Chapter 9

Can the partisan divide in climate change attitudes be bridged?

A review of experimental interventions

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Despite the scientific evidence of anthropogenic climate change (Cook et al., 2016), the American public remains politically divided on its existence, the role humans play in causing it, and the importance of implementing policies to mitigate it (e.g., Dunlap et al., 2016). Hornsey, Harris, et al. (2016) meta-analyzed the literature on the correlation between demographic variables and belief in climate change, finding that two of the biggest predictors of downplaying the seriousness and reality of climate change were political party and ideology. Additional recent research provides more evidence of political polarization in climate change beliefs (Cruz, 2017), and trends over time suggest that conservative disbelief in climate change is often resistant to new information (Carmichael et al., 2017; Nisbet et al., 2015). As a recent example, both conservatives and liberals were initially supportive of the Green New Deal, a set of policies aimed at addressing climate change, but over time conservatives grew to oppose the policy (especially those consuming conservative media), and liberals further endorsed it, resulting in growing attitude polarization (Gustafson et al., 2019). As polling data points out, recent increases in concern about climate change are largely confined to Democrats (Kennedy & Hefferon, 2019). Decreasing political polarization around climate change issues requires interventions targeted at Republicans, climate skeptics, and the unconcerned.

Alternative climate facts

Central to the ideological polarization of climate change is the divide in factual beliefs—liberals and conservatives disagree about the scientific evidence showing that greenhouse gas emissions from human activity are driving global warming (Leiserowitz et al., 2019). This disagreement follows a recent trend in the politicization of facts, leading to new terms like "fake news" and "alternative facts." Some have dubbed this the "post-truth" era (Lewandowsky et al., 2017).

Stark divides in factual beliefs across ideological lines may be driven by different sources of information (via selective exposure; e.g., Stroud, 2010) or by

motivated reasoning where information that does not align with prior beliefs or tribal allegiances is likely to be rejected (e.g., Ditto et al., 2019). Whatever their source, facts play a crucial role in the partisan debate over climate change. For many politically contested issues, factual beliefs comprise only a part of the discussion; for example, the central debate over abortion concerns the definition and value of human life, largely philosophical questions that rely on morals and values for an answer rather than facts alone. Yet for climate change the debate is most centrally about facts; it is not the value of a clean and healthy environment that is generally at issue, it is the science of what is necessary to achieve that healthy environment that is contested. In such cases, polarization seems odd and unnecessary: provide people with the scientific consensus and beliefs will converge. But the era of alternative facts reigns, and partisans instead engage in heated debates around scientific evidence bearing not just on the causes of climate change but on its very existence.

Ideological polarization, however, does not stop at whether climate change is occurring. Differences in attitudes towards climate change may result not only from politicized facts about climate change, but also from different values and reactions to its consequences or solutions. For example, given that conservatism is related to endorsing the societal status quo, the system- and status quo–threatening consequences of climate change may be perceived differently across political groups (Feygina et al., 2010). Additionally, common solutions for addressing climate change involve government intervention, conflicting with a conservative small-government worldview (e.g., Campbell & Kay, 2014).

Addressing, mitigating, and adapting to climate change will require collective action from a majority of the public. Given strong ideological polarization on climate change, research must focus on engendering bipartisan recognition of climate change and support for climate policies. Although not exclusively faulting conservatives—many liberals lack the motivation or behavioral urgency needed to address climate change as well—intervention research on this topic requires a careful consideration of the central role of political ideology.

Accordingly, this chapter serves as a review of research on experimental interventions designed to increase belief in climate change, support for climate change policy, or willingness to behave in ways to reduce climate change. Each section details a type of intervention (grouped by their focus on a particular construct or utilization of a similar manipulation as a way of influencing outcomes) and each discusses how well the various interventions succeed in reducing political polarization or garnering increased climate support from conservatives, Republicans, or climate skeptics. Although there are other types of interventions than those currently discussed, this chapter focuses on the most commonly researched ones. The chapter ends with a summary of the most promising interventions and recommendations for future research.

Interventions targeting emotions

One early tactic used by those communicating climate change was to incite a sense of fear and alarm, exemplified by Al Gore's *An Inconvenient Truth*. The most recent meta-analysis on fear appeals in persuasion demonstrated a robust positive effect of fear on attitudes, especially when paired with efficacy information (Tannenbaum et al., 2015). Fear appeals were thus easily adapted to fit the climate change narrative. Negative affect towards global warming has been found to be associated with both increased support for global-warming policies and higher risk perceptions of global warming (Leiserowitz, 2006; Smith & Leiserowitz, 2012, 2014). At the same time, others have called for climate change communicators to focus more on positive emotions and engender optimism by emphasizing the benefits of action (Markowitz & Shariff, 2012). Indeed, there seems to be a positive relation between hope and climate change beliefs, such that hope is positively related to policy support (Smith & Leiserowitz, 2014) and climate activism (Feldman & Hart, 2016). Still others argue that targeting emotions, whether negative or positive, is not an effective strategy to increase engagement with climate change, in part because of the heterogeneity of emotions and the responses climate change elicits (Chapman et al., 2017). Given this backdrop—the history of fear appeals, calls for more optimism, and arguments against using emotions—research that investigates emotional responses to climate change is both widespread and disparate, targeting a variety of types of emotions.

Negative emotions

Experimental interventions targeting negative emotions have examined both overall negative affect and specific discrete emotions like fear or anger. Some research shows that pessimistic, or negatively framed, messages can motivate people to mitigate climate change (Hornsey & Fielding, 2016; Schwartz & Loewenstein, 2017). Inducing fear specifically can garner higher perceptions of climate change risk (Skurka et al., 2018) and increase concern about global warming and willingness to reduce emissions (Nolan, 2010).

There is some evidence that focusing on negatively valanced emotions is especially effective for conservatives. In an experiment focused on manipulating perceptions of efficacy, Feldman and Hart (2016) found that an efficacy message about reducing global warming increased fear for conservatives, and fear in turn was positively related to climate change activism intentions (the same mediation path, in contrast, was not significant for liberals or moderates). In a similar study, fear was positively related to support for climate policies for conservatives but not liberals (Feldman & Hart, 2018a). Hornsey, Fielding, et al. (2016), however, did not find that a high-fear or guilt message was particularly persuasive for climate skeptics.

Positive emotions

Several experimental manipulations have successfully increased support for climate policies via hope as a mediator (Feldman & Hart, 2016, 2018a; Nabi et al., 2018). Additionally, providing potential solutions to global warming decreased skepticism from before to after learning about the solutions (Feinberg & Willer, 2011). In contrast to the majority of studies on hope, Hornsey, Fielding, et al. (2016) found that, although an optimistic climate message increased people's hope, it did not lead to an increase in motivation to mitigate climate change; in fact, the researchers observed that the optimistic message led to lower perceptions of climate change risk. van Zomeren et al. (2019) reported similar findings, where optimistic messages increased participants' hope but not intended collective action on climate change.

In contrast to the earlier findings—that fear may be particularly influential for conservatives—Feinberg and Willer (2011) found that dire, fear-inducing messages backfired among those high in system justification (and who tend to be more conservative, e.g., Jost et al., 2017), and that optimistic messages reduced global-warming skepticism for high system justifiers. In addition, some research indicates that hope is related to both policy support and climate activism for conservatives (Feldman & Hart, 2016, 2018a).

What works, and for whom?

The research on using emotions as a climate change intervention uses varying methods and finds mixed results. Some studies find that fear is a potential motivator, whereas other studies find opposite effects, suggesting that optimistic and positive interventions are better at influencing climate change attitudes. Although there is some evidence that positive interventions are influential for conservatives, other evidence points to negative, fear-inducing interventions as particularly effective for conservatives and skeptics (also see Hornsey & Fielding, 2016). Importantly, it is necessary to acknowledge that the research is largely mixed and heterogeneous. There is not a clear emotion-based approach that is effective, either for everyone or for climate skeptics specifically.

Psychological distance

Given the distant and abstract nature of climate change (e.g., Moser, 2010), researchers have argued that effective interventions should make climate change more concrete and local (Weber, 2016). Indeed, construal level theory (CLT) suggests that distance can be perceived psychologically, rather than only physically; psychological distance "is a subjective experience that something is close or far away from the self, here, and now" (Trope & Liberman, 2010, p. 440). When things are perceived as closer, people tend to see them as more concrete

rather than abstract (Trope & Liberman, 2010). In correlational studies, there is a link between psychological distance of climate change and people's attitudes towards it, such that people have more concern about climate change the closer they feel to its impacts (e.g., A. S. Singh et al., 2017). In other words, these studies find that climate change concern is positively associated with believing that the impacts of climate change are primarily felt now (as opposed to the distant future), occurring nearby oneself, and experienced by people similar to oneself. Conversely, other research suggests that people facing direct physical risk (e.g., living by the coast) only perceive an increased risk of climate change when they directly attribute nearby events (e.g., floods) to climate change (Brügger et al., 2015; Whitmarsh, 2008). Nevertheless, numerous experimental studies have been conducted to determine if and when psychological distance can be utilized as an effective way to increase concern for and action towards climate change.

Overall, psychological distance manipulations have not been effective in improving attitudes towards climate change, including belief (Herring et al., 2017), negative affect (Rickard et al., 2016), or risk perceptions (Altinay, 2017; Chu & Yang, 2018; Rickard et al., 2016; Wiest et al., 2015). Furthermore, studies have found a lack of evidence that proximal manipulations increase support for climate mitigation policies or projects (e.g., Brügger et al., 2016; Schuldt et al., 2018), behavioral intentions (Altinay, 2017; Chu & Yang, 2018), or perceived harm of sea-level rise (Mildenberger et al., 2019). Interestingly, some studies have actually shown that framing climate change as more distant or global (relative to local) can increase concern about climate change and sea-level rise (Joslyn & LeClerc, 2016), and increase people's perceptions of the severity of climate impacts (Spence & Pidgeon, 2010). Some studies manipulate both spatial and temporal distance (i.e., emphasizing how the effects of climate change are happening sooner rather than later) to investigate the interaction effects, although there is no clear pattern of findings (Joslyn & LeClerc, 2016; Rickard et al., 2016). The few studies that find distance to be an effective manipulation highlight the nuance of the phenomenon—perhaps policy support is limited to local policies (Wiest et al., 2015), manipulations only work by indirect (not direct) effects (Jones et al., 2017), and interventions need to be more widespread and tailored rather than short one-time messages (Romero-Canyas et al., 2019).

For conservatives, there is some evidence that manipulating distance influences attitudes. When climate change is framed as more distant (relative to a control condition), conservatives have less support for climate policy (Chu & Yang, 2018; Hart & Nisbet, 2012), lower risk perceptions (Chu & Yang, 2018), and lower negative affect (Chu & Yang, 2018). Similarly, conservatives displayed more support for policy and higher negative affect when climate change was framed as spatially close rather than far (with a complex relation to the timing of the impacts; Rickard et al., 2016). Most importantly, local or proximate frames of climate change led to less political polarization in

climate change attitudes (Chu & Yang, 2018; Rickard et al., 2016), and even eliminated political differences in behavioral intentions (Wiest et al., 2015). Illustrating the potential effectiveness of highlighting local climate impacts for conservatives, Romero-Canyas et al. (2019) conducted an effective field experiment that increased perceptions of and concerns for global warming—in a conservative region. There is some evidence that decreasing psychological distance could be an effective way to increase conservatives' engagement with climate change. However, more research is needed on the interactions between emotion, ideology, and psychological distance (e.g., Chu & Yang, 2019; Lu & Schuldt, 2015).

What works, and for whom?

Despite the theoretical promise, most research finds that decreasing the psychological distance of climate change has little effect on people's climate change attitudes or behavior, and can sometimes even decrease concern for climate change. However, a few studies do find that making the impacts of climate change closer to home can be beneficial in the right context. Some studies also find that highlighting local effects of climate change tends to be more effective for conservatives rather than liberals, and can reduce political polarization. Perhaps the most promising intervention—a widescale field study in a conservative region—found that television ads emphasizing local climate effects increased belief in and concern for global warming (Romero-Canyas et al., 2019). Importantly, psychological distance does not seem to have a direct relation to perceptions of climate change, but rather works through various mediators (e.g., fear, perceived relevance) and moderators (e.g., ideology). Psychological distance is not necessarily a straightforward intervention but has promise in specific contexts for specific audiences.

Scientific consensus

Scientists have come to a consensus about anthropogenic climate change, with evidence that around 97% of published papers endorse its reality (Cook et al., 2016). Initial correlational evidence demonstrated that understanding this scientific agreement about climate change is related to both climate change beliefs and support for climate policies (Ding et al., 2011; McCright et al., 2013). This research is consistent with the Gateway Belief Model (GBM) which posits that scientific consensus acts as a gateway belief for downstream attitudes about climate change and ultimately influences policy support (van der Linden et al., 2015).

Most studies find that a consensus message increases people's beliefs about the amount of scientific agreement, including both posttest-only studies (e.g., Bolsen & Druckman, 2018; Brewer & McKnight, 2017; Myers et al., 2015)

and pre–post studies (e.g., Goldberg et al., 2019; van der Linden et al., 2019). Additionally, there is some evidence that conservatives have larger increases in consensus estimates in response to a consensus message than liberals do (e.g., Goldberg et al., 2019; van der Linden et al., 2019).

However, evidence for an effect of a consensus message on other climate change attitudes—like belief or policy support—is mixed. Although the GBM does not predict a main effect of consensus information on climate change beliefs (as a two-stage model, it predicts an indirect effect; van der Linden et al., 2015), many studies test this direct effect on a variety of climate change attitude variables. Several studies show that a consensus message is effective for increasing people's belief in climate change, support for policy, and support for action on climate change (Bolsen et al., 2014; Brewer & McKnight, 2017; Cook & Lewandowsky, 2016; Deryugina & Shurchkov, 2016; van der Linden et al., 2019; van der Linden, Leiserowitz, Rosenthal, et al., 2017). One study found that a consensus manipulation reduced political polarization in belief in various attitudes about global warming (Bolsen et al., 2014).

On the other hand, several studies provide evidence that receiving consensus information does not directly impact climate beliefs (other than perceived scientific agreement). Several posttest-only experiments do not find significant effects of consensus information on belief in climate change, policy support, or behavioral intentions (e.g., Deryugina & Shurchkov, 2016; Dixon et al., 2017). A few studies even suggest a potential backfire effect of consensus information, where conservatives report less belief in climate change, less trust in scientists, or increased psychological reactance (Cook & Lewandowsky, 2016; Kahan et al., 2011; Ma et al., 2019). Despite the handful of studies suggesting a potential backfire effect with conservatives, multiple studies do not provide evidence of a backfire effect or interaction between the consensus manipulation and political ideology (e.g., Brewer & McKnight, 2017; Dixon et al., 2017; Myers et al., 2015).

What works, and for whom?

Nearly all studies demonstrate that consensus manipulations successfully increase participants' levels of perceived scientific consensus about climate change. There is some evidence that this effect is especially strong for conservatives and those with lower initial perceptions of scientific agreement. However, the downstream effects of the experimental manipulation—particularly for belief in climate change and support for policy—are less clear. While there is ample support for the GBM statistically, particularly with studies that use a pre–post design, questions remain about its practical implications (Kahan, 2017). Additionally, it is unclear how effective the intervention is for increasing other climate change attitudes—especially for conservatives—like belief in climate change, policy support, or behavioral intentions (e.g., voting).

Policy framing

In addition to measuring policy support as an outcome of interventions, researchers have manipulated various aspects of climate policies and measured responses. Generally, the interventions involve various emphasis frames—messages that highlight different aspects of a policy or issue (Druckman, 2001). Others, however, utilize source frames by attaching various political sources to a policy or by telling participants that policies or messages are endorsed by certain political groups (e.g., Cohen, 2003). Experimental research has applied both emphasis and source frames to climate policies in an attempt to increase support and reduce political polarization.

Emphasis frames

In a large survey experiment, Stokes and Warshaw (2017) revealed that people were more supportive of a renewable energy policy when it was framed as reducing air pollution, increasing jobs, and minimizing costs (compared to the same policy with no additional information). Similarly, Aklin and Urpelainen (2013) found that participants were more supportive of a clean energy policy when learning about its benefits, but this increase was mitigated when participants learned about the costs as well. Other studies find that the specific wording of policies is important, particularly that people dislike taxes and are more supportive of regulations framed as a "carbon offset" rather than a "carbon tax" (e.g., Hardisty et al., 2010). Importantly, this "carbon offset" framing also eliminated political polarization on support for regulation (Hardisty et al., 2010), perhaps because Republicans are especially averse to policies framed as taxes and directed towards consumers (Hardisty et al., 2019). Campbell and Kay (2014) provide evidence that it is climate policy solutions, rather than the problem of climate change itself, that may drive climate change attitudes. For example, they found that Republicans were less skeptical about climate change after learning about a free-market solution compared to a government regulation solution. Given conservative aversion to large government and taxes, conservatives may be especially influenced by the type of solution posed and whether it involves a tax. Furthermore, disconnecting policy from climate change—instead framing it in terms of air pollution or energy security—can improve Republican support (Feldman & Hart, 2018b), which is in line with polling data that finds evidence of conservative support for renewable energy (Leiserowitz et al., 2017). Taken together, these findings show that emphasis frames are potentially powerful for garnering conservative policy support and point to the influence of specific wording when it comes to climate policy. However, few of these studies measured actual behavior. Illustrating the difficulty of changing actual policy support, Binder et al. (2015) provided evidence of the effectiveness of shifting the wording of a carbon emissions policy in a survey experiment, but failed to find the same effect in a field experiment measuring actual voting behavior.

Source frames

Several studies have manipulated the source of a policy, or the group endorsing the policy, and measured support for it. Most studies demonstrate that, when Democrats endorse a climate policy, Democrats are more likely to support it, and when Republicans endorse a climate policy, Republicans are more likely to endorse it (Fielding et al., 2020; Van Boven et al., 2018). Ehret et al. (2018) found similar results, although the effects among Republicans were not as strong. However, other studies provide contrasting results. Although they manipulate the source of an environmental message (rather than a specific policy), Bolsen et al. (2019) and Zhou (2016) failed to find consistent effects of source frames. Zhou (2016) did not find any significant effects of Republican-endorsed messages, and Bolsen et al. (2019) did not find consistent effects of source frames, with little evidence that messages from Republicans were especially persuasive for garnering Republican policy support. Moreover, these studies find that source frames can backfire when attached to climate messages, at times leading to more climate skepticism and less policy support for Republicans (Bolsen et al., 2019; Zhou, 2016). Given that the studies with effective source frames all attached them to a specific policy (e.g., cap-and-trade), perhaps source frames are only successful when paired with specific climate policies.

What works, and for whom?

Policy framing effects vary across different experimental contexts. Although some research suggests that policy framing can be manipulated to increase support, other studies demonstrate the difficulty in changing attitudes or even behavior. Two interventions seem to be the most effective for garnering support for climate policies and reducing political polarization. First, framing a carbon tax as a carbon offset both reduces political polarization and increases policy support. More research is needed to investigate the opportunities and limitations of this intervention. Second, introducing people to Republican-endorsed climate policies can increase policy support in Republicans without dramatically reducing Democrat support. While general climate messages can be ineffective even when attached to a Republican source (e.g., Zhou, 2016), messages about specific policies seem to be promising in reducing political polarization. However, most of the research on the topic is focused on self-reported attitudes; given the difficulty of changing actual behavior rather than attitudes (e.g., Binder et al., 2015), future research should investigate if Republican-supported policies can actually influence behavior.

Other interventions

Health

Correlational research suggests that people generally respond positively to information about the health benefits of mitigating climate change, even

skeptical audiences (Maibach et al., 2010). However, experimental tests pro-
vide mixed evidence. Some studies show that people have more belief in cli-
mate change and support for climate policy after learning about health risks,
as well as endorse car pollution reduction policies when they are framed as
protecting public health rather than the environment (Levine & Kline, 2017;
Walker et al., 2018). More importantly, related research found that conservatives
in particular were more supportive of climate policy and reducing air pollution
when pollution was framed as affecting health rather than the climate (Petrovic
et al., 2014).

There are just as many studies, however, that find nearly the opposite effects
of framing climate change as a health issue. Framing climate change as a health
issue did not increase support for renewable or clean energy (Hanus et al.,
2018), belief in climate change (Hart & Feldman, 2018; McCright et al., 2016),
or support for reducing greenhouse gas emissions (McCright et al., 2016).
Furthermore, providing information about the health risks of climate change
compared to the environmental risks was unsuccessful at increasing support
for policy (Bernauer & McGrath, 2016; Hart & Feldman, 2018) or political
action on climate change (Bernauer & McGrath, 2016; Levine & Kline, 2017).
As opposed to the research discussed earlier, several studies do not find a mod-
erating role of ideology, suggesting that conservatives are similarly affected by
health information as liberals (e.g., Bernauer & McGrath, 2016; Levine & Kline,
2017). The intervention might be effective, but the current state of research is
too unclear to determine when and for whom it is effective.

Morality

Much of the literature on climate change and morality stems from Moral
Foundations Theory (MFT), which suggests there are five moral domains,
or foundations, in which people root their morality: harm, fairness, ingroup,
authority, and purity (Graham et al., 2011). MFT has implications for political
polarization in that conservatives generally weigh each of the five foundations
relatively equally in their morality, whereas liberals tend to emphasize harm and
fairness (Graham et al., 2009). Put another way, liberals emphasize the individu-
alizing foundations—morality relating to the welfare of the individual—and
conservatives value the binding foundations—morality relating to the welfare
of groups.

Perhaps because of this nuance in moral beliefs, general moral manipulations
have been ineffective for both liberals and conservatives (Albertson & Busby,
2015; Severson & Coleman, 2015). Targeted interventions, however, have more
potential. Perhaps the most promising research using morality manipulations
considers the effect of varying moral messages—focusing on either liberal moral
foundations (harm, care, fairness) or conservative ones (purity, sanctity, loyalty,
authority)—on liberals and conservatives separately. For example, Feinberg and
Willer (2013) provided participants with a neutral message, a message describing

the harm of environmental degradation and need to care for the Earth (targeting liberal morality), or a message emphasizing the need to keep the Earth pure and sacred (targeting conservative morality). Liberals were generally unaffected by moral messages, displaying high levels of belief in global warming across all conditions. Conservatives, however, had more belief in global warming when shown a pure and sacred message than the other two messages. Furthermore, the pure and sacred message (framing the effects of climate change more in terms of contamination than harm) reduced political polarization in global-warming belief, and eliminated it for general environmental attitudes. Similar manipulations—messages framed in terms of conservative morality—were also effective in increasing conservatives' belief in and concern for climate change (Wolsko, 2017; Wolsko et al., 2016). Day et al. (2014) demonstrated a similar effect—with liberals more supportive of issues framed in terms of liberal moral foundations and vice versa for conservatives—for a variety of issues, including concern for the environment. Although conservative moral arguments show promise in increasing conservatives' belief in climate change, more research is needed on the topic due to the limited number of experimental studies.

Economy and national security

Many studies utilize information about the effects of climate change on the economy or the national security of the US: for example, an intervention might include information that polices to mitigate climate change will add jobs within the US (economy) or reduce America's reliance on foreign oil (national security). Relative to a control condition, experimental manipulations that emphasize various economic or national security benefits of fighting climate change have shown promise to increase support for climate policy (Severson & Coleman, 2015), clean energy (Aklin & Urpelainen, 2013), greenhouse gas reductions (McCright et al., 2016), and belief in climate change (Dixon et al., 2017). At the same time, other research—or even other conditions or variables within the same studies—suggests that highlighting the economic or national security aspects of climate change action is not an effective intervention (e.g., Albertson & Busby, 2015; McCright et al., 2016; S. P. Singh & Swanson, 2017). Relatedly, emphasizing the economic benefits compared to the environmental benefits of climate change has not been effective in garnering policy support or behavioral intentions (Bernauer & McGrath, 2016; Fielding et al., 2020). Notably, the economic and national security messages used in interventions vary widely; for example, they are as short as one or two sentences (e.g., Aklin & Urpelainen, 2013; Bernauer & McGrath, 2016) or as long as a few paragraphs like a news article (e.g., Fielding et al., 2020; McCright et al., 2016).

The moderating role of ideology in response to economic and national security interventions is also largely ambiguous. Some research provides evidence for a backfire effect of national security or economic messages, where conservatives and Republicans have lower climate change beliefs in some

conditions compared to other experimental or control conditions (S. P. Singh & Swanson, 2017; Zhou, 2016); climate skeptics even report feeling anger towards national security messages (Myers et al., 2012). On the other hand, studies have shown the potential for economic messages to reduce political polarization (e.g., Campbell & Kay, 2014; Severson & Coleman, 2015). Specifically, Campbell and Kay (2014) and Dixon et al. (2017) demonstrated that highlighting free-market solutions was especially persuasive for conservatives. Moreover, Bolsen et al. (2019) revealed that national security messages were influential for Republicans only when they were paired with a Republican source, and induced negative responses from Republicans when they were from a Democrat or climate scientist. Although source effects may explain some of the negative results from Aklin and Urpelainen's (2013) national security message—which was either from scientists or no source—they fail to explain the backfire effect in Zhou (2016) when messages from Republicans had negative or null effects.

Economic messages are certainly not a robust or one-size-fits-all intervention. The largely mixed results imply that researchers need to focus on the context of when economic messages might be beneficial. In particular, rather than general messages, specific messages that discuss how solving or fighting climate change will involve free-market solutions—instead of large government policies—could target conservatives more specifically than a general economic message (e.g., Campbell & Kay, 2014). Despite being varied in their effectiveness, economic interventions do show promise for reducing political polarization on climate change.

Summary: what interventions work, and for whom?

The Earth has already warmed significantly since pre-industrial times. The next few decades will determine the extent of this warming and the amount of adaptation required to deal with its tangible negative impacts. To do this, effective collective action must be initiated soon, and the polarization-induced paralysis that currently reigns in US politics is one of the key obstacles to overcome.

This chapter reviewed the large and growing literature on interventions intended to spur action on global climate change by influencing belief in it, support for policies to mitigate it, and/or willingness to behave in ways to reduce it. In particular, many of these interventions attempted to influence the attitudes of political conservatives and climate skeptics to reduce polarization around climate change. Unfortunately, when viewed as a whole the interventions reviewed here showed very limited effectiveness in altering climate change beliefs and behavior or reducing the polarized positions on climate change between liberals and conservatives that hamper political progress on the issue in the US and elsewhere.

A few types of intervention did show promise: in particular, interventions that highlighted the free-market benefits of climate change solutions, attached a Republican source to specific climate policies, and highlighted localized

climate change effects. These studies generally found that, while liberals often demonstrated a ceiling effect and supported climate change policies no matter the intervention, conservatives were particularly influenced by these interventions. These studies were either targeted specifically towards conservatives (e.g., emphasizing the free market or employing a Republican source) or appealed to personal outcomes (e.g., localizing climate change consequences).

Despite the promise of these interventions, however, it is important to note that their effects were not consistent across studies. Even among studies that were the most targeted towards conservatives—using conservative values and conservative sources—interventions did not dependably reduce polarization. For example, in a sample of Republicans, Zhou (2016) did not find any significant effects in climate policy support of an economic or national security message, even from a Republican source. For studies that attached Republican sources to climate policies or messages, the results are similarly inconsistent (e.g., Bolsen et al., 2019; Ehret et al., 2018). As such, the primary conclusion of this review of interventions points to the stability of climate change attitudes in the face of attempts to change them and the difficulty of garnering bipartisan support for climate policies.

There is no one-size-fits-all way to increase engagement in climate change; every type of intervention included mixed results, with some studies showing the effectiveness of the intervention and others demonstrating its inability to influence attitudes. Interventions that theoretically should work often don't (e.g., Zhou, 2016) and polarization that is always supposed to exist sometimes doesn't (e.g., Severson & Coleman, 2015). Insufficient power is a problem in some studies, but not in others. The one constant seems to be the general resistance of a substantial portion of people to believe in or act on the very real and imminent threat of human-caused global climate change.

The hyper-polarized political environment in US politics creates many problems at many levels, but none of these problems is more pressing than the policy paralysis it has engendered regarding action to combat global climate change. Future research must continue to examine interventions and investigate the potential reasons for why they do not reduce polarization as consistently as would be expected. Bipartisan support for climate policy is not impossible (Leiserowitz et al., 2017), but the path to reduced polarization remains unclear during an increasingly urgent moment for climate policy.

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