

THE INTERPLAY BETWEEN BELIEFS AND COMPARATIVE FEEDBACK ON CLIMATE CHANGE MITIGATION EFFORTS

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Overview

Comparative feedback has recently been applied to encourage prosocial and pro-environmental behaviors such as lowering household energy consumption (e.g., Allcott, 2011; Allcott & Kessler, 2019; Allcott & Rogers, 2014; Andor et al., 2020). In these studies, households receive information about their resource consumption compared to that of similar households. High consumers are typically found to reduce their consumption, whereas low consumers are typically found to decrease or maintain their current levels, thus leading to a phenomenon referred to as ‘progression towards the mean’.

In this paper, we examine the causal effect of comparative feedback about individuals’ contribution to climate change on their efforts to mitigate climate change. We highlight a mechanism that may explain heterogeneous responses to comparative feedback, i.e., individuals’ beliefs about their relative contribution to climate change.

Our paper makes several contributions to the literature. First, it provides evidence on the effect of comparative feedback in the context of contributions to a pure public good. Previous work focused on impure public goods such as energy and water consumption, where—in addition to social norms—comparative feedback signals potentials to save money. Further, our study highlights the importance of controlling for individuals’ beliefs (here: about the size of their carbon footprint compared to that of others) when analyzing the effects of social norm interventions. Relatedly, study also contributes to the broader discourse on whether correcting biased beliefs affects behavior. Finally, our findings add to the literature about beliefs on the prevalence and effects of mitigation behaviors (here: individuals’ contribution to climate change as measured via their carbon footprint).

Methods

We conduct a demographically representative survey experiment among the adult population in Germany (N=1,825). In the experiment, we calculate individuals’ carbon footprint to measure their contribution to climate change, considering all major emitting activities, i.e. electricity, heating, transportation, (excluding flights), and dietary choices. We convert this information into *relative carbon footprint* by determining everyone’s position within the national carbon footprint distribution. We then elicit incentivized beliefs from participants about their *relative carbon footprint*. For a randomly selected subset of respondents, we correct their beliefs by informing them of their objective percentile in the carbon footprint distribution. We consider two randomized framings, i.e., the comparative feedback focuses on the share of the population with a lower carbon footprint, or higher. Respondents in the control group do not receive information about their *relative carbon footprint*. We measure mitigation efforts using an incentivized modified dictator game, where respondents can purchase emission allowances from the European Emissions Trading System (ETS). This measure captures the trade-off between climate change mitigation efforts and the personal costs of doing so.

Results

Our findings reveal a large bias in individuals’ beliefs about their *relative carbon footprint*. Nearly two-thirds of the respondents hold an optimistic bias, i.e., they underestimate their *relative carbon footprint*, while about one-third hold a pessimistic bias, i.e., they overestimate their *relative carbon footprint*. Next, we find no effect of comparative feedback on the full sample. This average effect, however, masks important heterogeneity related to respondents’ *relative carbon footprint* and to the direction of their bias. When comparative feedback conveys positive signals about respondents’ prosociality, it reinforces their mitigation efforts. This is the case for low emitters because they learn that they have a lower carbon footprint than others, and for respondents with a pessimistic bias because they discover that their *relative carbon footprint* is lower than they believed. Mitigation efforts increase particularly among low emitters with a pessimistic bias, i.e. among respondents for whom comparative feedback conveys two reinforcing positive signals. In comparison, when comparative feedback conveys negative signals about individuals’ prosociality, it discourages their mitigation efforts. Such a backfiring effect is observed among high emitters and

appears to be entirely driven by respondents with an optimistic bias. For these respondents, comparative feedback conveys two reinforcing negative signals, i.e. that their relatively carbon footprint is high, and that it is higher than they believed. These findings on the backfiring effect of comparative feedback, however, are not robust to adjusting inference for multiple hypothesis testing.

Conclusions

Together, the contrasting responses to comparative feedback by high and low emitters result in what we term ‘divergence from the mean’, where low emitters further amplify their mitigation efforts, whereas high emitters exhibit minimal response and may even be discouraged by the comparative feedback. This pattern contrasts with findings from field experiments on energy and water consumption (e.g., Allcott, 2011; Andor et al., 2020; Ferraro & Price, 2013) which typically observe a regression toward the mean. A key distinction lies in the nature of the behaviors studied. Energy and water consumption are impure public goods, where financial incentives matter. Learning that others consume less resources may reveal untapped savings opportunities, motivating behavioral change to reduce expenses.

Our findings have some policy implications for designing interventions to encourage climate change mitigation and, more in general, contribution to pure public goods. Comparative feedback appears most effective when targeted at individuals who already engage in mitigation behaviors, as it can reinforce their efforts. This effect persists regardless of the framing of the feedback considered in our study. Hence, comparative feedback may highlight either the share of those who behave more prosocially or the share of those who behave less prosocially, depending on the information available to policymakers. For individuals not yet engaging in such behaviors, alternative strategies may be more appropriate, such as publicly recognizing their engagement in prosocial behavior (Delmas & Lessem, 2014) or setting green defaults (Egebark & Ekström, 2016). Moreover, further research could investigate the impact of granular feedback on specific activities, such as electricity consumption, heating, transportation, and diet, to better understand potential spillover effects across domains and identify additional leverage points for promoting mitigation efforts.

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