Eliciting High-Level Visual Comprehension: A Qualitative Study

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Do users actually see the information the designer intends to communicate?

Motivation

High-level comprehension describes the overall knowledge a viewer intuitively gains about the data without explicit cueing or guidance. However, perceptual studies on the evaluation of visualization effectiveness typically focus on measuring people's abilities to estimate individual, pre-specified statistical quantities. **We explore data interpretation and communication more holistically to bridge the gap between visualization designers and consumers by understanding what graphs intuitively communicate.**
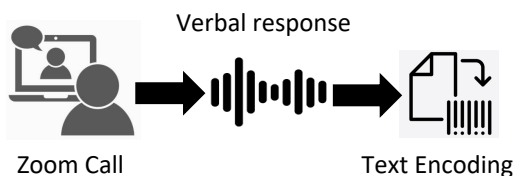
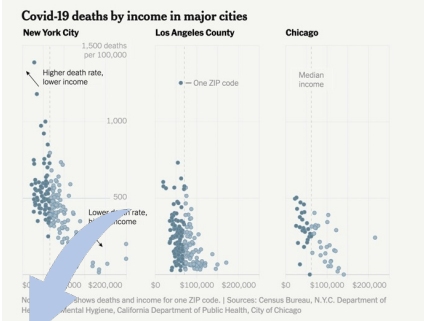### Participants and Graphs

10 X

5 X

Academia 5
Industry 3
Expert 2

Five graphs from New York Times.

Experimental Design
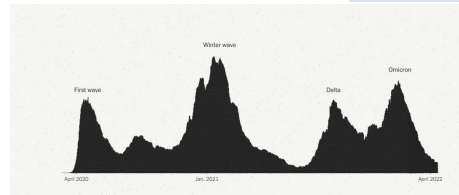

Zoom Call → Verbal response → Text Encoding
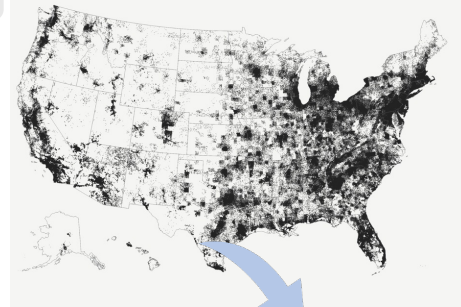
Task: Describe what you see in the graph.

8 X
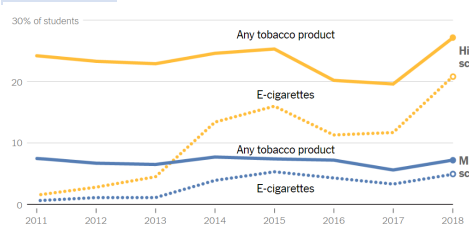
Partial match with designer's objective

3 X

4 X

Data
6 X deaths are **concentrated** in low-income regions.
3 X datapoints **represent** death & income for a zip.
2 X **compared** death count across cities.
1 X **correlation** between death & income in NYC.

Data
4 X darker-regions reflect **higher** quantity .
4 X noted **skew** of data on east coast.
3 X map points to highly **concentrated** regions.
3X east coast & extreme west-coast have more **quantity**.

Design
3 X overloaded. 2 X complicated.
3 X missing color legend.
1 X every subgraph annotates different info.

Design
5 X lacks a scale.
2 X asked for more info about the data and the graph.
2 X misleading graph.
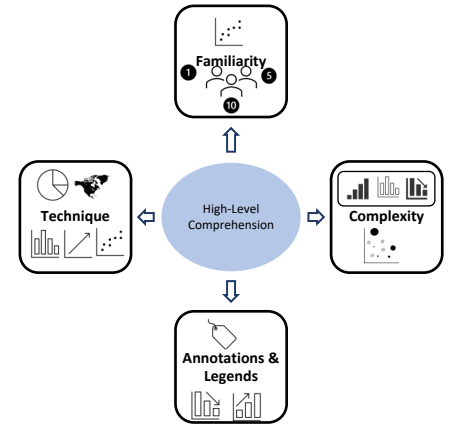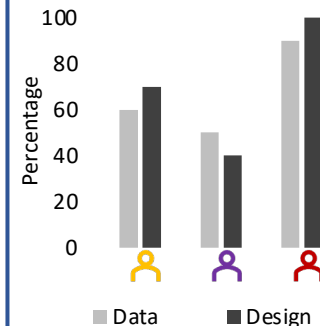
Complete match with designer's objective

10 X

No match with designer's objective

0 X
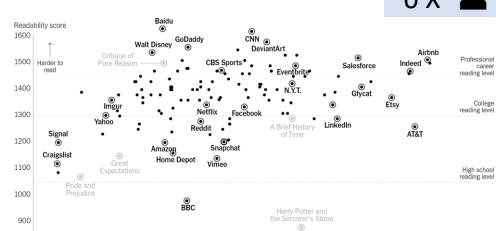
Data vs. Design Interpretation

Data | Design

Familiarity — Technique — High-Level Comprehension — Complexity — Annotations & Legends

Conclusion and Future Work

High-level comprehension is essential in public data communication, journalism, media, and education. We offer preliminary steps towards understanding what visualizations intuitively communicate to users, exploring high-level data interpretation and communication more holistically to bridge the gap between visualization designers and consumers. We will extend this subset of study by exploring a larger range of 1) design choices, 2) datasets, and 3) populations to generalize the findings and explore what factors hinder or improve comprehension.

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CIFellows 2021

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