Political Psychology

Political Psychology, Vol. 41, No. 5, 2020
doi: 10.1111/pops.12663

When and How Different Motives Can Drive Motivated Political Reasoning

Robin Bayes
Northwestern University

James N. Druckman
Northwestern University

Avery Goods
Northwestern University

Daniel C. Molden
Northwestern University

It is commonly assumed that the effectiveness of political messages depends on people's motivations. Yet, studies of politically motivated reasoning typically only consider what partisans generally might want to believe and do not separately examine the different types of motives that likely underlie these wants. The present research explores the roles of distinct types of motives in politically motivated thinking and identifies the conditions under which motivated reasoners are persuaded by political messages. Results of an experiment with a large, representative sample of Republicans show that manipulations inducing motivations for either (1) forming accurate impressions, (2) affirming moral values, or (3) affirming group identity each increased beliefs in and intentions to combat human-induced climate change, but only when also paired with political messages that are congruent with the induced motivation. We also find no evidence of a backlash effect even when individuals are provided with clearly uncongenial information and a motivation to reject it. Overall, our findings make clear that understanding when and why motivated political reasoning occurs requires a more complete understanding of both which motivations might be active among a group of partisans and how these motivations resonate with the messaging they receive.

KEY WORDS: accuracy motivation, moral values, group norms, climate change beliefs, motivated reasoning

Public opinion often shapes public policies, particularly when it comes to salient political issues. It is thus not surprising that scholars, practitioners, and political advocates have long sought to understand how various forms of political messaging influence these opinions. Yet, understanding such messaging effects becomes complicated when the issues involved are highly politicized and evoke partisan motivations (e.g., Leeper & Slothuus, 2014). At least three distinct literatures

The authors are listed in alphabetical order and contributed equally to the article.

Published by Wiley Periodicals, Inc., 350 Main Street, Malden, MA 02148, USA, 9600 Garsington Road, Oxford, OX4 2DQ, and PO Box 378 Carlton South, 3053 Victoria, Australia

have examined effects of political messaging in the context of the motivated reasoning surrounding politicized issues: One builds on older theories of knowledge deficits to look at how, despite whatever motivations are involved, exposure to novel information increases belief in the conclusions of that information (e.g., van der Linden, Leiserowitz, Feinberg, & Maibach, 2015); another explores how framing political messages in terms of values consistent with partisan motivations shapes acceptance of these messages (e.g., Slothuus & de Vreese, 2010); and a third focuses on the motivational impact of messages that convey information about descriptive norms (e.g., Unsworth & Fielding, 2014).

Although all of these literatures generally examine the impact of motivated political reasoning, extant work has neither theorized about the relative contribution of these various types of motivations to opinion change nor explored when each particular motivation might have a greater or lesser effect. That is, although there has been much research on how motivated reasoning might affect how people both process and are persuaded by political messages, the specific psychological mechanisms that evoke and constitute such reasoning have not always been precisely applied or tested (Leeper & Slothuus, 2014). In what follows, we use research and theory on motivated reasoning to formulate conditions under which different types of political messaging should be more or less likely to result in opinion change. We then present a large survey experiment that tests our hypotheses by directly inducing different types of motivations in the context of one prominent issue for which motivated reasoning effects have been observed: Republicans' beliefs and opinions on climate change (e.g., Hart & Nisbet, 2012; Zhou, 2016). The well-known politicization surrounding climate change makes it a prime topic for this initial focused study of different types of politically motivated reasoning.

We find strong evidence for the influence of motivated reasoning on opinion change in response to political messaging. However, at the same time, we find that such opinion change is greatest when the particular messages people receive are congruent with the particular motivations that have been aroused. Authoritative information on a topic can shift attitudes when people are motivated to accurately process this information, but framing messages in terms of partisan values can also shift attitudes when people are motivated to affirm these values, and communicating descriptive ingroup norms can also shift attitudes when people are motivated to affirm such norms. The results also suggest a greater general prominence of group-identity-based motivated reasoning relative to the other two motivations tested (Kahan, 2017a). The beliefs and behavioral intentions of participants who do not receive a direct motivational induction are moved most by a message about descriptive norms (also see Goldberg, van der Linden, Leiserowitz, & Maibach, 2019a); they are not influenced by messages framed in terms of partisan values or that present authoritative information. Thus, at least concerning the issue of climate change, absent other interventions, Republicans may most deeply care about holding preferences that correspond to those held by others in their group (e.g., Hogg & Reid, 2006; Sinclair, 2012). We conclude with a discussion of how, in light of these findings, work on messaging effects, particularly for highly politicized issues, might best proceed.

Routes to Influential Political Messaging

Among the myriad of factors that determine effective political messaging, three important facets on which we focus here include the presentation of novel information, the evocation of personally important values, and the communication of descriptive ingroup norms (Druckman & Lupia, 2016; National Academies of Sciences, Engineering, and Medicine, 2017). Each of these facets maps onto distinct existing literatures on political messaging. First, some argue that citizens draw on the information or evidence they receive, particularly when it comes from credible sources, such as elites from their party or scientists (e.g., Lupia, 2016; Nicholson, 2012). To investigate these types of

information effects in the present research, we focus specifically on the provision of a scientific consensus statement that provides information about experts' findings (van der Linden et al., 2015).[1]

An alternative route to political attitude change is message framing (Leeper & Slothuus, 2019), which broadly involves altering messages to highlight specific considerations regarding a given issue. Although there are a wide variety of ways in which messages can be framed, one powerful example involves a speaker invoking moral values that resonate with the message recipient. For example, Wolsko, Ariceaga, and Seiden (2016) find that political conservatives who receive a message framed around the moral foundations most distinctly endorsed on average by this group (i.e., loyalty, authority, and sanctity; see Graham, Haidt, & Nosek, 2009) exhibit more belief in climate change and are more likely to engage in environmental conservation behaviors (also see Campbell & Kay, 2014; Feinberg & Willer, 2013). Therefore, in the present research, we investigate framing effects in terms of these types of conservative moral values.

Finally, much research shows that descriptive norms shape people's political attitudes. People typically emulate the behavior of other members of their perceived ingroup, either because of the informational value afforded by similarly minded others when people are uncertain about their own behavior or because of desires to alter one's own behavior to conform to the behaviors of others from their group (Asch, 1956). In addition, a sizable literature shows how messages that include normative information can change opinions and behavior (Cialdini, 2007). For example, Gerber and Rogers (2009) show that those who typically do not vote are more likely to do so when they learn that others are voting—they are swayed by the descriptive norm (also see, e.g., Dwyer, Maki, & Rothman, 2015; Fielding & Hornsey, 2016; Goldberg et al., 2019a). To investigate these effects of norms, in the present research, we focus expressly on norms from one's own sociopolitical group; such norms are particularly powerful (Sinclair, 2012) because they often serve as a basis for people's broader social identity (e.g., Baumeister & Leary, 1995; Huddy, 2001; Leeper & Slothuus, 2014).

In sum, there is evidence that any of three types of messages—information, moral value frames, or descriptive ingroup norms—can shape opinions and behaviors. Yet, for each variety of message, there exists other studies that have failed to find consistent effects (e.g., Bolsen, Leeper, & Shapiro, 2014; Day, Fiske, Downing, & Trail, 2014; Kahan, 2016; Severson & Coleman, 2015). To our knowledge, no work has further explored the important questions of (1) the relative effectiveness of each message type on changing people's opinion or (2) under what conditions each of these distinct types of messages might be more or less effective. The primary goal of the present research is to address these questions by applying psychological theory and research on motivated reasoning.

The Role of Motivated Reasoning in Political Communication

Motivated reasoning occurs when individuals selectively process information and form preferences in the service of a particular goal. These goals are often classified as either *nondirectional goals* or *directional* goals. For nondirectional goals, individuals are motivated by broad concerns to form the most accurate, or most concise, or easiest to justify conclusions regardless of whatever the specific content of these conclusions might be. In contrast, for directional goals, individuals are motivated to reach the specific conclusions that best cohere with or support that goal (Kunda, 1990; Molden & Higgins, 2012).

In the context of motivated reasoning regarding politicized issues, one possible nondirectional goal involves engaging with the content of a message to reach the most accurate conclusion possible. People with this type of motivation would process a message thoughtfully and consider the arguments and evidence presented carefully. This type of accuracy motivation should thus create circumstances under which messages that focus on detailing credible information surrounding a

[1]We look at direct exposure to scientific information, although we recognize there are a host of ways individuals could receive such information, such as from family and friends (e.g., Goldberg, van der Linden, Maibach, & Leiserowitz, 2019b).

particular issue should be particularly effective in changing opinions (Bolsen, Druckman, & Cook, 2014; Dietz, 2013).

In contrast, two often discussed directional goals in the context of politicized issues concern *value-based* motivated reasoning and *identity-protective* cognition. In the case of value-based reasoning, individuals preferentially evaluate information in ways that allow them to reach conclusions that cohere with fundamental concerns they highly value. This effect seems notably strong when it comes to moral values: "[M]oral appeals…tend to be more successful than non-moral appeals…especially when the moral principles invoked resonate with the individuals targeted by the appeal" (Feinberg & Willer, 2013, p. 57; also see Mullen & Skitka, 2006; Wolsko et al., 2016). Thus, with people motivated by moral values, messages that frame political issues in ways that connect to these values should be particularly effective in changing opinions.[2] Similarly, in the case of identity protection, where one hopes to affirm membership in and alignment with a personally important social group, individuals assess information and derive opinions so as to cohere with the perceived group consensus. Kahan (2017a) states, "forming beliefs contrary to the ones that prevail in one's group risks estrangement from others on whom one depends for support, material and emotional" (pp. 1, 2). Thus, with people motivated by affirming their social identity, messages that communicate identity-relevant social norms should be particularly effective in changing opinions.[3]

The Present Research

In summary, the application of a motivated reasoning analysis to various existing approaches to political messaging leads to the overall hypothesis that when people's motivations align with the primary focus of the message they receive, this message will be more influential in moving their opinions. For instance, an individual primarily motivated to affirm coherence with an important social group who receives a message that the group is taking action on climate change should be more likely to form intentions to take action themselves. If this person instead receives an informational message about a scientific consensus on climate change or the moral responsibility of protecting the environment, this should have less effect because the individual's current motive is not to seek accuracy or affirm a personal value. Stated more formally:

> *H1*: All else constant, when an individual's goal—affirm values, maintain a group identity, or achieve accuracy—aligns with the message provided—a moral relevance frame, group norms, or credible information—the message will have a greater effect on that individual's opinions and intentions, relative to when the goal and the message provided do not align.

This type of general motivational matching hypothesis is analogous to established persuasion effects involving *functional matching* that have been studied in other domains (Watt, Maio, Haddock, & Johnson, 2008). That is, much previous work measuring individual differences in the function a particular attitude serves (e.g., as an utilitarian summary of costs and benefits or as a means of expressing one's own important values) shows that persuasive messages including content that matches the functions

[2]Some work discusses persuasive value messaging with a focus on the "fit" between one's values and the message, without explicit mention of motivated reasoning (e.g., Feinberg & Willer, 2013; Hornikx & O'Keefe, 2009). However, we follow many others in considering values as a type of prior belief that individuals may be directionally motivated to protect, since doing otherwise would undermine a commitment to the value (e.g., Ditto, Pizarro, & Tannenbaum, 2009, p. 318; Epley & Gilovich, 2016, p. 138; Slothuus & de Vreese, 2010, p. 632; Wolsko et al., 2016, p. 8).

[3]Another possibility is that one draws on descriptive norms that are not necessarily from their own social or political group—in part because that information has informational value. In that case, a nondirectional accuracy motivation could lead to an increased impact of descriptive norms (e.g., Goldberg et al., 2019a). Alternatively, nondirectional accuracy motivations could lead to the acceptance of moral value messages or ingroup norm messages, since one may believe that it is in fact most "accurate" (e.g., to accept what your group believes). Our study design allows us to evaluate those alternative possibilities as well.

of one's attitude produce greater persuasion (e.g., Petty & Wegener, 1998; Snyder & Debono, 1985). Other research that examines the various functions of different types of attitude objects (e.g., utilitarian products such as coffee versus personally expressive products such as perfume) similarly shows that persuasive messages matching the function of the object lead to greater attitude change (Shavitt, 1990).

However, the present study extends previous research on functional attitude matching in several ways. First, we extend hypotheses about the persuasive effects of message matching beyond the theorizing surrounding specific functions of attitudes and integrate it with the motivated reasoning literature by incorporating a broader range of more basic motivations. Furthermore, despite the frequency with which scholars invoke motivated reasoning in the study of politically charged messaging, a precise analysis of the motivational mechanisms involved has rarely been performed in these domains. Indeed, Druckman and McGrath (2019) describe the observational equivalence problem in much research on politically motivated reasoning, which occurs when scholars presume directional motivations exist without direct evidence that such a motive played a role among a sample of participants (also see Dunning, 2015). For instance, when a Republican rejects information about climate change, it could be that the person processes this information so as to maintain a perceived group norm of climate change skepticism, consistent with a directional, identity-protective motivation. However, it could be that the person simply rejects the information because he or she does not view it as credible, consistent with accuracy motivation. Thus, how particular motivations interact with particular types of messages remains largely unknown because past work has not isolated the direct role of motivations. It is for this reason that Leeper and Slothuus (2014) state "evidence of motivated reasoning from seminal observational studies should be read with some skepticism" (pp. 148, 149).

Beyond the matching effects that are the primary focus of our research, we also aim to test another hypothesis suggested by prior research. When people encounter a message counter to the goal they seek to maintain, they may engage in counterarguing to denigrate the message, leading to a *disconfirmation bias* (Lodge & Taber, 2013). This can result in *backlash* effects such that attitudes move in the opposite direction than that suggested by the message (e.g., Hart & Nisbet, 2012; Nyhan & Reifler, 2010; Zhou, 2016). For example, a climate change skeptic motivated to protect that belief might counterargue a message about the occurrence of climate change and end up even more skeptical than before receiving the message. As detailed below, in the present research, this would be most likely to occur among participants motivated to affirm relevant values or maintain an ingroup identity who receive specific, factual information that runs contrary to these relevant values or ingroup norms. Stated more formally:

> *H2*: When an individual possesses a directional goal—to affirm values or maintain a group identity—an informational message may backfire if the information is incongruent with the directional goal, leading the individual to express more extreme opinions in the direction opposite to the message, relative to when no message is received.

We note, however, that more recent studies have suggested that evidence for this type of backlash effect is mixed (e.g., Guess & Coppock, 2018; Wood & Porter, 2019). Another advantage of carefully isolating the motivations people possess when processing information in the present study is that it provides the clearest possible test of this type of hypothesis. Both Hypotheses 1 and 2 and the primary analyses we planned to test them were preregistered.[4]

Method

To test our motivated reasoning hypotheses, we focus on Republicans' opinions about climate change. Republicans, generally, have been skeptical of climate change (Palm, Lewis, & Feng, 2017),

[4]See http://aspredicted.org/blind.php?x=rz6p7c

making this a perfect testing ground for messaging effects on this topic.[5] Beyond serving as a good test case for our hypothesis, studying opinions on climate change addresses the challenge put forth by Javeline (2014) and Keohane (2015) for political scientists to more actively study this issue. Furthermore, it adds to an emerging literature aimed at understanding why Republicans have been less likely to change their opinions in the direction of the scientific consensus on climate change (e.g., Campbell & Kay, 2014, study 3; Zhou, 2016). Finally, in the case of our informational message, the present study also speaks to a prominent model of climate change communication (i.e., the gateway belief model) that suggests when anyone, regardless of partisanship, learns of the scientific consensus on human-induced climate change, they are more likely to believe this change is occurring (van der Linden et al., 2015; van der Linden, Leiserowitz, & Maibach, 2019).

Finally, we recognize that our presentation of a single data collection counters increasingly common practice to present multiple experiments. While we agree future studies are needed, testing our hypotheses requires a complex design with a very large set of conditions (as discussed below) and a specialized population since, as intimated, distinct groups have varying values and norms. We suspect prior work has in fact not explored this full set of messages combined with motivations because of the design challenges. In this sense, we believe our article can be read in the same vein as other single data-collection works on climate change opinions (e.g., Egan & Mullin, 2012, 2014; Hart & Nisbet, 2012).

Participants

Our experiment was embedded in an online survey administered to a panel that is representative of the American population (based on census benchmarks). We contracted with Bovitz Inc. for data collection.[6] They maintain a non-probability-based, but representative (on all key census demographics), Internet panel. From this panel, we obtained a sample of self-identified Republicans. A total of 1964 respondents completed the survey. As is detailed in Appendix S1 in the online supporting information, sample demographics largely resemble those found among Republicans in a national probability sample survey.

Procedures and Materials

Participants began the survey with basic demographic questions. We then assigned them to one of 13 experimental conditions. One of these conditions served as a baseline control where respondents proceeded directly to answering the outcome variables described below. The other 12 conditions varied two factors: messages and motivations. The message factor involved reading one of three (randomly assigned) public service announcements: (1) a detailed *informational* message that describes a recent report (Volume II of the *Fourth National Climate Assessment*) on the scientific consensus that climate is changing due to human activities, it will have grave consequences, and individual actions are needed; (2) a *moral values framing* message that, drawing on moral foundations theory (e.g., Graham et al., 2009), states that climate change is occurring and will destroy the sanctity of the pristine environment, making it everyone's patriotic duty to take action to combat climate change, or (3) a *norms* message that states the climate is changing, that contrary to many people's impressions a clear majority of Republicans agree with this fact, and also that many Republicans are

[5]We did not include Democrats in our design because (1) there is likely to be a ceiling effect for Democrats' beliefs about climate change, (2) we would have faced sizeable pretreatment effects on the norms message since many of the Democratic respondents would have already been influenced by the descriptive norms (e.g., that most Democrats believe in climate change), and (3) we would have had to use a different moral values message that appeals to Democratic values (see Graham et al., 2009), making the design not fully parallel.

[6]See http://bovitzinc.com/

Table 1. Experimental Conditions

Condition 1: Control condition with no motivation and no message.

		Message		
		Information	Moral Framing	Descriptive Norms
Motivation	No-motivation prime	2	3	4
	Value prime	5	6	7
	Identity prime	8	9	10
	Accuracy prime	11	12	13

taking action to combat climate change. Each announcement included a descriptive title and small picture; although we created the announcements, the content—including references to Republican support—were factually accurate. In Appendix S2 in the online supporting information, we describe the sources we used to construct the stimuli and the text of each. Also, we conducted a pilot test, using Amazon's Mechanical Turk, to assess the perceived strength of each of the messages; it shows that Republicans do in fact find the scientific consensus message to be strong (i.e., a credible piece of information), and thus it serves as a suitable message in line with our hypotheses about detailed credible information. Details are in Appendix S4 in the online supporting information.

Independent of the message condition, we randomly assigned respondents to one of four motivation conditions: (1) a *no-motivation* treatment that contained no additional instructions, (2) a directional *value threat* prime, (3) a directional *group-identity threat* prime, or (4) a nondirectional *accuracy* prime. The directional prime conditions first asked respondents for their ideology, their partisanship, and a series of partisan-as-social-identity questions (Huddy, Mason, & Aaroe, 2015) to activate these partisan identities. The value threat prime then asked respondents the extent to which they agree that the Republican Party has strayed from core values of decency and purity, while the group-identity threat prime asked respondents the extent to which they agree the Republican Party is falling apart and lacking consensus. In asking their agreement, we used an asymmetric scale, running from "agree somewhat" to "agree completely." Thus, even at the lowest end of the scale, respondents are forced to indicate some level of agreement, which previous research has shown can prime a sense of threat (Petrocelli, Martin, & Li, 2010). Our approach follows other work that shows threats induce motivation to demonstrate or reaffirm the importance of threatened aspects of oneself (e.g., Dunning, 2015); in our case, this involved either moral values or a sense of group identity. The nondirectional accuracy prime told respondents that they were going to read a public service announcement and instructed them to be evenhanded and consider the information presented while doing so. They also were told that later they would have to evaluate the announcement and explain how they arrived at their answers to questions about the issue. For the no-motivation and accuracy conditions, the ideology and partisanship items were asked posttreatment at the end of the survey. We did this to minimize priming partisan identity in these conditions. In Table 1, we present the full set of experimental conditions, which crossed the aforementioned two factors, with the assigned prime always preceding the given message.

After reading the assigned article, respondents answered a set of four outcome variables. First, we asked respondents (other than the control group) how negatively or positively they felt about the message they read. Second, we asked about beliefs that climate change is occurring, is human induced, is an important issue personally, is an important national issue, and is an issue on which people should be doing less or more. We combined these measures, taking the average, to create a *climate change belief* composite ($\alpha = .87$) (see Feinberg & Willer, 2013; Wolsko et al., 2016). Third, we asked people their likelihood of engaging in each of four environmentally oriented behaviors—buying a more fuel-efficient car, using only energy-efficient lightbulbs, adjusting thermostat settings, and buying green electricity—to create an *intended climate behavior* composite ($\alpha = .81$) (Attari, DeKay,

Davidson, & de Bruin, 2011). Fourth, we asked about support for a set of five climate-friendly policies, including regulating businesses that produce high levels of emissions, taxing such businesses, market solutions for pollution control, tax credits for environmentally friendly behaviors, and government investment in research on ways to reduce the impacts of climate change. These items make up our *climate policy support* composite (α = .87). The precise wording for each question appears in Appendix S3 in the online supporting information. As is typical with the types of motivational inductions we employed (Dunning, 2015), we did not include direct manipulation checks that asked participants to report the different levels of motivations they felt. Because in the case of directional motivations people generally perceive motivated biases as something to be avoided (Kunda, 1990), calling participants' attention to how our manipulations might have aroused such motivations risked undermining their effectiveness.

Results

We next turn to our results. We start by reviewing our hypotheses in light of the specific experimental design and then presenting our preregistered analysis plan.

Hypotheses

Hypothesis 1 leads us to expect more positive message evaluations, stronger belief in climate change, stronger intentions to engage in climate-friendly behavior, and stronger support for climate-friendly policy in conditions where the induced motivation matches the message content—that is, specifically, the moral values framing message following the value threat prime (condition 6), the norms message following the group-identity threat prime (condition 10), and the information message following the accuracy prime (condition 11)—relative to the control and conditions without matches (as mentioned, we piloted the messages to ensure the information message was seen as the "strongest" or "best"). Hypothesis 2 suggests more negative message evaluations, weaker belief in climate change, weaker intentions to engage in climate-friendly behavior, and weaker support for climate-friendly policy in conditions that paired a directional motivational threat related to moral values (condition 5) or group identity (condition 8) with information about a strong scientific consensus about climate change.

Analysis Plan

To test Hypothesis 1, we conducted two types of preregistered focused contrasts (Rosenthal, Rosnow, & Rubin, 2000). The first involved comparing the conditions in which the manipulated motivations matched the messages presented against the conditions with the same messages but no motivational manipulations; a significant difference would reveal a *motivational matching* effect. We carried out this test by creating a contrast variable with the motivational match conditions (6, 10, and 11) coded as "1," the no-motivation conditions (2, 3, and 4) coded as "−1," and all remaining conditions coded as "0." Second, we compared conditions with the motivational matches (6, 10, 11) against conditions with the same messages but a nonmatched motivational manipulation. A significant difference here would suggest a *motivational distinctiveness* effect. This involved creating a contrast variable with the motivational match conditions (6, 10, and 11) coded as "2," the motivational nonmatch conditions (5, 7, 8, 9, 12, and 13) coded as "−1," and all remaining conditions coded as "0."

For both types of focused contrasts, an MS_{contrast} based on the individual condition means weighted by the contrast codes was first calculated. This was then divided by the pooled MS_{within} for the entire sample to create an *F-ratio* (see Rosenthal et al., 2000). Where appropriate, the overall

focused contrasts were followed up with separate individual contrasts between specific conditions. All of these analyses were conducted separately for the climate change beliefs, intended climate behavior, and climate policy support composite variables.

To test Hypothesis 2 concerning backlash effects, we conducted another preregistered focused contrast. Here, our interest is in whether directional motivations lead to a backlash effect when such individuals received the scientific consensus message. We created a contrast variable with the directional motivation conditions paired with the climate change information message (5 and 8) coded as "1," the baseline no-message condition coded as "−2," and all other conditions coded as "0." This analysis also was conducted separately for the climate change belief, intended climate behavior, and climate policy support composite variables.

In addition to the preregistered analyses, the design of the present study allows us to assess which type of messaging is more impactful in "naturally occurring" situations where motivations are not primed. We therefore also conducted an exploratory *message effectiveness* analysis in which the information, moral value framing, and group-consensus messages were all compared to the baseline, no-message condition when no other motivations were manipulated. This was done with a one-way analysis of variance (ANOVA) that included only conditions 1–4.

Finally, another exploratory analysis examined the potential mediation of any observed effects by the *message evaluation* question that asked respondents how negatively/positively they felt about the message received. Previous research on functional-attitude matching effects has suggested that such effects can occur either because the match (1) produces increased engagement with and positive evaluation of the message itself or (2) activates a more heuristic acceptance of the message without altering engagement or positive evaluations (Petty & Wegener, 1998). To evaluate these possibilities, we conducted the same matching and distinctiveness contrasts (with the necessary exclusion of the no-message baseline control condition) but with the message evaluation measure as the outcome. If these results mimic those of people's climate change beliefs, climate-friendly intentions, or policy support, it would suggest that message engagement and evaluation is a possible mediator of these other effects, whereas if these results differ it would suggest the latter more heuristic mechanism.

Motivational Matching Effects

Results from the motivational matching focused contrast showed a significant overall effect for both participants' climate change beliefs, $F(1, 1951) = 4.48$, $p = .03$, $\eta^2 = .002$, and their intended climate behavior, $F(1, 1951) = 6.63$, $p = .01$, $\eta^2 = .003$. However, this contrast was not significant for participants' climate policy support, $F(1, 1950) = 1.68$, $p = .19$, $\eta^2 < .001$. In short, when the motivation matched the message, it significantly increased the impact of the message, relative to when there were no motivational primes, for climate beliefs and intended behaviors but not policy support.

In Figure 1, we present follow-up analyses by showing the average scores for the climate beliefs that underlie the motivational matching effect. Specifically, the first bar shows the control condition mean (4.16); we then segment the other bars into categories based on whether the message received was the moral framing message, the informational message, or the norms message. We bold the conditions, on the *x*-axis, that have motivational matches. This shows that in every case, when the matching motivation was activated before the message prompt, Republicans believed more in climate change. For example, the mean score for those who received the value threat prime/moral framing message (condition 6) is 4.57, compared to 4.27 for those who received the moral framing message without the prime (condition 3), $t(1951) = 1.91$, $p = .056$, $d = .09$. The individual comparisons for the accuracy prime/information message, $t(1951) = 1.46$, $p = .15$, $d = .07$, and for the group-identity threat prime/norms message, $t(1951) = 0.26$, $p = .79$, $d = .01$, do not reach statistical significance. Nevertheless, as is clear in Figure 1, participants' beliefs move in the predicted direction (although, as we discuss below, the effect for the group-identity threat prime/norms message is

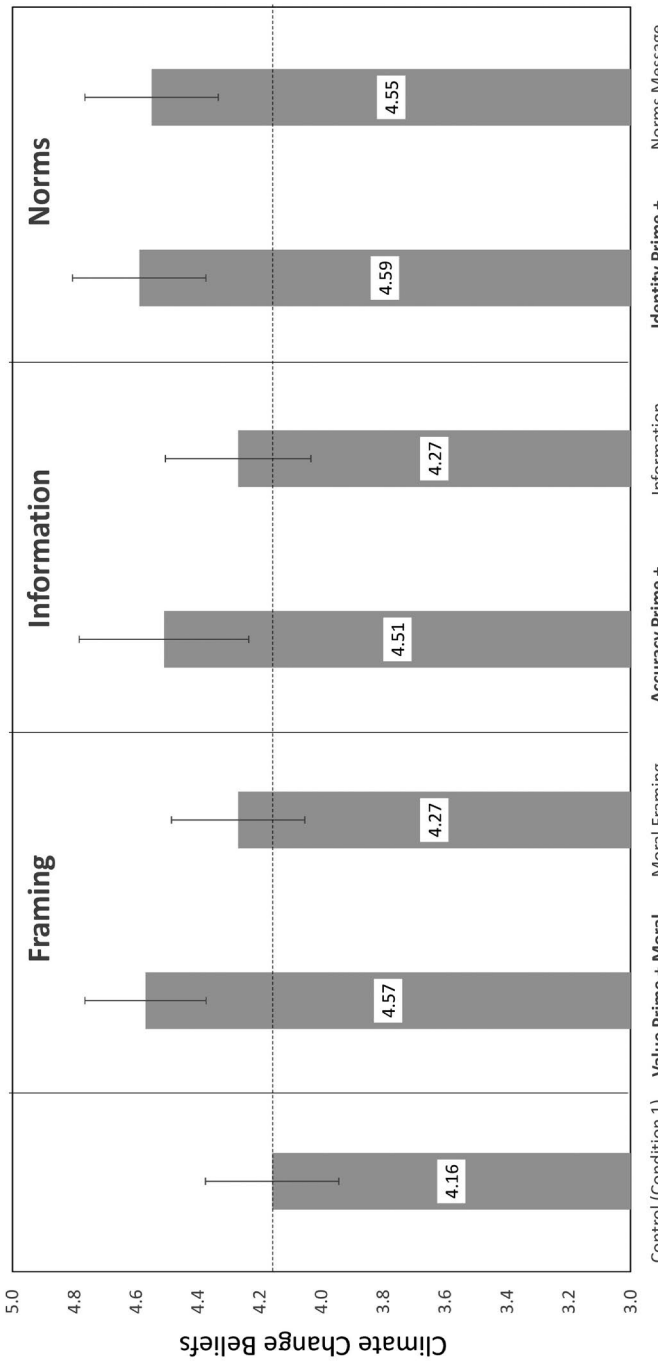

Figure 1. Average scores for climate change beliefs composite (see On-line Appendix C for question wording) with 95% confidence intervals. Motivation-message matched conditions are bolded and compared in each frame to conditions receiving the same message with no motivation primed.

attenuated by general influence of the norms message even absent an identity threat). Moreover, and importantly, Figure 1 shows that *all of the conditions with matches between motivations and messages significantly increased climate beliefs relative to the baseline control respondents who received neither any message nor motivational induction*.[7]

Figure 2 mirrors Figure 1 for the outcome variable of intended climate behaviors. The results are similar too: When the matching motivation was activated before the message prompt, Republicans reported stronger intentions for climate-friendly behaviors. The effect was marginally significant for value threat prime/moral framing message, $t(1951) = 1.71$, $p = .09$, $d = .08$, statistically significant for accuracy prime/information message, $t(1951) = 2.35$, $p = .02$, $d = .11$, but falls short of significance for the group-identity threat prime/norms message, $t(1951) = 0.29$, $p = .77$, $d = .01$ (although, again, this reflects the general influence of the norms message even absent an identity threat, as discussed below). Similar to climate beliefs, Figure 2 shows that *all of the conditions with matches between motivations and messages significantly increased respondents' climate-friendly intentions compared to the baseline control in every case*.[8,9]

Motivational Distinctiveness Effects

Turning to comparisons of conditions with matches between the messages and the induced motivations versus with nonmatches between the messages and the induced motivations, the results are similar to the previous analyses: There is a significant overall effect for both participants' climate change beliefs, $F(1, 1951) = 5.56$, $p = .02$, $\eta^2 = .003$, and their intended climate behavior, $F(1, 1951) = 4.10$, $p = .04$, $\eta^2 = .002$, but not for climate policy support, $F(1, 1950) = 0.20$, $p = .65$, $\eta^2 < .001$.

In Figure 3, we display follow-up analyses of condition climate belief means (again separating the conditions by message type and bolding the motivational match conditions). We see generally stronger effects when the induced motivation matched the message as opposed to when the induced motivation did not match. For example, the value threat paired with the moral framing message (condition 6) produced stronger beliefs than the conditions in which the same moral framing message was paired with an identity threat (condition 9) or an accuracy prime (condition 12). We see the same general trends for the informational message and the norms message (with the exception of there being a comparably high value for the pairing of a value threat with a norms message—condition 7). The individual contrasts between each matching condition and the two nonmatching conditions featuring the same message showed that the moral framing message resulted in significantly stronger beliefs following a values threat versus an accuracy prime, $t(1951) = 2.00$, $p = .05$, $d = .09$, and that the norms message resulted in significantly stronger beliefs following both an identity, $t(1951) = 2.29$, $p = .02$, $d = .10$, and a values threat, $t(1951) = 2.31$, $p = .02$, $d = .10$, as compared to an accuracy prime. None of the remaining contrasts within each message were significant, ts$(1951) < 1.21$, ps $> .08$, ds $< .06$.[10]

[7]For the values prime/moral framing condition, $t(1951) = 2.65$, $p = .008$, $d = .12$; for the accuracy prime/information condition, $t(1951) = 2.11$, $p = .04$, $d = .10$; and for the identity prime/norms message condition, $t(1951) = 2.79$, $p = .005$, $d = .13$.
[8]For the values prime/moral framing framing condition, $t(1951) = 1.99$, $p = .047$, $d = .09$; for the accuracy prime/information condition, $t(1951) = 1.76$, $p = .08$, $d = .08$; and for the identity prime/norms message condition, $t(1951) = 2.21$, $p = .03$, $d = .10$.
[9]We do not, in the text, report follow-up analyses for policy support given the nonsignificance of the focused contrast. We do, however, present them in Appendix S5 in the online supporting information.
[10]None of the nonmatching conditions resulted in climate beliefs that differed from the no-message, no-motivation control condition, ts$(1951) < 1.44$, ps $> .15$, ds $< .07$, with the exception of the group-consensus message following a values threat, ts$(1951) = 2.80$, $p = .005$, $d = .13$. As noted above, this pattern of results is in contrast to the matched conditions, all of which significantly differ from the baseline. It also is worth noting that, counter to a possibility that we noted earlier (see note 3), we see no evidence that priming accuracy motivation before receiving the moral framing message (condition 12) or norms message (condition 13) significantly altered beliefs.

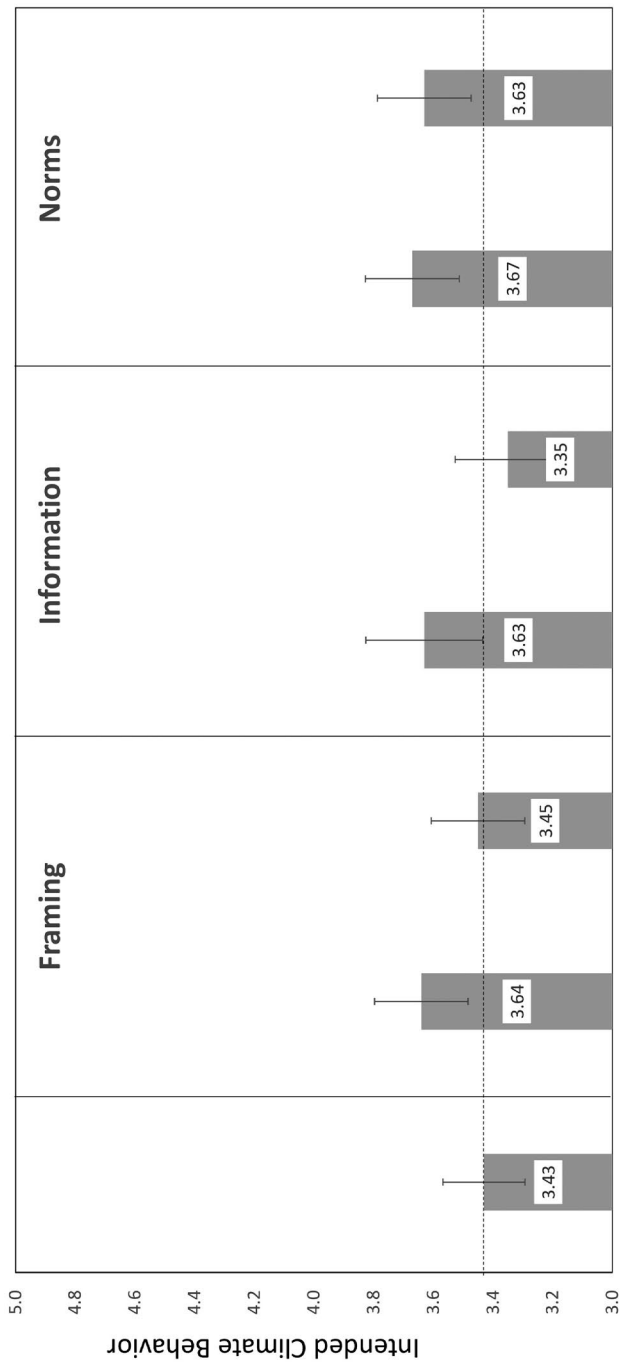

Figure 2. Average scores for intended climate behavior composite (see On-line Appendix C for question wording) with 95% confidence intervals. Motivation-message matched conditions are bolded and compared in each frame to conditions receiving the same message with no motivation primed.

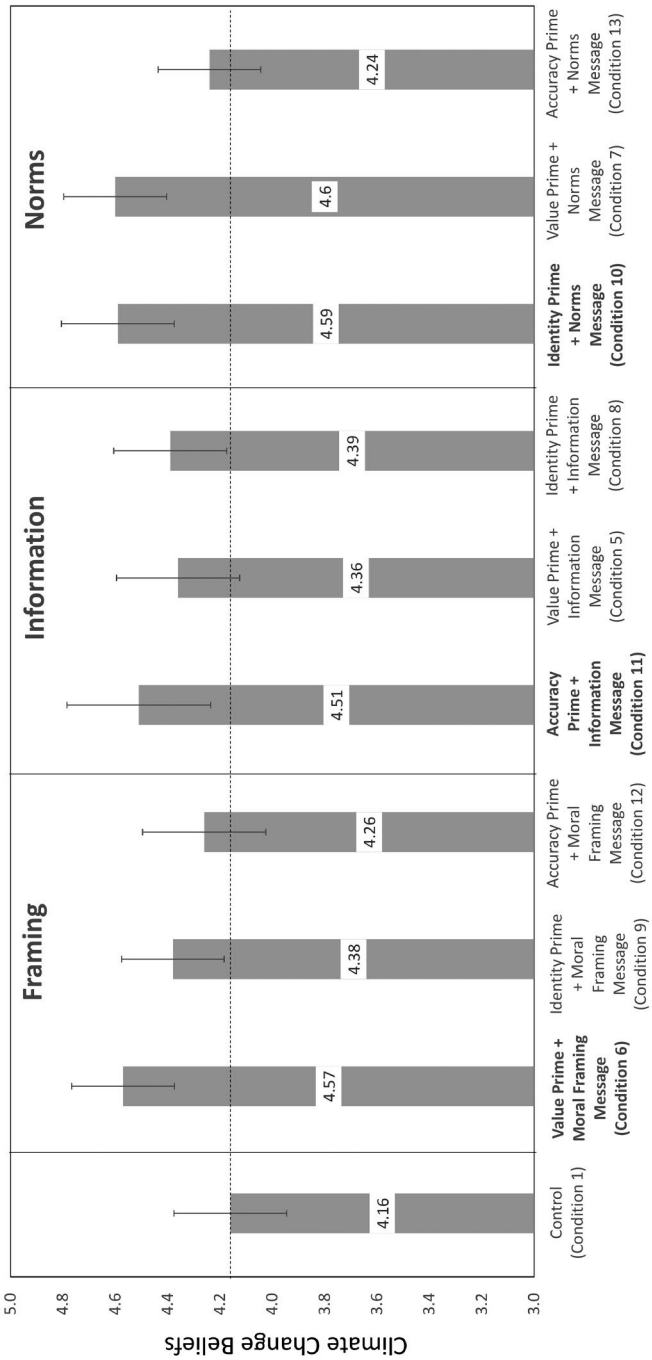

Figure 3. Average scores for climate change beliefs composite (see On-line Appendix C for question wording) with 95% confidence intervals. Motivation-message matched conditions are bolded and compared in each frame to conditions receiving the same message with a mismatched motivation primed.

We see this same pattern when it comes to intended climate behaviors, displayed in Figure 4: Matches led to stronger intents, such that the value threat paired with the moral values message again increased intent more than conditions in which the same message was paired with an identity threat (condition 9) or accuracy prime (condition 12). However, none of these differences are statistically significant, ts(1951) < 1.67, ps > .09, ds < .08, with the exception of the contrast between receiving a moral framing message following a values threat versus an accuracy prime, $t(1951) = 1.98$, $p = .05$, $d = .09$.[11,12]

Summary of Motivation Effects

Taken together, the motivational matching and the motivational distinctiveness analyses offer a clear conclusion. A message—whether it included credible information, moral value framing, or group norms—had a greater impact on beliefs and behavioral intentions when individuals' underlying motivations matched the nature of the message. This is particularly true relative to the no-motivation induction groups (i.e., motivational matching analyses), which is perhaps the most relevant comparison point given that virtually all prior work in this domain does not induce motivation in any way (i.e., employs a no-motivation/no-message control baseline). Indeed, as emphasized, the individual means when it comes to both beliefs and behavioral intentions consistently significantly exceed the baseline control. Thus, it may be that the aforementioned heterogeneity in prior work examining the effectiveness of different types of political messages stems from insufficient consideration of motivational dynamics.

The effect sizes of the motivational matching effects are—while small—clearly meaningful and in line with prior related work. For example, relative to the control condition, the matched conditions increased mean climate beliefs by about 6.5%, and mean intended climate behaviors by roughly 5.5%. Prior work on moral framing reported effects of approximately 15% on beliefs, and 8% to 12% effects on behavioral intentions (Feinberg & Willer, 2013; Wolsko et al., 2016), while work on consensus information has shown effects of about 5% impact on climate change beliefs (e.g., van der Linden et al., 2019). Furthermore, any movement on such a salient, entrenched political issue among a group with strong reasons to oppose endorsing climate change is meaningful.

Backlash Effects

Results from the backlash focused contrast did not show any significant overall effects for participants' climate change beliefs, $F(1, 1951) = 2.43$, $p = .12$, $\eta^2 = .001$, intended climate behaviors, $F(1, 1951) = 1.20$, $p = .27$, $\eta^2 < .001$, or climate policy support, $F(1, 1950) = 1.89$, $p = .17$, $\eta^2 = .001$. None of the individual contrasts between either the value threat plus information message or group-identity threat plus the information message versus the no-information, no-message control were statistically significant either, ts(1951) < 1.47, ps > .14, ds < .07. As shown in Figures 3 and 4, Republicans who had their values or identity threatened before being presented with information about a scientific consensus on climate change did not show any evidence of reduced belief in climate change or weaker intentions to behave in ways that might help reduce climate change. (There also was no backlash on policy support; see Appendix S5 in the online supporting information).

[11]None of the nonmatching conditions resulted in intended climate behaviors that differed from the no-message, no-motivation control group, ts(1951) < 1.47, ps > .14, ds < .07, with the exception of the norms message following a values threat, ts(1951) = 2.09, $p = .04$, $d = .09$. As noted above, this pattern of results is in contrast to the matched conditions, all of which significantly differ from the baseline.

[12]See Appendix S5 in the online supporting information for follow-up analyses for policy support—there are no significant differences.

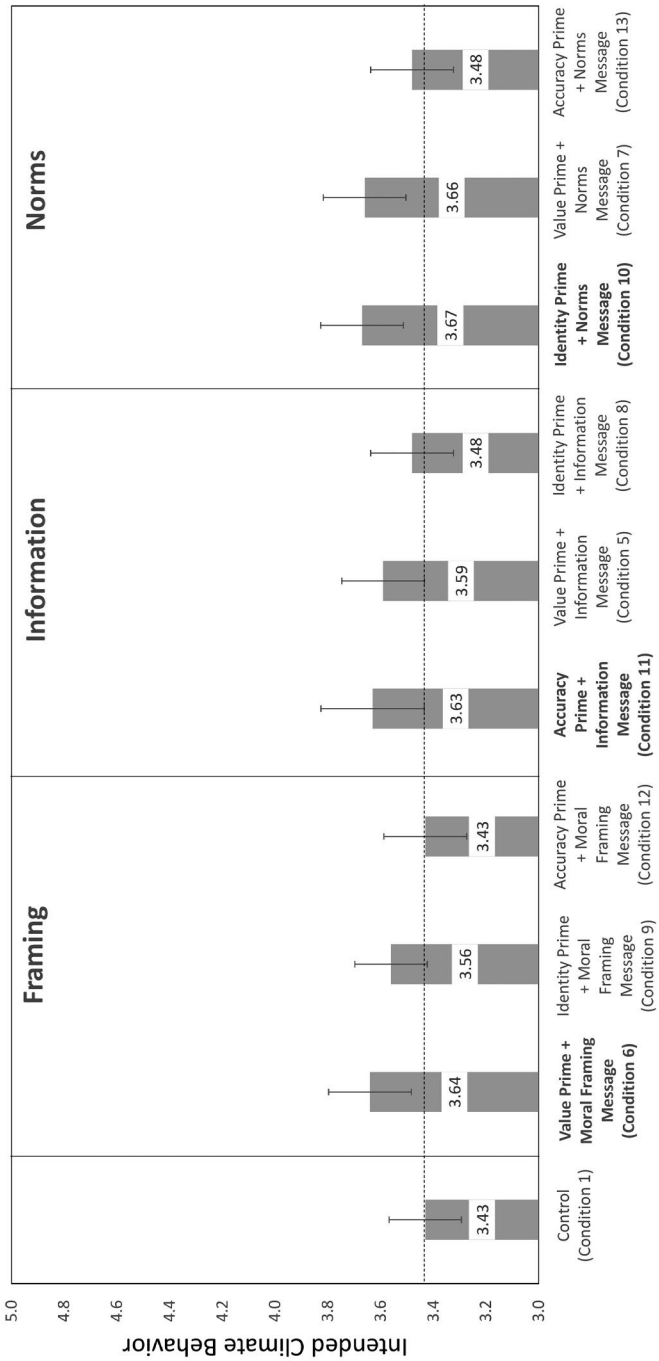

Figure 4. Average scores for intended climate behavior composite (see On-line Appendix C for question wording) with 95% confidence intervals. Motivation-message matched conditions are bolded and compared in each frame to conditions receiving the same message with a mismatched motivation primed.

Message Effectiveness

Results of one-way ANOVAs involving only the no-motivation conditions (1–4) showed marginally significant effects for climate change beliefs, $F(3, 620) = 2.33$, $p = .07$, $\eta^2 = .01$, intended climate behaviors, $F(3, 620) = 2.46$, $p = .06$, $\eta^2 = .01$, and no effect for climate policy support, $F(3, 620) = 1.75$, $p = .16$, $\eta^2 = .008$. As illustrated in Figure 1, follow-up individual contrasts showed that the norms message (condition 4) produced significantly stronger beliefs in climate change than the no-message control (condition 1), $t(620) = 2.51$, $p = .01$, $d = .20$, and marginally stronger beliefs than the information (condition 2), $t(620) = 1.80$, $p = .07$, $d = .14$, and the moral value framing messages (condition 3), $t(620) = 1.80$, $p = .07$, $d = .14$. No other differences were significant, $ts(620) < 0.69$, $ps > .49$, $ds < .06$. Similarly, as illustrated in Figure 2, follow-up individual contrasts showed that the norms message (condition 4) produced marginally stronger intended behaviors than the no-message control (condition 1), $t(620) = 1.94$, $p = .053$, $d = .16$, and the moral value frame (condition 3), $t(620) = 1.66$, $p < .10$, $d = .13$, and significantly stronger intended behaviors than the information message (condition 2), $t(620) = 2.58$, $p = .01$, $d = .20$. No other differences were significant, $ts(620) < 0.92$, $ps > .36$, $ds < .07$.

These results suggest that, at this moment in time, Republicans are most swayed by group-norm messaging concerning climate change. Perhaps more importantly, this further suggests that absent any other motivational induction, the primary motivation for Republicans appears to be a focus on group cohesion, at least with respect to climate change. As illustrated in Figures 1 and 2, (1) climate beliefs and climate-friendly intentions were just as strong following the norms message in the no-motivation condition as they were in the separate motivational match conditions, and (2) group-identity threat did not specifically increase the effectiveness of the norms message as compared to the no-motivation condition. These findings are both consistent with the preexisting salience of motivations to maintain group identity among the Republican respondents before receiving any of the treatments.

Message Evaluation

Results of the focused contrasts for the message-evaluation analyses revealed no significant effects for either the motivational matching, $F(1, 1793) = 0.18$, $p = .67$, $\eta^2 < .001$, or motivational distinctiveness contrasts, $F(1, 1790) = 0.25$, $p = .62$, $\eta^2 < .001$, on how positively participants rated the message they read.[13] That these results do not mirror those for climate change beliefs or intended climate behaviors indicates that positive reactions to the messages themselves do *not* mediate the results reported above. In addition, these results are in contrast with the results of the pilot test in which participants directly evaluated how strong and persuasive the messages were (see Appendix S4 in the online supporting information). Thus, ratings of message positivity were not simply a function of perceived message strength.

These results suggest that in the present study, there was not a prior attitude effect where motivations shaped message evaluation itself (Lodge & Taber, 2013, p. 152). Rather, it seems that people's motivations influenced whether they used the messages as a source of data to form their opinions at all. For example, following a threat to one's moral values, people were influenced by the content of messages that evoked these values, but they were not influenced by the same message in the absence

[13]Follow-up individual contrasts showed that in all of the motivational induction conditions (including the no-motivation control), the moral values framing, $ts(1793) > 3.37$, $ps < .001$, $ds > .16$, and norms messages, $ts(1793) > 2.33$, $ps < .02$, $ds > .11$, were both rated significantly more positively than the information message, and the moral values framing message was rated significantly more positively than the norms message, $ts(1793) > 2.30$, $ps < .02$, $d = .11$, with the exception of when participants' were induced with accuracy motivations, where these two messages did not differ in positivity, $t(1793) = 1.09$, $p = .28$, $d = .05$.

of a threat. Alternatively, following the inducement of accuracy motivations, people were influenced by scientific information about climate change that could help them achieve greater accuracy, but again they were not influenced by such information without these types of motivations, even though this type of message was rated as the most persuasive overall in pilot testing. These results are therefore more consistent with a heuristic mechanism for the observed motivational matching effects (Petty & Wegener, 1998).

Discussion

The present research had two primary goals. The first goal was to apply theory and research on motivated reasoning to integrate various findings on the effects on different kinds of messages on people's political opinions. Although past work has shown instances in which the presentation of a factual consensus (van der Linden et al., 2015), moral framing (Wolsko et al., 2016), and the presentation of descriptive ingroup norms (Unsworth & Fielding, 2014) can all increase the effectiveness of political messages, such findings have been inconsistent. Our survey experiment was designed to examine how such inconsistency might be explained by variations in the motives of those who received these types of messages. The second goal was to provide a more direct test of several hypotheses concerning the role of motivated reasoning in people's opinions. Although motivated reasoning is a frequent explanation for partisan differences in people's beliefs about climate change (and other salient issues) (Kahan, 2017a, 2017b), the evidence for such reasoning is often indirect and inferred rather than conclusively demonstrated (Druckman & McGrath, 2019; Tappin, Pennycook, & Rand, 2020).

Primary Findings

Although our study only examined one particular test case involving Republicans' beliefs and intentions concerning climate change, overall, the findings advanced both of the above goals. Following the induction of (1) motivations for accuracy, (2) motivations to defend against threats to one's moral values, or (3) motivations to defend against threats to an important group identity, respondents expressed greater belief in human-induced climate change and greater intentions to perform climate-friendly behaviors when they respectively read messages that (1) presented information about the wide scientific consensus, (2) framed the problem of responding to a changing climate in terms of the central Republican values, or (3) described the emerging norms among the majority of Republicans. These three distinct matching effects with three different motivational inductions and message types provide strong support for the general role of motivated reasoning in response to messages (see also Bolsen et al., 2014). Moreover, these effects provide a potential explanation for why some studies observe the influence of different types of messages on people's opinions whereas others do not. Our results suggest two possible explanations for prior conflicting findings. First, it may be that, in a given study, the sample being studied did not have sufficiently high levels of the motivations that best matched the messages—different samples may contain distinct variability on individuals' motivations. Second, the prior messages used may not have been precise enough to tap the relevant motivation: This is an intriguing possibility insofar as it may explain inconsistent results, but it also highlights the importance of future work on how people react to messages that contain a mix of scientific information, values, and/or ingroup norms.

One nuance of the present findings worth noting is our ancillary analysis examining which type of communication had the largest effects absent motivational inductions. We find that a message outlining descriptive norms among Republicans was more effective than the other messages. This coheres with a sizeable literature that shows norms play a powerful role across social and political decision-making (e.g., Davis, Hennes, & Raymond, 2018; Goldberg et al., 2019a; Nyborg et al., 2016). Our interpretation is that it also is, at some level, consistent with the politically motivated

reasoning model; it seems that motivations to maintain one's identity as a Republican may be particularly salient and powerful in this context (e.g., Kahan, 2017a, 2017b). The greater strength of the norms message relative to the values message suggests a motivational priority of concerns with group identity over concerns about upholding moral values regarding this issue (see Dunning, 2015; Molden & Higgins, 2012).

Another notable aspect of our findings concerns the lack of a backlash effect (e.g., Hart & Nisbet, 2012; Zhou, 2016). Following threats to their values or group identity, Republicans did not react defensively to the scientific consensus information by expressing weaker beliefs in climate change or fewer intentions to behave in climate-friendly ways. In this respect, our findings cohere with other recent reevaluations of backlash effects (e.g., Guess & Coppock, 2018; Wood & Porter, 2019). Again, because we directly manipulated Republicans' defensive motivations in two different ways before presenting the information about climate change, ours was perhaps the strongest test of the backlash hypothesis to date; our lack of findings thus reinforces the idea that such effects might not be as large or robust as initially suspected.

Yet another facet of the present findings worth highlighting concerns the lack of effects on respondents' evaluations of the messages themselves. This indicates that the matching effects were not directly mediated by respondents' greater engagement with the specific content of the arguments presented. Perhaps the unique tension when it comes to climate change—between the scientific consensus and the historic climate skepticism among Republicans—meant that the motivational matches simply disinhibited Republicans' acceptance of the message content even without engagement or positive feelings toward this content. It is an intriguing question worthy of further research whether this finding of non-message-mediated motivational matching might generalize to attitude change in other highly politicized domains as well.

Another nonresult of interest is our null effects when it comes to Republican respondents' support of public policies to combat climate change (see Appendix S5 in the online supporting information). This echoes some prior work and accentuates the importance of distinguishing outcome variables (also see Levine & Kline, 2017). One possible explanation is that although all of the climate change messages presented mentioned that climate change is happening and advocated for people to take personal action, they did not push for climate change policies. Thus, it could be that the motivational matching influenced responses directly relevant to the content of the messages received but did not generalize beyond that. That said, another possible explanation is that there is an additional layer of motivations attached to policy support that was not addressed by the messages. For example, Campbell and Kay (2014) outline how Republicans' specific aversion to the types of big-government solutions proposed to reduce climate change can produce additional motivations for them to disavow climate change concerns. Messages that change Republicans' support for policies to address climate change might need to speak to these other motivations. Both of these possibilities are important considerations for future research.

General Implications and Directions for Future Research

In the experiment described here, we presented evidence that both nondirectional motivations (e.g., concerns with accuracy) and different types of directional motivations (e.g., desires to defend moral values or maintain important group identities) can be at play when people receive political messages. One challenge for future research will be to further establish under what circumstances different types of nondirectional or directional motivations predominate so as to best tailor such messages. The current experiment addressed this challenge by directly inducing different types of motivations, but this may be less practical in many real-world conditions. Another route may be to more carefully consider the individual attributes of a particular audience that might privilege one type of motivation over another: When someone cares deeply enough about understanding an issue, he or she

may be more likely to seek accuracy and engage in the direct communication of information (Leeper, 2014); when someone holds a strong partisan identity (Huddy et al., 2015), messages that reference group norms may be most effectual; when someone possesses deep value convictions, he or she may be swayed more by framing the information concerning this issue in line with these values. Thus, an important direction for future work is to map individual and contextual features onto the distinct types of reasoning likely to be present and that successful messages must address. Another important direction for future research might be to develop practical primes for accuracy motivations that could be applied at scale, such as encouraging people to think about how they would justify their opinions to a skeptical audience or increasing personal relevance by inducing them to consider the impact of climate change on their own well-being and that of their current and future family. This type of work could provide further insight into how to increase acceptance of communications of the scientific consensus surrounding climate change and other issues.

Another related implication for future research concerns the illustration of multiple types of motivated reasoning that can influence political communication; scholars need to carefully recognize distinctions between the underlying motivations (also see Kahan, 2017a, 2017b). For example, in our study, those motivated by a desire to protect their group identity were influenced by a message focused on descriptive norms but not a message focused on moral values. Therefore, treating "motivated reasoning" as a monolithic concept can lead to inconsistencies and confusion—carefully defining and isolating particular motives likely will be critical for designing effective communication, particularly for politically charged issues such as climate change or abortion. That said, as discussed, it is intriguing that we find no evidence of a backlash effect on the climate change issue. This contrasts with some other work on climate change (e.g., Hart & Nisbet, 2012; Ma, Dixon, & Hmielowski, 2019; Zhou, 2016), but it coheres with recent research on other policy issues (Guess & Coppock, 2018; Wood & Porter, 2019). It may be that on the issue of climate change, Republicans have become less reactive than they had been in the past. Future work is needed to identify when and why backlash effects occur when it comes to climate change and other issues.

Our study, of course, has limitations more generally—it focuses on a single issue, population, and time/context. One inspiration for our study involved the slowly evolving movement of Republican public opinion on climate change and how that may affect Republicans' opinions more generally. Yet, it remains unclear if the results, particularly the strong ingroup norm effect, would hold for other partisan opinions. Further, although the size of the motivational matching effects we observed did not differ by the specific type of match (see Figures 1 and 2), it is possible that the manipulations we used varied in strength. Similarly, although we pretested the strength of the messages used (see Appendix S4 in the online supporting information), it is also possible that the degree of the match produced by each message with the relevant manipulation varied as well. Indeed, the norms message appeared to resonate equally well following both values and identity threats (see Figures 3 and 4), which could indicate either that the values threat evoked multiple types of motivations or that the norms message was experienced as relevant for multiple types of threats; thus, one should be cautious in generalizing about the relative strength of any of the particular effects observed here.

In the spirit of these limitations, we emphasize that, despite our findings, factual evidence itself has an important role. In some instances, a goal of political messages is to ensure people accurately consider the existing facts, whereas in other instances, the goal may be to induce individuals to alter their beliefs or behaviors in a direction that coheres with a strong evidence-based consensus. In either case, factual evidence itself plays the lynchpin role in identifying consensus when it exists, and it is key in the communication processes through which norms are created in the first place. However, as the discipline of political science shows growing interest around political information and misinformation, it is essential that investigation of all of the additional motivational and messaging components necessary to communicate factual evidence itself also keeps pace.

ACKNOWLEDGMENTS

Financial support was provided by an Academic Year Undergraduate Research Grant from Northwestern University, a Ginsberg Grant from the Political Science Department at Northwestern University, and the Institute of Sustainability and Energy at Northwestern University. The authors thank Toby Bolsen, Erin Hennes, Adam Levine, and Sander van der Linden for helpful advice. Correspondence concerning this article should be addressed to James N. Druckman, Department of Political Science, Northwestern University, Scott Hall, 601 University Place, Evanston, IL 60208. E-mail: druckman@northwestern.edu. Daniel C. Molden, Department of Psychology, Northwestern University, Swift Hall, 2029 Sheridan Road, Evanston, IL 60208. E-mail: molden@northwestern.edu

REFERENCES

Asch, S. E. (1956). Studies of independence and conformity. *Psychological Monographs: General and Applied, 70*(9), 1–70.

Attari, S. Z., DeKay, M. L., Davidson, C. I., & de Bruin, W. B. (2011). Changing household behaviors to curb climate change. *Sustainability: The Journal of Record, 4*(1), 9–11.

Baumeister, R. F., & Leary, M. R. (1995). The need to belong: desire for interpersonal attachments as a fundamental human motivation. *Psychological Bulletin, 117*(3), 497–529.

Bolsen, T., Druckman, J. N., & Cook, F. L. (2014). The influence of partisan motivated reasoning on public opinion. *Political Behavior, 36*(2), 235–262.

Bolsen, T., Leeper, T. J., & Shapiro, M. A. (2014). Doing what others do. *American Politics Research, 42,* 65–89.

Campbell, T. H., & Kay, A. C. (2014). Solution aversion. *Journal of Personality and Social Psychology, 107*(5), 809–824.

Cialdini, R. B. (2007). Descriptive social norms as underappreciated sources of social control. *Psychometrika, 72*(2), 263–268.

Davis, T., Hennes, E. P., & Raymond, L. (2018). Cultural evolution of normative motivations for sustainable behaviour. *Nature Sustainability, 1*(5), 218–224.

Day, M. V., Fiske, S. T., Downing, E. L., & Trail, T. E. (2014). Shifting liberal and conservative attitudes using moral foundations theory. *Personality and Social Psychology Bulletin, 40*(12), 1559–1573.

Dietz, T. (2013). Bringing values and deliberation to science communication. *Proceedings of the National Academy of Sciences, 110*(Supplement_3), 14081–14087. https://doi.org/10.1073/pnas.1212740110

Ditto, P. H., Pizarro, D. A., & Tannenbaum, D. (2009). Motivated moral reasoning. *Psychology of Learning and Motivation, 50,* 307–338.

Druckman, J. N., & Lupia, A. (2016). Preference change in competitive political environments. *Annual Review of Political Science, 19*(1), 13–31. https://doi.org/10.1146/annurev-polisci-020614-095051

Druckman, J. N., & McGrath, M. C. (2019). The evidence for motivated reasoning in climate change preference formation. *Nature Climate Change, 9*(2), 111–119.

Dunning, D. (2015). Motivational theories. In B. Gawronski & G. V. Bodenhausen (Eds.), *Theory and explanation in social psychology* (pp. 108–131). New York, NY: Guilford.

Dwyer, P. C., Maki, A., & Rothman, A. J. (2015). Promoting energy conservation behavior in public settings. *Journal of Environmental Psychology, 41,* 30–34.

Egan, P. J., & Mullin, M. (2012). Turning personal experience into political attitudes. *The Journal of Politics, 74,* 796–809.

Egan, P. J., & Mullin, M. (2014). Local weather and climate concern. *Nature Climate Change, 4,* 89–90.

Epley, N., & Gilovich, T. (2016). The mechanics of motivated reasoning. *Journal of Economic Perspectives, 30*(3), 133–140.

Feinberg, M., & Willer, R. (2013). The moral roots of environmental attitudes. *Psychological Science, 24*(1), 56–62.

Fielding, K. S., & Hornsey, M. J. (2016). A social identity analysis of climate change and environmental attitudes and behaviors. *Frontiers in Psychology, 7*(121), 1–12. https://doi.org/10.3389/fpsyg.2016.00121

Gerber, A. S., & Rogers, T. (2009). Descriptive social norms and motivation to vote. *Journal of Politics, 71*(1), 178–191. https://doi.org/10.1017/S0022381608090117

Goldberg, M. H., van der Linden, S., Leiserowitz, A., & Maibach, E. (2019a). Perceived social consensus can reduce ideological biases on climate change. *Environment and Behavior*. https://doi.org/10.1177/0013916519853302

Goldberg, M. H., van der Linden, S., Maibach, E., & Leiserowitz, A. (2019b). Discussing global warming leads to greater acceptance of climate science. *Proceedings of the National Academy of Sciences, 116*(30), 14804–14805.

Graham, J., Haidt, J., & Nosek, B. A. (2009). Liberals and conservatives rely on different sets of moral foundations. *Journal of Personality and Social Psychology, 96*(5), 1029–1046. https://doi.org/10.1037/a0015141

Guess, A., & Coppock, A. (2018). Does counter-attitudinal information cause backlash? Results from three large survey experiments. *British Journal of Political Science*, 1–19. https://doi.org/10.1017/S0007123418000327

Hart, P. S., & Nisbet, E. C. (2012). Boomerang effects in science communication. *Communication Research, 39*(6), 701–723. https://doi.org/10.1177/0093650211416646

Hogg, M. A., & Reid, S. A. (2006). Social identity, self-categorization, and the communication of group norms. *Communication Theory, 16*(1), 7–30.

Hornikx, J., & O'Keefe, D. J. (2009). Adapting consumer advertising appeals to cultural values. *Annals of the International Communication Association, 33*(1), 39–71.

Huddy, L. (2001). From social to political identity: A critical examination of social identity theory. *Political Psychology, 22*(1), 127–156.

Huddy, L., Mason, L., & Aaroe, L. (2015). Expressive partisanship. *American Political Science Review, 109*(1), 1–17. https://doi.org/10.1017/S0003055414000604

Javeline, D. (2014). The most important topic political scientists are not studying. *Perspectives on Politics, 12*(2), 420–434. https://doi.org/10.1017/S1537592714000784

Kahan, D. M. (2016). The "gateway belief" illusion. *Journal of Science Communication, 16*(5), 1–20.

Kahan, D. M. (2017a). Misconceptions, misinformation, and the logic of identity-protective cognition. *Cultural Cognition Project Working Paper Series No. 164*.https://doi.org/10.2139/ssrn.2973067

Kahan, D. M. (2017b). On the sources of ordinary science knowledge and extraordinary science ignorance. In K. H. Jamieson, D. Kahan, D. A. Scheufele (Eds.), *The Oxford handbook of the science of science communication* (Vol. *35,* pp. 35–50). New York, NY: Oxford University Press.

Keohane, R. (2015). The global politics of climate change. *PS: Political Science & Politics, 48*(1), 19–26. https://doi.org/10.1017/S1049096514001541

Kunda, Z. (1990). The case for motivated reasoning. *Psychological Bulletin, 108*(3), 480–498.

Leeper, T. J. (2014). The informational basis for mass polarization. *Public Opinion Quarterly, 78*(1), 27–46. https://doi.org/10.1093/poq/nft045

Leeper, T. J., & Slothuus, R. (2014). Political parties, motivated reasoning, and public opinion formation. *Advances in Political Psychology, 35*(Supplement_1), 129–156.

Leeper, T. J., & Slothuus, R. (2019). How the News Media Persuades. In B. Grofman, E. Suhay, & A. Trechsel (Eds.), *The Oxford handbook of electoral persuasion*. New York, NY: Oxford University Press.

Levine, A., & Kline, R. (2017). When does self-interest motivate political engagement? *The Case of Climate Change* (March 12, 2017). https://doi.org/10.2139/ssrn.2931842

van der Linden, S. L., Leiserowitz, A. A., Feinberg, G. D., & Maibach, E. W. (2015). The scientific consensus on climate change as a gateway belief. *PLoS ONE, 10*(2), 2–9.

van der Linden, S., Leiserowitz, A., & Maibach, E. (2019). The gateway belief model. *Journal of Environmental Psychology, 62,* 49–58.

Lodge, M., & Taber, C. S. (2013). *The rationalizing voter*. New York, NY: Cambridge University Press.

Lupia, A. (2016). *Uninformed*. New York, NY: Oxford University Press.

Ma, Y., Dixon, G., & Hmielowski, J. D. (2019). Psychological reactance from reading basic facts on climate change: The role of prior views and political identification. *Environmental Communication, 13*(1), 71–86.

Molden, D. C., & Higgins, E. T. (2012). Motivated thinking. In K. J. Holyoak & R. G. Morrison (Eds.), *The Oxford handbook of thinking and reasoning*. New York, NY: Oxford University Press.

Mullen, E., & Skitka, L. J. (2006). Exploring the psychological underpinnings of the moral mandate effect. *Journal of Personality and Social Psychology, 90*(4), 629–643.

National Academies of Sciences, Engineering, and Medicine. (2017). *Communicating science effectively*. Washington, DC: The National Academies Press. https://doi.org/10.17226/23674

Nicholson, S. P. (2012). Polarizing cues. *American Journal of Political Science, 56*(1), 52–66.

Nyborg, K., Anderies, J. M., Dannenberg, A., Lindahl, T., Schill, C., Schlüter, M., … de Zeeuw, A. (2016). Social norms as solutions. *Science, 354*(6308), 42–43.

Nyhan, B., & Reifler, J. (2010). When corrections fail. *Political Behavior, 32*(2), 303–330.

Palm, R., Lewis, G. B., & Feng, B. (2017). What causes people to change their opinion about climate change? *Annals of the American Association of Geographers, 107*(4), 883–896.

Petrocelli, J. V., Martin, J. L., & Li, W. Y. (2010). Shaping behavior through malleable self-perceptions. *Journal of Research in Personality, 44*(2), 213–221.

Petty, R. E., & Wegener, D. T. (1998). Matching versus mismatching attitude functions. *Personality and Social Psychology Bulletin, 24*(3), 227–240.

Rosenthal, R., Rosnow, R. L., & Rubin, D. B. (2000). *Contrasts and effect sizes in behavioral research*. New York, NY: Cambridge University Press.

Severson, A. W., & Coleman, E. A. (2015). Moral frames and climate change policy attitudes. *Social Science Quarterly, 96*(5), 1277–1290.

Shavitt, S. (1990). The role of attitude objects in attitude functions. *Journal of Experimental Social Psychology, 26,* 124–148.

Sinclair, B. (2012). *The social citizen*. Chicago, IL: University of Chicago Press.

Slothuus, R., & de Vreese, C. H. (2010). Political parties, motivated reasoning, and issue framing effects. *Journal of Politics, 72*(3), 630–645.

Snyder, M., & DeBono, K. G. (1985). Appeals to images and claims about quality. *Journal of Personality and Social Psychology, 49,* 586–597.

Tappin, B. M., Pennycook, G., & Rand, D. G. (2020). Thinking clearly about causal inferences of politically motivated reasoning: Why paradigmatic study designs often undermine causal inference. *Current Opinion in Behavioral Sciences, 34,* 81–87.

Unsworth, K. L., & Fielding, K. S. (2014). It's political. *Global Environmental Change, 27,* 131–137.

Watt, S. E., Maio, G. R., Haddock, G., & Johnson, B. T. (2008). Attitude functions in persuasion. In W. D. Crano & R. Prislin (Eds.), *Attitudes and attitude change* (pp. 189–211). New York, NY: Psychology Press.

Wolsko, C., Ariceaga, H., & Seiden, J. (2016). Red, white, and blue enough to be green. *Journal of Experimental Social Psychology, 65,* 7–19. https://doi.org/10.1016/j.jesp.2016.02.005

Wood, T., & Porter, E. (2019). The elusive backfire effect. *Political Behavior, 41*(1), 135–163.

Zhou, J. (2016). Boomerangs versus javelins. *Environmental Politics, 25*(5), 788–811. https://doi.org/10.1080/09644016.2016.1166602

Supporting Information

Additional supporting information may be found in the online version of this article at the publisher's web site:

Appendix S1. Sample Demographics
Table S1.1. Sample Description versus the American National Election Studies (Republicans Only)
Appendix S2. Treatments
Appendix S3. Question Wording
Appendix S4. Pilot Test
Appendix S5.
Figure S5.1. Average scores for climate change policy support composite (see Appendix S3 for question wording) with 95% confidence intervals. Motivation-message matched conditions are bolded and compared in each frame to conditions receiving the same message with no motivation primed.
Figure S5.2. Average scores for climate change policy support composite (see Appendix S3 for question wording) with 95% confidence intervals. Motivation-message matched conditions are bolded and compared in each frame to conditions receiving the same message with a mismatched motivation primed.