



What Makes a Visualization Complex?

Exploring Design Features Related to Visual Complexity

Kylie Lin, Sean Ru, David Rapp, Hui Guan, Cindy Xiong Bearfield

School of Interactive Computing, Georgia Institute of Technology; Department of Psychology, Northwestern University;
Department of Computer Science, University of Massachusetts Amherst

Overly complex visualizations overwhelm their audiences. However, the extent to which design choices impact people's perceptions of visual complexity (the “**amount of detail or intricacy**” in an image²) has not been systematically examined. We ask:

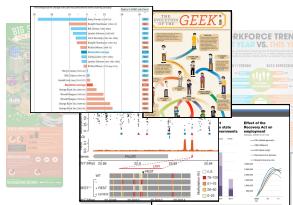
What design features contribute to perceptions of visual complexity?

1 RELABEL THE MASSVIS DATASET

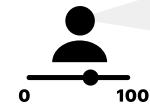
MASSVIS Dataset¹
(5800+ Visualizations)

Design Features
(Text, Color, Data, Design)

Visual Complexity Ratings
(1-100 Slider Response)

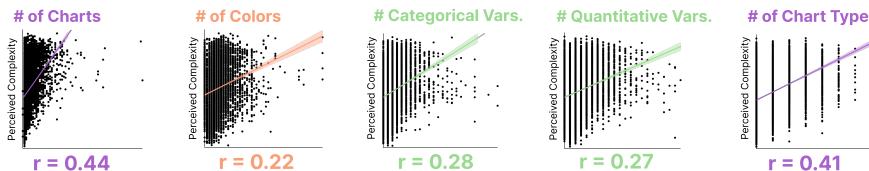


TEXT		Design		
Titles	Captions	Legend Titles	# of Charts	Area
Annotations	Axes Labels	Legend Text	# of Chart Types	Map
Axes Text		Text Only	Bar	Distribution
No Text			Circle	Line
Diagram			Diagram	Text
Data		Color		
# of Quantitative Variables		# of Colors		Black & White
# of Qualitative Variables		Background Color		

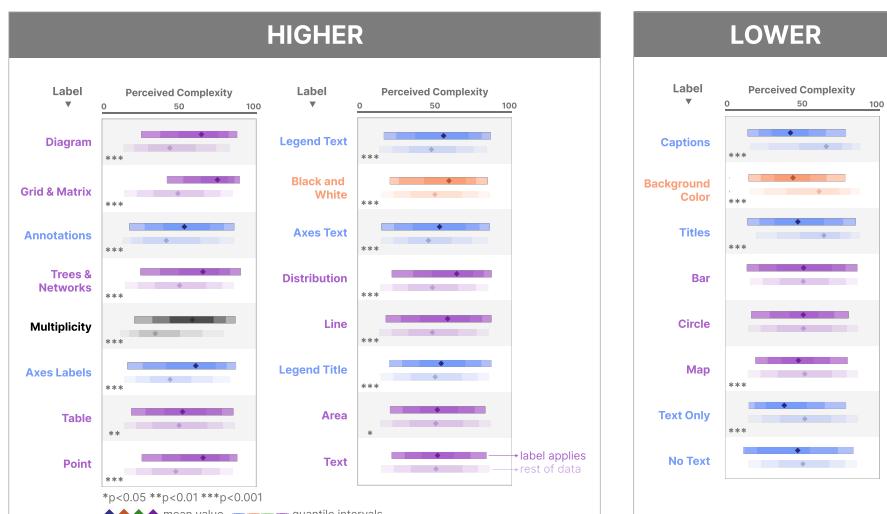


2 ASSOCIATIONS WITH COMPLEXITY

For all continuous labels, higher values correlate with higher complexity:



Mean perceived complexity was higher/lower when certain labels applied to a visualization:



Features ranked by importance, generated by Random Forest model

3 CONCLUSIONS

Intuitive Findings

- The feature with the **most influence** on complexity is the **Number of Charts** in a visualization.
- The **more visual elements** a visualization contains, the greater its perceived complexity.

References

- [1] M. A. Borkin, A. A. Vo, Z. Bylinskii, P. Isola, S. Sunkavalli, A. Oliva, and H. Pfister. What makes a visualization memorable? IEEE transactions on visualization and computer graphics, 19(12):2306–2315, 2013. 1 [2] J. G. Shodgrass and M. Vanderwart. A standardized set of 260 pictures: norms for name agreement, image agreement, familiarity, and visual complexity. Journal of experimental psychology: Human learning and memory, 6(2):174, 1980. 1

Scan Here

To view our poster online:
[→](#)



For Related Work

See our poster on chart types:
[→](#)



KYLIE R. LIN *lead author*
klin368@gatech.edu
<https://kylierlin.github.io>

