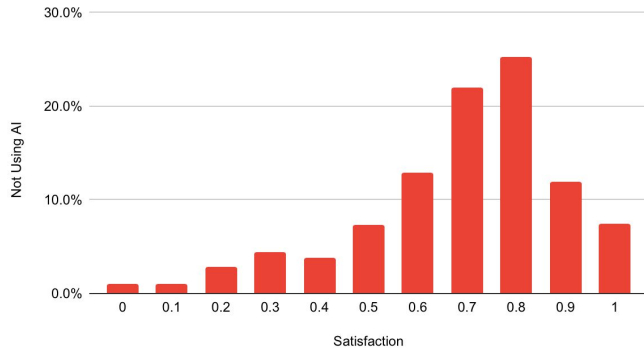
Fairly robust hierarchy



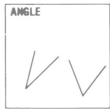
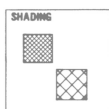
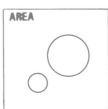
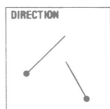
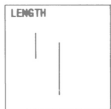
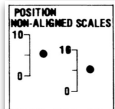
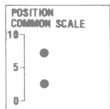
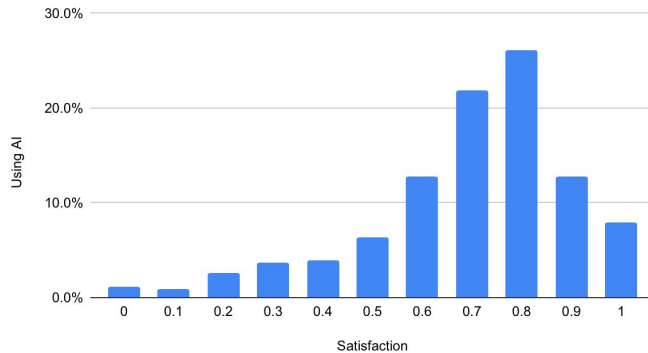
Satisfaction Using AI and Not Using AI



Satisfaction Not Using AI

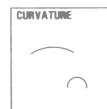
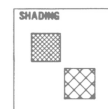
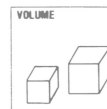
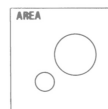
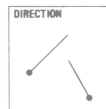
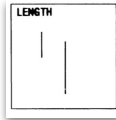
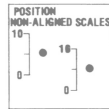
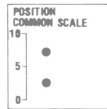
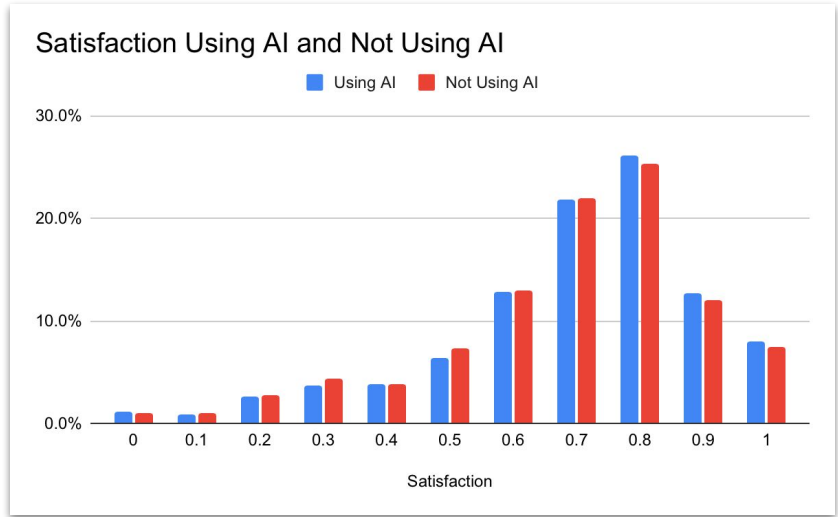
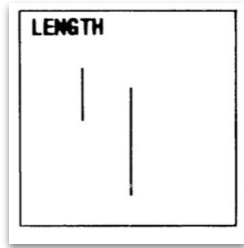


Satisfaction Using AI



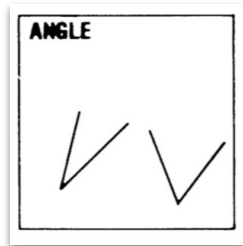
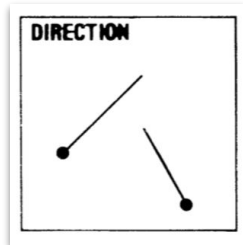
COLOR SATURATION

Fairly robust hierarchy



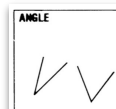
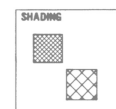
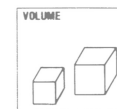
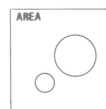
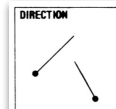
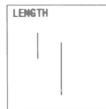
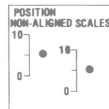
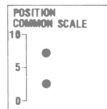
COLOR SATURATION

Fairly robust hierarchy



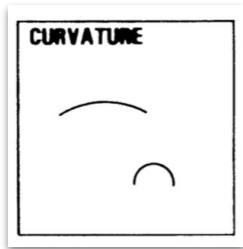
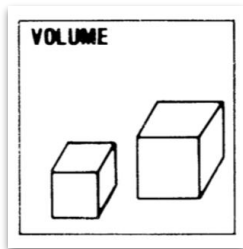
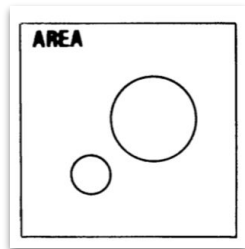
I am placing length higher than direction (slope) and angle because of consistency. There's evidence that we do better with angle closer to cardinal directions.

This is why pie charts may perform relatively poorly. Length typically has an easy fix: align against a common axis.



COLOR SATURATION

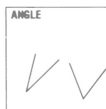
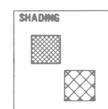
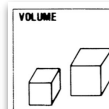
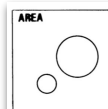
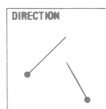
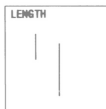
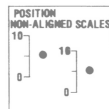
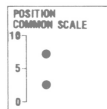
Fairly robust hierarchy



Volume generally never goes well. This may be partially due to 3D representation within 2D media.

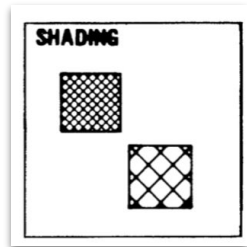
In general, area is good for less important “contextualizing” metrics.

Area has an issue: area vs radius.



COLOR SATURATION

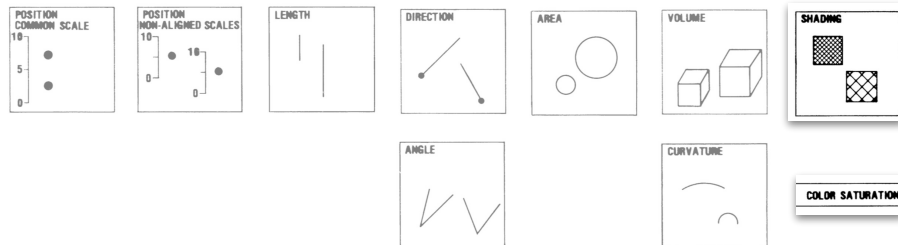
Fairly robust hierarchy



Returning to the lessons of our earlier lectures, color is fairly unreliable. It is often better for branding or complementing a message through emotion and aesthetic than it is for conveying quantitative information.

It may still serve a purpose for a limited number of qualitative groups.

Lightness generally better than hue.



Today

Cleveland and McGill: ranking of encodings.

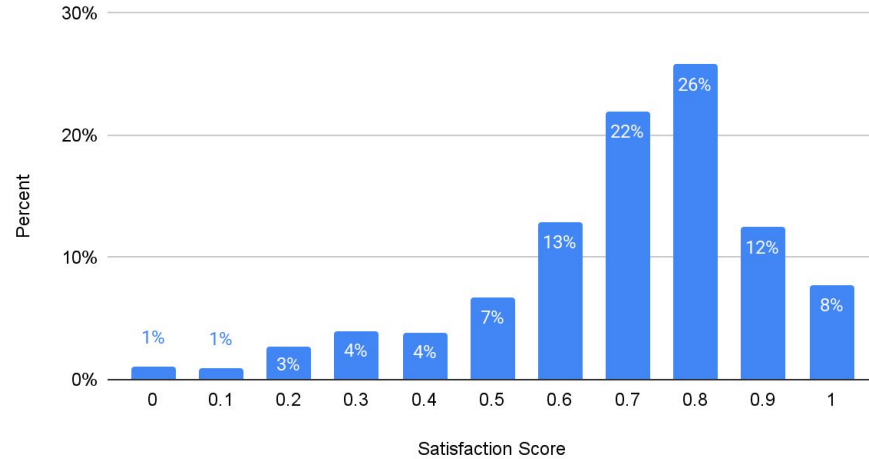
> Group activity: which graphic is more likely to be read accurately?

Working in limitations: shared axes, dual axes, and direct labeling.

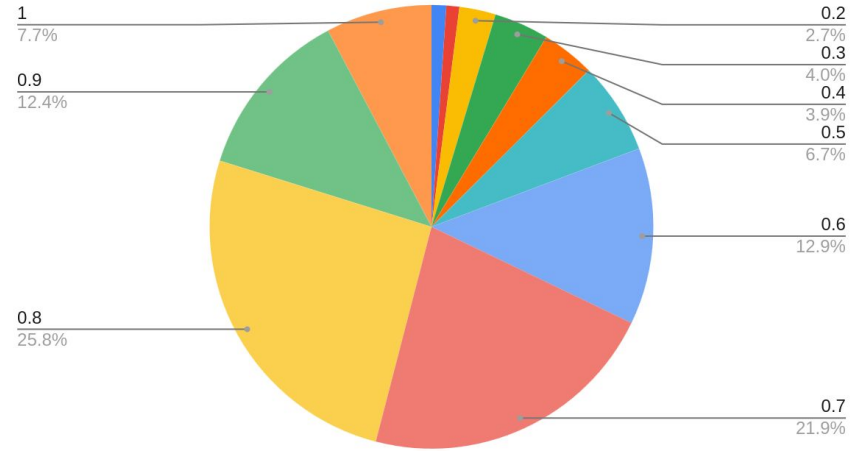
Revisiting chart junk: how to keep channels clear.

Which one is more likely to be successful?

Satisfaction Score Frequency

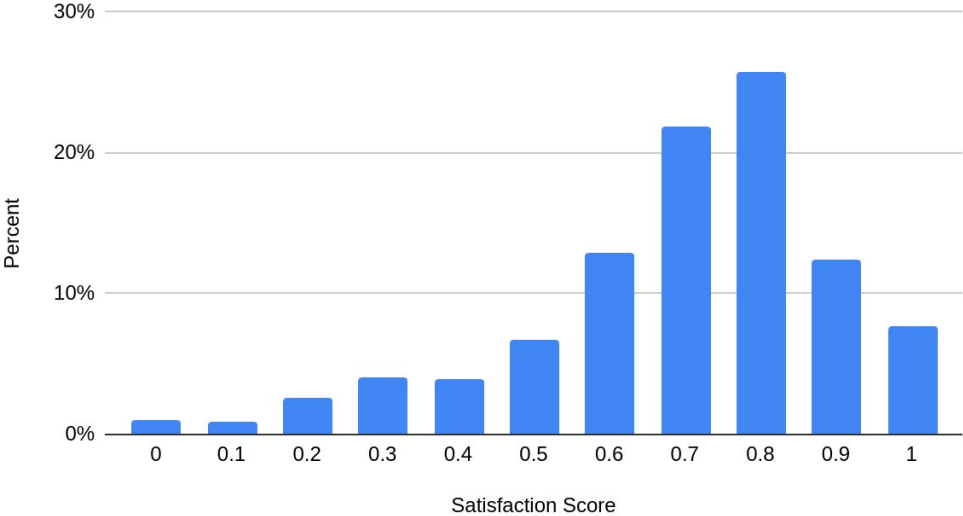


Satisfaction Score Frequency



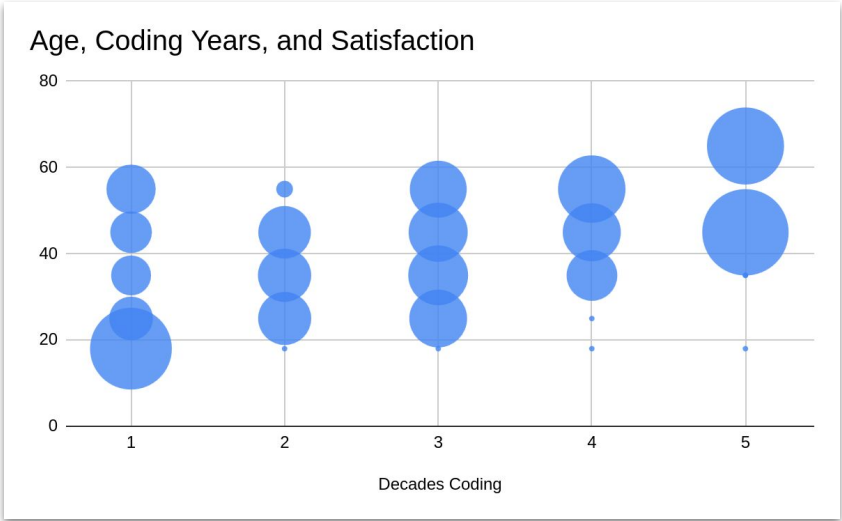
Which one is more likely to be successful?

Satisfaction Score Frequency



Satisfaction Score	Percent
0	
0.1	
0.2	
0.3	
0.4	
0.5	
0.6	
0.7	
0.8	
0.9	
1	

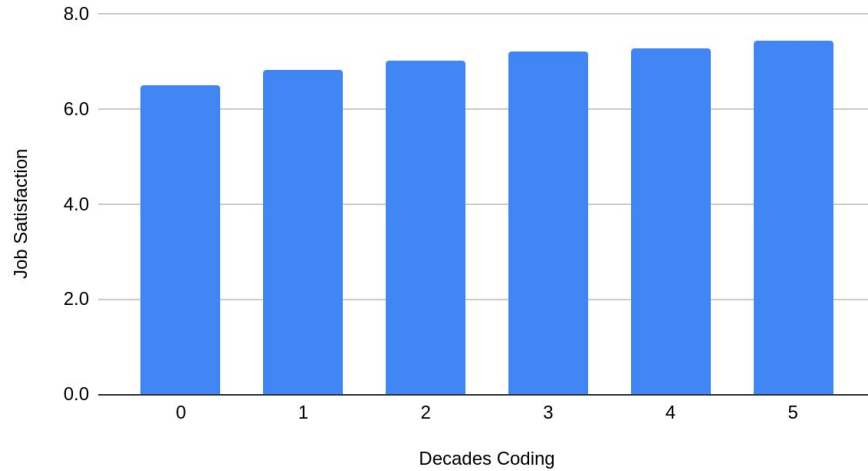
Which one is more likely to be successful?



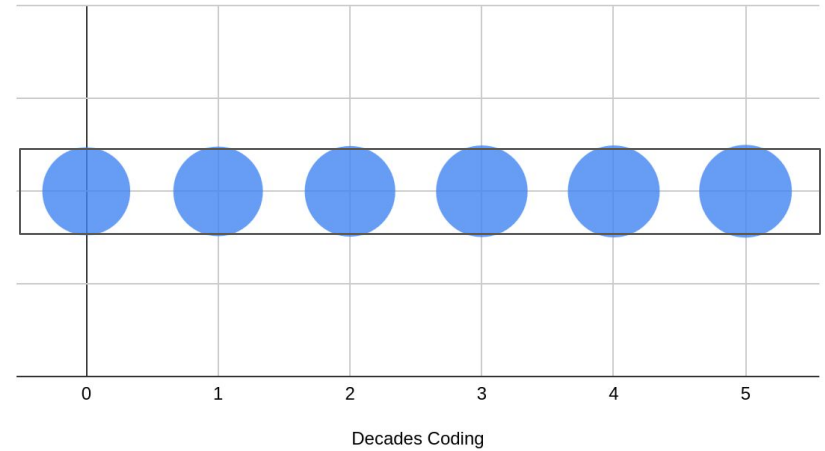
		Decades Coding				
		1	2	3	4	5
Age Group	65					1
	55	1	1	1	1	
	45	1	1	1	1	1
	35	1	1	1	1	
	25	1	1	1		
	18	1				

Which one is more likely to be successful?

Job Satisfaction vs. Decades Coding



Job Satisfaction vs. Decades Coding



Today

Cleveland and McGill: ranking of encodings.

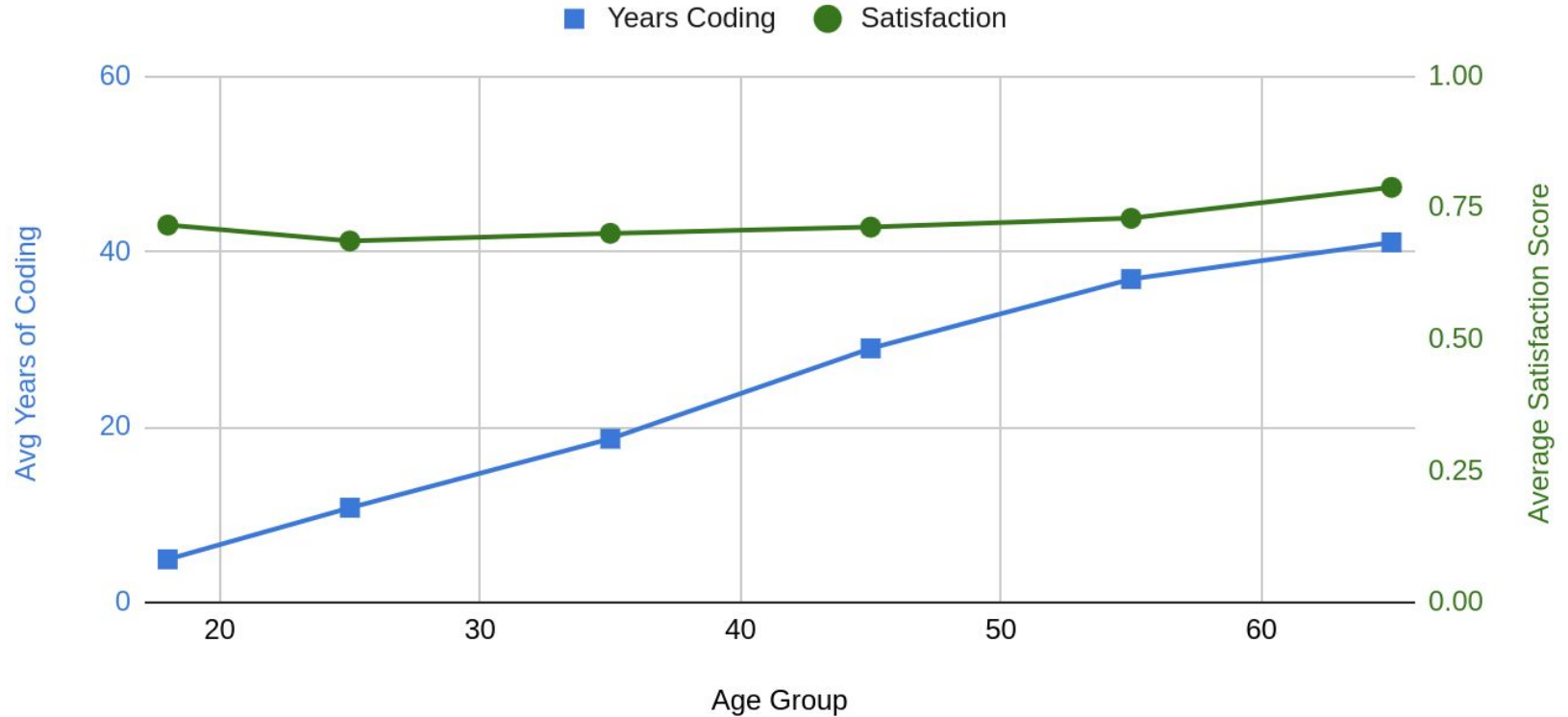
Group activity: which graphic is more likely to be read accurately?

> Working in limitations: shared axes, dual axes, and direct labeling.

Revisiting chart junk: how to keep channels clear.

Dual Axes

Age vs Years of Coding and Satisfaction

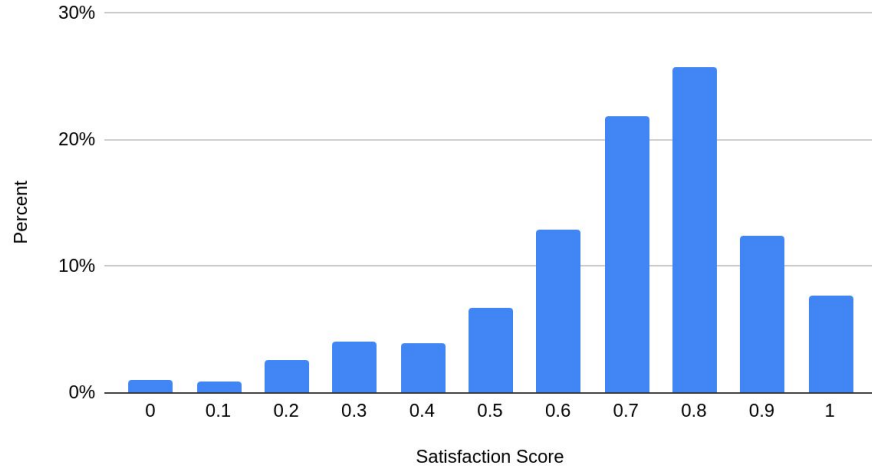


Shared Axes

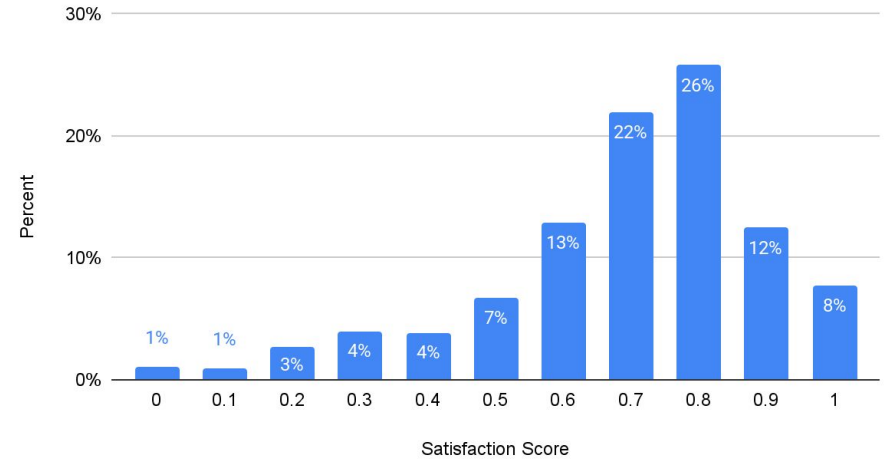


Direct Labeling

Satisfaction Score Frequency



Satisfaction Score Frequency



Today

Cleveland and McGill: ranking of encodings.

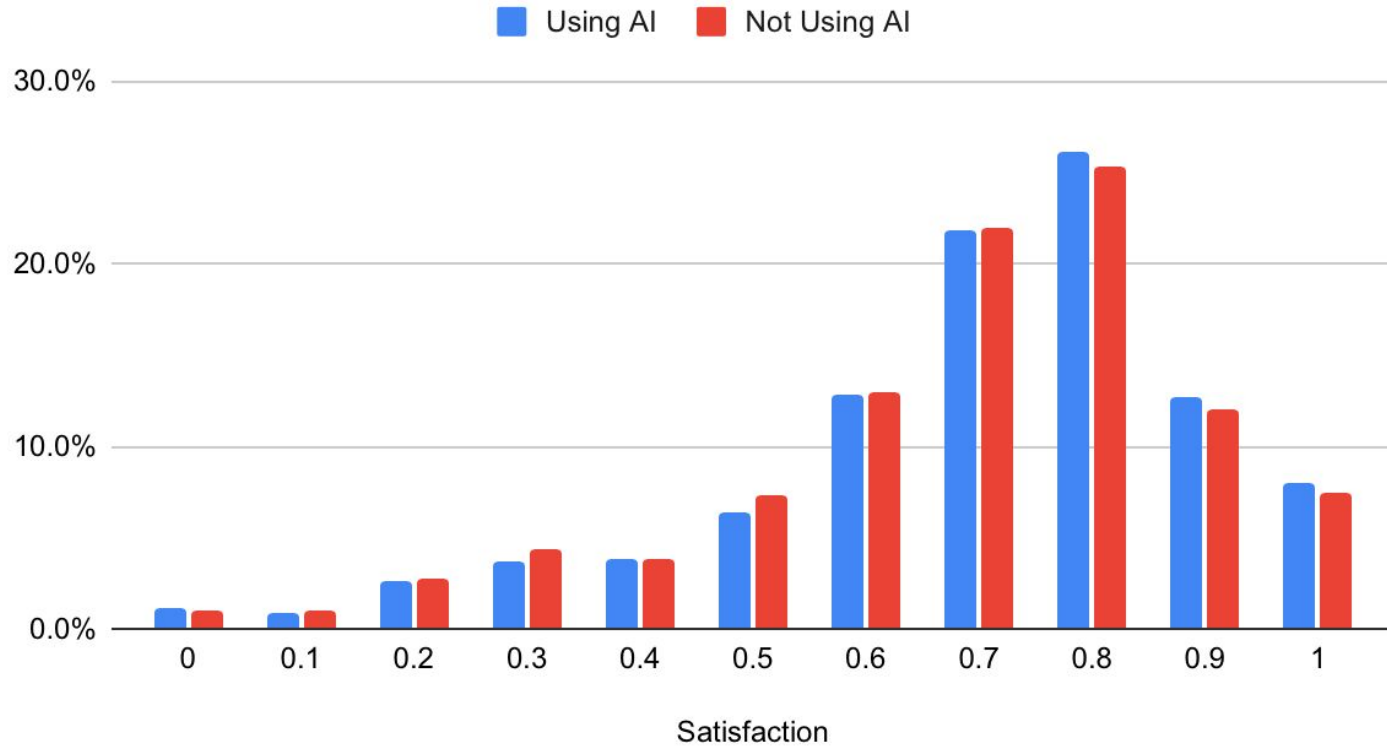
Group activity: which graphic is more likely to be read accurately?

Working in limitations: shared axes, dual axes, and direct labeling.

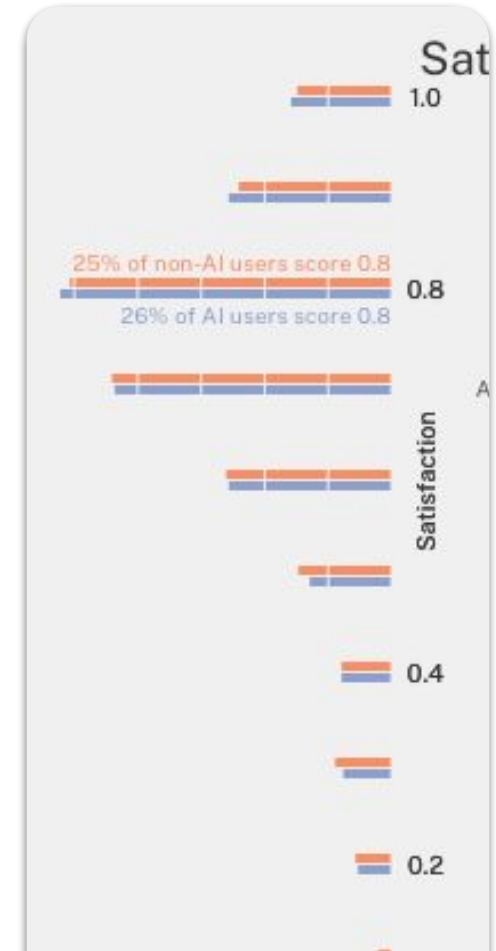
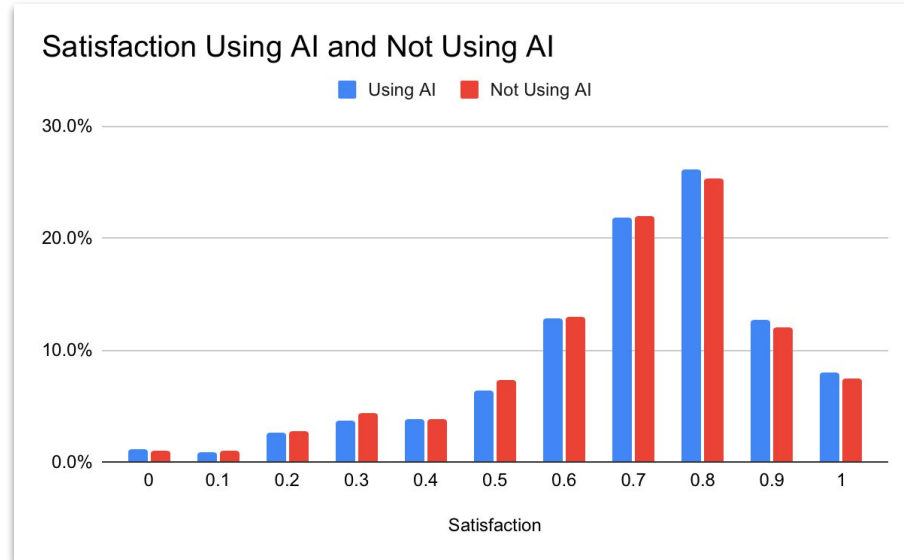
> Revisiting chart junk: how to keep channels clear.

Keeping channels clear

Satisfaction Using AI and Not Using AI



Keeping channels clear



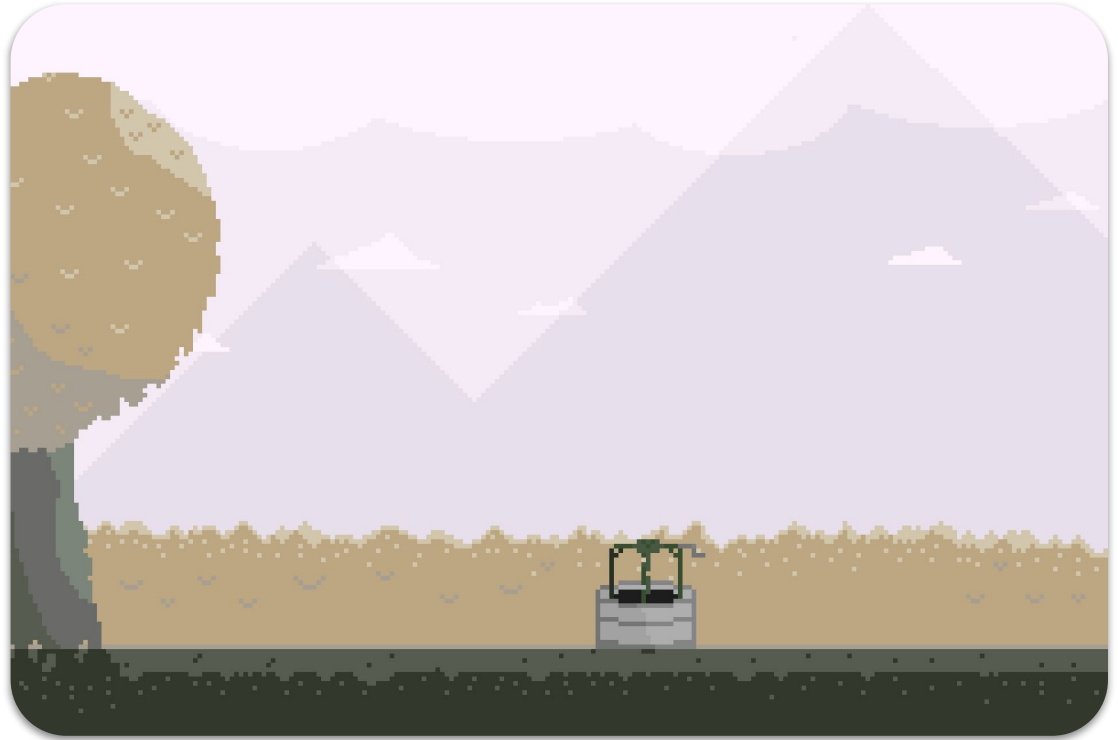
Quick Pause

Cleveland and McGill

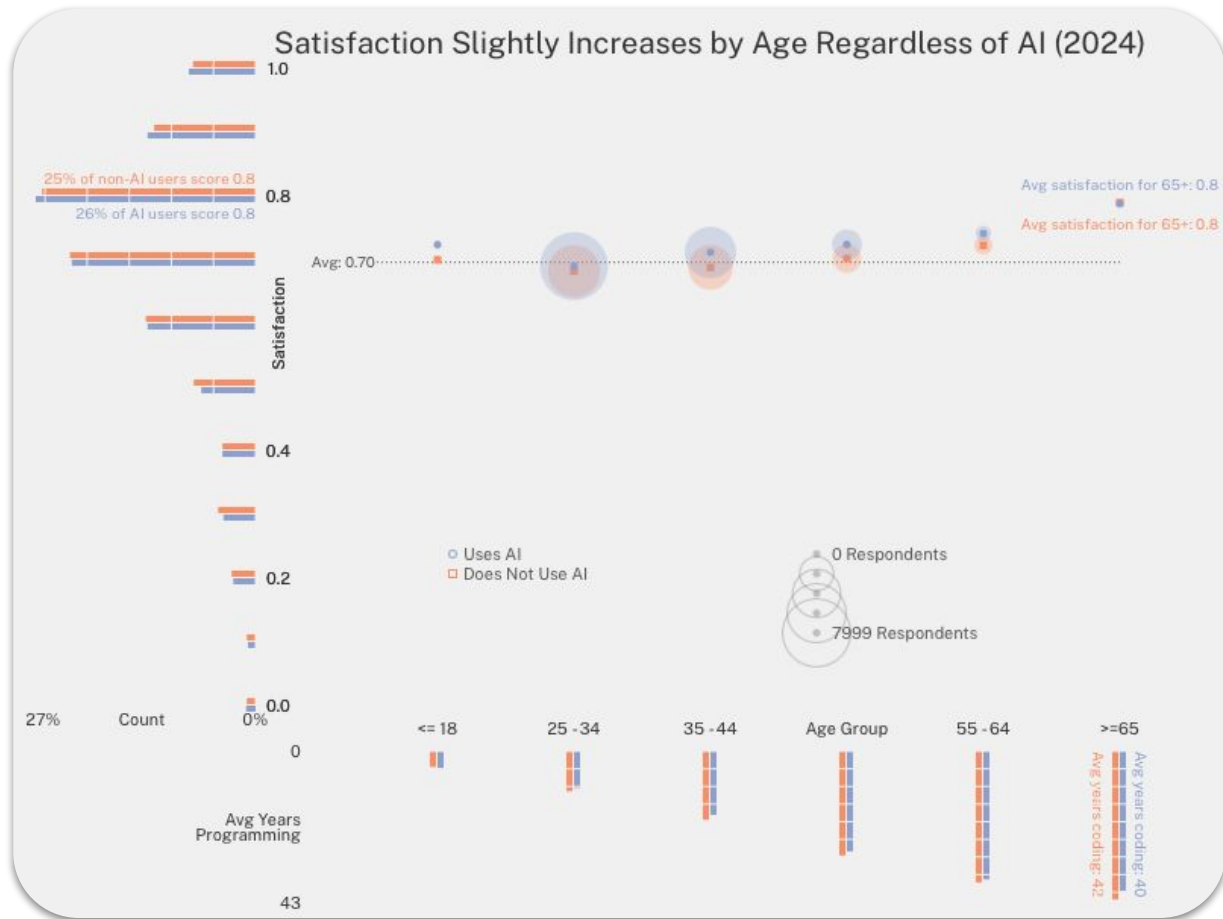
Group activity

Working in limitations

Revisiting chart junk



Quick Pause 1



Upcoming Assignment

Intentional labeling.

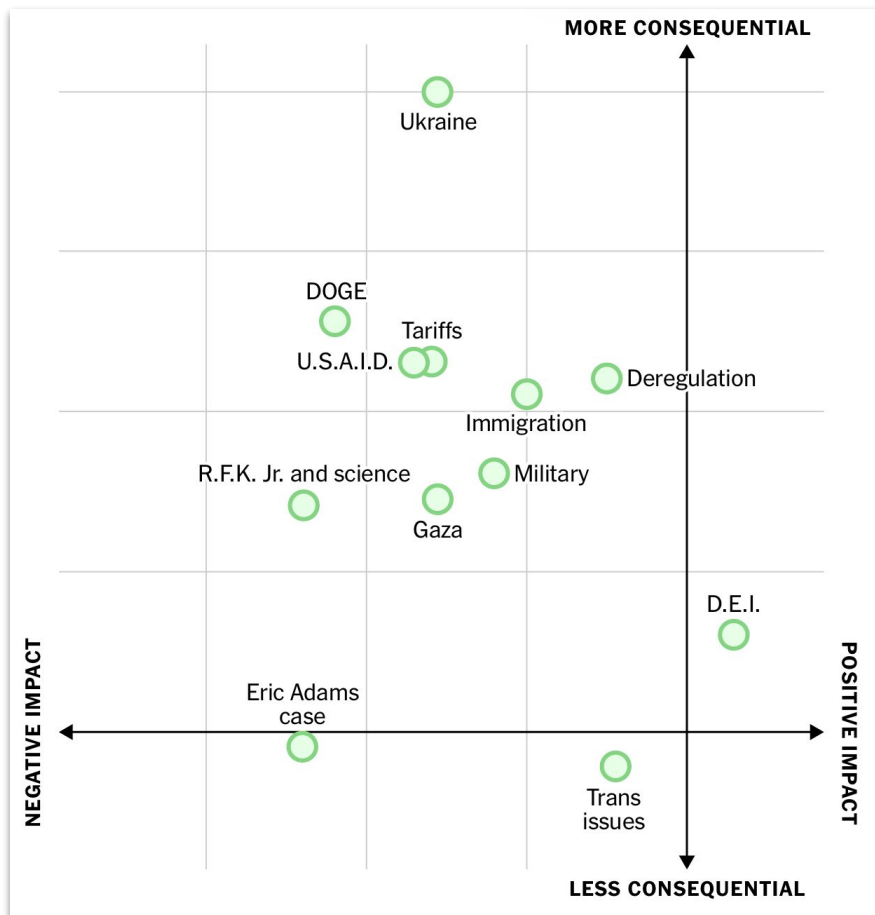
Removal of chartjunk.

Negative space grid.

Shared axes styling.

Future: interaction.

Quick Pause 2



10 Columnists and Writers Rate What Mattered in Trump's First Full Month

By New York Times Opinion

Feb. 28, 2025

Works Cited

A. Pottinger, "TED Visualization," GLeap.org. Available: https://gleap.org/content/ted_visualization

W. Cleveland and R. McGill, "Graphical Perception: Theory, Experimentation, and Application to the Development of Graphical Methods," Journal of the American Statistical Association, 1984. Available: <https://www.jstor.org/stable/2288400>

"Stack Overflow Annual Developer Survey 2024," Stack Exchange Inc, 2024. Available: <https://survey.stackoverflow.co/>

C. Ware, "Information Visualization: Perception for Design (Interactive Technologies)," Morgan Kaufmann, 2012.

A. Cairo, "The Truthful Art," New Riders, 2016.

NYT Opinion, "10 Columnists and Writers Rate What Mattered in Trump's First Full Month," New York Times Company, 2025. Available: <https://www.nytimes.com/interactive/2025/03/01/opinion/trump-administration-first-month.html>.

