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The complexity of pluralistic ignorance in Republican climate change policy support in the United States

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Most Americans fail to recognize widespread public support for climate change action. Here we investigate how this phenomenon differs for Republican supporters versus opponents of several climate change policies. Surveying a representative sample of Republican voters ($N = 1000$), we find that misperception of in-group support for climate action is primarily restricted to Republicans already opposed to action. Specifically, those in the minority (i.e., Republicans opposed to climate action) were more likely to erroneously perceive other Republicans as holding views on climate change policy similar to their own. While Republican supporters recognize that most Republicans support climate change policy, they may be discouraged from expressing their support due to an information environment disproportionately portraying Republicans as opposed to climate change action.

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Recent public opinion surveys suggest that Americans, including Republicans, largely support climate mitigation policies like power plant restrictions and tax incentives for carbon capture[1,2]. However, while policy supporters outnumber opponents two to one on average, most Americans in general (and Republicans in particular) erroneously underestimate these actual support levels by wide margins[3]. These findings are one manifestation of a phenomenon known as pluralistic ignorance— a systematic and population-level misperception of what other people think, do, or feel[4]; specifically, that "individuals belonging to a group mistakenly believe that others' cognitions (attitudes, beliefs, feelings) and/or behaviors differ systematically from their own" (p. 166). In other words, people may mistakenly believe that fewer people share their opinion than in actuality, which can discourage them from speaking out and acting in accordance with their views[5]. As a result, pluralistic ignorance on a large scale can hinder public mobilization on climate mitigation policy[3].

Indeed, when one's beliefs are perceived to be an outlier relative to others in a social group, fear of isolation can motivate silence and self-censorship[6]. Republicans may be especially prone to this cognitive bias, as they significantly underestimate climate policy support among the broader U.S. public[3]. This misperception may also extend to Republicans perceiving their in-group's (i.e., other Republicans) support for climate policies is low, despite being high[1]. Both outcomes seem likely for the same reason—the environment in which issue-related information is received (i.e., face-to-face contact, social media, news media, etc.) may disproportionately feature policy opponents who are in the minority relative to U.S. adults as a whole and/or Republicans specifically. Indeed, right-wing media often features critical coverage of climate change policy, while the official Republican party platform rejects most climate mitigation efforts[7]. In both circumstances, this viewpoint more than likely reflects lobbying efforts from industry opposed to climate mitigation policy, rather than that of the American public[8].

Although correcting misperceived opinion climates may appear as a reasonable solution to pluralistic ignorance in climate policy, such attempts often fail to overcome self-censorship and inaction[9,10], suggesting that other considerations beyond pluralistic ignorance might be at play. One possibility is that the same, aforementioned information environment that arguably contributes to pluralistic ignorance by overrepresenting climate policy opponents may also impact one's willingness to disclose their views directly and indirectly via the potential for perceived social conflict (i.e., with other Republicans) should one do so. For example, the degree of pluralistic ignorance might differ among Republicans who personally support climate mitigation policies (and are thus in the majority relative to Republicans as a whole, even if they may not realize it) versus those in opposition (and are thus in the minority). It could be that underestimation of in-group support occurs primarily for those in the minority, meaning that efforts to correct pluralistic ignorance among the majority may not work because they (a) are already aware of their majority status and (b) the information environment is over-represented by minority view holders. For these individuals, perceiving a potentially hostile and uncivil information environment may heighten the belief that social conflict may ensue should one speak out, which in turn would decrease the likelihood of one doing so. The result, in essence, is self-censorship among this group.

Therefore, our study investigates how highlighting public consensus might not encourage action among the majority because (a) they are already aware of this fact and (b) they exhibit reluctance to speak out due to perceiving a minority-dominated information environment.

Results and discussion

Surveying a representative sample of Republican voters in the United States ($N = 1000$), we find that support for climate mitigation policies is reasonably high. Four out of five policies received greater than 50 percent support, including tax credits for carbon capture, restrictions on carbon emissions from power plants, and increased use of solar power and wind turbine "farms." When asked to estimate the percent of Republicans who support these same policies, our respondents significantly underestimated support for all but one policy, indicating pluralistic ignorance (Fig. 1). It is important to note that these underestimations are smaller in magnitude when compared to recent research investigating similar phenomena[3]. One reason is that the Sparkman et al.[3] investigated estimates of the general public, rather than one's political in-group. As a result, Republicans in their study might have reported stronger underestimation due to greater uncertainty about general public opinion on the matter. Additionally, when separating our findings by respondents' own support/opposition to each policy, we find
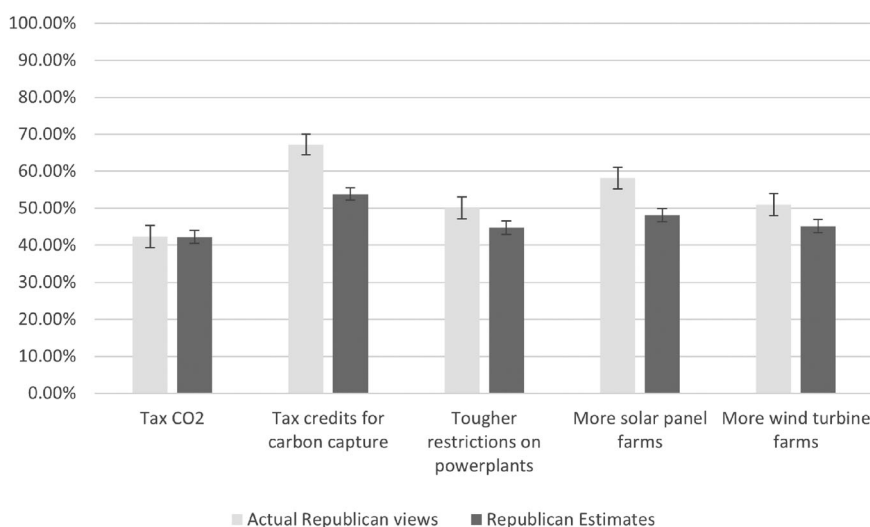
Fig. 1 Republican support for climate mitigation policies versus their public opinion estimates. X axis represents percent support/estimated support. Error bars = 95% CI.
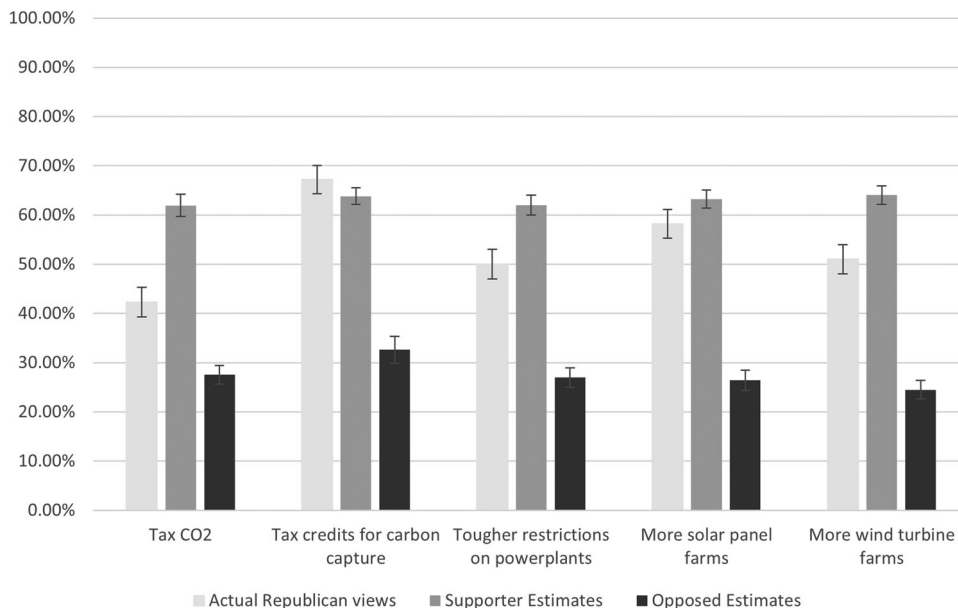
Fig. 2 Republican support for climate mitigation policies versus their public opinion estimates by support versus opposition to the policy. X axis represents percent support/estimated support. Error bars = 95% CI.

Table 1 OLS regression of climate policy support on prior information sharing.

Outcome	Prior information sharing
Constant	3.6 (0.16)***
Climate policy support	−0.15 (0.03)***
Age	0.006 (0.002) **
Race (White = 1)	0.01 (0.11)
Gender (Female = 1)	−0.22 (0.07)**
R^2	0.04
F	(4995) = 11.37***

*$p < 0.05$; **$p < 0.01$, ***$p < 0.001$. Regression conducted using SPSS version 27.

that underestimation mainly occurred among those who personally opposed the policy. Supporters, in contrast, reported average estimates at or slightly above the actual estimate. Thus, pluralistic ignorance appears to be largely driven by minority view holders, suggesting that they may instead be experiencing a false consensus effect (i.e., erroneously believing that other Republicans hold views similar to their own) (see Fig. 2). This finding corresponds with recent research finding that opponents of carbon taxation overestimate the extent to which their views are held by the public[11]. This signals that instead of pluralistic ignorance, other factors could discourage Republican supporters of climate mitigation policies from speaking out.

One such factor could be the overrepresentation of minority views in the information environment such as on social media or in face-to-face contexts. Indeed, we find that Republicans opposed to climate change policies might have a stronger presence in sharing their views than supporters. Using OLS regression, we report a significant negative association between respondents' level of personal support/opposition for climate change mitigation policy and sharing these face-to-face and on social media, such that policy opposition was associated with greater sharing in the information environment, $b = -0.15$, $p < 0.001$ (Table 1).

The overrepresentation of minority view holders in the information environment may then impact majority view holders'

willingness to speak out. Using PROCESS version 3.5, model 7[12], our results show that the association between one's perceived information environment and anticipated social conflict from speaking out differs if one supports or opposes climate mitigation efforts, $b = 0.11$, $p < 0.001$ (Table 2). Republican supporters (i.e., those scoring in the 16th percentile of the support scale) report a significant negative association, $b = -0.17$, $p = 0.002$, meaning that perceiving the Republican information environment as opposed to climate mitigation policies associates with higher anticipated social conflict from speaking out for Republican supporters. On the other hand, Republicans opposed to climate mitigation policies (i.e., those scoring in the 84th percentile of the support scale) report a significant positive association, $b = 0.17$, $p = 0.004$, meaning that perceiving the Republican information environment as opposed to climate mitigation efforts associates with lower anticipated social conflict from speaking out for Republicans opposed to climate mitigation policies. We then find that anticipated social conflict from speaking out is negatively correlated with one's willingness to speak out about their views on climate mitigation policy $= -0.11$, $p < 0.001$.

Tying these findings together, we report a significant index of moderated mediation $= -0.012$, 95% CI $= [-0.024, -0.004]$, indicating the indirect effect of one's perceived information environment on willingness to speak out via anticipated social conflict is conditioned by one's support for climate mitigation policies. For Republican supporters of climate mitigation policies (i.e., 16th percentile of support scale), this indirect effect is statistically significant, $b = 0.02$, 95% CI [0.001, 0.05], suggesting fears of social conflict prompted by a minority-dominated information environment could discourage them from speaking out. Moreover, this finding occurs when controlling for public opinion estimates, suggesting that even recognizing one's views are in the majority may do little in encouraging action when the information environment is dominated by minority views. For Republican opponents of climate mitigation policies (i.e., 84th percentile of support scale), this indirect effect is statistically significant, $b = -0.02$, 95% CI [−.05, −0.004], suggesting that perceiving their information environment as opposed to climate mitigation policy could encourage them to speak out in part due to their perception that social conflict from doing so is unlikely.

Table 2 OLS regression of conditional indirect effect of perceived information environment on willingness to speak out about climate change policy, by support for climate change policy.

Outcome	Anticipated social conflict	Willingness to speak out to other Republicans
Constant	4.56 (0.36)***	3.58 (0.33)***
Perceived information environment	−0.39 (0.08) ***	−0.08 (0.05)
Climate change policy support	−0.16 (08)*	-
Perceived information environment*Climate change policy support	0.11 (0.02)***	-
Opinion climate estimates	−0.002 (0.02)	0001 (0.002)
Anticipated social conflict	-	−0.11 (0.03)***
Age	0.01 (0.002)***	−0.01 (0.002)***
Race (White = 1)	0.16 (0.1)	0.14 (0.11)
Gender (Female = 1)	−0.02 (0.06)	−0.28 (0.07)***
R^2	0.19	0.07
F	(7992) = 33.54***	(6993) = 12.68***

Note: 5000 bootstrap samples for percentile bootstrap confidence intervals. Index of moderated mediation = −0.01, 95% CI [−0.02, −0.004]. Significant indirect effect at 16th percentile of the climate policy support scale (i.e., Climate policy supporting Republicans), b = 0.02, 95% CI [0.001, 0.05]. Significant indirect effect at 84th percentile of the climate policy support scale (i.e., Climate policy opposed Republicans), b = −0.02, 95% CI [−0.05, −0.004]. Regression conducted using SPSS version 27 and PROCESS Macro version 3.5. *$p < 0.05$; **$p < 0.01$, ***$p < 0.001$.

As a result, efforts aimed at encouraging Republican supporters to speak out and act on their beliefs may need to consider the role of the information environment—in particular, building up their resilience to hostile social information environments. Interventions grounded in self-affirmation theory could be a potential approach. Self-affirmation refers to how people reflect on their personal strengths and values[13]. People are motivated to maintain a sense of self-integrity and self-worth, and interventions that involve having people reflect on personal strengths and cherished values can help bolster that self-worth. A minority-dominated information environment and the social conflict it may elicit among issue supporters in the actual majority could serve as a direct threat to their self-integrity. Priming self-affirmation may lead to greater resilience against social conflict because it highlights one's personal strengths and values, making people feel empowered to speak out even when they may experience opposition from doing so. For example, research has found that self-affirmation exercises designed to enhance a sense of self-worth can more help individuals handle threats to their self-worth[14]. Thus, future research can experimentally test whether activating self-affirmation produces resilience toward anticipated social conflict when sharing their views about climate policy in the information environment. Doing so can further advance theory-informed solutions to encourage greater consistency between people's private beliefs and public actions on issues of great importance.

Furthermore, those experiencing false consensus bias are less likely to change their minds on climate change[15]. As a result, efforts to address minority view holders' (i.e., Republican opponents of climate policy) false consensus bias should be done with careful attention so as to not induce directional motivated reasoning[16]. That is, being informed of their minority view status would likely be discomforting and could lead to backfire effects. Instead, messaging that reflects the shared values of this particular group could be an avenue for increasing climate policy support for this group. For example, research has found that highlighting proposed free market solutions to climate change produces stronger recognition of anthropogenic climate change among political conservatives because the free market policies reflect the shared values of that particular group[17].

In conclusion, our work provides additional insight into the nature of pluralistic ignorance in climate change policy. We show that public opinion misperceptions can vary by people's support or opposition to climate change policies, which provides insight into why interventions aimed at encouraging mobilization may not result in desired outcomes. Without assessing how supporters and those opposed view public opinion, and instead only evaluating the presence of misperceptions across the entire population, interventions that correct misperceived views on public opinion may have limited effects or unintended consequences. For instance, emphasizing Republican support for climate policies may do little to impact Republican supporters' actions, given that they already hold relatively accurate public opinion estimates. Even if they hold inaccurate public opinion estimates—that is failing to recognize that their views are in the majority—emphasizing Republican support for climate policies may fail to encourage action when the information environment is continually dominated by views opposing climate action.

Methods

This study used an online survey of a nationally representative sample of registered Republican voters in the United States obtained by YouGov. The study received exempt status following a review by [redacted for peer review] Institutional Review Board. Data collection occurred from December 7, 2022, to December 14, 2022. YouGov surveyed 1026 Republican registered voters who were then matched down to a sample of 1000 to produce the final dataset with a margin of error of ±3.7% ($M_{age} = 53.5$, $SD_{age} = 17$; 52.1% female; 87% White, 1.3% Black; 7.1% Hispanic or Latino). The respondents were matched to a sampling frame on gender, age, race, and education, which was created from the 2020 Cooperative Congressional Election Study (CCES). Post-stratification weights provided by YouGov were used in our analyses.

At the beginning of the survey, participants first answered screening questions about their age and political party affiliation and based on their responses to the latter, were either screened out (Not Republican) or allowed to proceed (Republican). After completing a consent form, participants reported their support for five different climate mitigation policies (i.e., carbon taxation, powerplant restrictions, more solar farms, more wind farms, and tax credits for carbon capture) using a six point support scale (1 = strongly support to 6 = strongly opposed). We used these data in our analysis in two ways. First, we dichotomized each item to estimate the proportion of respondents who supported each policy (Support = strongly support, support, somewhat support; Oppose = strongly oppose, oppose, somewhat oppose). Second, we averaged the original, non-dichotomized items together into a single variable for use in our moderated mediation model,

$M = 3.57$, $SD = 1.34$, Cronbach's alpha $= 0.89$ (see supplementary information notes 1 and 2 for descriptive data).

Public opinion estimates were assessed by asking participants to estimate the percent of Republican voters who support each of the five aforementioned climate policies. We examined public opinion estimates for each policy across all respondents and by their dichotomized support or opposition for each policy. For our moderated mediation analysis, we created a scale for perceived Republican public opinion by averaging their estimates for all five policies, $M = 46.78$, $SD = 24.93$, Cronbach's alpha $= 0.92$ (see supplementary information note 3 for survey instruments).

In assessing their perceived information environment, participants were asked to think about the environment in which they obtain information about climate change policies and alternative energy (e.g., social media, television, news media, friends, family, colleagues, etc.) and then rate whether the information they have come across suggests that Republicans support or oppose each of the five policies (1 = strongly support; 6 = strongly oppose). These items were then averaged together, $M = 3.57$, $SD = 1.16$, Cronbach's alpha $= 0.89$.

Willingness to speak out about one's climate mitigation views to other Republicans focused on two items specific to renewable energy and climate change policies (1 = very willing to 6 = very unwilling; these items were then averaged together, $M = 2.25$, $SD = 1.13$, $r = 0.87$, $p < 0.001$.

Past engagement in the information environment was assessed by four items asking participants the extent to which they have shared their views on climate change policies and renewable energy face-to-face and on social media (e.g., Facebook, Twitter, Instagram, etc.) (1 = Almost always, 2 = often, 3 = sometimes, 4 = seldom, 5 = never). These items were then averaged together, $M = 3.3$, $SD = 1.15$, Cronbach's alpha $= 0.87$

Lastly, anticipated social conflict was assessed by adapting Matthes'[18] conflict avoidance scale, in which participants were asked six items regarding whether they would experience social conflict if they spoke out about their views on the aforementioned climate policies (1 = strongly agree to 6 = strongly disagree); these items were then averaged together, $M = 4.79$, $SD = 1.11$, Cronbach's alpha $= 0.97$.

Reporting summary. Further information on research design is available in the Nature Portfolio Reporting Summary linked to this article.

Data availability
The data for Figs. 1 and 2 can be found here: 10.6084/m9.figshare.24835134. The dataset is available here: 10.6084/m9.figshare.24886599.

Code availability
Syntax used for analysis is available on request from the corresponding author.

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Author contributions
G.D., C.C., D.E., J.J., and P.S.H. designed the study. G.D. conducted data collection and analyzed the main results. G.D. wrote the first draft, and all other authors provided feedback and edits. All authors approved of the final version of the article.

Competing interests

Ethics approval
This research was reviewed and determined exempted by the Ohio State University Internal Review Board.

Additional information