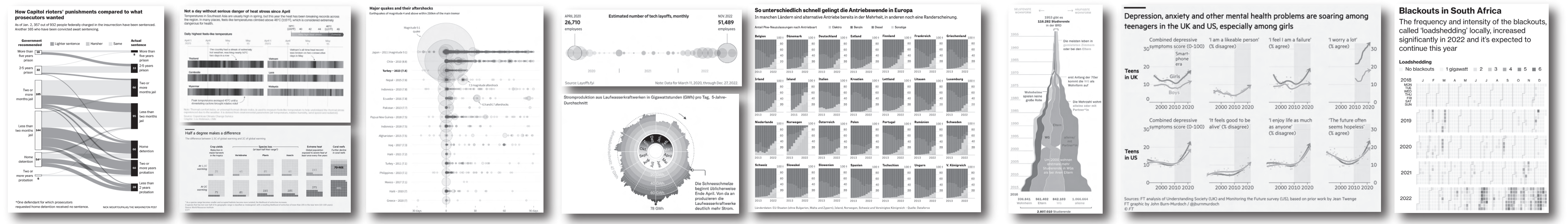


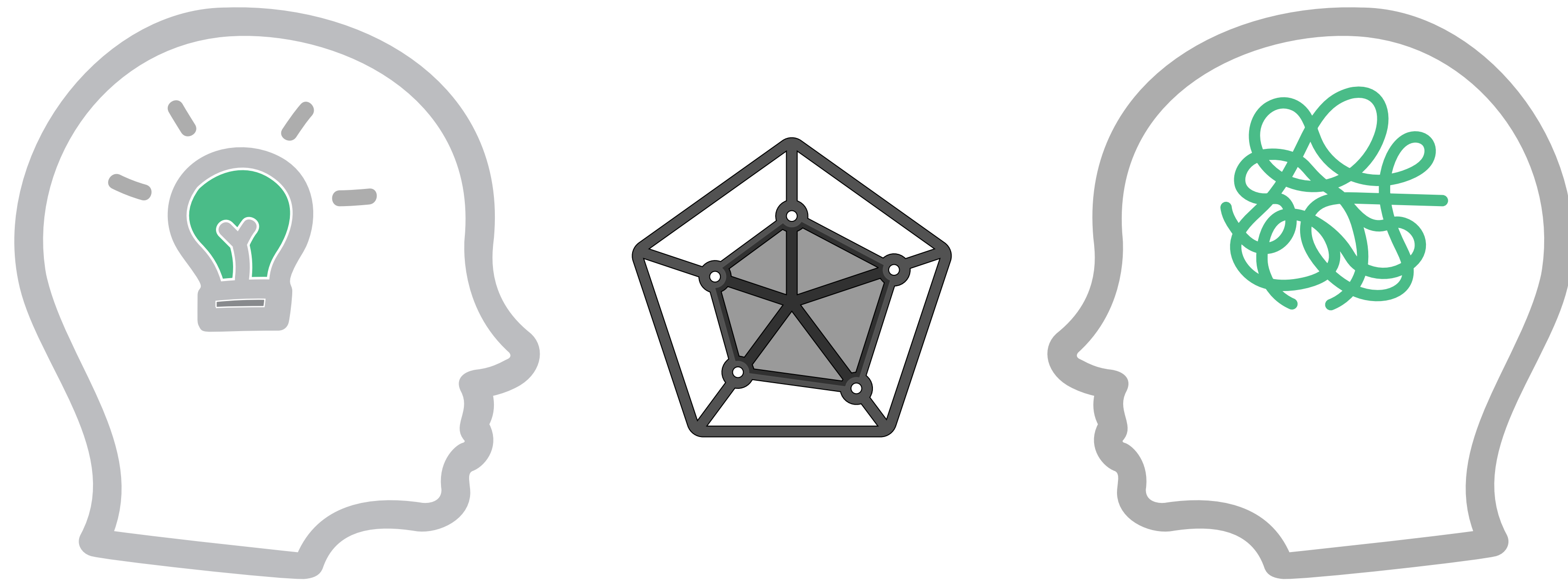
## Are these too complicated?

“This is too complicated” is a common criticism of journalistic data visualizations during editorial production, if it is a more elaborate visualization type such as a radar chart or Marimekko chart.

We investigated how people perceive and understand elaborate visualization types, distinguishing them by the number of data dimensions shown.



# What Makes Data Visualizations Difficult to Understand?



## How we investigated perceived complicatedness

- Collection of data visualization examples from data journalism stories
- Examples were clustered by the number of data dimensions shown: 2D, 3D, 4D+
- Participants of a representative online survey (n=1041) were asked to evaluate one example per data dimensions and to write down insights and obstacles

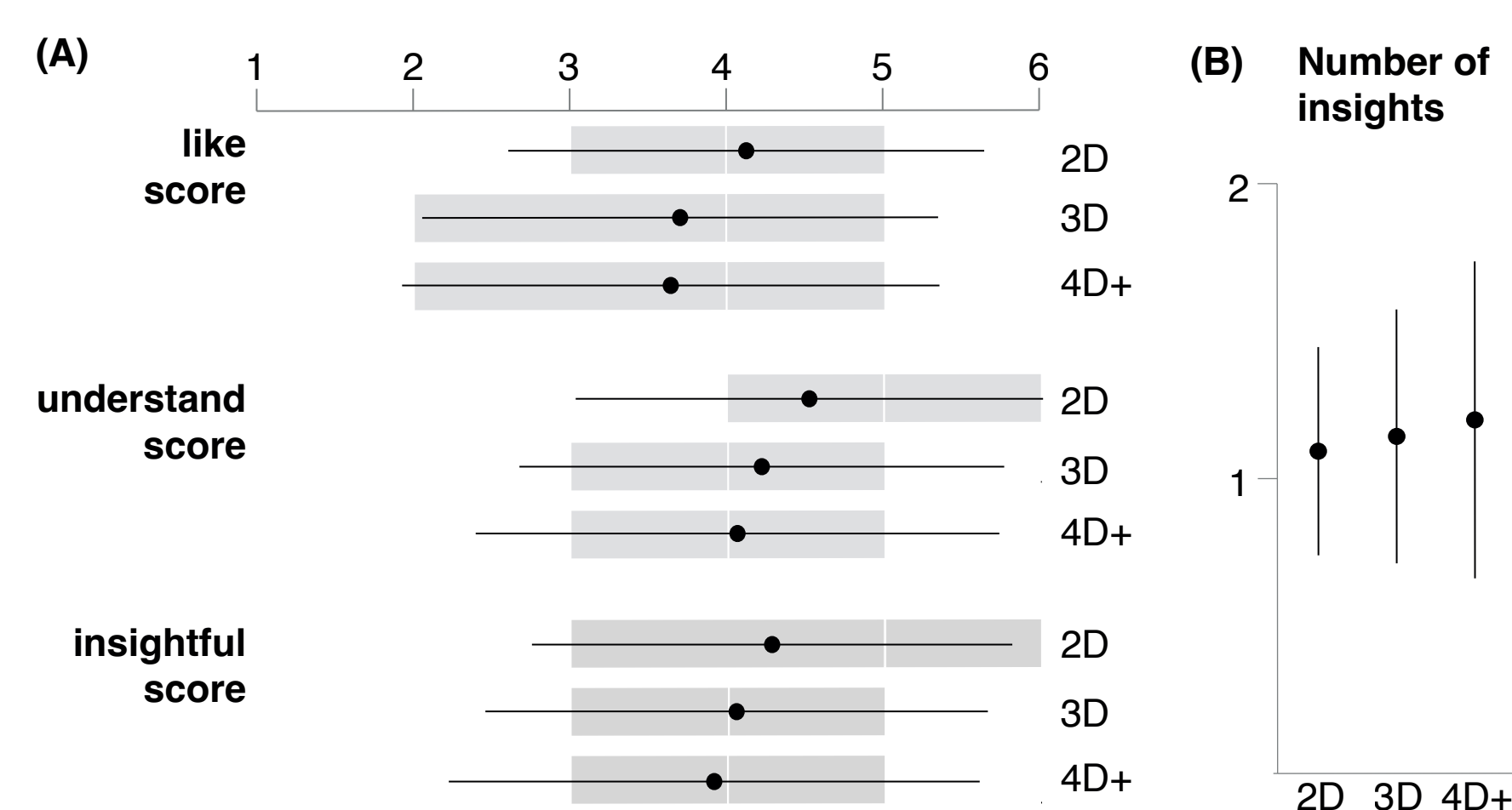
## INFLUENCE OF DIMENSIONALITY ON PERCEPTION OF DATAVIZ

Visualizations with two (2D), three (3D) or four (4D+) data dimensions received similar ratings for liking, understanding, and perceived insightfulness.

## PERCEIVED VS ACTUAL INSIGHTS

Across all data dimensions, most participants reported only one insight.

Visualizations with more data dimensions had a slightly greater variability in the number of insights reported compared to those with fewer dimensions.



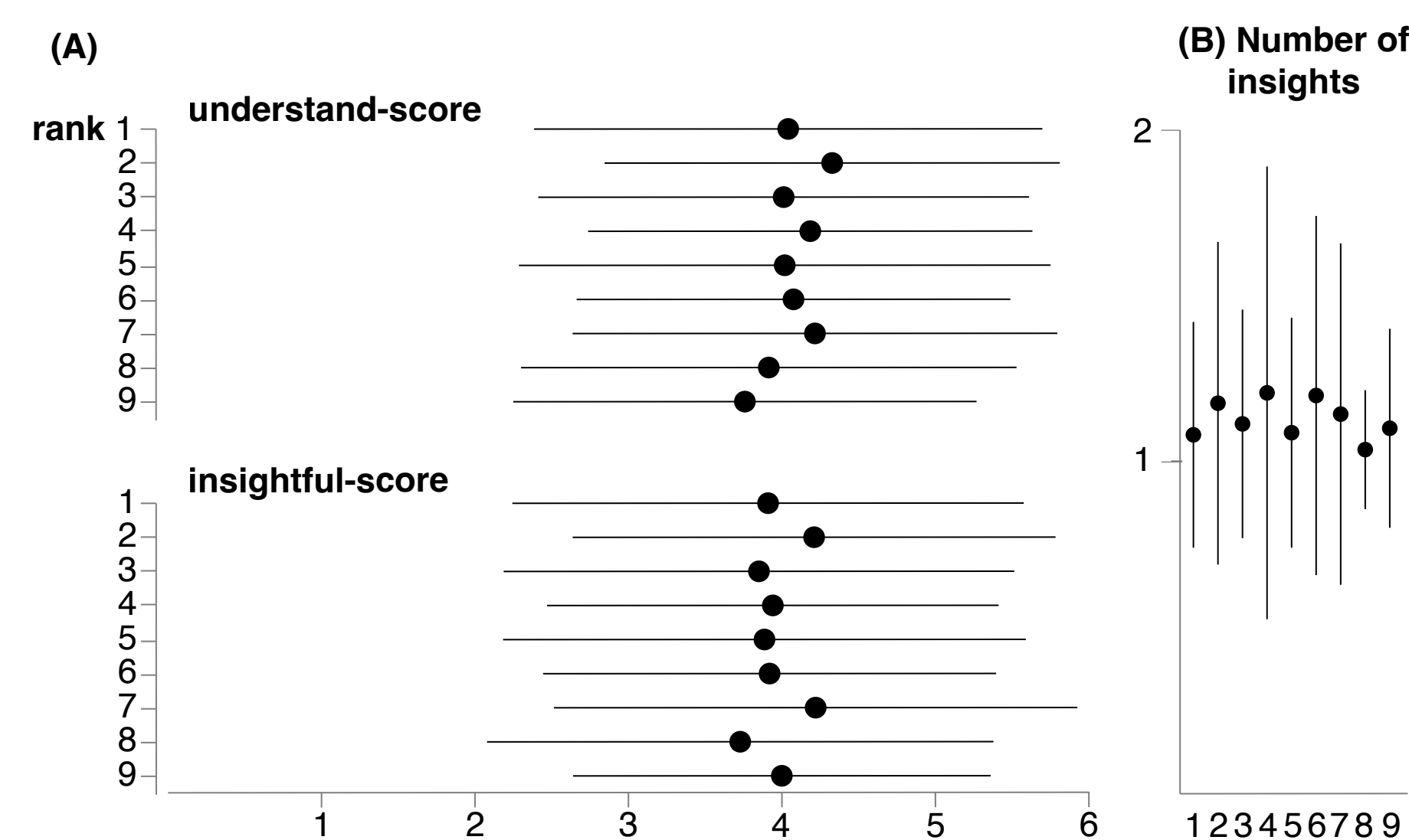
The circles represent the arithmetic mean, the black lines show the standard deviation. (A) aggregated users' perception of data visualizations (B) Aggregated number of insights users had

Participants were asked to rate each example on a six-point Likert scale: one scale for whether they like the example (1 = not at all, 6 = very much), one for whether they understand an example, and one for whether they find it insightful. Next, they were asked to note down insights in free text.

## INFLUENCE OF CHART FAMILIARITY

Chart familiarity does not appear to notably influence

- how charts are perceived with regards to liking a chart, understanding it or perceiving it as insightful
- the number of insights gained from data visualizations



The circles represent the arithmetic mean, the black lines show the standard deviation.

Before evaluating the examples, participants ranked at least three out of nine different chart types according to their familiarity, placing the most familiar in the first position. Fig A relates these rankings to participants' ratings for understanding and perceived insightfulness, and Fig B to the number of insights.

## REPORTED OBSTACLES

- Half of all participants reported no obstacles
- When obstacles were reported, design-related issues are mentioned most frequently
- No significant differences emerged between visualizations of different data dimensions.

obstacle cluster	2D	3D	4D+
no obstacles	56	55	55
design	18	23	17
understanding	8	7	11
information density	6	8	9

Normalized frequency of mentions of obstacle clusters per dimensionality (median number of mentions per 100 participants who saw an example of the respective data dimension)

After evaluating each example, participants were asked to describe in free text any obstacles they encountered while understanding the chart or having insights.

# Not Their Dimensionality, Evidence Shows.

Data from a representative online survey (n=1,041) indicate that the notion of “complicatedness” is not related to the number of data dimensions shown: Visualizations showing two, three, or four dimensions of data perform equally well in users' evaluations.

Scan for more



## What remains to be done

- The biggest limitation is the context of an online survey, with participants being incentivized to finish quickly rather than replying thoroughly
- Future work includes relating this research to other factors for chart engagement such as topic interest, enjoyment of dataviz, and visual literacy

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