Processing Fluency Improves Trust in Scatterplot Visualizations

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Summary:

Trust plays a significant role in how people perceive, discount, or dismiss scientific information and make critical decisions. Therefore, establishing trust is a critical first step in visual data communication. But what makes a visualization trustworthy? Researchers in psychology and behavioral economics have identified processing fluency (i.e., speed and accuracy of perceiving and processing a stimulus) as a key factor impacting trust perception. We examine the association between processing fluency and trust in visualizations through two empirical studies. We manipulated fluency by creating camouflaged visualizations that are more difficult to process. In Experiment 1, we tested the effect of camouflaging a visualization on processing fluency. Participants completed a perceptual task with six camouflaged visualizations and one non-camouflaged control. The task involved estimating the proportion of data values within a range and reporting the difficulty of doing so. We found the camouflaged visualizations produced less accurate estimations compared to the control. In Experiment 2, we created a decision task based on trust games adapted from behavioral economics. We asked participants to invest money in two hypothetical companies and report how much they trust each company. One company communicates its strategy with a camouflaged visualization, the other with a controlled visualization. The results revealed that participants tend to invest less money in the company presenting a camouflaged visualization. We found that processing fluency is a key factor in the perception of trust in visual data communication.

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