CENTRE FOR DECISION RESEARCH & EXPERIMENTAL ECONOMICS

University of Nottingham
UK | CHINA | MALAYSIA

Discussion Paper No. 2021-08

Monika Pompeo and
Nina Serdarevic

December 2021

Is information enough? The case of Republicans and climate change

CeDEx Discussion Paper Series
ISSN 1749 - 3293

CENTRE FOR DECISION RESEARCH & EXPERIMENTAL ECONOMICS

The Centre for Decision Research and Experimental Economics was founded in 2000, and is based in the School of Economics at the University of Nottingham.

The focus for the Centre is research into individual and strategic decision-making using a combination of theoretical and experimental methods. On the theory side, members of the Centre investigate individual choice under uncertainty, cooperative and non-cooperative game theory, as well as theories of psychology, bounded rationality and evolutionary game theory. Members of the Centre have applied experimental methods in the fields of public economics, individual choice under risk and uncertainty, strategic interaction, and the performance of auctions, markets and other economic institutions. Much of the Centre's research involves collaborative projects with researchers from other departments in the UK and overseas.

Please visit http://www.nottingham.ac.uk/cedex for more information about the Centre or contact

Suzanne Robey
Centre for Decision Research and Experimental Economics
School of Economics
University of Nottingham
University Park
Nottingham
NG7 2RD
Tel: +44 (0)115 95 14763
suzanne.robey@nottingham.ac.uk

The full list of CeDEx Discussion Papers is available at

http://www.nottingham.ac.uk/cedex/publications/discussion-papers/index.aspx

Is information enough? The case of Republicans and climate change*

Monika Pompeo† Nina Serdarevic‡

Abstract

One of the most important determinants when it comes to climate change attitudes is political partisanship. While both Democrats and Republicans underestimate the share of their in-groups that believe climate change is happening, this perception gap is wider for Republicans. Using a sample of Republican respondents, we examine their beliefs about climate change and the perceived distribution of climate change attitudes of either other Americans or Republicans. Then, to generate exogenous variation in beliefs, we provide respondents in the treatment groups with the actual distribution of either American or Republican attitudes towards climate change. Our results highlight the importance of distinguishing between beliefs and behaviour when assessing the effect of information on issues that fall strongly along party lines. While information alters the respondents' beliefs about the Republican Party's stance on climate change, it is not enough to instigate a change in individual donation behaviour.

JEL Classification: J16, C91, D01

Keywords: Republicans, partisanship, climate change, social norms, information, online experiment

*We thank the Department of Economics, University of Bergen for funding the project. We are grateful to brown bag and seminar participants at CeDEx at the University of Nottingham, FAIR and the Centre for Applied Research at the Norwegian School of Economics for comments. We thank Daniele Nosenzo, Alex Possajennikov, Silvia Sonderegger and Vincent Sommeville for valuable suggestions. The study received ethical approval from the Nottingham School of Economics Research Ethics Committee on 03/11/20.

†University of Nottingham, School of Economics & University of Bologna, School of Economics. Email: monika.pompeo@nottingham.ac.uk and monika.pompeo@unibo.it

‡Centre for Applied Research, FAIR Insight Team, Norwegian School of Economics, Email: nina.serdarevic@snf.no

1 Introduction

Political partisanship is one of the most important determinants of beliefs about climate change (for a meta-analysis, see Hornsey, Harris, Bain, & Fielding, 2016). In particular, those who align with more liberal political parties are more likely to believe that climate change is happening compared to those who align with conservative groups. In the US, both political parties estimate their own group's belief in climate change more accurately than those of the opposing political group. However, Republicans in particular consistently underestimate other Republicans' beliefs (Mildenberger & Tingley, 2019). This might be due to, for example, recent changes within the Republican Party, which has seen a rise in moderate and young supporters' engagement with climate-related issues (Funk & Hefferon, 2019).

Moreover, Republican representatives have challenged the support for environmental legislation for decades, a recent example being the New Green Deal (Boyle, Leggat, Morikawa, Pappas, & Stephens, 2021). However, things are moving in a new direction as the Conservative Climate Caucus has been established with the aim to educate citizens and elites on climate change with the idea of enabling meaningful policies that transcend party lines. Still, all these changes often take time to acknowledge, and, meanwhile, might lead to a gap between the perceived and actual share of Republicans who believe climate change is happening. This could be problematic as it has the potential to keep individuals in an inefficient equilibrium, where they do not act or speak up in fear of social reproach by their political peers, when in reality, their reference group is more supportive of their view than they think.[1] This is a phenomenon commonly referred to as "Pluralistic Ignorance" (Katz, Allport, & Jenness, 1931).

In this paper, we investigate the relationship between Republicans' second-order climate change beliefs and the support for action aimed at mitigation. We start by examining whether Republicans in the US have accurate perceptions of their party members' climate change beliefs. We then move on to causally examine how partisanship, as opposed to mere endorsement, influences both behaviour and beliefs related to climate change. To this end, we conduct a 2×2 information provision experiment with an online sample of 2,319 Republican respondents. We generate exogenous variation in beliefs using data from a sample of previously gathered responses and provide a random subset of participants with information about the distribution of climate change beliefs of other Republicans or Americans. Next, we observe how this information affects behaviour as measured by the likelihood of privately authorising a donation to a climate change organisation and publicly acknowledging having donated on social media. The

[1] Some examples include alcohol use in college campuses (Prentice & Miller, 1993), the support for racial segregation among whites (O'Gorman, 1975) and female labour force participation in Saudi Arabia (Bursztyn, González, & Yanagizawa-Drott, 2020).

final stage of the experiment elicits additional attitudes and perceptions, allowing us to evaluate whether information successfully updates the subject's beliefs as well as affecting behaviour. In particular, we focus on whether it changes the subject's perception of the Republican Party's position on climate change.

Despite the consistent evidence that climate beliefs (i.e., existence, origin, and impact) are a positive predictors of climate action (Ding, Maibach, Zhao, Roser-Renouf, & Leiserowitz, 2011; Druckman, Peterson, & Slothuus, 2013), relatively little is known about the combined effect of information on beliefs and behaviour in a setting characterised by pluralistic ignorance. Our main contribution lies in testing the notion that information interventions that fall strongly along party lines might have differential effects on beliefs and behaviour. This responds to the call of, for instance, Doell, Pärnamets, Harris, Hackel, and Van Bavel (2021) who argue that successful interventions in the climate change domain will ultimately involve targeting partisan identities, as social identities and pro-environmental collective actions are closely related. Nonetheless, as pointed out by the previously cited paper, interventions targeting partisan identities need to be carefully evaluated, especially due to the danger of backfiring. Ideally, they should be tailored to address the specific norms of relevant groups, keeping in mind that the relationship between beliefs and behaviour need not be straightforward.

Given the importance of behaviour in the climate policy debate, this distinction may be particularly important when examined among Republicans, as recent information interventions targeting this group have yielded mixed results.[2] For example, Goldberg, Gustafson, Rosenthal, and Leiserowitz (2021) show that advertising campaigns increase Republicans' beliefs about the existence, causes and harms of climate change. Also, Benegal and Scruggs (2018) show experimentally that elite Republicans speaking against their expected partisan positions are most likely to increase the acknowledgement of the scientific consensus on climate change.

On the other hand, several studies find that in a politically polarised context information is ineffective and may result in "boomerang effects" on beliefs and policy attitudes held by the public in general, and Republicans in particular (Doell et al., 2021; Nyhan & Reifler, 2010; Hart & Nisbet, 2012). Moreover, due to motivated reasoning and threats to social identity, individuals exposed to counter-attitudinal messages are motivated to interpret available cues, such as group membership or geographical location, in ways that lowers their social identification with the individuals featured in the message. As a case in point, Zhou (2016) finds that Republicans are resistant to frames that encourage support for governmental action or personal engagement to counteract climate change. Their results suggest that the effect is mediated by social distance,

[2]Studies in other domains have also reported that information provision might lead to a change in beliefs but not to a shift in behaviour (Ozaki & Nakayachi, 2020; Kuang, Delea, Thulin, & Bicchieri, 2020; Haaland & Roth, 2021).

particularly how subjects modify the extent to which they identify with the source of the counter-attitudinal message. Investigating the combined effect of information on beliefs and behaviour may complement approaches that model pro-environmental behaviour by i) enabling more empirically informed predictions and ii) obtaining measures of the importance of identity-targeted messages in climate change communication. The methodology we adopt in the present paper engages with both objectives.

By examining the role of climate change attitudes and partisanship in an information provision framework, we are able to establish several important findings. Subjects underestimate just how how widespread the belief in climate change of other respondents in our sample is. The average guess was that 54% of other Republicans believe that climate change is happening, whereas the figure in our sample is approximately 76%. When asked about American opinions in general, the average guess was 69% when, in our sample, this share reaches an 87% consensus. Suggestive evidence points to the lack of communication about climate change as one important predictor of the size of misperceptions. The gap between the guesses of the subjects and the true share regarding the proportion of individuals who believe in the occurrence of climate change is smaller among Republicans who discuss the topic often and larger among those who rarely talk about it.

Evaluating the effect of correcting these misperceptions, our results suggest that information provision has two different effects on behaviour and beliefs, which strengthen the idea that it is important to distinguish between the two. First, the overall effect of information on donation rates is negative, albeit insignificant, at conventional levels. The effect is also negative for each treatment condition but, similarly, is not statistically significant, that is, information about other Republicans' and Americans' beliefs about climate change does not seem to affect support for mitigation. Conversely, information is important when it comes to the respondents' beliefs. As a result of our intervention, we find that more Republicans believe that the party's position does acknowledge the present occurrence of climate change, the effect being stronger when given information that makes party identity salient, that is, when information concerns other Republicans rather than other Americans.

Our interpretation of these results and their potential implications for policymakers is two-fold. First, focusing only on whether and how information interventions change beliefs in the climate change domain may lead, as we show in the paper, to inaccurate predictions of how willing Republicans are to engage in action aimed at mitigation. To this end, it is also important to evaluate future interventions in terms of actual, and not only stated, climate change related behaviour. Second, changing beliefs about the Republican Party's stance on climate change is an important step to assigning the issue a higher priority and to increase leniency towards policies dealing with climate change. This interpretation is in line with research showing that political party's positions af-

fect the voter's policy preferences (Mullinix, 2016; Grewenig, Lergetporer, Werner, & Woessmann, 2020). Additionally, as more Republicans start to believe that the majority of other Republicans believe in climate change, they could become more inclined to demand action from their representatives to address these concerns. This, in turn, might facilitate a positive cycle where politicians, assuming that they seek election or re-election, are incentivised to alter their position to better represent the preferences of their voters (Wynes, Kotcher, & Donner, 2021; N. R. Lee & Stecula, 2021).

2 Related Literature

Our paper contributes to several strands of literature. We contribute to the literature on information provision, which largely relies on information provision interventions as a tool to change beliefs and/or behaviour (for a literature review see Haaland, Roth, & Wohlfart, 2020). One of the reasons for their popularity is that, in principle, they are not very costly, and in many cases they have proven to be effective. The standard way of implementing such interventions is to generate exogenous variation in beliefs and examine the subsequent influence on perceptions and/or behaviour. Beliefs about the beliefs of others (or second-order beliefs) have been found to exert an extensive influence on a series of behaviours and attitudes, including female labour participation (Bursztyn, González, & Yanagizawa-Drott, 2020) and the public expression of xenophobic attitudes (Bursztyn, Egorov, & Fiorin, 2020). Similarly, Perez-Truglia and Cruces (2017) find that providing individuals with information about contributions to political campaigns of their neighbours increases contributions of supporters of the local majority party and decreases those of supporters of the minority party. Given that individuals face social sanctions when deviating from the norm, it is clear why they might conform to their perceived political group preference. In this context, for example, a Republican who believes that most other Republicans do not believe in climate change might refrain from publicly expressing his support, which in turn could reinforce the misperception that it is socially inappropriate for Republicans to express their stance on climate change—a phenomenon often referred to as the Spiral of Silence (Scheufle & Moy, 2000). This is particularly important because the distribution of the beliefs of others is an important determinant of the willingness to publicly discuss the topic of climate change (Geiger & Swim, 2016).

We also engage with literature focusing on the nature of second-order climate change beliefs. The presence of pluralistic ignorance and the systematic underestimation of the share of those believing that climate change is happening has already been documented (Leviston, Walker, & Morwinski, 2013; Kjeldahl & Hendricks, 2018). However, we are the first paper to causally examine the role of partisanship when conveying climate change information and to measure the effect on private and public support for action

aimed at mitigation. To the best of our knowledge, only two previous papers resemble our setting or design. The first (Andre, Boneva, Chopra, & Falk, 2021), examines general climate change attitudes of Americans and provides the subjects with the actual distribution of second-order beliefs related to climate-friendly behaviour. However, the content of the information provided in the paper does not focus specifically on Republican respondents and targets action aimed at fighting global warming. The second paper (Mildenberger & Tingley, 2019) focuses on the second-order beliefs of Americans. The main difference with our experiment is that the provided information completely lacks the partisanship component and only examines the private dimension, measured as the individuals' preferences to engage in, or support, climate policy action.

Finally, by distinguishing between information that focuses on the beliefs about other Republicans and Americans in general, we contribute to the growing literature examining the role of partisanship in the climate change debate. There is a widespread misconception that Republicans are opposed to climate policy because they do not believe in anthropogenic climate change (DeNicola & Subramaniam, 2014; Kahan, 2012). In the US, the division between Democrats and Republicans on this matter, as seen by the general public, is larger than it is in reality, possibly due to recent trends in terms of polarisation swaying the perception of party lines further apart (Gennaioli & Tabellini, 2019). Surveys indicate that while the vast majority of Democrats believe in global warming, so do the majority of Republicans (Leiserowitz et al., 2021). It is true, however, that most of the climate change sceptics identify as Republican. In their 2014 and 2016 studies, Van Boven, Ehret, and Sherman (2018) find that among climate sceptics, which make up 15% of the sample in 2014 and 14% in 2016, there is a big difference between those that identify as Democrats (15%) and those that identify as Republicans (71%). Nonetheless, the differences between Democrats and Republicans in the proportion that believes climate change is happening is more modest (93% vs 70% in 2014; 89% vs 63% in 2016). The authors suggest that the media and other interest groups have often underlined the first rather than the second difference as it is more newsworthy, thus amplifying the misconceptions about Republicans and climate change.

3 Experimental design

We used Prolific to recruit a total of 2,319 US participants based on whether they self-identified as Republican.[3] The survey was conducted with the use of Qualtrics in the period from June to September in 2021. The timeline of the experiment is shown in

[3]Eyal, David, Andrew, Zak, and Ekaterina (2021) examine the quality of platforms and panels for online behavioural research along aspects that are most critical to researchers such as attention, comprehension, honesty, and reliability. Prolific performs well relative to other platforms on all measures.

Figure 1.

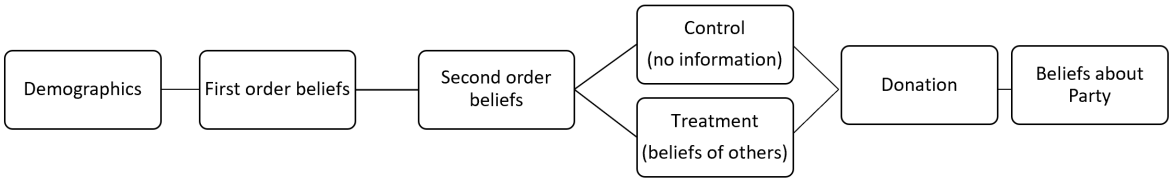


Figure 1: Timeline of the experiment

We started by asking the respondents a series of demographic questions (age, gender, education, marital status, placement on the political spectrum, and whether they had a social media account). Then, in the first stage of the experiment, we elicited the participant's beliefs about whether climate change is happening, that is, their first-order beliefs. In particular, they were asked to state on a scale from "Strongly disagree" to "Strongly agree" whether they agreed with the statement: "Climate change is happening". The order of the scale was randomised and the question was not incentivised.

In the second stage, we elicited treatment-specific second-order beliefs. In particular, subjects were told that in a previous study, we asked 100 Republicans (Americans) their opinion about whether climate change is happening and had them guess how many of these previous participants agreed. The guess was incentivised for correctness with a 10$ Amazon voucher. Subjects were told that the individual with the closest guess to the actual number would win the voucher.[4] If more than one person provided the same closest guess, the winner was decided between them by a random draw.

Next, we provided a subset of our respondents with information about the actual number of Republicans (Americans) who agreed that climate change is happening. Subjects assigned to the control groups were not given this information and proceeded directly to the charity donation decision. The donation consisted of the opportunity to authorise a $1 donation to ConservAmerica, a nonpartisan NGO that focuses on conservation and environmental action. Respondents were explicitly told that this donation does not affect their payoffs. Only those who decided to donate were then given the opportunity to share a post on Facebook or Twitter.[5]

Finally, we assessed whether informing subjects about the average beliefs of others also corrected potential misperceptions regarding what they believe the Republican Party's stance on climate change to be. In particular, subjects were asked their belief on

[4]Incentivising subjects to provide accurate guesses with a gift card follows the approach of Bursztyn, González, and Yanagizawa-Drott (2020), among others. With continuous outcomes, one can offer the respondents a monetary reward if their answer is within some percentage range of the correct answer. As reviewed by Haaland et al. (2020), the advantages of this incentive structure is that it is simple to explain to respondents and provides stark incentives to provide correct answers. The disadvantage is that they only able to elicit the mode of the respondents' belief distribution.

[5]To preserve the subjects' privacy, we did not keep a record of their names on social media or whether they went on to post on their profile, but we did record whether they clicked on the share button for either Facebook or Twitter.

the Party's position in line with three answers:"Climate change is happening", "Climate change is not happening", or "I don't know". While this question does not ask about party members per se, previous work has shown that questions about the party stance on an issue can be understood as a reflection of respondents' beliefs of the average member of a political party (Bordalo, Tabellini, & Yang, 2020; Westfall, Van Boven, Chambers, & Judd, 2015).

3.1 Information treatments

We implement a 2×2 between-subjects design varying the following elements: i) whether participants were informed about the distribution of climate change beliefs of others and ii) whether they were informed about the climate change beliefs of other Republicans or Americans in general.[6] This resulted in two control and two treatment conditions as shown in Table 1. In the control conditions, subjects are either asked to guess the number of Americans, referred to as *ControlAmericans* or the number of Republicans, referred to as *ControlRepublicans*, who in our previous study agreed that climate change is happening. Once subjects made their guess, they state how confident they feel about it.

In the treatment conditions, referred to as *InfoRepublicans* and *InfoAmericans*, subjects go through the same stages. The main difference between the control and treatment conditions is that subjects in InfoRepublicans and InfoAmericans are provided with the actual distribution of climate change attitudes (first-order beliefs) of either Americans or Republicans that took part in our previous study. After making their guess and stating how confident they feel about it, subjects in InfoRepublicans receive information that represents the climate change attitudes "of a group of 100 Republicans in the United States from one of our previous studies". In InfoAmericans, subjects are told that that this information represents the climate change attitudes "of a group of 100 Americans (Democrats, Republicans and Independents) in the United States from one of our previous studies".[7] All subjects are then given the opportunity to support ConservAmerica by privately authorising a donation and then publicly sharing a post on their social media accounts.

Comparing the behaviour of Republicans in the information conditions with those in the no information conditions determines the average effect of information provision. However, the more interesting comparison is of InfoRepublicans and InfoAmericans, as

[6]The instructions are available in the Online Materials, Section E.

[7]To avoid deception and to obtain control of the direction in which we treat subjects, we first elicited the climate change beliefs of a sample of Republicans and examined the distribution of their beliefs before designing the information message. We also fielded these questions among the general US population to obtain information to use in the Americans treatments. A similar approach was employed, for example, by Bicchieri et al., (2020). Importantly, both pilots were conducted on Prolific, which is the same platform used to contact the respondents in our information provision setting.

Table 1: Overview of treatment conditions

	No Information	Information
Republicans	ControlRepublicans: N = 570	InfoRepublicans: N = 581
Americans	ControlAmericans: N = 585	InfoAmericans: N = 583

this isolates the impact of making party identity salient in the context of information provision. A significant treatment effect difference, if found, would indicate that partisanship plays an important role in the nature of misperceptions and the re-calibration of Republicans' beliefs in the climate change domain.

3.2 Donations

Our main behavioural outcome variable consists of two dimensions, private and public. First, respondents are given the opportunity to authorise a $1 donation to ConservAmerica, an organisation that presents itself as "nonpartisan, nonprofit, dedicated to the development and advancement of sound environmental and conservation policy".[8] They are informed that we would make the donation on their behalf and that the donation will not affect their final payoff.[9] Previous papers have used similar methods, except that in these cases the amount donated is either a share of the subject's endowment or the donation is implemented with a certain probability (e.g. Settele, 2019; Andre et al., 2021). The amount donated, either factually or hypothetically, is then used to measure the effectiveness of a given treatment. However, the donated amount is not necessarily a signal of support as it relates to many dimensions such as generosity, previous donation habits, and social status (Y.-K. Lee & Chang, 2007). Additionally, a measure that does not entail any monetary cost to the respondents safeguards against free-riding problems where subjects abstain from donating because they are informed that others are donating, resulting in a higher payoff to themselves. In our setting, there are technically no material incentives for not authorising the donation.

Second, to capture the public dimension of our treatment effect, conditional on authorising the donation, subjects are given the opportunity to share a post stating "I made a donation to ConservAmerica! You can do the same clicking here:" on their Facebook and/or Twitter profile. Figure 2 shows an example. Our aim with this additional public layer is to proxy the respondent's revealed preferences to publicly

[8] Although the organisation currently presents itself as nonpartisan, it is formerly known as Republicans for Environmental Protection (REP) and is a national nonprofit organisation formed in 1995. REP's stated purpose was to strengthen the Republican Party's stance on environmental issues and support efforts to conserve natural resources and protect human and environmental health.

[9] A similar approach was used by (Bursztyn, Haaland, Rao, & Roth, 2020). After the experiment was finalised, we made the actual donations on behalf of subjects to the stated organisation.

express that climate change is happening.[10]

Figure 2: Example of the post that subjects were given the opportunity to share

On the relevant page, survey respondents are told that if they want to make their donation public on Facebook or Twitter, they could click on a button saying "Yes". Otherwise they could click "No". Importantly, we show them how the actual post will look like on their social media accounts before they are asked to make the choice. Subjects are told that we will not have access to any personally identifying information and that they will be able to see the post before they decide to share it on their account. When a respondent clicks on the "Yes" button, three things happen: First, the click is captured in our data. Second, a new page opens displaying a Facebook and/or Twitter plug-in "SHARE" button allowing them to proceed with sharing the post. In order for them to share it on their profile, they would need to log-in into their accounts. Importantly, the number of subjects clicking on the "SHARE" button is also registered in our data, enabling us to distinguish between those who intended to share the post and those who went on and did it.

4 Results

4.1 Sample characteristics and balance

To be eligible to participate in the study, respondents had to reside in the US and be at least 18 years old. We start by providing an overview of the sample and report the results of the balancing test. In total, 2,319 subjects took part in our experiment. When it comes to gender, 55% of the sample was comprised of females and 45% of males. Slightly more than the majority of subjects declared they were moderately conservative (52%), whereas the rest declared to be conservative Republicans (48%). The average subject was 35 years old with a college degree. The sample was mostly

[10]Our way of implementing this public layer is inspired by the approach of Settele (2019) who examines subjects' willingness to support a NGO that lobbies for policy making to support women in the labour maker with a Facebook like.

comprised of college (33%) or university graduates (41%) but a significant share listed high school as their highest educational attainment (24%). Approximately 53% stated they were married while 40% were single. Almost all of our respondents had a social media account (95%). Half of the subjects had never been directly or indirectly exposed to an extreme weather event. Additionally, most of the respondents stated that they rarely engage in conversation about climate change and report that only some of the people belonging to their social circle believe climate change is happening.

Balancing tests are contained in Table A.1 in the Appendix together with the summary statistics. None of the observable individual characteristics differs based on the treatment, suggesting that the randomisation procedure was successful. In the Online Materials, Section A, we use The US Census data to compare our sample to the US general population. Figure A.1 maps the distribution of respondents by US state and shows that we have a geographically broad sample of Republicans.

4.2 Climate change beliefs

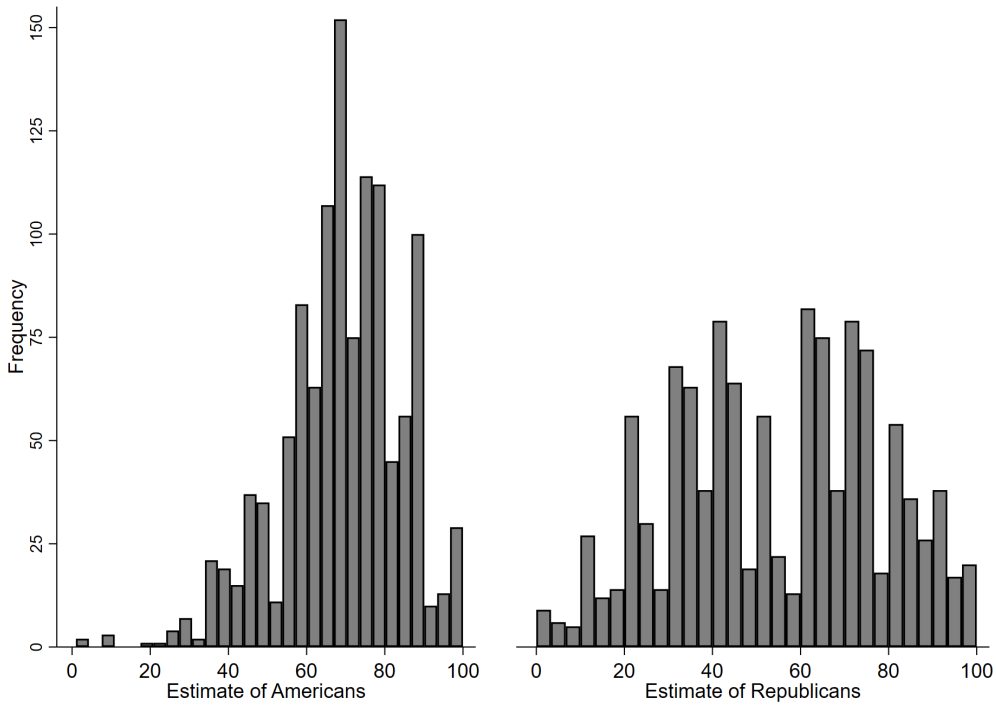
First-order beliefs We observe that 75% of the sample agree (25% strongly and 50% somewhat agree), 14% neither agree nor disagree, and 10% disagree (3% strongly and 7% somewhat disagree) with the statement suggesting that climate change is happening. A visual summary of these results is contained in Figure D.1 in the Online Materials. A recent report suggests that 67% of Republicans believe global warming is presently occurring (MacInnis, Krosnick, et al., 2020).[11] Schuldt, Enns, and Cavaliere (2017) find that while it does not make a difference for Democrats, using the term global warming compared to climate change results in different approval rates among Republicans. In particular, when using a probabilistic sample of the American population they find that 74% of Republicans believe climate change is happening, whereas 65.5% believe global warming is happening. It is important to note this share is very close to the expressed beliefs of the Republicans in our sample. However, the data have been gathered at a later point in time and we are not using a strictly representative sample.

Table B.1 in the Appendix presents the results of OLS regressions examining the correlates of the subject's first-order beliefs. Being older, having less than a college degree and identifying as a conservative Republican increases the likelihood of not believing that climate change is happening. On the other hand, we find a positive association between the number of individuals in one's social circle that believe climate change is happening and one's climate change attitudes. Moreover, the frequency with which subjects talk about it is associated with a higher inclination to believe in climate

[11] While the terms global warming and climate change are often used interchangeably they denote different things. Global warming is part of a broader phenomenon commonly referred to as climate change. Climate change also encompasses other types of changes unrelated to temperatures, such as precipitation and wind patterns. These differences also feed into people's attitudes about the two issues (D. Benjamin, Por, & Budescu, 2017)

change. It is important to keep in mind that these relationships are not necessarily unilateral, as it is likely that subjects that believe climate change is happening are more likely to be surrounded by those who share the same belief. Surprisingly, exposure to an extreme weather event is not significantly associated with individual attitudes. This is despite previous evidence suggesting that those that have been exposed to weather shocks are more likely to believe in climate change (Hornsey et al., 2016).

Figure 3: Distribution of second-order beliefs about climate change (N = 2,319)



Note: The figure shows the distribution of subjects' guesses about how many out of 100 Republicans (Americans) agreed that climate change is happening.

Second-order beliefs There are significant differences between the second-order beliefs of the subjects who guessed the number of Republicans and those who guessed the number of Americans who believe in climate change.[12] In particular, the average guess about other Republicans was 54% and that for Americans was 69% (Wilcoxon ranksum test, $N = 2,318$, $p = 0.000$). Figure 3 shows how different the distributions of subjects' second-order beliefs look between conditions. Beliefs about Americans are right-skewed, suggesting that subject's guesses are concentrated in the upper values. The shape of the distribution of beliefs about Republicans is bimodal, with one mode above and the other below 50, suggesting that subjects guesses were more spread about the range. We interpret this as indicating more uncertainty about where the actual value lies. Both deviate from a normal distribution (Shapiro-Wilk test; Americans: N = 1,168, $p = 0.000$; Republicans: N = 1,150, $p = 0.000$).

[12]Due to a technical issue, one subject did not provide their guess in the InfoRepublicans.

Tables C.1 and C.2 examine the correlates of second-order beliefs about Republicans and Americans, respectively. Starting with the second-order beliefs about Republicans, we observe in column (1) a significant and strong association between first-order and second-order beliefs. A lower likelihood of believing that climate change is happening is associated with a 6-point lower estimate of other Republicans' climate change beliefs. Other important variables in column (4) are the confidence in one's guess, the number of individuals in one's social circle who believe that climate change is happening, the frequency of engaging in discussions about climate change, and caring about the opinions of Republicans. The more subjects care about the good opinion of other Republicans, the higher their second-order belief estimate. Moving to the second-order beliefs about Americans in Table C.2, we see a similar pattern except that, for instance, disagreeing that climate change is happening is not a significant predictor of one's guess. The same is the case for how often the subject discusses climate change in column (4).

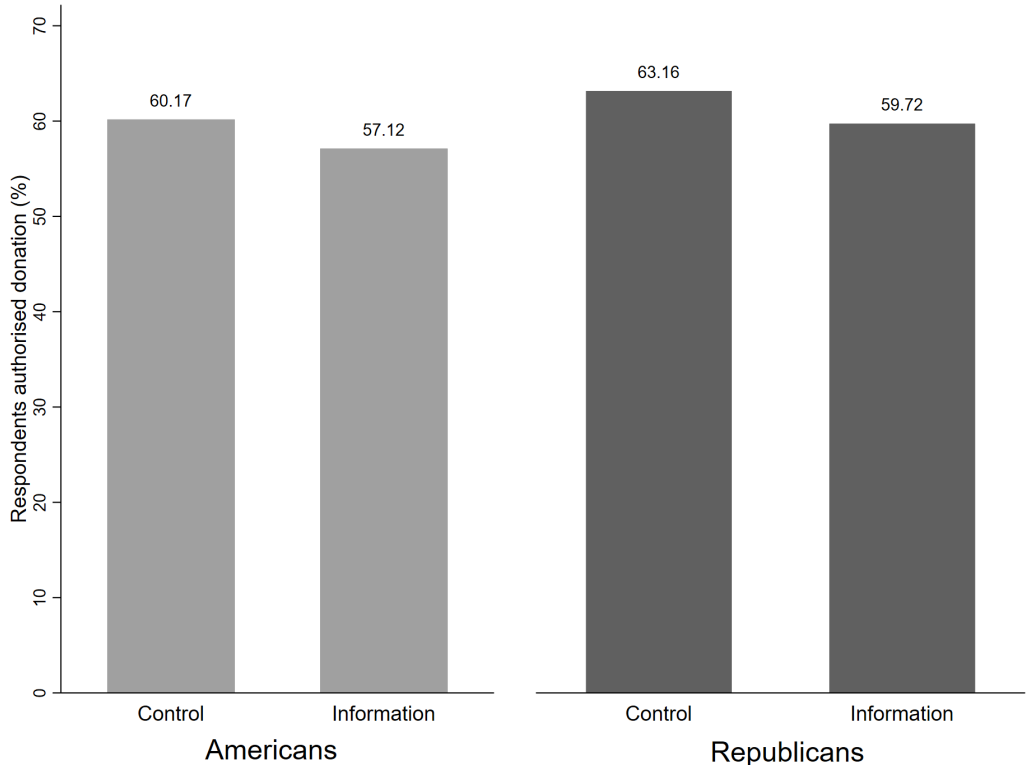
Misperceptions Concerning the gap between first and second-order beliefs, we distinguish between subjects who over-estimated and under-estimated the number of Republicans (or Americans) in our sample who believed that climate change is happening. We calculated the wedges as the difference between the actual percentage of subjects agreeing with the statement and subjects' guesses of others' climate change beliefs. The distribution of the wedges is plotted in Figure G.1 in the Appendix. Positive wedges (wedge ≥ 0) indicate that subjects underestimated the share of Americans or Republicans who believe that climate change is happening, while negative wedges (wedge $<$ 0) indicate that subjects overestimated it. Those whose value is zero got the estimate exactly right (2% in Americans and 1% in Republicans treatment conditions, respectively).

We note that confidence in one's guess is an important predictor of the size of the absolute wedge. Figure G.2 shows that more accurate guesses are correlated with higher levels of confidence in the guess itself. Moreover, how frequently subjects talk about climate change is strongly associated with the size of the gap. The relationship between the frequency of discussion and size of the wedge is contained in Figure G.3. The more frequently subjects talk about it, the smaller the gap is between the guessed and actual share of subjects that believe climate change is happening and vice-versa. This correlation could also reflect reverse causality whereby subjects expect that others do not believe that climate change is happening, making them more reluctant to discuss the topic.[13] Although we do not tackle this question experimentally, the correlation could suggest that a lack of discussion about climate change helps fuel misperceptions.

[13] A similar argument is advanced by Bursztyn, González, and Yanagizawa-Drott (2020) who find that misperceptions about women's labour force participation are larger among those who rarely discuss the topic compared to those who discuss it very often.

4.3 Private outcome: authorise a donation

Figure 4: Effect of information provision on donation rates, by treatment (N = 2,319)



Aggregate results reveal that 62% of the subjects decided to authorise a $1 donation to the charity, this is without being provided information about others. Being given information about the beliefs of others decreases authorisation rates to 58% ($\chi^2(1)$, N = 2,319, $p = 0.113$). Figure 4 displays the differences between the treatment conditions. In ControlRepublicans, 63% authorise the donation while in InfoRepublicans, the authorisation rate decreases to 60% ($\chi^2(1)$, N = 1,151, $p = 0.232$). In ControlAmericans, 60% authorise the donation compared to 57% in InfoAmericans ($\chi^2(1)$, N = 1,168, $p = 0.290$).[14]

We proceed to estimate the effect of information provision, controlling for individual covariates and examining interaction effects in the following model:

$$Donation_i = \alpha + \beta_1 Info_i + \beta_2 PartyIdentity_i + \beta_3 Info_i \times PartyIdentity_i + \theta \mathbf{X_i} + \epsilon_i, \quad (1)$$

[14] At the end of the experiment, we asked subjects whether they trusted the information they were given. The majority of subjects find the information trustworthy (67%). More subjects stated they found the information untrustworthy in InfoRepublicans than InfoAmericans (6% vs 11%), and the difference is significant at the 5% level. In general, those that found the information trustworthy were more likely to authorise the donation ($\chi^2(2)$, N = 1,052, $p = 0.000$). See Figures D.3 and D.4 in the Online Materials.

where $Donation_i$ is an indicator variable taking value 1 if subject i authorised the \$1 donation and 0 otherwise; *Info* is an indicator variable taking value 1 for subject i receiving information about the distribution of the beliefs of others and 0 for subject i who did not receive information; *PartyIdentity* takes value 1 for subjects receiving information about the distribution of beliefs of other Republicans—making party identity salient—and 0 if subjects receive information about Americans. β_3 tests whether the effect of information provision differs between those who receive information about Americans and those who receive information about other Republicans. The vector $\mathbf{X_i}$ includes controls for gender, age, age squared, marital status, educational level, whether the subject is a moderate or conservative Republican, an agreement that climate change is happening and confidence in the guess about others. We present results with and without controls employing robust standard errors throughout the analysis.[15]

Table D.1 in the Appendix displays the findings from the regression analysis without controls: columns (1), (2), and (3) replicate the insights from Figure 4. Overall, information reduces donation rates (N = 2,319, $p = 0.113$). The effect of information is also negative in the Americans and Republicans treatment conditions, yet neither effect is statistically significant (N = 1.168, N = 1,151, $p > 0.232$). Finally, column (4) shows no differential effect of information between the treatments ($p = 0.925$).

Result 1 *Information provision does not yield a statistically significant effect on donation rates. Also, there are no differences in donation rates between subjects who receive information about Americans and those who receive information about Republicans.*

Table D.2 extends the baseline regressions by adding individual covariates as specified in Equation 1. Column (1) shows that the negative effect of information becomes significant at the 10% level when we add controls (N = 2,317, $p = 0.078$). In particular, the overall donation rate is reduced by 3.4 percentage points compared to receiving no information. Still, we are careful to not put too much weight on this effect.[16] Nevertheless, being a climate change sceptic, single, female, and a conservative Republican all yield a significant negative effect on donation rates. Columns (2) and (3) focus on the American and Republican treatment conditions, respectively. Column (4) probes the differential effect of information between treatments. While the impact of information is insignificant in these model specifications, most covariates remain significant predictors of donation behaviour. We discuss heterogeneous treatment effects related to some of these variables in Subsection 4.6.

[15] Table B.1 in the Online Materials presents an overview of the variables and corresponding scales used in the analysis.

[16] D. J. Benjamin et al. (2018) discusses statistical standards of evidence for claiming new discoveries, arguing that in many fields of science, these are simply too low.

4.4 Public outcome: willingness to share a post on social media

Finally, recall that our respondents had the opportunity to share a post on their Facebook and Twitter account stating that they authorised a donation to ConservAmerica, making the public component of their behaviour salient and capturing a different dimension of support than the preceding private donation decision. Restricting the analysis only to those who donated, we observe that a total of 170 subjects (12%) respondents reported their willingness to share a post on their social media. Of the subjects who stated they would share the post, 60 subjects clicked on the Facebook share button while 26 decided to do the same for Twitter. Given the low share of subjects that actually ended up clicking the "SHARE" button, we focus on the *willingness* to share and view the following exercise as merely exploratory. To facilitate the interpretation of the effects on the willingness to share the post, we employ an instrumental variable approach. In the first stage, Equation 2, we instrument the subject's donation decisions with treatment assignment. In the second stage, Equation 3, we estimate the effect of the donation on the willingness to share the post on social media.

$$Donation_i = \pi_0 + \pi_1 Info_i + \theta \mathbf{X_i} + \epsilon_i, \tag{2}$$

$$Socialmedia_i = \gamma_0 + \gamma_1 \widehat{Donation}_i + \theta \mathbf{X_i} + v_i, \tag{3}$$

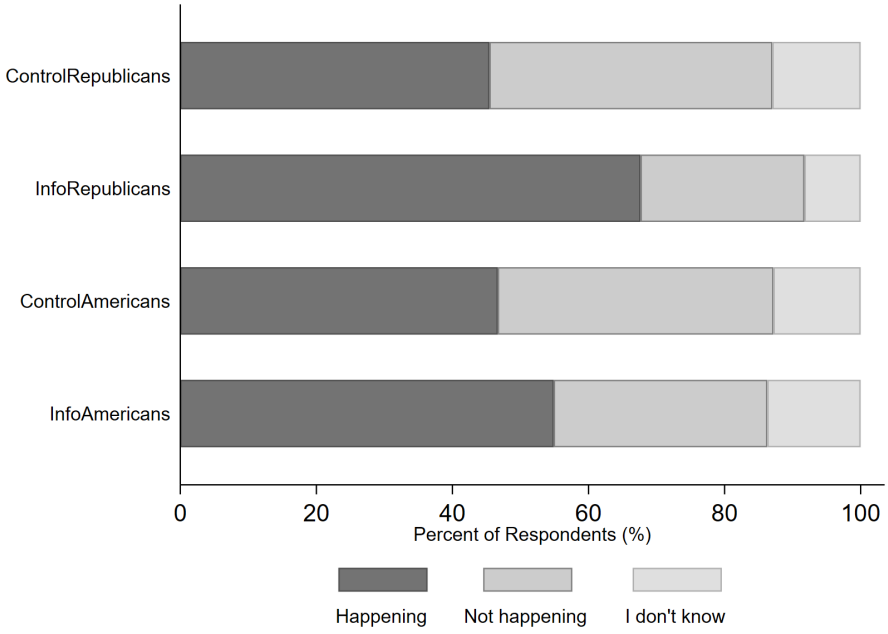
The vector of controls in both equations includes the covariates that we used in the main analysis: gender, age, higher education, marital status, agreement that climate change is happening, confidence in guess, and political affiliation. Table F.1 displays the results. Column (1) in Panel A shows the first stage results, suggesting that information has a weakly significant effect on donations overall, but not when we distinguish between American and Republican treatment conditions. Panel B shows the second stage estimates; the direction of effects on the probability of sharing on social media is negative in all regression specifications, and only significant in the Americans' treatment.

4.5 Beliefs about the Republican Party's climate change stance

The previous sections have focused on the behavioural effects of information provision. We finalise our main analysis by examining the impact on beliefs, particularly on whether it affected the answers to other related questions. One such question concerns the beliefs about the Republican Party's position on climate change. It is plausible to think that the treatments that make the Republican identity more salient will be more

likely to affect subject's beliefs about the Republican Party compared to those that focus on Americans in general.

Figure 5: Effect on beliefs about the Republican Party's climate position (N = 2,319)



Overall, our results confirm that information provision increases the share of respondent's who believe that the Republican Party's position is that climate change is happening (46% vs 61%, $\chi^2(2)$, N = 2,319, $p = 0.000$). Figure 5 shows that 45% respondents in ControlRepublicans believed that the party's position is that climate change is happening. This share increases to 68% after receiving information about the beliefs of other Republicans ($\chi^2(2)$, N = 1,151, $p = 0.000$). Similarly, the share of respondents who thought that the party's position is that climate change is happening increases from 46% to 55% after being given information about Americans ($\chi^2(2)$, N = 1,168, $p = 0.004$).

Result 2 *Information alters what Republican respondents believe to be the Republican Party's stance on climate change. More subjects perceive that the party's position is that climate change is happening, the effect being significantly stronger when given information about other Republicans.*

Notably, and importantly, OLS regressions in columns (1) and (2) contained in Table E.3 show that the effect of information on beliefs is stronger when it concerns the climate change attitudes of other Republicans as opposed to other Americans in general.[17] The

[17]For ease of interpretation, in the main analysis, we consider a binary variable whereby we interpret "I don't know" as indicating that subjects do not agree that climate change is happening. In the Online Materials, we also present our main results with alternative scale definitions. The main conclusions remain unaffected. See Tables C.5 and C.6.

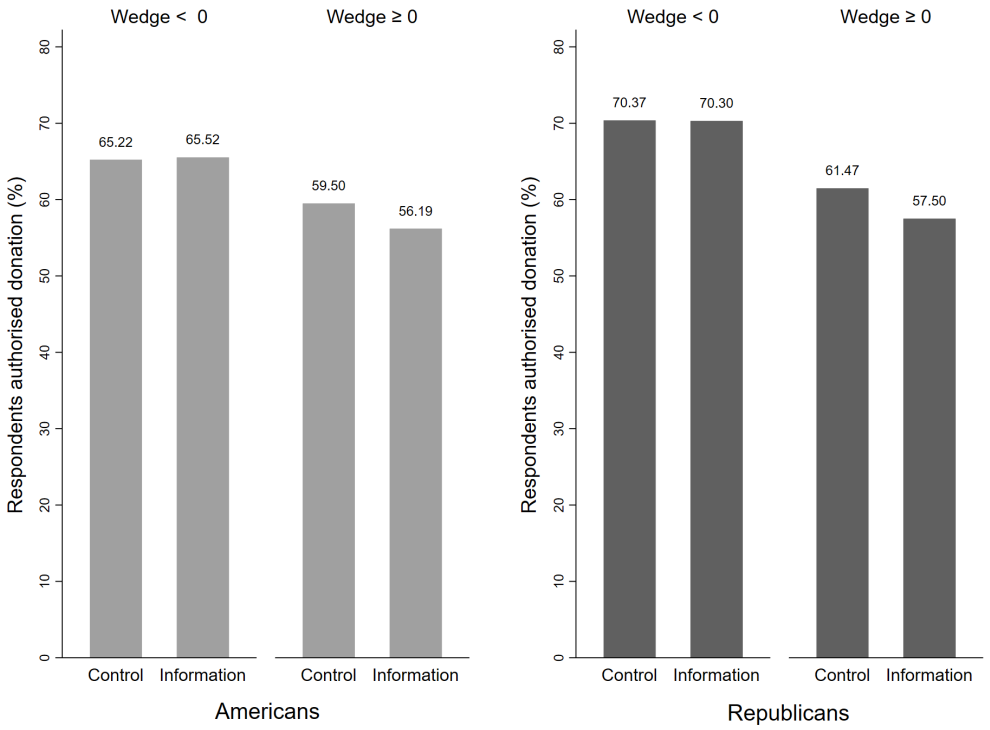
size of the interaction coefficient in column (3) corresponds to a difference between treatment conditions of 14 percentage points (N = 2,319, $p < 0.01$). Columns (1) and (2) in Table E.4 show the results controlling for individual covariates.

4.6 Additional analysis

4.6.1 Direction of belief updating

In this part of the analysis, we move beyond examining the average effect of information provision and focus on heterogeneous effects as defined by the direction of belief updating. The majority of Republicans under-estimated the actual share of others who agreed that climate change is happening. Specifically, when asked about the beliefs of Americans in our previous study, 89% under-estimated while 11% overestimated how widespread the belief in climate change is. Also, only 12% of the respondents thought that the share of Americans believing in climate change is below 50%. When asked about the beliefs of other Republicans, 82% under-estimated while 18% over-estimated the agreement with the statement. In fact, 47% of respondents thought the share of agreement to be below 50%, which suggests that a considerable portion of respondents believe agreement to constitute a minority attitude among Republicans. Having established that subjects largely under-estimate others' belief in climate change, we examine the effect of information provision by the direction of belief updating.

Figure 6: Effect on donation rates by direction of belief updating (N = 2,319)



Donation rates Among those who under-estimate (wedge ≥ 0) how likely others are to believe in climate change, information has an overall negative effect on donation rates compared to receiving no information ($\chi^2(1)$, N = 1,981, $p = 0.102$). Figure 6 shows that among those who under-estimated the beliefs of other Republicans, 61% authorised the donation without receiving information, whereas 57% did the same having been given information ($\chi^2(1)$, N = 942, $p = 0.215$). Among subjects who under-estimated the share of Americans agreeing with the statement, 59% authorised the donation in the control condition while 56% did the same after receiving information ($\chi^2(1)$, N = 1,041, $p = 0.280$). On the other hand, over-estimating (wedge < 0) the share of other Republicans and Americans agreeing that climate change is happening is not associated with a change in donation behaviour after receiving information ($\chi^2(1)$, N = 209, $p = 0.991$, N = 127, $p = 0.927$).

Table E.1 in the Appendix presents the regression analysis without controls. Focusing on those under-estimating, column (1) shows that the overall effect of information is negative, albeit insignificantly, at conventional levels. The same conclusion follows when we distinguish between information about Americans and Republicans in columns (3) and (5). However, controlling for individual covariates in column (1) in Table E.2 yields a significant negative effect of information on donation rates by 4 percentage points (N = 1,981, $p = 0.060$). The effect of information about Americans (column 3) and Republicans (column 5) remains insignificant compared to no information after adding controls. Similar to results obtained with non-parametric tests, over-estimating the share of other Republicans and Americans agreeing that climate change is happening is not associated with a change in donation rates after adding controls.

Beliefs To explore the effect of information about others on the direction on belief updating about the party's position, we distinguish between subjects who under- and over-estimated the average position of others. To this end, inspired by the work of Bordalo et al. (2020), we analyse whether information has a differential effect on those who thought that a minority ($\leq 50\%$) of others believed that climate change is happening and those who thought that a majority ($> 50\%$) did the same. Regression analysis in columns (3) and (6) in Table E.3 reveals that the effect on belief updating is significant in magnitude and in the statistical terms among Republicans who thought that others who believe in climate change constitute a minority. Subjects in InfoRepublicans are 36 percentage points more likely to believe that the Republican Party's stance is that climate change is happening compared to ControlRepublicans (N = 548, $p = 0.000$). Being given information about Americans increases the probability of believing the same by 17 percentage points compared to ControlAmericans (N = 147, $p = 0.000$). Conversely, subjects who thought that agreement constitutes a majority opinion among other Republicans is associated with an increase, albeit of a smaller

magnitude (8 percentage points) in InfoRepublicans compared to ControlRepublicans (N = 603, $p = 0.029$). Similar conclusions follow for InfoAmericans (N = 1,021, $p = 0.031$). See Table E.3 columns (5) and (7) for corresponding regression estimates, respectively.

4.6.2 Gender and party factions

From the regression analysis in Table D.2 and E.2, we observe that gender and factions within the Republican Party are important correlates of donation rates. Women's donation rates are generally lower than men's in most regression specifications. Considering that this effect differs from what is typically reported in the literature, particularly in the review by Egan and Mullin (2017) in which Republican women are found to express higher levels of belief and concern about climate change than men, we take a closer look at the moderating effects of gender in our setting. Exploring the overall impact of information, we observe a significant negative effect whereby women's donation rates are reduced by six percentage points ($\chi^2(1)$, N = 1,266, $p = 0.033$). This effect seems to be driven by women who are given information about other Republicans compared to those receiving no information ($\chi^2(1)$, N = 626, $p = 0.049$). We also observe reductions in donation rates when women are informed about Americans, yet the effect is not statistically significant ($\chi^2(1)$, N = 640, $p = 0.292$).

The Republican Party in the United States includes several factions or wings. Concerning climate change, the Republican electorate tends to be split in their views about the issue with conservative Republicans believing that enough is being done about climate change and moderate Republicans believing that more should be done (Noel, 2016). In our study, conservative Republicans have overall lower donation rates than their more moderate counterparts ($\chi^2(1)$, N = 2,319, $p = 0.000$). Investigating the effect of information provision among these two subgroups reveals that conservatives' willingness to authorise a donation is reduced compared to not receiving any information ($\chi^2(1)$, N = 1,110, $p = 0.037$). In particular, donation rates are lower by six percentage points after being given information about other Americans' climate change attitudes compared to receiving no information ($\chi^2(1)$, N = 557, $p = 0.074$). No such effect is found when conservative respondents are given information about other Republicans (N = 553, $\chi^2(1)$, $p = 0.215$). Donation rates of moderate Republicans do not differ with respect to whether information is about other Americans or Republicans, respectively ($\chi^2(1)$, N = 611, N = 598, $p > 0.707$).[18]

Interestingly, while information about others reduces donation rates in general,

[18]In the Online Materials, we report the heterogeneity analysis by direction of belief updating for gender and party factions. The results mirror the results reported here and seem to be driven by those who under-estimate the widespread beliefs in climate change; women reduce their donation rates when given information about Republicans while Conservatives do the same when given information about Americans. Both effects are significant at the 10% level. See Tables C.1-C.4.

from the heterogeneity analysis two different effects emerge concerning information that makes party identity salient. The first effect indicates that women decrease their donation rates when informed about the beliefs of other Republicans. The second shows that conservative Republicans decrease their donation rates following information about Americans' beliefs. The first effect could be related to women being more sensitive to what they expect constitutes appropriate behaviour for a Republican. In particular, previous evidence shows that women anticipate facing more threats if they deviate from the norm (Wormley et al., 2021) and are more sensitive to social cues in a variety of domains (Croson & Gneezy, 2009). Confirming this expectation, we ran a follow-up vignette study that taps into the normative dimension of publicly speaking up in support for climate change.[19] We find that subjects expect a Republican voicing his or her concern that climate change is happening to be deemed as less appropriate compared to a Democrat or an Independent. Additionally, we show that women expect such behaviour to be considered more inappropriate than men. When it comes to the effect for Conservative Republicans, as they are more likely to strongly identify with the values of the party, when given information about other Americans, it is reasonable to think that they would be more likely to retreat to what they expect to be their party's position on the issue (Druckman et al., 2013; Taber & Lodge, 2006). The two effects have the same consequences in terms of willingness to donate, but pass through different channels.[20]

5 Conclusion

There is a widespread misperception that Republicans do not believe climate change is happening, partly held by Republicans themselves. While it is true that most climate change sceptics are Republican, it is also true that according to most of the survey companies, the majority of those who identify as Republicans do believe climate change is happening. The issue is particularly important because if Republicans believe that they will be socially sanctioned if they speak or act up in support of climate change, they might self-silence and, in doing so, perpetuate the misperception. In this paper, we examine whether correcting beliefs about the distribution of climate change beliefs of others changes private and public support for climate action. Additionally, we examine whether it changes the beliefs about the Republican Party's stance on the matter. Considering that bipartisan support is needed to implement climate change policy, our

[19] The full design and results are reported in the Online Materials.

[20] In the paper, we focused mainly on heterogeneity in terms of effects on donation rates. In the Online Materials, Section C.1 and C.2, we show the heterogeneous effects of information on beliefs about the Party's stance. Women believe that the Party's position is that climate change is happening only when party identity is made salient. Similarly, conservative Republicans' beliefs about the Party are unaffected when information concerns Americans whereas they update in a positive direction when informed about other Republicans.

paper sheds light on the effect of information provision on the beliefs and behaviour of Republicans, who are an important target group.

In line with findings in environmental psychology and political science, we find that Republicans largely underestimate how widespread the belief is that climate change is happening both among other Americans and other Republicans. Our main contribution lies in showing that it is important to distinguish between beliefs and behaviour when assessing the role of partisanship in the climate change communication domain. We show that information provision leads to an insignificant effect on donation rates. On the other hand, providing information in a way that makes party identity salient changes the subject's perception of the Republican Party's position on climate change. In particular, providing them with information about the beliefs others have makes the subjects more likely to believe that the Republican party's stance is that climate change is happening. Finally, the analysis shows that there are important heterogeneities in terms of how information and party identity affect women's and conservative Republicans' beliefs and donation behaviour.

These findings are of particular importance to policymakers, given the recent rise in the use of social norms and information provision interventions as way to encourage behavioral change in the climate domain. We show that correcting misperceptions about the beliefs of others may not be enough to instigate action among certain groups. Thus, focusing only on beliefs when evaluating information interventions may give inaccurate predictions of how information affects behaviour. Still, our results highlight that information carrying party salient cues could be useful to change beliefs about the Republican Party's position, which could be viewed as a useful first step considering the deeply rooted political polarisation on the issue. In view of the importance of climate-related action to revert and prevent further damages, our results call for more research on the role of party identity in the information provision settings. In particular, further research is needed to examine the channels affecting behaviour and beliefs in the climate change domain and to test which messages and messengers are more likely to motivate a behavioural response. For instance, it would be interesting to investigate whether Republican voters misperceive the position of elite Republicans, and if they do, experimentally test whether information would increase support for climate change policies. Furthermore, it would be interesting to vary the social proximity of the beliefs of others. That is, test whether proving subjects with information on a group that is closer to their social circle might help change behaviour.

References

Andre, P., Boneva, T., Chopra, F., & Falk, A. (2021). Fighting climate change: The role of norms, preferences, and moral values. *CEPR Discussion Paper No. DP16343*.

Benegal, S. D., & Scruggs, L. A. (2018). Correcting misinformation about climate change: The impact of partisanship in an experimental setting. *Climatic change*, *148*(1), 61–80.

Benjamin, D., Por, H.-H., & Budescu, D. (2017). Climate change versus global warming: Who is susceptible to the framing of climate change? *Environment and Behavior*, *49*(7), 745–770.

Benjamin, D. J., Berger, J. O., Johannesson, M., Nosek, B. A., Wagenmakers, E.-J., Berk, R., ... others (2018). Redefine statistical significance. *Nature human behaviour*, *2*(1), 6–10.

Bordalo, P., Tabellini, M., & Yang, D. Y. (2020). *Issue salience and political stereotypes* (Tech. Rep.). National Bureau of Economic Research.

Boyle, A. D., Leggat, G., Morikawa, L., Pappas, Y., & Stephens, J. C. (2021). Green new deal proposals: Comparing emerging transformational climate policies at multiple scales. *Energy Research & Social Science*, *81*, 102259.

Bursztyn, L., Egorov, G., & Fiorin, S. (2020). From extreme to mainstream: The erosion of social norms. *American economic review*, *110*(11), 3522–48.

Bursztyn, L., González, A. L., & Yanagizawa-Drott, D. (2020). Misperceived social norms: Women working outside the home in saudi arabia. *American economic review*, *110*(10), 2997–3029.

Bursztyn, L., Haaland, I., Rao, A., & Roth, C. (2020). Disguising prejudice: Popular rationales as excuses for intolerant expression. *University of Chicago, Becker Friedman Institute for Economics Working Paper*(2020-73).

Croson, R., & Gneezy, U. (2009). Gender differences in preferences. *Journal of Economic literature*, *47*(2), 448–74.

DeNicola, E., & Subramaniam, P. (2014). Environmental attitudes and political partisanship. *Public Health*, *128*(5), 404–409.

Ding, D., Maibach, E. W., Zhao, X., Roser-Renouf, C., & Leiserowitz, A. (2011). Support for climate policy and societal action are linked to perceptions about scientific agreement. *Nature Climate Change*, *1*(9), 462–466.

Doell, K. C., Pärnamets, P., Harris, E. A., Hackel, L. M., & Van Bavel, J. J. (2021). Understanding the effects of partisan identity on climate change. *Current Opinion in Behavioral Sciences*, *42*, 54–59.

Druckman, J. N., Peterson, E., & Slothuus, R. (2013). How elite partisan polarization affects public opinion formation. *American Political Science Review*, *107*(1), 57–79.

Egan, P. J., & Mullin, M. (2017). Climate change: Us public opinion. *Annual Review of Political Science*, *20*, 209–227.

Eyal, P., David, R., Andrew, G., Zak, E., & Ekaterina, D. (2021). Data quality of platforms and panels for online behavioral research. *Behavior Research Methods*, 1–20.

Funk, C., & Hefferon, M. (2019). Us public views on climate and energy. *Pew Research Center*, *25*.

Geiger, N., & Swim, J. K. (2016). Climate of silence: Pluralistic ignorance as a barrier to climate change discussion. *Journal of Environmental Psychology*, *47*, 79–90.

Gennaioli, N., & Tabellini, G. (2019). Identity, beliefs, and political conflict. *Available at SSRN 3300726*.

Goldberg, M. H., Gustafson, A., Rosenthal, S. A., & Leiserowitz, A. (2021). Shifting republican views on climate change through targeted advertising. *Nature Climate Change*, 1–5.

Grewenig, E., Lergetporer, P., Werner, K., & Woessmann, L. (2020). Do party positions affect the public's policy preferences? experimental evidence on support for family policies. *Journal of Economic Behavior Organization*, *179*(9), 523-543.

Haaland, I., & Roth, C. (2021). Beliefs about racial discrimination and support for pro-black policies. *The Review of Economics and Statistics*, 1–38.

Haaland, I., Roth, C., & Wohlfart, J. (2020). Designing information provision experiments. *CEBI Working Paper Series, Working Paper 20/20*.

Hart, P. S., & Nisbet, E. C. (2012). Boomerang effects in science communication: How motivated reasoning and identity cues amplify opinion polarization about climate mitigation policies. *Communication research*, *39*(6), 701–723.

Hornsey, M. J., Harris, E. A., Bain, P. G., & Fielding, K. S. (2016). Meta-analyses of the determinants and outcomes of belief in climate change. *Nature climate change*, *6*(6), 622–626.

Kahan, D. (2012). Why we are poles apart on climate change. *Nature News*, *488*(7411), 255.

Katz, D., Allport, F. H., & Jenness, M. B. (1931). Students' attitudes; a report of the syracuse university reaction study. *The ANNALS of the American Academy of Political and Social Science*, *155*(1), 256–257.

Kjeldahl, E. M., & Hendricks, V. F. (2018). The sense of social influence: pluralistic ignorance in climate change: Social factors play key roles in human behavior. individuals tend to underestimate how much others worry about climate change. this may inhibit them from taking collective climate action. *EMBO reports*, *19*(11), e47185.

Kuang, J., Delea, M. G., Thulin, E., & Bicchieri, C. (2020). Do descriptive norms messaging interventions backfire? protocol for a systematic review of the boomerang

effect. *Systematic reviews*, *9*(1), 1–7.

Lee, N. R., & Stecula, D. (2021). Subnational bipartisanship on climate change: evidence from surveys of local and state policymakers. *Climatic Change*, *164*(1), 1–12.

Lee, Y.-K., & Chang, C.-T. (2007). Who gives what to charity? characteristics affecting donation behavior. *Social Behavior and Personality: an international journal*, *35*(9), 1173–1180.

Leiserowitz, A., Maibach, E., Rosenthal, S., Kotcher, J., Carman, J., Wang, X., ... Marlon, J. (2021). Politics global warming. *Yale University and George Mason University. New Haven, CT: Yale Program on Climate Change Communication*.

Leviston, Z., Walker, I., & Morwinski, S. (2013). Your opinion on climate change might not be as common as you think. *Nature Climate Change*, *3*(4), 334–337.

MacInnis, B., Krosnick, J., et al. (2020). Climate insights 2020: Partisan divide.

Mildenberger, M., & Tingley, D. (2019). Beliefs about climate beliefs: the importance of second-order opinions for climate politics. *British Journal of Political Science*, *49*(4), 1279–1307.

Mullinix, K. J. (2016). Partisanship and preference formation: Competing motivations, elite polarization, and issue importance. *Political Behavior*, *38*(2), 383–411.

Noel, H. (2016). Ideological factions in the republican and democratic parties. *The ANNALS of the American Academy of Political and Social Science*, *667*(1), 166–188.

Nyhan, B., & Reifler, J. (2010). When corrections fail: The persistence of political misperceptions. *Political Behavior*, *32*(2), 303–330.

O'Gorman, H. J. (1975). Pluralistic ignorance and white estimates of white support for racial segregation. *Public Opinion Quarterly*, *39*(3), 313–330.

Ozaki, T., & Nakayachi, K. (2020). When descriptive norms backfire: Attitudes induce undesirable consequences during disaster preparation. *Analyses of Social Issues and Public Policy*, *20*(1), 90–117.

Perez-Truglia, R., & Cruces, G. (2017). Partisan interactions: Evidence from a field experiment in the united states. *Journal of Political Economy*, *125*(4), 1208–1243.

Prentice, D. A., & Miller, D. T. (1993). Pluralistic ignorance and alcohol use on campus: some consequences of misperceiving the social norm. *Journal of personality and social psychology*, *64*(2), 243.

Scheufle, D. A., & Moy, P. (2000). Twenty-five years of the spiral of silence: A conceptual review and empirical outlook. *International journal of public opinion research*, *12*(1), 3–28.

Schuldt, J. P., Enns, P. K., & Cavaliere, V. (2017). Does the label really matter? evidence that the us public continues to doubt "global warming" more than "climate

change". *Climatic Change*, *143*(1), 271–280.

Settele, S. (2019). How do beliefs about the gender wage gap affect the demand for public policy? *Available at SSRN 3382325*.

Taber, C. S., & Lodge, M. (2006). Motivated skepticism in the evaluation of political beliefs. *American journal of political science*, *50*(3), 755–769.

Van Boven, L., Ehret, P. J., & Sherman, D. K. (2018). Psychological barriers to bipartisan public support for climate policy. *Perspectives on Psychological Science*, *13*(4), 492–507.

Westfall, J., Van Boven, L., Chambers, J. R., & Judd, C. M. (2015). Perceiving political polarization in the united states: Party identity strength and attitude extremity exacerbate the perceived partisan divide. *Perspectives on Psychological Science*, *10*(2), 145–158.

Wormley, A. S., Scott, M., Grimm, K., Li, N. P., Choy, B. K., & Cohen, A. B. (2021). Loosening the definition of culture: an investigation of gender and cultural tightness. *Current Research in Ecological and Social Psychology*, 100021.

Wynes, S., Kotcher, J., & Donner, S. D. (2021). Can citizen pressure influence politicians' communication about climate change? results from a field experiment. *Climatic change*, *168*(1), 1–20.

Zhou, J. (2016). Boomerangs versus javelins: how polarization constrains communication on climate change. *Environmental Politics*, *25*(5), 788–811.

A Descriptive Statistics

Table A.1: Summary statistics

	(1) ControlRepub		(2) InfoRepub		(3) ControlAme		(4) InfoAme		(5) Diff
	M	SD	M	SD	M	SD	M	SD	p-value
Female	0.54	(0.50)	0.55	(0.50)	0.54	(0.50)	0.54	(0.50)	0.962
Conservative Republican	0.47	(0.50)	0.50	(0.50)	0.48	(0.50)	0.46	(0.50)	0.567
Age*	35.01	(13.01)	34.85	(12.24)	34.78	(12.79)	35.62	(12.74)	0.54
Education									
Less than high school	0.01	(0.08)	0.01	(0.08)	0.01	(0.08)	0.01	(0.08)	1.000
High school	0.25	(0.43)	0.25	(0.43)	0.25	(0.43)	0.23	(0.42)	0.925
College	0.32	(0.47)	0.32	(0.47)	0.35	(0.48)	0.34	(0.47)	0.854
University degree and above	0.42	(0.49)	0.42	(0.49)	0.40	(0.49)	0.42	(0.49)	0.913
Marital status									
Married	0.53	(0.50)	0.56	(0.50)	0.54	(0.50)	0.56	(0.50)	0.738
Single	0.40	(0.49)	0.36	(0.48)	0.38	(0.49)	0.37	(0.48)	0.699
Widowed	0.01	(0.10)	0.01	(0.12)	0.02	(0.14)	0.02	(0.12)	0.996
Divorced	0.06	(0.24)	0.06	(0.24)	0.05	(0.23)	0.05	(0.23)	0.991
N	570		581		585		583		

Notes: Variables are continuous when asterisked. The reported p-values are obtained from a χ^2 test for binary variables, and from a Kruskal-Wallis test for the rest of the variables.

B First-order beliefs

Table B.1: Correlates of first-order beliefs about climate change

	(1)	(2)	(3)	(4)
Conservative	0.317***	0.253***	0.227***	0.240***
	(0.040)	(0.037)	(0.037)	(0.035)
Single		0.080**	0.105**	0.049
		(0.036)	(0.041)	(0.040)
Female		0.033	0.016	-0.028
		(0.037)	(0.037)	(0.035)
Exposed		-0.022	-0.025	-0.016
		(0.036)	(0.035)	(0.034)
Many in social circle		-0.804***	-0.773***	-0.638***
		(0.037)	(0.037)	(0.036)
Opinion Republicans		-0.172***	-0.141***	-0.041
		(0.048)	(0.048)	(0.046)
Opinion others		-0.080**	-0.064	-0.065*
		(0.041)	(0.041)	(0.039)
Age			-0.011	-0.006
			(0.009)	(0.009)
Age^2			0.000**	0.000*
			(0.000)	(0.000)
Higher education			-0.123***	-0.103**
			(0.042)	(0.041)
Discussion				-0.542***
				(0.036)
Constant	1.958***	2.471***	2.584***	2.636***
	(0.023)	(0.050)	(0.182)	(0.178)
N	2319	2317	2317	2317
R^2	0.027	0.217	0.237	0.299
adj.R^2	0.026	0.215	0.233	0.296

Notes: Coefficients from OLS regressions with robust standard error in parentheses. Dependent variable takes values from 1 (strongly agree) to 5 (strongly disagree) for the statement: "Climate change is happening". All covariates except *Age* and Age^2 are binary indicators. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

C Second-order beliefs

Table C.1: Correlates of second-order beliefs about climate change - Republicans

	(1)	(2)	(3)	(4)
Agree	16.960***	11.604***	11.428***	9.803***
	(1.854)	(1.983)	(2.009)	(2.031)
Disagree	-5.833**	-4.536	-4.665*	-4.422
	(2.739)	(2.779)	(2.774)	(2.774)
Conservative	7.618***	6.405***	6.439***	5.955***
	(1.320)	(1.298)	(1.303)	(1.312)
Single		-4.663***	-3.844***	-3.441**
		(1.278)	(1.409)	(1.409)
Female		-0.368	-0.288	0.304
		(1.264)	(1.262)	(1.273)
Exposed		-3.320***	-3.290***	-3.332***
		(1.242)	(1.243)	(1.232)
Many in social circle		11.426***	11.496***	10.520***
		(1.369)	(1.373)	(1.390)
Opinion Republicans		5.417***	5.184***	3.956**
		(1.610)	(1.621)	(1.634)
Opinion others		-1.600	-1.406	-1.251
		(1.431)	(1.455)	(1.448)
Age			0.405	0.303
			(0.303)	(0.305)
Age^2			-0.005	-0.003
			(0.004)	(0.004)
Higher education			0.807	0.536
			(1.485)	(1.485)
Discuss				5.270***
				(1.411)
Confident				2.831**
				(1.334)
Constant	38.080***	39.568***	30.922***	30.835***
	(1.808)	(2.313)	(6.692)	(6.735)
N	1150	1149	1149	1149
R^2	0.137	0.210	0.212	0.227
adj. R	0.134	0.204	0.204	0.217

Notes: Coefficients from OLS regressions with robust standard error in parentheses. Dependent variable takes values from 0 to 100 and measures guesses about how many out of 100 Republicans agreed with the statement: "Climate change is happening". All covariates except *Age* and Age^2 are binary indicators. * p < 0.10, ** p < 0.05, *** p < 0.01

Table C.2: Correlates of second-order beliefs about climate change - Americans

	(1)	(2)	(3)	(4)
Agree	8.131***	4.881***	4.882***	4.146***
	(1.186)	(1.259)	(1.263)	(1.292)
Disagree	-0.234	0.363	0.355	0.378
	(1.860)	(1.852)	(1.850)	(1.873)
Conservative	3.061***	2.585***	2.483***	2.321***
	(0.878)	(0.863)	(0.871)	(0.861)
Single		-0.668	-0.174	0.007
		(0.850)	(0.954)	(0.954)
Female		-2.957***	-2.953***	-2.631***
		(0.874)	(0.879)	(0.895)
Exposed		-1.557*	-1.503*	-1.466*
		(0.857)	(0.863)	(0.857)
Many in social circle		6.815***	6.816***	6.602***
		(0.964)	(0.964)	(0.959)
Opinion Republicans		2.647**	2.585**	1.897
		(1.163)	(1.163)	(1.178)
Opinion others		0.314	0.460	0.777
		(1.003)	(1.011)	(1.015)
Age			0.165	0.181
			(0.181)	(0.182)
Age^2			-0.002	-0.002
			(0.002)	(0.002)
Higher education			0.380	0.338
			(0.975)	(0.974)
Discussion				1.018
				(0.986)
Confident				3.337***
				(0.921)
Constant	61.778***	62.357***	58.265***	55.807***
	(1.139)	(1.412)	(4.114)	(4.149)
N	1168	1167	1167	1167
R^2	0.058	0.122	0.123	0.135
adj. R	0.055	0.115	0.114	0.124

Notes: Coefficients from OLS regressions with robust standard error in parentheses. Dependent variable takes values from 0 to 100 and measures guesses about how many out of 100 Americans agreed with the statement: "Climate change is happening". All covariates except *Age* and Age^2 are binary indicators. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

D Main results

Table D.1: Effect of information provision on donation rates without controls

	(1) Overall	(2) Americans	(3) Republicans	(4) Interaction
Info	-0.032			-0.034
	(0.020)			(0.029)
InfoAmericans		-0.031		
		(0.029)		
InfoRepublicans			-0.034	
			(0.029)	
PartyIdentity				-0.030
				(0.029)
Info×PartyIdentity				0.004
				(0.041)
Constant	0.616***	0.602***	0.632***	0.632***
	(0.014)	(0.020)	(0.020)	(0.020)
Observations	2319	1168	1151	2319
R^2	0.001	0.001	0.001	0.002

Note: Coefficients from OLS regressions with robust standard error in parentheses. Dependent variable measures whether donation was authorised (1: yes, 0: no). Information captures whether respondent was given information about others' beliefs (1: Information, 0: no information). PartyIdentity indicates whether information represents other Republicans' or Americans' beliefs (1: Republicans, 0: Americans). Treatment conditions without information are the reference group in all regression specifications. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table D.2: Effect of information provision on donation rates with controls

	(1) Overall	(2) Americans	(3) Republicans	(4) Interaction
Info	-0.034*			-0.038
	(0.020)			(0.027)
Female	-0.036*	-0.009	-0.068**	-0.035*
	(0.020)	(0.028)	(0.028)	(0.020)
Higher education	0.016	0.030	0.001	0.017
	(0.023)	(0.033)	(0.033)	(0.023)
Single	-0.102***	-0.110***	-0.098***	-0.102***
	(0.022)	(0.031)	(0.032)	(0.022)
Agree	0.224***	0.215***	0.234***	0.223***
	(0.030)	(0.040)	(0.044)	(0.030)
Disagree	-0.080*	-0.162***	-0.004	-0.082**
	(0.041)	(0.055)	(0.061)	(0.041)
Confident	0.013	0.014	0.008	0.014
	(0.021)	(0.030)	(0.030)	(0.021)
Conservative	-0.091***	-0.090***	-0.090***	-0.091***
	(0.021)	(0.029)	(0.029)	(0.021)
InfoAmericans		-0.037		
		(0.027)		
InfoRepublicans			-0.033	
			(0.028)	
PartyIdentity				0.022
				(0.027)
Info×PartyIdentity				0.007
				(0.039)
Constant	0.553***	0.661***	0.459***	0.543***
	(0.100)	(0.137)	(0.144)	(0.101)
N	2317	1167	1150	2317
R^2	0.086	0.102	0.078	0.087
adj. R	0.082	0.095	0.070	0.082

Note: Coefficients from OLS regression with robust standard error in parentheses. Dependent variable measures whether donation was authorised (1: yes, 0: no). Info captures whether respondent was given information about other's beliefs (1: Information, 0: no information). PartyIdentity indicates whether information represents other Republicans' or Americans' beliefs (1: Republicans, 0: Americans). InfoRepublicans indicates whether respondent is in the treatment condition that gives information about other Republicans (1: InfoRepublicans, 0: ControlRepublicans). InfoAmericans indicates whether respondent is in treatment condition that gives information about Americans (1: InfoAmericans, 0: ControlAmericans). Treatment conditions without information are the reference group in all regression specifications. All regression specifications control for *Age* and Age^2 (continuous). * p < 0.10, ** p < 0.05, *** p < 0.01

E Heterogeneity

E.1 Donation authorisation

Table E.1: Effect of information provision on donation authorisation by direction of belief update

	(1) Under-estimate Overall	(2) Over-estimate Overall	(3) Under-estimate Americans	(4) Over-estimate Americans	(5) Under-estimate Republicans	(6) Over-estimate Republicans
Info	-0.036	0.002				
	(0.022)	(0.051)				
InfoAmericans			-0.033	0.003		
			(0.031)	(0.085)		
InfoRepublicans					-0.040	-0.001
					(0.032)	(0.064)
Constant	0.604***	0.684***	0.595***	0.652***	0.615***	0.704***
	(0.016)	(0.035)	(0.022)	(0.058)	(0.023)	(0.044)
N	1983	336	1041	127	942	209
R^2	0.001	0.000	0.001	0.000	0.002	0.000

Note: Coefficients from OLS regressions with robust standard error in parentheses. Dependent variable measures whether donation was authorised (1: yes, 0: no). Info captures whether respondent was given information about other's beliefs (1: Information, 0: no information). InfoRepublicans indicates whether respondent is in the treatment condition that gives information about other Republicans (1: InfoRepublicans, 0: ControlRepublicans). InfoAmericans indicates whether respondent is in the treatment condition that gives information about Americans (1: InfoAmericans, 0: ControlAmericans). Treatment conditions without information are the reference group in all regression specifications. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table E.2: Effect of information provision on donation authorisation by direction of belief update with controls

	(1) Under-estimate Overall	(2) Over-estimate Overall	(3) Under-estimate Americans	(4) Over-estimate Americans	(5) Under-estimate Republicans	(6) Over-estimate Republicans
InfoAmericans			-0.039	-0.015		
			(0.029)	(0.090)		
InfoRepublicans					-0.042	0.015
					(0.031)	(0.060)
Info	-0.039*	-0.002				
	(0.021)	(0.050)				
Female	-0.032	-0.048	-0.002	-0.052	-0.069**	-0.031
	(0.022)	(0.055)	(0.030)	(0.099)	(0.032)	(0.066)
Higher education	0.016	0.021	0.035	-0.060	-0.005	0.040
	(0.025)	(0.068)	(0.035)	(0.120)	(0.036)	(0.087)
Single	-0.103***	-0.093	-0.120***	-0.047	-0.090**	-0.125
	(0.024)	(0.061)	(0.033)	(0.107)	(0.035)	(0.078)
Agree	0.215***	0.257**	0.218***	0.123	0.213***	0.296**
	(0.031)	(0.127)	(0.041)	(0.232)	(0.047)	(0.147)
Disagree	-0.072*	-0.169	-0.156***	-0.153	0.007	-0.214
	(0.042)	(0.181)	(0.056)	(0.291)	(0.063)	(0.223)
Confident	0.007	0.030	-0.004	0.308**	0.013	-0.059
	(0.022)	(0.069)	(0.031)	(0.135)	(0.033)	(0.076)
Conservative	-0.097***	-0.085*	-0.095***	-0.050	-0.097***	-0.123**
	(0.023)	(0.051)	(0.031)	(0.097)	(0.033)	(0.060)
Constant	0.621***	0.049	0.701***	0.302	0.557***	-0.136
	(0.106)	(0.305)	(0.141)	(0.575)	(0.158)	(0.353)
N	1981	336	1040	127	941	209
R^2	0.087	0.080	0.110	0.077	0.072	0.138
adj. R	0.082	0.052	0.101	-0.002	0.062	0.094

Note: Coefficients from OLS regressions with robust standard error in parentheses. Dependent variable measures whether donation was authorised (1: yes, 0: no). Info captures whether respondent was given information about other's beliefs (1: Information, 0: no information). InfoRepublicans indicates whether respondent is in the treatment condition that gives information about other Republicans (1: InfoRepublicans, 0: ControlRepublicans). InfoAmericans indicates whether respondent is in the treatment condition that gives information about Americans (1: InfoAmericans, 0: ControlAmericans). Treatment conditions without information are the reference group in all regression specifications. All regression specifications control for Age and Age^2 (continuous). * p < 0.10, ** p < 0.05, *** p < 0.01

E.2 The Republican Party's stance on climate change

Table E.3: Effect of information provision on beliefs about the Republican Party by direction of belief update

	(1) Republicans	(2) Americans	(3) Interaction	(4) Republicans Minority	(5) Republicans Majority	(6) Americans Minority	(7) Americans Majority
InfoAmericans		0.082***				0.166**	0.067**
		(0.029)				(0.076)	(0.031)
InfoRepublicans	0.222***			0.360***	0.077**		
	(0.029)			(0.038)	(0.035)		
Info			0.082***				
			(0.029)				
PartyIdentity			-0.012				
			(0.029)				
Info×PartyIdentity			0.140***				
			(0.041)				
Constant	0.454***	0.467***	0.467***	0.183***	0.715***	0.234***	0.502***
	(0.021)	(0.021)	(0.021)	(0.023)	(0.027)	(0.049)	(0.022)
N	1151	1168	2319	548	603	147	1021
R^2	0.050	0.007	0.031	0.141	0.008	0.032	0.005

Note: Coefficients from OLS regressions with robust standard error in parentheses. Dependent variable measures beliefs about the Republican Party's climate change stance (1: Climate change is happening, 0: Climate change is not happening/I don't know). Info captures whether respondent was given information about other's beliefs (1: Information, 0: no information). InfoRepublicans indicates whether respondent is in the treatment condition that gives information about other Republicans (1: InfoRepublicans, 0: ControlRepublicans). InfoAmericans indicates whether respondent is in the treatment condition that gives information about Americans (1: InfoAmericans, 0: ControlAmericans). Minority indicates that subjects thought that $\leq$ 50% of other Republicans (Americans) believed that climate change is happening. Treatment conditions without information are the reference group in all regression specifications. * p < 0.10, ** p < 0.05, *** p < 0.01

Table E.4: Effect of information provision on beliefs about the Republican Party, by treatment and direction of belief update with controls

	(1) Republicans	(2) Americans	(3) Interaction	(4) Republicans Minority	(5) Republicans Majority	(6) Americans Minority	(7) Americans Majority
InfoAmericans		0.079***				0.187***	0.059**
		(0.027)				(0.068)	(0.029)
InfoRepublicans	0.224***			0.372***	0.074**		
	(0.026)			(0.037)	(0.032)		
Female	-0.044*	-0.095***	-0.069***	-0.022	-0.046	0.043	-0.109***
	(0.026)	(0.027)	(0.019)	(0.037)	(0.033)	(0.063)	(0.029)
Higher education	0.002	0.038	0.021	0.026	-0.044	0.114	0.023
	(0.030)	(0.031)	(0.022)	(0.040)	(0.040)	(0.072)	(0.035)
Single	-0.076**	-0.051*	-0.063***	-0.026	-0.085**	0.003	-0.062*
	(0.030)	(0.030)	(0.021)	(0.041)	(0.039)	(0.071)	(0.033)
Agree	0.363***	0.351***	0.355***	0.152***	0.537***	0.390***	0.327***
	(0.038)	(0.036)	(0.026)	(0.046)	(0.068)	(0.078)	(0.042)
Disagree	-0.133**	-0.172***	-0.152***	-0.181***	0.052	-0.234***	-0.161***
	(0.052)	(0.045)	(0.035)	(0.058)	(0.114)	(0.078)	(0.054)
Confident	0.069**	0.091***	0.080***	0.033	0.048	0.045	0.095***
	(0.028)	(0.029)	(0.020)	(0.037)	(0.039)	(0.067)	(0.032)
Conservative	0.126***	0.169***	0.148***	0.095**	0.093***	0.314***	0.154***
	(0.027)	(0.027)	(0.019)	(0.041)	(0.033)	(0.071)	(0.030)
Info			0.078***				
			(0.026)				
PartyIdentity			-0.019				
			(0.026)				
Info×PartyIdentity			0.147***				
			(0.037)				
Constant	-0.132	0.071	-0.020	-0.135	-0.016	-0.201	0.132
	(0.128)	(0.126)	(0.092)	(0.172)	(0.165)	(0.337)	(0.137)
N	1150	1167	2317	547	603	146	1021
R^2	0.225	0.192	0.209	0.206	0.206	0.335	0.171
adj. R	0.218	0.185	0.205	0.192	0.193	0.286	0.163

Note: Coefficients from OLS regressions with robust standard error in parentheses. Dependent variable measures beliefs about the Republican Party's climate change stance (1: Climate change is happening, 0: Climate change is not happening/I don't know). Info captures whether respondent was given information about other's beliefs (1: Information, 0: no information). InfoRepublicans indicates whether respondent is in the treatment condition that gives information about other Republicans (1: InfoRepublicans, 0: ControlRepublicans). InfoAmericans indicates whether respondent is in the treatment condition that gives information about Americans (1: InfoAmericans, 0: ControlAmericans). Minority indicates that subjects thought that $\leq$ 50% of other Republicans (Americans) believed that climate change is happening. Treatment conditions without information are the reference group in all regression specifications. All regression specifications control for Age and Age^2 (continuous). * p < 0.10, ** p < 0.05, *** p < 0.01 *

F Social media

Table F.1: First stage, reduced form and second stage regression estimates

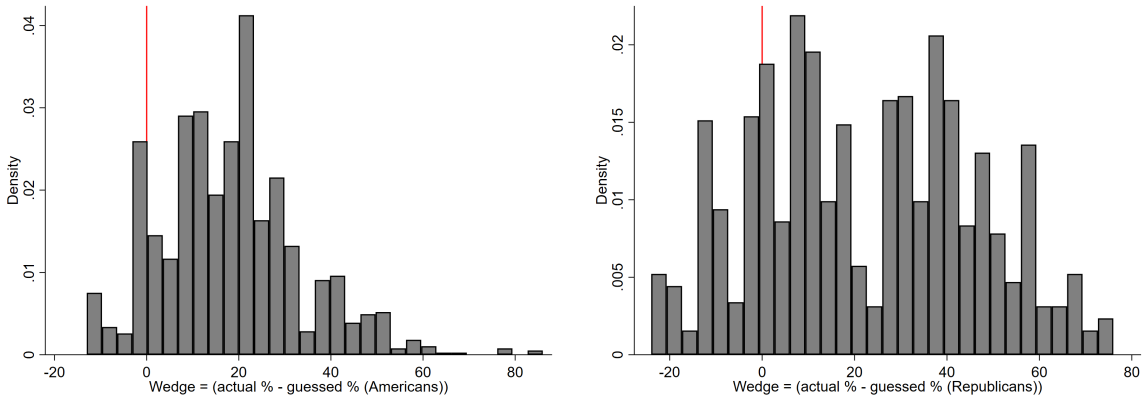
Panel A: First stage	(1) Overall Donation	(2) Americans Donation	(3) Republicans Donation
Info	-0.034*		
	(0.020)		
InfoAmericans		-0.037	
		(0.027)	
InfoRepublicans			-0.033
			(0.028)
Constant	0.553***	0.661***	0.459***
	(0.100)	(0.137)	(0.144)
N	2317	1167	1150

Panel B: Second stage	(1) Overall Social media	(2) Americans Social media	(3) Republicans Social media
$\widehat{Donation}$	-0.793		
	(0.503)		
$\widehat{Donation}$		-1.325**	
		(0.663)	
$\widehat{Donation}$			-0.139
			(0.758)
Constant	0.203	0.633	-0.197
	(0.281)	(0.432)	(0.360)
N	1392	685	707

Note: Coefficients from OLS regressions with robust standard error in parentheses. All regression specifications in the first and second stage control for gender, age, higher education, marital status, agreement that climate change is happening, confidence in guess and political affiliation. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

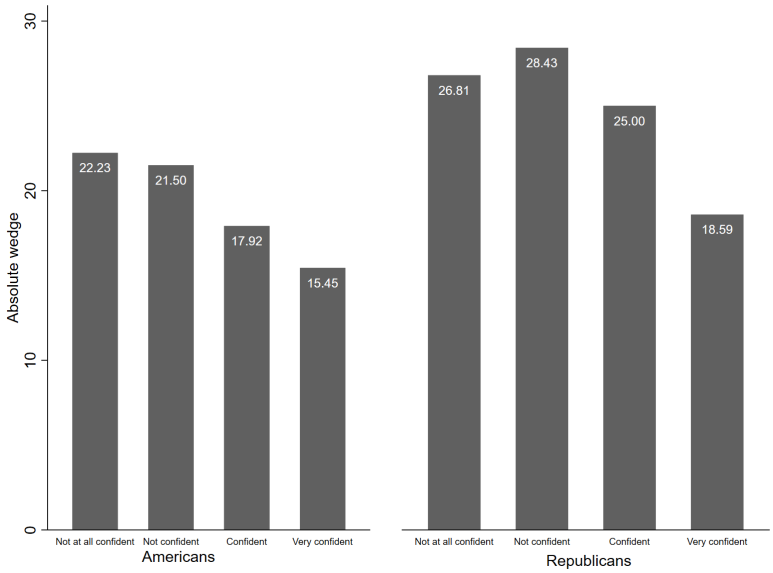
G Figures

Figure G.1: Wedge between actual and guessed first-order beliefs



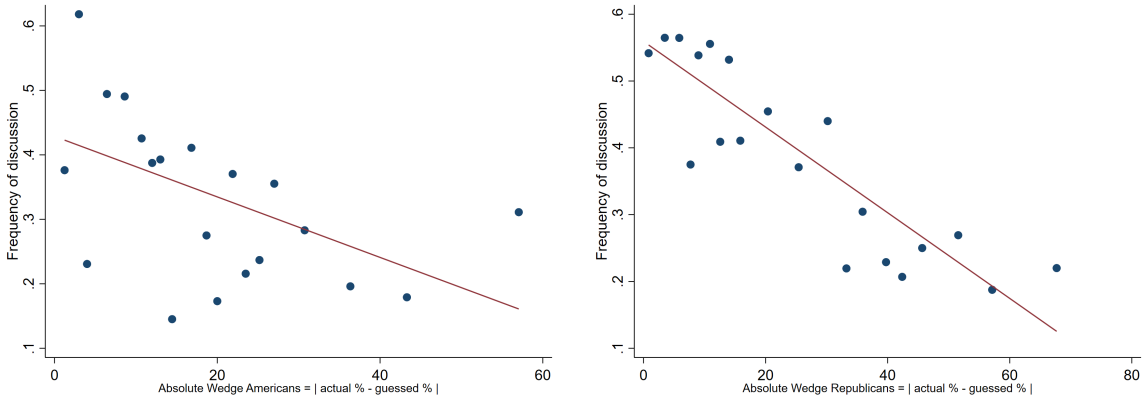
(a) Americans (N=1,168) (b) Republicans (N=1,150)

Figure G.2: Association between confidence and average absolute wedge (N = 2,318)



Note: The figure shows the average absolute wedge in perceptions about the beliefs of others for each confidence level. Absolute wedge is calculated as |(actual % - guessed %)|.

Figure G.3: Association between climate change discussion and size of absolute wedge



(a) Americans (N = 1,168) (b) Republicans (N =1,150)

Note: The figures show binned scatterplots of the frequency of discussing climate change against the size of the absolute misperception wedge. Frequency of discussing climate change is treated as binary (1: discuss often, 0: discuss rarely)