

UC Merced

Proceedings of the Annual Meeting of the Cognitive Science Society

Title

What is graph comprehension and how do you measure it?

Permalink

<https://escholarship.org/uc/item/6wx5v99w>

Journal

Proceedings of the Annual Meeting of the Cognitive Science Society, 45(45)

Authors

Lloyd, Hannah
Huey, Holly
Brockbank, Erik
et al.

Publication Date

2023

Peer reviewed

What is graph comprehension and how do you measure it?

Hannah Lloyd

University of California, San Diego, La Jolla, California, United States

Holly Huey

University of California, San Diego, La Jolla, California, United States

Erik Brockbank

University of California San Diego, San Diego, California, United States

Lace Padilla

UC Merced, Merced, California, United States

Judith Fan

University of California, San Diego, La Jolla, California, United States

Abstract

Data visualizations are indispensable to modern scientific communication. As such, improving graph comprehension is a crucial target for STEM education. Unfortunately, there is no strong agreement on the components of graph comprehension nor how to measure it reliably, partly because no studies have compared the different measures directly. Here we administered two common graph comprehension assessments to the same individuals ($N = 1,140$) and analyzed their performance and error patterns. Our results suggest that these assessments measure a suite of abilities rather than a single construct. However, these abilities do not correspond to the categories that guided the design of either test. We find convergence between results obtained in a U.S. university and a U.S. demographically-representative sample, including an association between test performance and formal mathematics training. These findings raise fundamental questions concerning the mental representations that account for detailed patterns in how people answer questions using graphs.