

Graeber, Thomas Wilhelm; Roth, Christopher; Zimmermann, Florian

Research Report

Stories, statistics, and memory

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Thomas Graeber

Christopher Roth

Florian Zimmermann

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Widespread misperceptions shape attitudes on key societal topics, such as climate change and the recent pandemic. These belief distortions are puzzling in contexts where accurate statistical information is broadly available and attended to. This column argues that the nature of human memory may be key for understanding the persistence of misperceptions in practice. It documents that anecdotal information in the form of stories comes to mind more easily than statistical information, generating the potential for systematic belief biases.

People hold severely biased beliefs about many important facts, ranging from topics such as climate change (Nowakowski and Oswald 2020) to immigration (Alesina et al. 2018, Grigorieff et al. 2017) to the recent pandemic (Fetzer et al. 2020), even though information about these facts is easily available and widely reported. The persistence of these biases and misperceptions about factual issues is puzzling and at odds with a large literature documenting that people do update their beliefs in response to new information (Haaland et al. 2022). Leading explanations for this puzzle in the literature include a wide variety of biases in belief updating relative to Bayesian benchmarks (Benjamin 2019), as well as motivated reasoning and self-deception (Kahan 2013, Kunda 1990, Bénabou and Tirole 2002, Epley and Gilovich 2016).

In a recent paper (Graeber et al. 2022), we add a different perspective. We highlight the role of stories, which are a powerful determinant of beliefs (Andre et al. 2021). If stories that are unrepresentative of reality at large strongly affect beliefs, persistent biases and misperceptions can emerge. Our results indicate that stories more easily come to mind than statistics, causing a stronger belief impact in the long run.

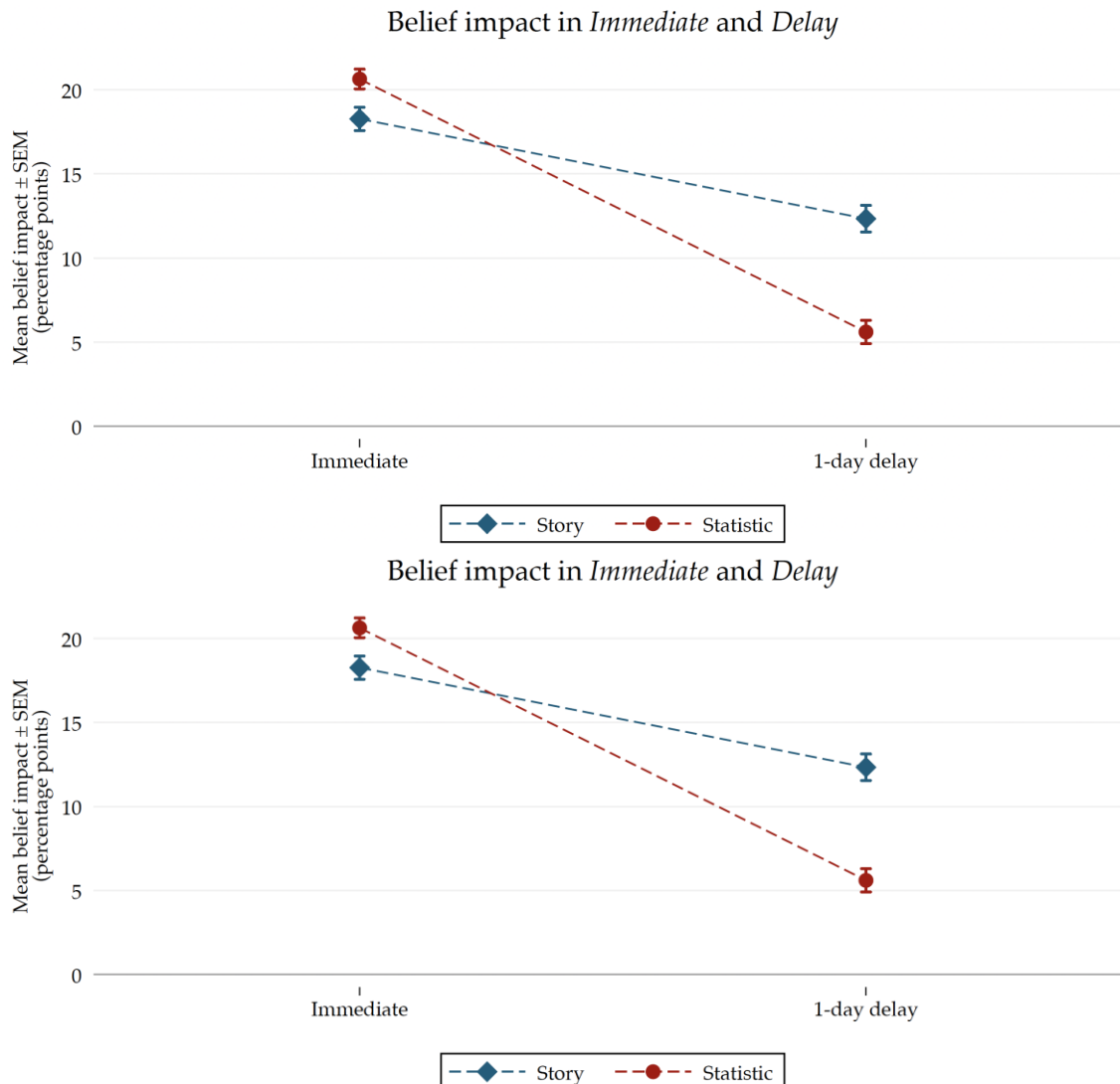
Stories versus statistics

To examine the belief impact of stories versus statistics, we conducted controlled online experiments. The key idea of these experiments is to compare the immediate belief impact of stories and statistics to the belief impact after some delay, to isolate the role of memory. Participants in our experiment were informed that hypothetical products received a number of reviews. The task of participants was to guess whether a randomly selected review is positive. Before stating their guess, participants either received news in the form of a statistic, a story, or no information. We conceptualise statistics as abstract summaries of multiple data points (multiple reviews). Stories, by contrast, contain one datapoint (one review), but in addition provide contextual qualitative information about the review. Each participant saw three different product scenarios across which they were presented with one story, one statistic, and once no information. Crucial to our experimental design was that we elicited beliefs from participants twice, once immediately after they received the information and once following a delay of one day. This allows us to track the belief impact of stories versus statistics over time.

The story-statistic gap in memory

We collected data from 984 respondents for the main experiment. Figure 1 summarises our key result on belief impact. Belief impact is the movement of beliefs (expressed in percentage points) between the experimentally induced prior and the elicited posterior. The figure plots average belief impact for stories versus statistics, pooled across all products. The figure reveals that both stories and statistics have an immediate effect on beliefs. On average, subjects immediately adjust their beliefs by about 20 percentage points for statistics, and by about 18 percentage points for stories. This pattern, however, looks markedly different after a one-day delay. While there remains a substantial belief impact for stories (about 12 percentage points), the belief impact of statistics drops to about five percentage points. In other words, we document a pronounced story-statistic gap in the evolution of beliefs. While the impact of statistics on beliefs decays rapidly, stories have a more persistent effect on beliefs. Using recall data, we confirm that the reason for this dynamic pattern is that stories are more easily retrieved than statistics.

Figure 1 Average belief impact: Immediate versus delay



Notes: The figure displays average belief impact (in percentage points), separated by whether beliefs were elicited immediately after information was received or after a delay of one day. Belief impact is given by the signed distance between belief and prior (50%) and is signed in the direction of the rational update.

What makes stories stick?

Why do stories tend to stick, while statistics tend to be more rapidly forgotten? To make progress on this question, we start with a simple formal framework that builds on models that conceptualise the cue-dependent nature of episodic memory (Bordalo et al. 2021, 2023). Experiences such as the consumption of stories and statistics are stored as memory traces that are connected through associations. Recall of these traces is triggered by contextual cues. The key drivers of recall are similarity and interference. The higher the similarity between a memory trace and a cue, the more likely successful retrieval becomes. A higher number of non-target memory traces that are similar to the target trace weakens recall, as these non-target traces interfere with the successful retrieval of the target trace.

The model can account for the story-statistic gap. The reason stories stick according to our model is that the rich, contextualised information contained in stories makes them distinct from non-target memory traces. As a consequence, they suffer less from interference.

In tailored mechanism experiments, we test some of the core predictions of the model. The following insights emerge: First, the contextual features of stories give them an advantage over statistical information and cause the relatively high recall rates. This insight can be used to boost the long-run belief impact of statistics. Once contextual features are added to statistics, their recall rates improve. Second, in line with the principle of interference, the story-statistic gap increases in the total number of product scenarios participants are exposed to. Third, stories lose their edge over statistics in situations where participants are exposed to many similar stories that compete for retrieval.

Policy implications

Our results have ramifications for the effects of news coverage and mass media on belief formation. The mass media cover many topics not only by providing facts and statistics, but they frequently rely on anecdotes about individual cases that provide detailed qualitative, anecdotal information. For example, consider allegations about election fraud in the context of the 2020 US presidential election, where some outlets reported stories about individual instances of election fraud, even though these constituted rare exceptions.

Our results also bear implications for how policymakers, marketers, or leaders should communicate with their audiences: communication of statistical information can be greatly enhanced by complementing it with contextual anecdotes. For example, when discussing economic figures, it can be beneficial to provide anecdotes that are consistent with and relevant to the statistics being presented. Finally, our research also highlights the importance of timing in persuasion: statistics and facts are more effective when messaging is delivered close to the audience's anticipated action, whereas stories are more effective when there is a delay involved.

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