

Exploring the Hierarchical Nature of Visual Comprehension Through the Lens of Individual Background

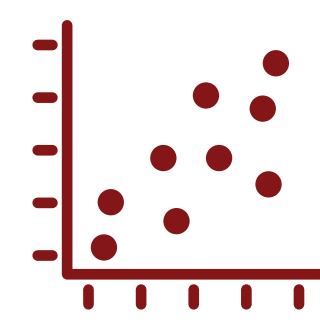


Faraz Naeinian*, Arran Zeyu Wang^, Danielle Albers Szafir^, and Ghulam Jilani Quadri*
*University of Oklahoma ^University of North Carolina at Chapel Hill

High-level comprehension describes the overall knowledge a viewer intuitively gains about the data without explicit cueing or guidance. However, the high-level comprehension significantly differ depending on individual's background.

We explored the hierarchical nature of visual comprehension, examining how factors such as individuals' backgrounds, education, profession, and graphical literacy affect their ability to understand statistical information in a graph.

EXPERIMENT PROCEDURES



1. STIMULUS SELECTION

Eight scatterplot stimuli were chosen based on the work of Quadri et al. [1]



2. PARTICIPANT RECRUITMENT

Ten participants from diverse backgrounds, including education and various professional fields.

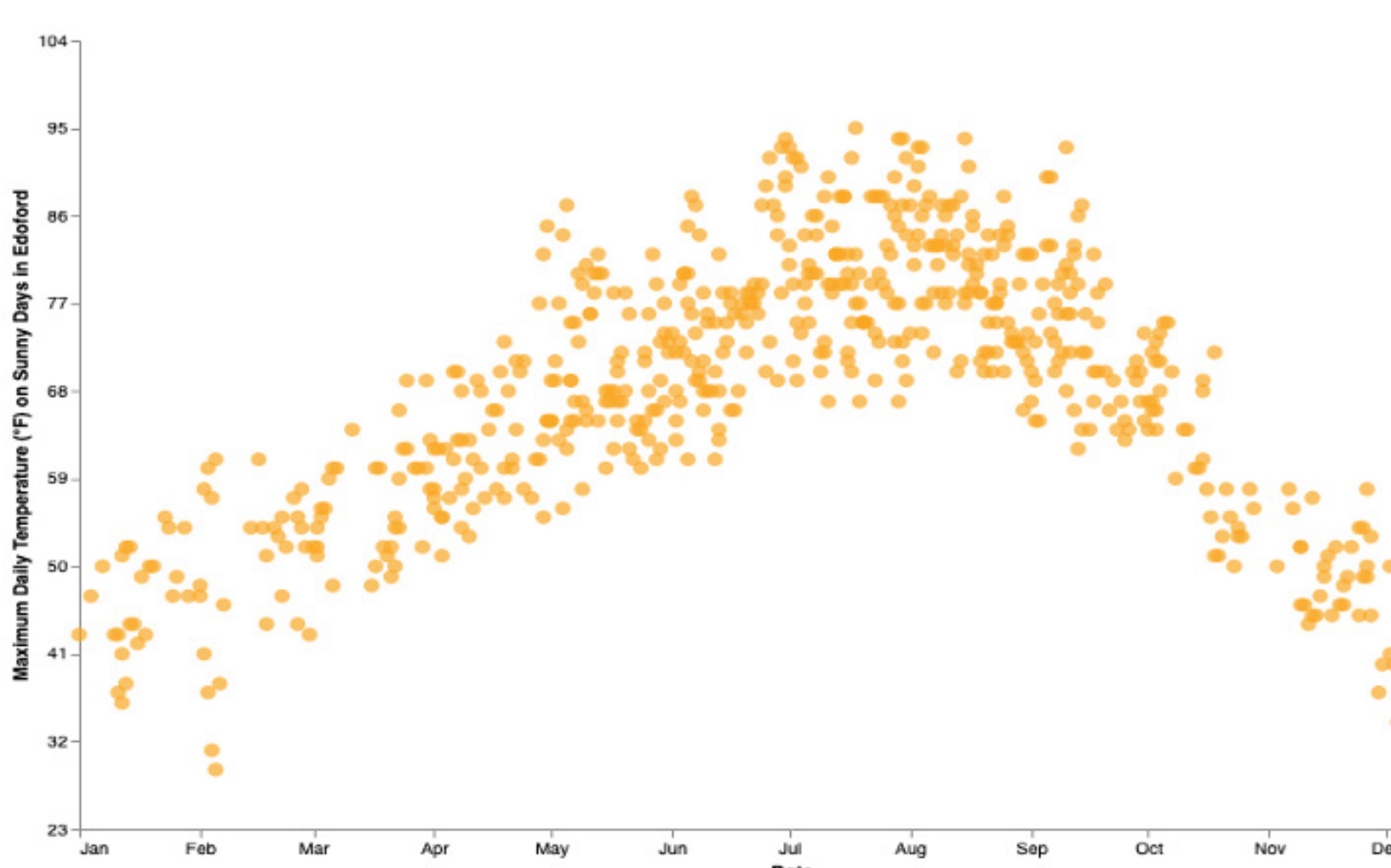


3. DATA COLLECTION

Participants engaged in a Zoom call where their verbal responses were recorded for axial encoding analysis.

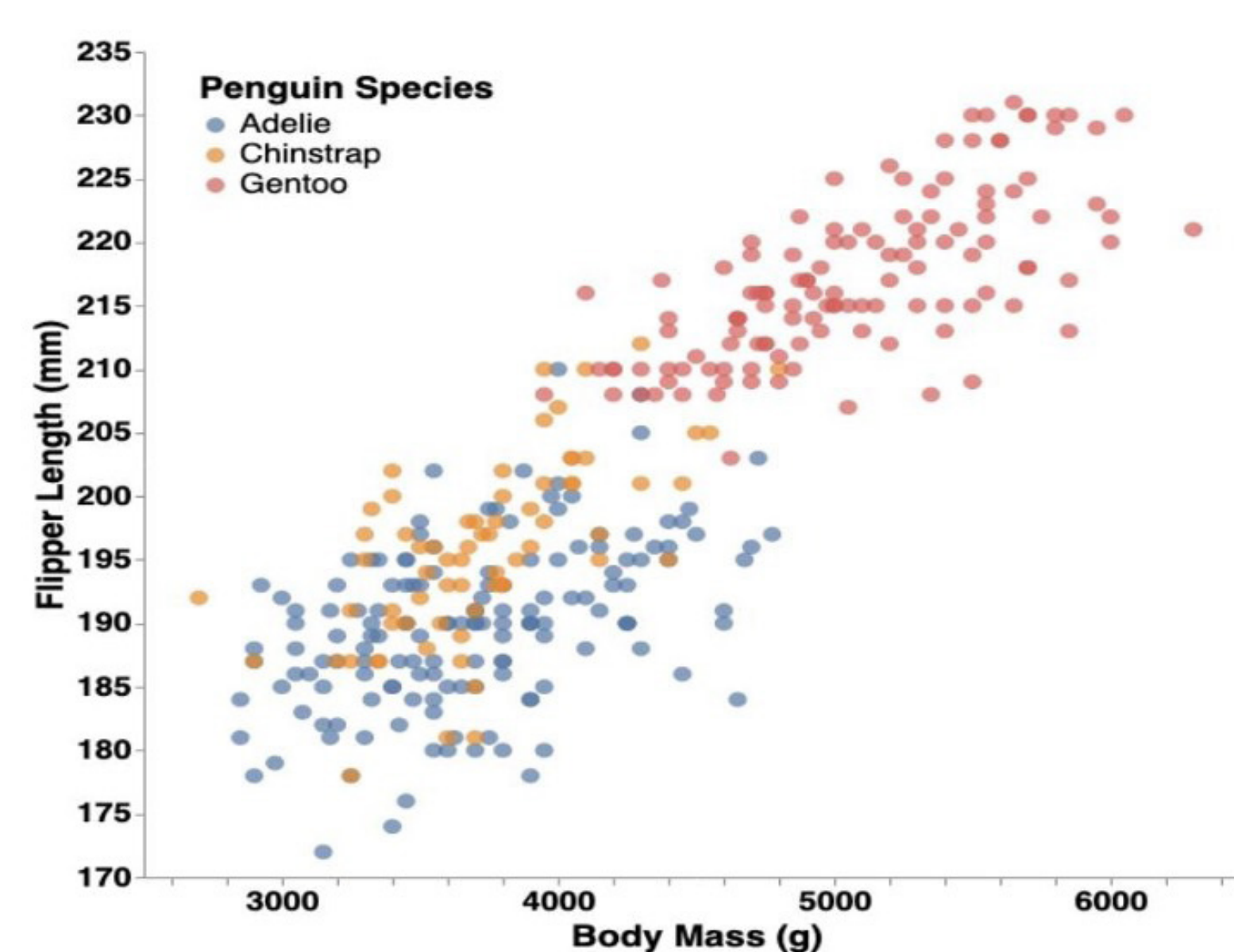
RESULTS

STUDY TASK Describe what you see in the graph.



Participant [P06] identified **correlations between sunny days and temperature** aligning with designer's intent.

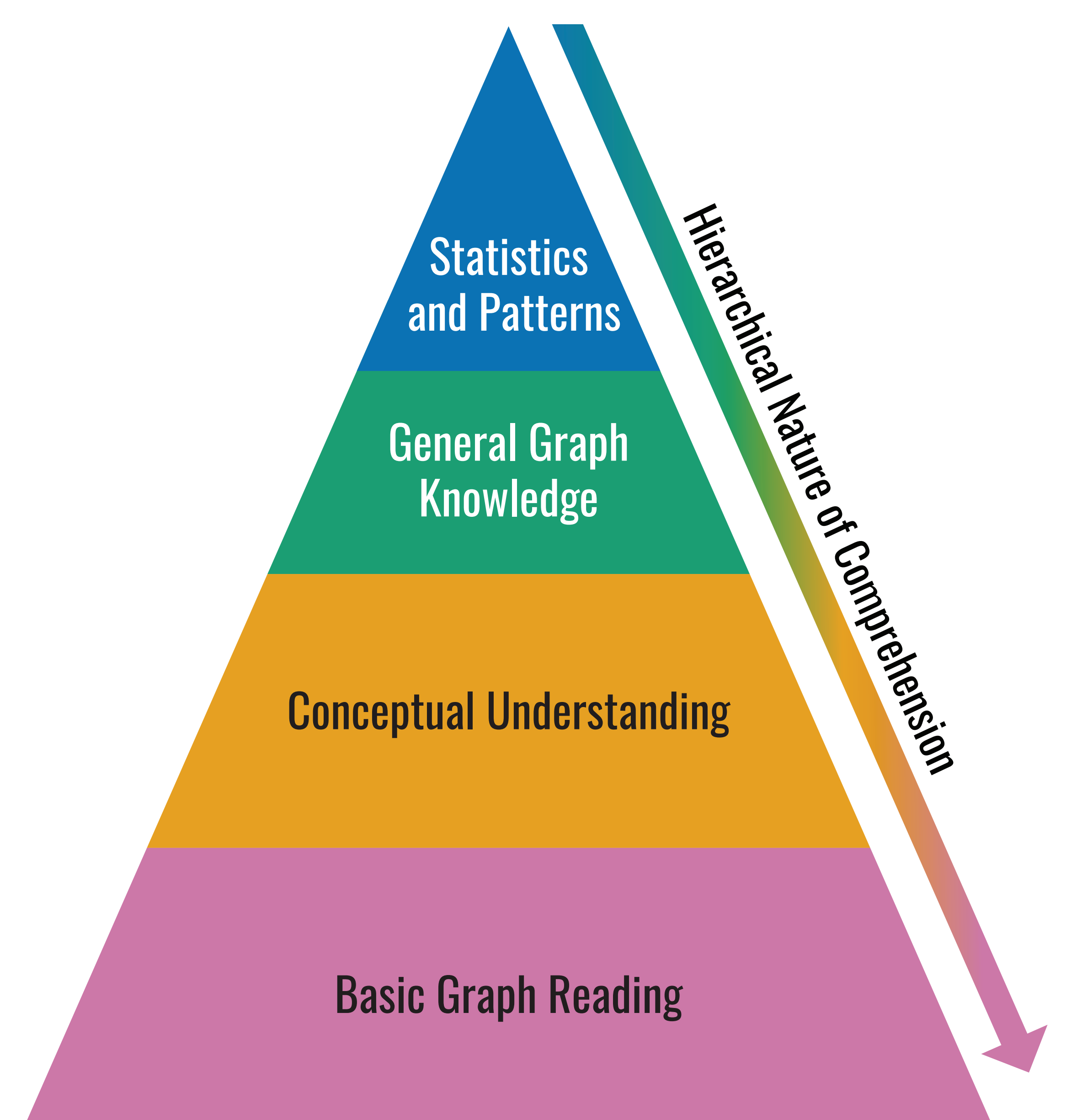
Participant [P02] struggled with graphs interpretation, **only able to "read" graph.**



Participant [P04] identified **general species differences but missed statistical insights.**

Participant [P09] comprehend **information about data but missed overall message and statistics.**

The Hierarchy of Visual Comprehension



DISCUSSION AND FUTURE WORK

High-level comprehension is essential in public data communication, journalism, media, and education. We offer preliminary steps towards understanding the hierarchical nature of visual high-level comprehension and how various backgrounds, for example, education, profession, or graphical literacy, influence levels of visual comprehension. We will extend this subset of study by exploring a larger range of 1) visualization types, 2) datasets, and 3) diverse populations to generalize the findings and explore what factors hinder or improve comprehension.

REFERENCE

[1] G. J. Quadri, A. Z. Wang, Z. Wang, J. Adorno, P. Rosen, and D. A. Szafir. Do you see what i see? A qualitative study eliciting high-level visualization comprehension. In ACM SIGCHI Conference on Human Factors in Computing Systems, pp. 1–26, 2024.