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Using Political Efficacy Messages to Increase Climate Activism: The Mediating Role of Emotions

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Abstract

Using an online experiment with a national sample, this study tests the effects of political efficacy messages on two types of climate-related political participation via the discrete emotions of hope, fear, and anger and compares these effects across ideological groups. Relative to a message that discusses only negative climate impacts, messages that emphasize the internal, external, or response efficacy of political actions to address climate change are found to influence hope and fear but not anger, and these effects vary by political ideology. Furthermore, exposure to efficacy information indirectly increases participation via hope—even, in some cases, among conservatives.

Keywords

climate change, efficacy, emotions, political participation, political ideology

In light of the scientific consensus that climate change is real, is human-caused, and carries negative impacts (e.g., Romero-Lankao et al., 2014), scholars have identified grassroots citizen engagement as a critical factor to

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pressure policy makers to pass meaningful climate mitigation policies (Ockwell, Whitmarsh, & O'Neill, 2009). However, climate activism is relatively uncommon in the United States; for example, only about 1 in 10 Americans has contacted a government official about global warming (Leiserowitz, Maibach, Roser-Renouf, Feinberg, & Rosenthal, 2014). One promising yet understudied communication strategy to increase citizen political engagement around climate change is to focus on efficacy messages (Roser-Renouf, Maibach, Leiserowitz, & Zhao, 2014), which portray climate change as an addressable problem. Historically, much climate change communication has emphasized the threat of climate change and its potentially catastrophic impacts on humans and the environment (e.g., Nisbet, 2009). This approach, however, can leave citizens feeling helpless to do anything about climate change (O'Neill & Nicholson-Cole, 2009), thereby failing to mobilize those who are concerned about the threat of climate change and leading to further alienation and defensive avoidance among those who are doubtful about climate change.

Drawing from risk communication (Witte, 1992) and political science (Craig, Niemi, & Silver, 1990) approaches to efficacy, Hart and Feldman (2014) outlined three forms of efficacy information that are likely to motivate citizen political engagement around climate change: internal efficacy information, which emphasizes the ease with which an individual can take action in the political sphere; external efficacy information, which emphasizes the likelihood that elected officials will respond to public opinion or calls for action; and response efficacy information, which stresses the effectiveness of a proposed policy for slowing climate change or reducing its negative impacts. Prior research has shown that perceived efficacy is an important individual-level predictor of whether someone will take action on an issue (e.g., Rosenstone & Hansen, 2003; Witte, 1992); however, little is known about the effects of media content that provides information about political efficacy, either on political participation or on potential intervening variables such as emotions.

The present study addresses this research gap, contributing to the literature in three significant ways. First, we offer an initial test of efficacy information as a message-level variable in a policy context, adopting the framework outlined by Hart and Feldman (2014) to test the effects of messages that emphasize three different types of political efficacy (i.e., internal, external, and response). Second, we examine the discrete emotions of hope, fear, and anger as mediators of the effects of efficacy messages on two forms of climate-related political participation. In the context of climate change, this is the first study we are aware of to link message effects on emotions to political participation. Finally, we examine differences in the effects of

efficacy messages across ideological groups, thereby adding to a growing body of research on how political orientation influences reception of climate change messages (e.g., Hart & Nisbet, 2012; Hart, Nisbet, & Myers, 2015). Here, we offer evidence that some forms of efficacy messaging may help reduce ideological biases in information processing.

Efficacy, Emotions, and Political Activism

A key reason why efficacy information may help motivate political participation is through its effects on emotions. Emotions are psychological reactions of varying intensity and duration that are elicited in response to some external stimulus (Nabi, 2002). Fear, anger, and hope are considered discrete emotions, in that they have "unique appraisal patterns, motivational functions, and behavioral associations" (Nabi, 2002, p. 290). However, one commonality of these emotions that make them particularly relevant to study in the context of climate change is that all three represent reactions to an external threat. Fear and anger are both negative emotions aroused in response to a threatening situation; however, fear occurs when the situation appears outside one's control, while anger arises from appraisals of individual agency over the threat (Lerner & Keltner, 2001; C. A. Smith & Ellsworth, 1985). Although hope is considered a positive emotion, Lazarus (1991) argues that hope is aroused only in the face of a threatening situation, albeit when a desirable future outcome is deemed possible.

Efficacy messages about climate change are likely to influence fear, hope, and anger differently. First, efficacy messages—by portraying climate change as an addressable threat—may diminish fear. This follows from the theoretical predictions of the extended parallel process model (Witte, 1992), which argues that in a fear-based message appeal, the inclusion of efficacy information encourages people to cognitively confront the perceived danger, thereby alleviating fear and, in turn, motivates them to take action to alleviate the danger.

Second, efficacy messages may increase hope. According to Lazarus (2006), hope involves "fearing the worst but yearning for better and believing the wished-for improvement is possible" (p. 16). Thus, when information about the threat of climate change is combined with information about what can be done to address it, this should encourage hope. Indeed, Chadwick's (2015) research on hope appeals, conducted in the context of climate change, found that exposure to a message that emphasized the possibility that individuals can take action to improve the climate—which is similar to our concept of efficacy information—increased subjective feelings of hope.

Finally, anger also may be affected by efficacy messages, although the direction of this influence is less clear. Valentino, Gregorowicz, and

Groenendyk (2009) found that in the face of a policy threat, feelings of internal political efficacy facilitated anger. This is likely because efficacy signals personal confidence for dealing with a threat, which is the appraisal pattern associated with anger. Other research, however, has found a negative relationship between political efficacy and anger (Tausch et al., 2011). Given that anger occurs when one's goals are being thwarted (Lazarus, 1991), efficacy may imply the removal of barriers to goal attainment, thereby decreasing anger. It is important to note that most empirical studies linking efficacy to emotions have considered efficacy only as an individual-level variable, not as a message-level variable (see Dahlstrom, Dudo, & Brossard, 2012). We thus know very little about the effects of efficacy *messages* on emotions, a gap this study aims to address.

Discrete emotions, in turn, are important predictors of behavior. According to cognitive appraisal theory and functional approaches to emotion, specific emotions guide behavior based on the relationship they signal between individuals and their environment, which triggers a particular action tendency in order to cope with the emotion (e.g., Lazarus, 1991; C. A. Smith & Ellsworth, 1985). For example, the perceived lack of control associated with fear leads to immobilization and risk avoidance (Huddy, Feldman, Taber, & Lahav, 2005; Lerner & Keltner, 2001). In contrast, anger, because it is defined by a perceived sense of control, leads to more optimistic judgments of future events and more risk-seeking choices (Lerner & Keltner, 2001), which may motivate action. Similarly, enthusiasm (whose measurement often includes indicators of hope; see Brader, 2005; Valentino, Brader, Groenendyk, Gregorowicz, & Hutchings, 2011) signals that things are going well and that one's goals are being met (Marcus, Neuman, & MacKuen, 2000), which promotes action as a means to preserve or further achieve these goals.

Several studies have found that anger and enthusiasm positively relate to various forms of campaign-related political participation, including both low-cost, expressive actions and more costly actions such as attending a rally and volunteering (Brader, 2005; Groenendyk & Banks, 2014; Marcus et al., 2000; Valentino et al., 2009; Valentino et al., 2011). In contrast, fear bears little association to higher order forms of political participation (Brader, 2005; Groenendyk & Banks, 2014; Valentino et al., 2011) and is sometimes negatively related to participation (Valentino et al., 2011).

In the context of climate change, discrete emotions—especially worry and hope—have been found to be important predictors of support for policy action to mitigate global warming (N. Smith & Leiserowitz, 2014). Although recent research points to climate change messaging strategies that may productively influence emotions (Myers, Nisbet, Maibach, & Leiserowitz,

2012), there has not yet been any research that directly links message effects on emotions to climate-related political participation.

Addressing this gap, we hypothesize that a climate change message that includes political efficacy information will increase hope (Hypothesis 1 [H1]) and decrease fear (H2) relative to a message that does not include efficacy information. It is less clear how exposure to efficacy information will influence anger; thus, we examine this relationship as Research Question 1 (RQ1). In turn, we expect that both hope (H3) and anger (H4) will be positively associated with climate-related political participation, while fear (H5) will be negatively associated with participation. This should lead to positive indirect effects of exposure to efficacy information on participation via both hope (H6) and fear (H7). Given the uncertain effect of efficacy information on anger, the nature of the indirect effect on participation via this emotion is examined as RQ2.

Following from Hart and Feldman (2014), we also seek to compare the effects of messages that emphasize different forms of political efficacy related to climate change action (i.e., internal, external, or response). Given the distinct focal points of internal, external, and response efficacy messages—that is, the self, the system, and the policy, respectively—they may differentially affect emotional reactions and, in turn, participation. Thus, as an exploratory research question, we consider whether the direct effects of efficacy messages on emotions and the indirect effects of efficacy messages on political participation via emotions depend on the type of efficacy information emphasized (RQ3). In addition, individuals' political ideology may affect their receptivity to efficacy messages about climate change. Thus, as described in the section that follows, we also consider political ideology as a moderator of the effects of efficacy information on emotional responses and political behavior.

Political Ideology as a Moderator of the Effects of Efficacy Messaging

In the United States, public opinion about climate change is divided along ideological lines, with liberals more concerned about climate change and supportive of actions to address it than conservatives (McCright & Dunlap, 2011). In turn, research has shown that liberals and conservatives respond differently to information about climate change (Bolsen, Druckman, & Cook, 2015; Hart & Nisbet, 2012). This differential response is attributable to motivated reasoning, whereby people with strong ideological commitments actively counterargue and/or defensively avoid information that contradicts their values and beliefs while readily accepting information that supports

their views (Taber & Lodge, 2006). By this account, we might expect conservatives to be more resistant to *any* communication about climate change than liberals or moderates; thus, efficacy messaging may do little to reconcile gaps in public opinion or spur policy action and instead may amplify polarization (Hart & Nisbet, 2012).

On the other hand, the extended parallel process model—although not typically applied in political contexts—proposes that exposure to efficacy information may make individuals less likely to manage a potential threat like climate change through defensively biased processing (Witte, 1992). Thus, if conservatives (as well as liberals and moderates) are informed of available political mechanisms to address climate change, they may be more open to information about the problem and to taking action to mitigate its effects. In this way, exposure to efficacy information may help attenuate political polarization on climate change. Given these competing hypotheses, we propose an additional research question that explores whether the direct effects of efficacy messaging on emotions and indirect effects of efficacy messaging on climate-related political participation via emotions are conditional on political ideology (RQ4). Figure 1 depicts the full conceptual model used for testing.

Method

An online experiment was fielded in June 2014. The study used a four-condition (*type of efficacy message*: internal, external, response, or no efficacy information) experimental design. The experimental stimulus, a news article constructed for the study, was embedded within an online survey designed and hosted on the Qualtrics platform.

Sample

A sample of 425 adults was recruited from a national paid opt-in online survey panel through Qualtrics Panels. Qualtrics selects potential study participants from traditional, actively managed market research panels, recruited via e-mail sign-up, web banners, social media, and invitation only methods. Prior research has shown that in political science experiments, samples recruited from online opt-in panels behave similarly to probability samples (e.g., Leeper & Mullinix, 2015).

Quotas were used to ensure age, gender, race, and ethnicity distributions that approximated census estimates. The average age of study participants was 44.8 years (SD = 14.4). The sample was 56% female, 75% White, and 7.5% Hispanic. Median education level was “some college,” and 36% of

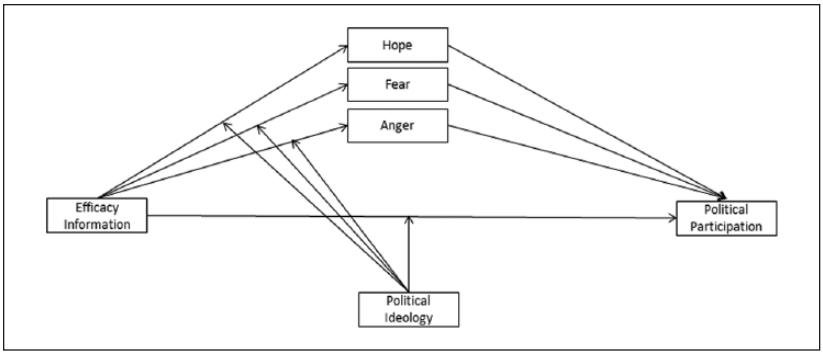


Figure 1. Proposed conceptual model.

subjects had a bachelor's degree or higher. Median annual household income was $40,000 to $59,999.

Procedure and Stimuli

After consenting to participate and answering basic demographic questions, participants were randomly assigned to see one of four versions of a news article about climate change. Participants assigned to the internal, external, or response efficacy information conditions read about the June 2014 Environmental Protection Agency (EPA) proposal to cut carbon pollution from existing power plants by 30% nationwide by 2030, compared with 2005 levels. The article first described the basic details of the proposal and indicated that the EPA would be taking public comment on the proposal before finalizing the standards in June 2015 (see the appendix for a sample article text). This core information was followed by an efficacy information paragraph that varied randomly, along with the headline of the article, according to experimental condition (see Table 1). In the *internal efficacy* condition, the efficacy information emphasized the ease with which individuals can participate in the EPA commenting period. In the *external efficacy* condition, the efficacy information emphasized the willingness of the EPA to take the public's comments into account before finalizing the regulations. In the *response efficacy* condition, the efficacy information emphasized the likely effectiveness of the proposed regulations for addressing climate change. All versions of the article concluded with a paragraph describing some of the expected impacts of climate change in the United States. Participants assigned to the *no efficacy information control* condition read an article that included only this paragraph about climate change impacts, without any information about the EPA proposal.

Table 1. Headlines and Manipulated Text for Efficacy Message Conditions.

Condition	Headline	Manipulated efficacy text
No efficacy control	Severe impacts of climate change on the horizon, according to new report	N/A
Internal efficacy	Many Americans are finding it easy to weigh in on proposed EPA climate change plan	Already, many Americans are taking advantage of the public comment period. "It's easy enough to submit a comment on the EPA website, send an e-mail, or write a letter. When it's an issue as important as this, it's not difficult to find the time to do this," said political analyst John Morris. Many citizens also feel they have a reasonable grasp of climate change and of how the political process works. As a result, they are more confident that they can effectively comment on the EPA proposal.
External efficacy	EPA will take public comments into account before finalizing proposed climate change plan	The public comment period ensures that the views of ordinary citizens will be taken into account before the proposed regulations are finalized. The EPA has a strong track record of responding to public comments. "I think the EPA is committed to incorporating the opinions of the public when revising the proposal over the next year. The agency is open-minded and may change the proposed regulations as a result of public input. Public commenting is an important part of the regulatory process," said political analyst John Morris.
Response efficacy	Proposed EPA plan can help stop negative impacts of climate change	The EPA's proposed emissions reduction is expected to be an effective tool in the effort to stop the negative impacts of climate change. Based on estimates from the National Oceanic Atmospheric Administration, the proposed rule can help slow the increase in global average temperatures and reduce sea level rise, preventing some of the catastrophic effects of climate change. Plus, according to political analyst John Morris, others of the world's biggest polluters such as China and India may follow the leadership of the United States and institute stronger limits on emissions in their countries.

Note. EPA = Environmental Protection Agency.

The articles were attributed to the Associated Press and formatted to resemble an online news article. The articles in the efficacy conditions ranged in length from 370 to 376 words. The control article, which contained no efficacy information, was necessarily shorter (120 words). Participants were instructed to read the article carefully and told that several questions about the article would follow. After reading the article, participants were asked about their emotional reactions to the story, their intentions to take various political actions on the issue of climate change, and their environmental attitudes, among other variables.

Measures

Emotions. Participants were asked to indicate how much they had felt each of several emotions while reading the news story, on a scale from 1 = *not at all* to 7 = *very*. Our measure of *hope* averages together responses for "hopeful" and "enthusiastic" ($r = .68$, $p < .001$; $M = 3.83$, $SD = 1.63$). Our measure of *fear* averages together responses for "fearful" and "anxious" ($r = .63$, $p < .001$; $M = 3.79$, $SD = 1.70$). *Anger* was measured using a single item that gauged how "angry" respondents reported they felt while reading the story ($M = 3.51$, $SD = 1.88$).

Climate-Related Political Participation. Climate-related participation was measured in two ways. First, *intended climate change activism* was measured by asking participants about their intentions to engage in several actions aimed specifically at mitigating climate change. Participants were asked to indicate how likely, on a scale from 1 = *very unlikely* to 7 = *very likely*, they would be to engage in the following activities over the next 12 months: "contact government officials to urge them to take action to reduce climate change," "participate in a rally or protest in support of action to reduce climate change," "sign a petition in support of taking action to reduce climate change," "join or volunteer with an organization working to reduce climate change," and "donate money to an organization working to reduce climate change." These items loaded on a single factor and were averaged together ($\alpha = .92$; $M = 3.34$, $SD = 1.66$). Second, *intention to comment on the EPA proposal* was a valence-free measure meant to capture general intentions to engage politically with the EPA proposal. Just before concluding the study, participants were asked, "After finishing the survey, would you like to go to the EPA website where you can make a comment about the proposed regulations to reduce carbon emissions from power plants?"[1] If participants responded "yes" (21.4%), on the final page of the survey, they were shown a link to the EPA commenting site, which they were told they could copy and paste into a

new browser. For privacy reasons, we could not track whether participants actually visited and left a comment on the EPA site; thus, we relied on their expressed interest as an indicator of behavior. Because this question was asked in the online context within which the target behavior is carried out, it likely more closely approximates actual behavior than a typical self-report measure of intention.

Political Ideology. *Political ideology* was measured on a 7-point scale ranging from 1 = *very liberal* to 7 = *very conservative* ($M = 3.97$, $SD = 1.54$). For the purpose of analysis, this was recoded into a categorical variable, distinguishing between liberals (1-3 on original scale; $n = 132$, 31%), moderates (4 on original scale; $n = 162$, 38%), and conservatives (5-7 on original scale; $n = 131$, 31%). Ideology was not treated as a continuous variable because the interactions between the efficacy treatments and ideology were nonlinear.

Control Variables. In addition to controlling for basic sociodemographic variables (age, gender, race, ethnicity, income, and education), the analyses controlled for ecological beliefs.[2] Ecological beliefs were measured using a seven-item subset (Stedman, 2004) of the original New Environmental Paradigm scale (Dunlap & Van Liere, 1978). Responses were measured from 1 = *strongly disagree* to 7 = *strongly agree*, where higher scores indicate stronger ecological beliefs ($\alpha = .85$; $M = 4.97$, $SD = 1.13$).

Results

We first tested the main and interactive effects of the efficacy treatment and ideology on each emotion using a two-way analysis of variance (ANOVA).[3] The ANOVA results for hope showed significant main effects of the treatment, $F(3, 413) = 8.60$, $p < .001$, $\eta^2 = .06$, and ideology, $F(2, 413) = 8.91$, $p < .001$, $\eta^2 = .04$, as well as an interaction between the two, $F(6, 413) = 3.41$, $p < .01$, $\eta^2 = .05$. For the main effect, planned contrasts indicate that all three efficacy types ($M_{internal} = 3.81$, $SE = 0.16$; $M_{external} = 3.99$, $SE = 0.15$; $M_{response} = 4.24$, $SE = 0.15$) significantly increased hope relative to the no efficacy condition ($M_{no\_efficacy} = 3.23$, $SE = 0.15$; all $p < .01$), in support of H1. Looking next to the interactive effects (shown visually in Figure 2), we see that the influence of the efficacy conditions on hope varied by ideology.[4] Among liberals, the external and response efficacy conditions, but not the internal efficacy condition, significantly increased hope relative to the no efficacy condition ($p < .01$). Among moderates, the internal and external efficacy conditions produced significantly higher levels of hope than the no efficacy condition ($p < .01$); the difference between the response efficacy and no efficacy

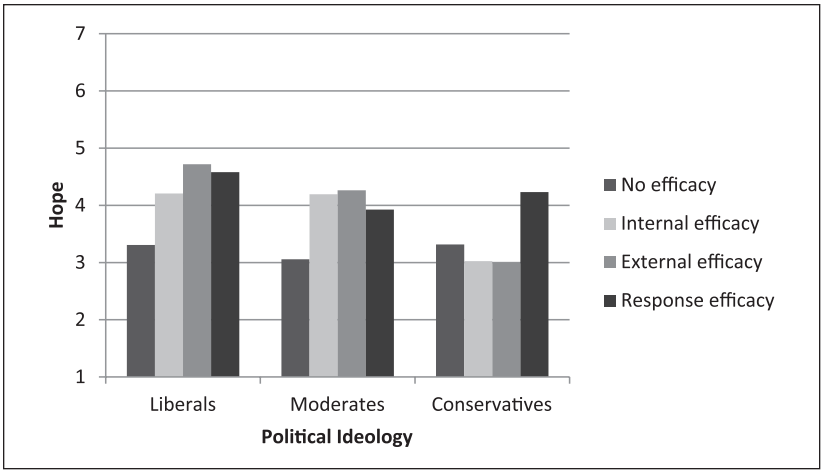


Figure 2. Adjusted marginal means for hope across message conditions and ideological groups.

conditions approached significance ($p < .07$).[5] Among conservatives, only the response efficacy condition increased hope relative to the no efficacy condition ($p = .05$). Of note, there were no ideological differences in mean levels of hope in the no efficacy and response efficacy conditions. In the internal efficacy and external efficacy conditions, hope was significantly higher among liberals and moderates than among conservatives ($p < .05$).

Turning to fear, the ANOVA results showed nonsignificant main effects of the treatment, $F(3, 410) = 1.58$, $p = .19$, and ideology, $F(2, 410) = 1.18$, $p = .31$; however, the interaction between treatment and ideology was significant, $F(6, 410) = 2.87$, $p < .01$, $\eta^2 = .04$. As depicted in Figure 3, the manipulation had a negligible effect among liberals, with no significant differences between conditions. Among moderates, both the internal and response efficacy conditions decreased fear relative to the no efficacy condition ($p < .05$). Among conservatives, the effect of the response efficacy condition approached significance ($p < .08$), producing *higher* fear than the no efficacy condition. Notably, the only significant ideological differences in fear occurred in the no efficacy condition, where conservatives were less fearful than moderates and liberals ($p < .05$). The overall trend in means (see Figure 3) suggests that exposure to efficacy information reduces fear among liberals and moderates while raising it among conservatives, thereby partially supporting H2.

For anger (RQ1), neither the main effect of the treatment, $F(3, 409) = 1.97$, $p = .12$, or ideology, $F(2, 409) = .087$, $p = .92$, nor the interaction

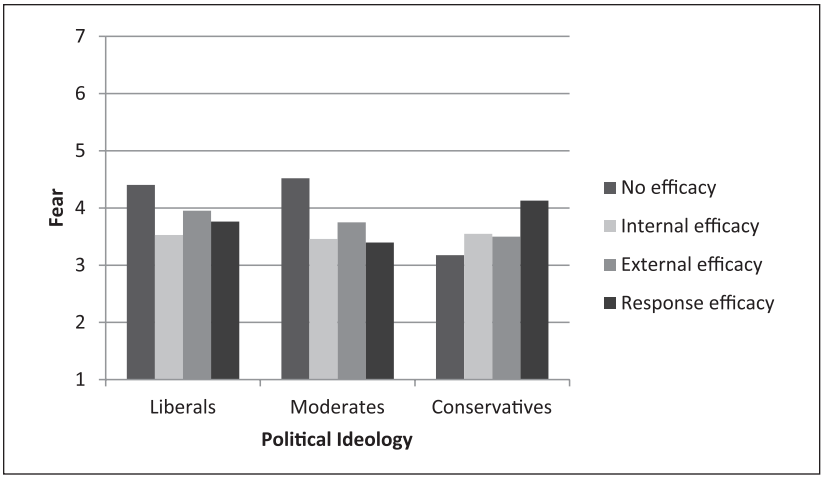


Figure 3. Adjusted marginal means for fear across message conditions and ideological groups.

between treatment and ideology was significant, $F(6, 409) = 1.08$, $p = .37$. Figure 4 indicates a nonsignificant trend whereby exposure to efficacy information reduces anger among liberals and moderates.

We now turn to a test of our overall conceptual model, which proposed indirect effects of efficacy information on participation through emotions, conditional on ideology (see Figure 1). We used the SPSS PROCESS macro (Hayes, 2013), which employs a regression-based path analytic framework to test the proposed conditional indirect effects. It provides bootstrapped confidence intervals for the indirect effects of each type of efficacy information (relative to no efficacy information) on climate-related participation via hope, fear, and anger, accounting for the conditional effects of ideology and controlling for all exogenous variables. As a test of mediation, bootstrap methods are considered superior to alternative approaches such as the Sobel test or causal steps approach (Hayes, 2013). Following Hayes (2013), the bootstrap analysis was conducted with 10,000 iterations and bias-corrected estimates.[6]

We first report the ordinary least square regression results showing the effects of efficacy information, ideology, and the interaction between them on emotions (see Table 2). These are generally consistent with the ANOVA results.[7] Looking to the results for hope (Table 2, Column 1), there is a significant interaction between the internal efficacy condition and ideology. Specifically, the internal efficacy message had a more positive effect on hope

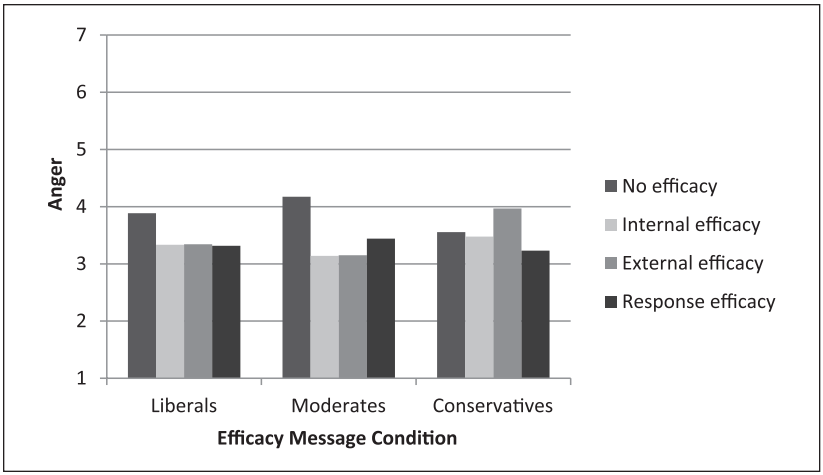


Figure 4. Adjusted marginal means for anger across message conditions and ideological groups.

among liberals and moderates than among conservatives. An identical interaction was found for the external efficacy message condition. The effect of the response efficacy message on hope, which is positive and significant, is unmoderated by ideology. Turning to the results for fear (Table 2, Column 2), the internal and external efficacy conditions, relative to the no efficacy condition, produced a greater decrease in fear among moderates than among conservatives. The response efficacy condition produced a greater decrease in fear, relative to the no efficacy condition, among both liberals and moderates than among conservatives (for whom fear actually increased; see Figure 3). For anger (Table 2, column 3), the external efficacy condition resulted in a greater decrease among moderates than among conservatives, consistent with the pattern in Figure 4; however, recall that the overall interaction between treatment and ideology was not significant.

The regression analyses in Table 3 predict the dependent variables—intentions to engage in climate activism and comment on the EPA proposal—from the efficacy message conditions, ideology, the interactions between the efficacy conditions and ideology, the emotion mediators, and controls. These permit tests of H3 to H5 regarding the effects of emotions on participation. Looking to the first dependent variable, climate activism, both hope (unstandardized B = 0.32, $SE = 0.05$, $p < .001$) and fear (B = 0.20, $SE = 0.08$, $p < .001$) are significant, positive predictors. Anger is unrelated to climate activism (B = 0.01, $SE = 0.05$, $p = .75$). Turning to the second dependent variable,

Table 2. Ordinary Least Square Regression Results Predicting Emotions.

Predictor Variables	Hope, B (*SE*)	Fear, B (*SE*)	Anger, B (*SE*)
Conceptual variables			
Efficacy condition[a]			
Internal efficacy	−0.29 (0.42)	0.40 (0.45)	−0.10 (0.52)
External efficacy	−0.12 (0.37)	0.48 (0.40)	0.35 (0.46)
Response efficacy	1.03 (0.35)**	1.08 (0.38)**	−0.32 (0.43)
Political ideology[b]			
Liberals	−0.18 (0.40)	0.89 (0.43)*	0.22 (0.49)
Moderates	−0.42 (0.33)	1.15 (0.36)**	0.59 (0.41)
Efficacy × ideology interactions			
Internal × liberal	1.22 (0.57)*	−1.08 (0.62)	−0.40 (0.71)
Internal × moderate	1.46 (0.54)**	−1.42 (0.58)*	−1.03 (0.66)
External × liberal	1.42 (0.55)**	−0.89 (0.59)	−0.90 (0.68)
External × moderate	1.38 (0.49)**	−1.09 (0.53)*	−1.34 (0.61)*
Response × liberal	0.19 (0.52)	−1.66 (0.56)**	−0.26 (0.64)
Response × moderate	−0.11 (0.48)	−2.20 (0.52)***	−0.39 (0.60)
Control variables			
Age	0.001 (0.005)	0.004 (0.006)	0.008 (0.007)
Gender (male)	0.15 (0.15)	−0.25 (0.16)	0.19 (0.19)
Race (White)	−0.17 (0.18)	−0.01 (0.19)	0.31 (0.21)
Ethnicity (Hispanic)	0.02 (0.29)	0.10 (0.31)	−0.001 (0.35)
Education	−0.08 (0.05)	0.02 (0.05)	0.05 (0.06)
Income	0.03 (0.04)	−0.04 (0.04)	0.04 (0.05)
Ecological beliefs	0.27 (0.07)***	0.37 (0.08)***	0.17 (0.09)
Constant	2.39 (0.55)***	1.36 (0.59)*	1.68 (0.69)*
R^2	.18	.13	.06
N	420	420	420

Note. Unstandardized regression coefficients are reported.
[a]No efficacy information (control) condition is the reference category. [b]Conservative ideology is the reference category.
*$p < .05$. **$p < .01$. ***$p < .001$.

EPA commenting, hope is again a significant, positive predictor (B = 0.38, $SE = 0.09$, $p < .001$), as is anger (B = 0.22, $SE = 0.09$, $p < .05$). Fear is unrelated to EPA commenting (B = 0.15, $SE = 0.11$, $p = .17$). For both dependent variables, there are no significant direct effects of the efficacy treatment, either independently or in interaction with ideology.[8] Overall, these results support H3 (hope), support H4 (anger) in the case of EPA commenting but not climate activism, and fail to support H5 (fear), instead showing a positive effect on climate activism and a null effect on EPA commenting.

Table 3. Regression Results Predicting Climate-Related Participation.

Predictor Variables	Activism intentions,[a] B (*SE*)	Environmental Protection Agency commenting,[b] B (*SE*)
Conceptual variables		
Efficacy condition[c]		
Internal efficacy	−0.02 (0.36)	−0.40 (0.74)
External efficacy	0.13 (0.32)	−0.05 (0.61)
Response efficacy	−0.34 (0.31)	−0.49 (0.60)
Political ideology[d]		
Liberals	0.85 (0.34)*	−1.23 (0.71)
Moderates	0.43 (0.29)	−1.25 (0.61)
Efficacy × Ideology interactions		
Internal × liberal	−0.28 (0.50)	1.35 (1.02)
Internal × moderate	−0.17 (0.47)	1.09 (0.97)
External × liberal	−0.08 (0.48)	0.84 (0.94)
External × moderate	−0.47 (0.43)	0.55 (0.87)
Response × liberal	−0.21 (0.46)	0.43 (0.94)
Response × moderate	0.01 (0.43)	0.33 (0.93)
Emotion mediators		
Hope	0.32 (0.05)***	0.38 (0.09)***
Fear	0.20 (0.08)***	0.15 (0.11)
Anger	0.01 (0.05)	0.22 (0.09)*
Control variables		
Age	−0.005 (0.005)	−0.01 (0.009)
Gender (male)	−0.02 (0.13)	0.15 (0.27)
Race (White)	−0.57 (0.15)***	−0.25 (0.30)
Ethnicity (Hispanic)	0.13 (0.25)	−0.10 (0.51)
Education	0.02 (0.04)	0.12 (0.08)
Income	−0.006 (0.04)	0.03 (0.07)
Ecological beliefs	0.41 (0.06)***	0.26 (0.14)
Constant	−0.45 (0.49)	−5.11 (1.10)***
R^2	.42	.18
−2 Log likelihood		380.08
Model log likelihood		53.28
N	420	420

Note. Unstandardized regression coefficients are reported.
[a]Ordinary least squares regression. [b]Logistic regression. Nagelkerke R^2 is reported. [c]No efficacy information (control) condition is the reference category. [d]Conservative ideology is the reference category.
*$p < .05$. **$p < .01$. ***$p < .001$.

Table 4 reports the bootstrapped indirect effects of each of the three efficacy conditions on climate activism via hope, fear, and anger across ideological groups. Among liberals and moderates, all three efficacy conditions exerted a significant, positive indirect effect on activism via hope (i.e., the 95% confidence interval does not include zero), which is consistent with H6. In contrast to H7, among moderates, all three efficacy conditions indirectly decreased activism via fear. Among liberals, only the internal efficacy condition demonstrated a negative indirect effect via fear. Among conservatives, the response efficacy condition produced significant, positive indirect effects on activism via both hope and fear; these results are consistent with H6 and H7. Addressing RQ2, there were no significant indirect effects via anger.

Turning to the indirect effects on EPA commenting (see Table 5), among liberals and moderates, all three efficacy conditions indirectly increased commenting via hope, providing additional support for H6. Among conservatives, only the response efficacy condition produced positive indirect effects via hope. Among moderates, the internal and external efficacy conditions produced negative indirect effects via anger (RQ2).[9] Contrary to H7, there were no indirect effects via fear for any combination of efficacy condition and ideology.

Discussion

The goal of this exploratory study was to test the indirect effects of political efficacy messages on climate change activism via the discrete emotions of hope, fear, and anger and compare these effects across ideological groups. The results indicate that messages that emphasize the internal, external, or response efficacy of climate change actions can influence emotions, relative to a message that discusses only the negative impacts of climate change. These effects, however, vary by political ideology. Moderates were more hopeful in response to all three types of efficacy information and also less fearful after seeing internal and response efficacy information. Liberals were more hopeful when exposed to external and response efficacy information; however, efficacy messaging did not significantly affect fear among this group. Among conservatives, only the response efficacy message had a significant effect, increasing hope *and* fear. Anger was unaffected by the treatment, regardless of ideology.

Although there was no main effect of the efficacy manipulation on intentions to engage in climate change activism or comment on the EPA power plant rule, hope positively predicted both forms of political action.[10] In addition, fear positively predicted climate change activism, and anger was

Table 4. Conditional Indirect Effects of Efficacy Message Type on Climate Change Activism via Emotional Mediators Across Levels of Political Ideology.

		Internal efficacy condition[a]		External efficacy condition[a]		Response efficacy condition[a]	
Mediator	Political ideology	Indirect effect (boot *SE*)	Boot 95% CI	Indirect effect (boot *SE*)	Boot 95% CI	Indirect effect (boot *SE*)	Boot 95% CI
Hope	Liberal	**.30 (.11)**	**[.112, .533]**	**.41 (.15)**	**[.169, .745]**	**.39 (.12)**	**[.179, .662]**
	Moderate	**.37 (.12)**	**[.174, .636]**	**.40 (.12)**	**[.190, .665]**	**.29 (.11)**	**[.097, .543]**
	Conservative	−.09 (.14)	−.381, .185	−.04 (.11)	[−.270, .192]	**.33 (.12)**	**[.123, .594]**
Fear	Liberal	**−.13 (.08)**	**[−.335, −.005]**	−.08 (.08)	[−.262, .049]	−.11 (.08)	[−.307, .012]
	Moderate	**−.20 (.08)**	**[−.396, −.070]**	**−.12 (.07)**	**[−.301, −.006]**	**−.22 (.09)**	**[−.445, −.073]**
	Conservative	.08 (.12)	[−.135, .360]	.09 (.08)	[−.045, .301]	**.21 (.09)**	**[.064, .441]**
Anger	Liberal	−.007 (.03)	[−.108, .035]	−.008 (.03)	[−.116, .037	−.0009 (.03)	[−.116, .039]
	Moderate	−.02 (.06)	−.144, .086	−.01 (.05)	[−.129, .075]	−.01 (.04)	[−.118, .048]
	Conservative	−.001 (.03)	−.085, .051	.005 (.03)	[−.029, .112]	−.0005 (.03)	[−.101, .026]

Note. Bootstrapped standard errors and confidence intervals (CIs) were computed using 10,000 bootstrap samples. Boldface text is used to denote significant effects, $p < .05$.

[a]Relative to the no efficacy information (control) condition.

Table 5. Conditional Indirect Effects of Efficacy Message Type on EPA Public Commenting Via Emotional Mediators Across Levels of Political Ideology.

		Internal efficacy condition[a]		External efficacy condition[a]		Response efficacy condition[a]	
Mediator	Political ideology	Indirect effect (boot *SE*)	Boot 95% CI	Indirect effect, (boot *SE*)	Boot 95% CI	Indirect effect (boot *SE*)	Boot 95% CI
Hope	Liberal	**.36 (.17)**	**[.093, .728]**	**.50 (.22)**	**[.144, .972]**	**.47 (.20)**	**[.152, .906]**
	Moderate	**.45 (.19)**	**[.154, .886]**	**.48 (.21)**	**[.155, .954]**	**.35 (.18)**	**[.077, 0.75]**
	Conservative	−.11 (.19)	[−.522, .249]	−.05 (.15)	[−.355, .266]	**.39 (.19)**	**[.102, .802]**
Fear	Liberal	−.10 (.11)	[−.426, .031]	−.06 (.09)	[−.343, .043]	−.09 (.10)	[−.398, .031]
	Moderate	−.15 (.14)	[−.494, .052]	−.09 (.10)	[−.381, .034]	−.16 (.15)	[−.546, .071]
	Conservative	.06 (.12)	[−.087, .485]	.07 (.10)	[−.039, .383]	.16 (.15)	[−.066, .521]
Anger	Liberal	−.11 (.13)	[−.451, .073]	−.12 (.13)	[−.480, .057]	−.13 (.13)	[−.476, .056]
	Moderate	**−.25 (.16)**	**[−.621, −.016]**	**−.22 (.14)**	**[−.582, −.017]**	−.16 (.12)	[−.486, .007]
	Conservative	−.02 (.16)	[−.401, .283]	.08 (.13)	[−.109, .449]	−.07 (.12)	[−.399, .108]

Note. EPA = Environmental Protection Agency. Bootstrapped standard errors and confidence intervals (CIs) were computed using 10,000 bootstrap samples. Boldface text is used to denote significant effects, $p < .05$.

[a]Relative to the no efficacy information (control) condition.

positively related to EPA commenting. In turn, exposure to political efficacy information indirectly influenced political action via emotions, conditional on ideology. Among moderates and liberals, exposure to efficacy information indirectly increased climate change activism and EPA commenting via hope; however, among moderates—and liberals in the internal efficacy condition—it also indirectly decreased climate activism (but not EPA commenting) via fear. Among conservatives, exposure to the response efficacy message had positive indirect effects on activism via both hope and fear and a positive indirect effect via hope on EPA commenting. In addition, among moderates, there were negative indirect effects of the internal and external efficacy messages on EPA commenting via anger; however, these results should be interpreted cautiously given that the efficacy manipulation did not have significant overall main or interactive effects on anger.

Several specific findings warrant discussion. First, the most consistent effects of efficacy messages on emotions were observed among political moderates. This is unsurprising theoretically, as moderates are likely to be least certain of their beliefs about climate change and thus more open to media influence (Maibach, Roser-Renouf, & Leiserowitz, 2009). Indeed, moderates are a critical target audience for strategic communication aimed at increasing public engagement with climate change (Maibach, Roser-Renouf, & Leiserowitz, 2008). From a practical perspective, the results of this study suggest that moderates may be particularly receptive to an efficacy-based communication strategy.

A second notable set of findings regards the relationships between fear and anger, respectively, and political participation, as these findings diverge from past research in several ways. First, anger—typically a strong predictor of political participation—was unrelated to climate activism, although it was positively related to EPA commenting. Anger's nonsignificant effect on climate activism may be due to the fact that our measure of climate activism was specifically directed at mitigating climate change, whereas commenting on the EPA proposal was valence-neutral. Thus, it is possible that the lack of overall relationship between anger and activism is due to the fact that the direction of this relationship varies across different subgroups. That is, anger may motivate activism only among those who are concerned about climate change and whose anger is instigated by the threat of climate change; others, who may be angered by the discussion of climate change itself, may turn away from activism.[11] On the other hand, the positive relationship between anger and intentions to comment on the EPA proposal may be because anger focuses attention on retribution (Nabi, 2003), and posting immediate comments in response to a policy proposal—as opposed to more distant and potentially hypothetical forms of activism—offers an

easy and satisfying retributive solution. Overall, however, anger—being that it was unaffected by the efficacy manipulation—was not a big part of the story here.

The positive relationship between fear and climate activism also contradicts past research, which mostly has found either a null or negative relationship between fear and political participation, with any motivating effects of fear confined to low-cost, expressive political acts (e.g., Valentino et al., 2011).[12] There are several potential explanations for this discrepancy. Prior research linking fear to political participation has been conducted in an election-related context. It may be that fear is a particularly important ingredient for climate activism, given that climate change is a risk that people may need to feel is sufficiently threatening before they are willing to take action to address it (Roser-Renouf et al., 2014). Another possibility is that our measure of fear may not have been nuanced enough to distinguish between fear and other closely related but less intense emotions like worry. For example, prior research has found that worry is a strong predictor of public support for climate mitigation policies, whereas fear (and anger) is not (N. Smith & Leiserowitz, 2014). In any case, the motivating effect of fear on activism observed in our study meant that among moderates and, in some cases, liberals—for whom exposure to efficacy information decreased fear—the positive indirect effects of efficacy messaging on activism via hope were somewhat offset by negative indirect effects via fear. Future research may benefit by investigating why fear is particularly motivating in the case of climate activism, as well as how to develop messages that leverage the hope-inducing effects of efficacy information without reducing the motivational factor of fear. All told, our findings serve as an important reminder that the relationships between discrete emotions and political behavior are not always consistent; rather, they vary based on the context and form of participation involved.

Finally, of the three types of efficacy messages, only response efficacy information influenced conservatives, increasing both hope and fear. In turn, among conservatives, the response efficacy condition produced positive indirect effects on activism via both emotions and a positive indirect effect on EPA commenting via hope, suggesting that messages that highlight the effectiveness of climate policies may be a way to reduce motivated reasoning among this group. This raises two interesting theoretical questions. First, why was response efficacy information, in particular, hope inducing for conservatives? Possibly, it is due to the message's focus on the likely success of a proposed policy solution. Prior research has shown that conservatives' concerns about the economic implications of commonly proposed regulatory

solutions to climate change drive much of their motivated reasoning in response to climate change information (Campbell & Kay, 2014). Information indicating that a proposed regulatory policy may, in fact, work to slow climate change may be especially resonant for conservatives. Specifically, the reference to China and India in the response efficacy message (see Table 1) may have cued conservatives to think about global economic competitiveness (Nisbet, 2009) and thus made them more open to the proposed solution and, in turn, more hopeful.

The second theoretical question raised with regard to conservatives is why exposure to response efficacy information *increased* fear among this group, while it decreased fear among liberals and moderates. One possibility is that the prospect of unwanted policy change—and not the perceived threat of climate change—triggered conservatives' fear. In turn, this fear may have motivated activism aimed at supporting nonregulatory policies that conservatives see as more desirable (Miller & Krosnick, 2004). This explanation, however, is undermined by the positive effect of the response efficacy message on hope, as it is unlikely that a perceived policy threat also would induce hope. Instead, there may be variation within conservatives, such that some conservatives were fearful in the face of a perceived policy threat, whereas others—perhaps more moderate conservatives—were hopeful in the face of a potential solution to climate change. We explored this possibility, but it was inconsistent with the data.[13] Thus, a final explanation may be that the pairing of response efficacy information with information about climate change impacts in the stimulus message encouraged conservatives to process the impacts information in a way that they did not when it was unaccompanied by efficacy information. That is, when conservatives were presented with impacts information alone, they may have been dismissive of that information, thus registering little fear. However, when impacts information was paired with information about a potentially effective policy solution, they were more receptive to it, consistent with the expectations of the extended parallel process model (Witte, 1992); thus, conservatives may have reacted with fear in response to the impacts information and hope in response to the efficacy information. This is the most optimistic scenario for reducing political polarization, and one that should be probed in future research. In the meantime, the results provide preliminary evidence that messages focused on response efficacy may be a way to reach otherwise resistant conservatives and help reconcile ideological differences in the public's engagement with climate change.

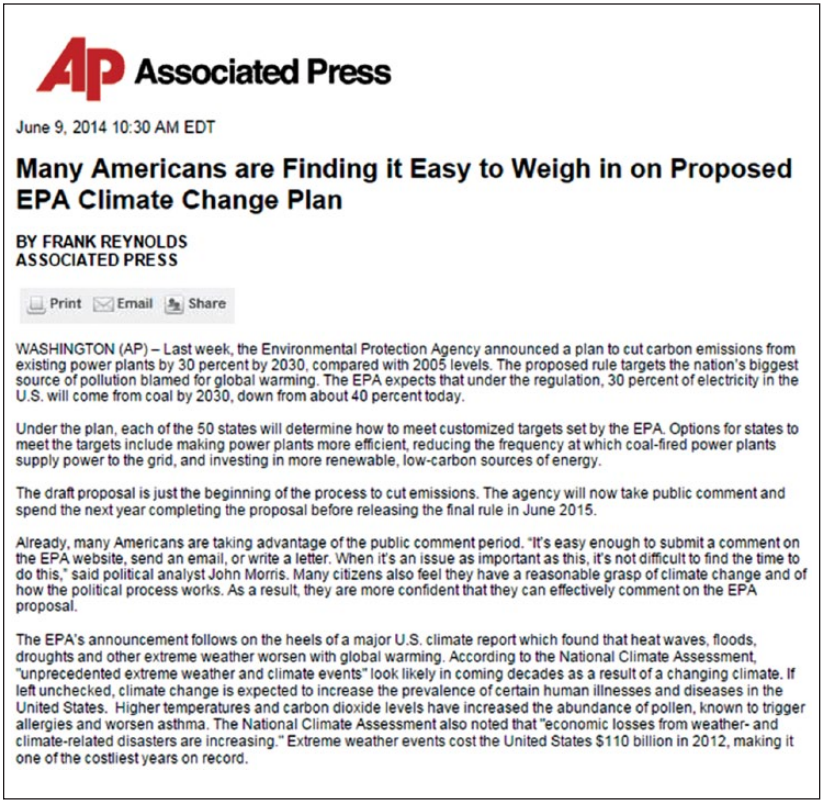
As with any study, there are limitations that should be kept in mind. Our manipulation was limited to a single message exposure, and we measured only short-term effects. It is thus unclear whether the observed patterns would

persist over a longer time period, as well as how they might vary with protracted exposure to efficacy messaging. In addition, the results may have been influenced by the specific language adopted for each of the conditions in our study. We note, for example, that the response efficacy message mentioned India and China, and it may have been this particular reference that influenced conservatives' emotions in this condition. Respondents also may have perceived other unintended differences between conditions, which could have affected our results. Given the exploratory nature of this research, future studies may wish to examine the implications of language choices at a finer scale. Similarly, although focusing the efficacy messages on the EPA's proposed power plant regulations increased external validity by using a real proposed policy, it is possible that efficacy messages related to other proposals to address climate change will have varying effects on emotions and participation. Future studies will benefit from testing the effects observed here in additional substantive domains. Finally, given that the emotion mediators were not directly manipulated, this may bias the mediation analysis (see Bullock, Green, & Ha, 2010).

While much remains to be understood about the effects of political efficacy information, this study provides initial empirical evidence for the value of efficacy messaging as a climate change communication strategy. The study's experimental design increases confidence in the causal relationship between exposure to efficacy information and emotions, and this study is the first to show that message-induced emotions can fuel climate activism—both general participatory actions aimed at mitigating climate change and public comments in response to a specific policy proposal. As the severe consequences of climate change move from potentiality to reality, political efficacy messages about climate change may provide citizens with much-needed hope, which, in turn, is critical for both types of participation. Moreover, messages that emphasize political response efficacy increase participation indirectly via emotions even among conservatives, suggesting that this type of efficacy messaging may help reduce motivated reasoning and political polarization. Yet efficacy messaging is not a panacea. The responses of liberals and conservatives to the internal and external efficacy treatments are indicative of motivated reasoning, suggesting that these types of messages may amplify polarization. Furthermore, among political moderates, exposure to political efficacy information decreases fear, and fear mobilizes political action aimed at mitigating climate change. In this case, efficacy messaging indirectly works against participation by lessening fear. The challenge, therefore, for those working to build a broad-based climate movement is how best to balance efficacy and threat information in order to maximize the motivational impact of climate change communication.

Appendix

Sample Stimulus Article (Internal Efficacy Condition)



Associated Press

June 9, 2014 10:30 AM EDT

Many Americans are Finding it Easy to Weigh in on Proposed EPA Climate Change Plan

BY FRANK REYNOLDS
ASSOCIATED PRESS

Print Email Share

WASHINGTON (AP) – Last week, the Environmental Protection Agency announced a plan to cut carbon emissions from existing power plants by 30 percent by 2030, compared with 2005 levels. The proposed rule targets the nation's biggest source of pollution blamed for global warming. The EPA expects that under the regulation, 30 percent of electricity in the U.S. will come from coal by 2030, down from about 40 percent today.

Under the plan, each of the 50 states will determine how to meet customized targets set by the EPA. Options for states to meet the targets include making power plants more efficient, reducing the frequency at which coal-fired power plants supply power to the grid, and investing in more renewable, low-carbon sources of energy.

The draft proposal is just the beginning of the process to cut emissions. The agency will now take public comment and spend the next year completing the proposal before releasing the final rule in June 2015.

Already, many Americans are taking advantage of the public comment period. "It's easy enough to submit a comment on the EPA website, send an email, or write a letter. When it's an issue as important as this, it's not difficult to find the time to do this," said political analyst John Morris. Many citizens also feel they have a reasonable grasp of climate change and of how the political process works. As a result, they are more confident that they can effectively comment on the EPA proposal.

The EPA's announcement follows on the heels of a major U.S. climate report which found that heat waves, floods, droughts and other extreme weather worsen with global warming. According to the National Climate Assessment, "unprecedented extreme weather and climate events" look likely in coming decades as a result of a changing climate. If left unchecked, climate change is expected to increase the prevalence of certain human illnesses and diseases in the United States. Higher temperatures and carbon dioxide levels have increased the abundance of pollen, known to trigger allergies and worsen asthma. The National Climate Assessment also noted that "economic losses from weather- and climate-related disasters are increasing." Extreme weather events cost the United States $110 billion in 2012, making it one of the costliest years on record.

Note. The headline and the fourth paragraph were manipulated across efficacy conditions (see Table 1). All other information was held constant across efficacy conditions. For the control group, only the information in the final paragraph was included.

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Notes

1. Earlier in the survey, we asked all respondents "If you were to make a comment on the proposed EPA rule, would you likely (1) support the proposed EPA rule as currently written (29.4%), (2) advocate for stricter emissions standards than what the EPA has currently proposed (30.4%), (3) advocate for looser emissions standards than what the EPA has currently proposed (4.9%), (4) oppose the proposed EPA rule in any form (8.5%), or (5) not applicable—unlikely to comment (26.8%). Thus, although our measure of intentions to comment was directionally neutral, the vast majority of those wishing to comment on the EPA rule either supported it or favored even stricter standards.
2. Because political ideology and political party identification were highly correlated ($r = .69$), we opted to include only ideology and not party identification in our models. However, we also reran our analyses including party identification as an additional control variable, and the substantive findings were unchanged.
3. Readers may note that we did not test the effects of the manipulation on perceived efficacy. Following O'Keefe (2003), we argue that a manipulation check is not needed in this study, because we are manipulating an intrinsic message feature (i.e., presence of information about the likely effectiveness of a particular action). In other words, the news articles objectively included (or did not include) efficacy information of different types. This study is concerned with the role of efficacy as a message-level variable and specifically with whether the presence of efficacy information in a message impacts emotions and political participation, regardless of whether it makes people feel more efficacious. Moreover, the theoretical processes proposed herein do not require the messages to affect perceptions of efficacy. This is consistent with the approach taken by other researchers who have manipulated the presence of efficacy information in a message and examined its effects on affective and behavioral outcomes (Dahlstrom et al., 2012).
4. The *n*s for each ideological subgroup across conditions were as follows: no efficacy: liberal $n = 26$, moderate $n = 52$, conservative $n = 38$; internal efficacy: liberal $n = 36$, moderate $n = 36$, conservative $n = 22$; external efficacy: liberal $n = 32$, moderate $n = 40$, conservative $n = 32$; response efficacy: liberal $n = 38$, moderate $n = 34$, conservative $n = 39$.
5. All pairwise tests reported used the Sidak adjustment for multiple comparisons. Without this adjustment (i.e., using least significant differences), all three efficacy conditions significantly increased hope among liberals and moderates, and the response efficacy condition significantly increased hope among conservatives ($p < .05$). In addition, all three efficacy conditions significantly decreased fear among moderates; the internal efficacy condition significantly decreased fear among liberals, and the response efficacy condition significantly increased fear among conservatives. Although there were no significant main effects or interactions for anger, the internal and external efficacy conditions significantly decreased anger among moderates.
6. PROCESS assumes either a binary or a continuous independent variable. Because our independent variable is multicategorical, in order to obtain estimates of the

conditional indirect effects for all three types of efficacy messages, we ran three PROCESS analyses so that the effects of each of the dummy-coded message conditions could be tested (see Hayes, 2014). Each model treated dummy variables representing moderate and liberal ideology as moderators. The dummy variables for the efficacy conditions that were not being considered as the independent variable, as well as the interactions between those conditions and the ideology dummy variables, were included as covariates, along with the sociodemographic controls indicated earlier.

7. The predicted values of fear, hope, and anger computed from the regression models were nearly identical to the adjusted marginal means from the ANOVAs.
8. We also tested the direct effects of the message treatment on climate activism using a simple ANOVA. This showed a nonsignificant main effect of the treatment, $F(3, 413) = .63$, $p = .59$, and a nonsignificant interaction between the treatment and political ideology, $F(6, 413) = .83$, $p = .54$. Because EPA commenting is a dichotomous variable, we used a chi-square test to examine the direct effect of the treatment, $\chi^2(3, N = 425) = 3.37$, $p = .34$, and its interaction with ideology, liberal $\chi^2(3, N = 132) = 5.16$, $p = .16$; moderate $\chi^2(3, N = 162) = 2.96$, $p = .40$; conservative $\chi^2(3, N = 131) = 1.02$, $p = .80$. For both dependent variables, we also did a subgroup analysis to test whether the treatment predicted participation for particular ideological groups when considered separately. In no case was the effect of the treatment statistically significant.
9. These indirect effects via anger should be interpreted cautiously, given that there were no main or interactive effects of the efficacy manipulation on anger. The reason that we observe these indirect effects is because there were pairwise differences (using a least significant differences test) in moderates' mean levels of anger between the internal efficacy and no efficacy conditions and between the external efficacy and no efficacy conditions.
10. The likely reason that there were no main effects of the message manipulation on participation is that the indirect effects via hope were positive and those via fear and anger were negative (see Tables 4 and 5), thus canceling each other out.
11. We explored this possibility by examining interactions between ideology and emotions in predicting the dependent variables. There was a single interaction between anger and liberal ideology in predicting climate activism, such that the effect of anger on activism was more positive for liberals than for conservatives ($B = 0.27$, $SE = 0.12$, $p < .05$). Probing the interaction showed that despite this difference, the effect of anger on activism was not significant for any ideological group ($B_{conservatives} = -0.10$, $SE = 0.07$, $p = .13$; $B_{moderates} = 0.05$, $SE = 0.07$, $p = .46$; $B_{liberals} = 0.11$, $SE = 0.07$, $p = .12$). No other interactions between ideology and any of the emotions were significant for either dependent variable, and including these interactions in our models did not appreciably change the results reported elsewhere in the article.
12. We tested whether the positive relationship between fear and participation differed for low-cost actions (i.e., contacting a politician, signing a petition) versus high-cost actions (i.e., attending a rally, joining or volunteering for an

organization, donating). The effect of fear was positive and significant in predicting both types of actions.

13. We disaggregated conservatives into those who identified as "somewhat conservative" (n = 59), "conservative" (n = 44), or "very conservative" (n = 28) and examined whether the effects of the response efficacy message on fear and hope, and the effects of fear and hope on activism, varied across groups. The positive effect of response efficacy information on hope was confined to "somewhat conservatives"; however, the positive effect of response efficacy on fear also was strongest for "somewhat conservatives" (it approached significance, $p < .10$, among "conservatives"). In turn, the positive relationship between hope and activism was uniform across levels of conservatism, while the positive relationship between fear and activism was significant for all but the "very conservative."

References

Bolsen, T., Druckman, J. N., & Cook, F. L. (2015). Citizens', scientists', and policy advisors' beliefs about global warming. *Annals of the American Academy of Political and Social Science*, *658*, 271-295. doi:10.1177/0002716214558393

Brader, T. (2005). Striking a responsive chord: How political ads motivate and persuade voters by appealing to emotions. *American Journal of Political Science*, *49*, 388-405. doi:10.1111/j.0092-5853.2005.00130.x

Bullock, J. G., Green, D. P., & Ha, S. E. (2010). Yes, but what's the mechanism? (don't expect an easy answer). *Journal of Personality and Social Psychology*, *98*, 550-558.

Campbell, T. H., & Kay, A. C. (2014). Solution aversion: On the relation between ideology and motivated disbelief. *Journal of Personality and Social Psychology*, *107*, 809-824. doi:10.1037/a0037963

Chadwick, A. E. (2015). Toward a theory of persuasive hope: Effects of cognitive appraisals, hope appeals, and hope in the context of climate change. *Health Communication*, *30*, 598-611. doi:10.1080/10410236.2014.916777

Craig, S. C., Niemi, R. G., & Silver, G. E. (1990). Political efficacy and trust: A report on the NES pilot study items. *Political Behavior*, *12*, 289-314. doi:10.1007/BF00992337

Dahlstrom, M. F., Dudo, A., & Brossard, D. (2012). Precision of information, sensational information, and self-efficacy information as message-level variables affecting risk perceptions. *Risk Analysis*, *32*, 155-166. doi:10.1111/j.1539-6924.2011.01641.x

Dunlap, R. E., & Van Liere, K. D. (1978). The new environmental paradigm: A proposed measuring instrument and preliminary results. *Journal of Environmental Education*, *9*, 10-19.

Groenendyk, E. W., & Banks, A. J. (2014). Emotional rescue: How affect helps partisans overcome collective action problems. *Political Psychology*, *35*, 359-378. doi:10.1111/pops.12045

Hart, P. S., & Feldman, L. (2014). Threat without efficacy? Climate change on U.S. network news. *Science Communication*, *36*, 325-351. doi:10.1177/1075547013520239

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

Hart, P. S., Nisbet, E. C., & Myers, T. (2015). Public attention to science and political news and support for climate change mitigation. *Nature Climate Change*, *5*, 541-545. doi:10.1177/0093650211416646

Hayes, A. F. (2013). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach*. New York, NY: Guilford Press.

Hayes, A. F. (2014, May). *Hacking PROCESS: Some advanced and undocumented applications in mediation and moderation analysis*. PowerPoint slides presented at the Midwest Psychological Association Conference, Chicago, IL.

Huddy, L., Feldman, S., Taber, C., & Lahav, G. (2005). Threat, anxiety, and support of antiterrorism policies. *American Journal of Political Science*, *49*, 593-608. doi:10.2307/3647734

Lazarus, R. S. (1991). *Emotion and adaptation*. New York, NY: Oxford University Press.

Lazarus, R. S. (2006). Emotions and interpersonal relationships: Toward a person-centered conceptualization of emotions and coping. *Journal of Personality*, *74*(1), 9-46. doi:10.1111/j.1467-6494.2005.00368.x

Leeper, T. J., & Mullinix, K. J. (2015). *What if you had done things differently? Testing the generalizability of framing effects with parallel experiments*. Unpublished manuscript. Retrieved from https://dl.dropboxusercontent.com/u/414906/ParallelExperimentsOnFraming.pdf

Leiserowitz, A., Maibach, E., Roser-Renouf, C., Feinberg, G., & Rosenthal, S. (2014) *Americans' actions to limit global warming, November 2013*. New Haven, CT: Yale Project on Climate Change Communication. Retrieved from http://environment.yale.edu/climate-communication/files/Behavior-November-2013.pdf

Lerner, J. S., & Keltner, D. (2001). Fear, anger, and risk. *Journal of Personality and Social Psychology*, *81*(1), 146. doi:10.1037//O022-3514.81.1.146

Maibach, E., Roser-Renouf, C., & Leiserowitz, A. (2008). Communication and marketing as climate change-intervention assets: A public health perspective. *American Journal of Preventive Medicine*, *35*, 488-500. doi:10.1016/j.amepre.2008.08.016

Maibach, E., Roser-Renouf, C., & Leiserowitz, A. (2009). *Global warming's six Americas 2009: An audience segmentation analysis*. New Haven, CT: Yale Project on Climate Change Communication. Retrieved from http://environment.yale.edu/climate-communication/files/SixAmericas2009.pdf

Marcus, G. E., Neuman, W. R., & MacKuen, M. (2000). *Affective intelligence and political judgment*. Chicago, IL: University of Chicago Press.

McCright, A. M., & Dunlap, R. E. (2011). The politicization of climate change and polarization in the American public's views of global warming, 2001–2010. *Sociological Quarterly*, *52*, 155-194. doi:10.1111/j.1533-8525.2011.01198.x

Miller, J. M., & Krosnick, J. A. (2004). Threat as a motivator of political activism: A field experiment. *Political Psychology*, *25*, 507-523.

Myers, T. A., Nisbet, M. C., Maibach, E. W., & Leiserowitz, A. A. (2012). A public health frame arouses hopeful emotions about climate change. *Climatic Change*, *113*, 1105-1112. doi:10.1007/s10584-012-0513-6

Nabi, R. L. (2002). Discrete emotions and persuasion. In J. P. Dillard & M. W. Pfau (Eds.), *The persuasion handbook: Developments in theory and practice* (pp. 289-308). Thousand Oaks, CA: Sage.

Nabi, R. L. (2003). Exploring the framing effects of emotion do discrete emotions differentially influence information accessibility, information seeking, and policy preference? *Communication Research*, *30*, 224-247. doi:10.1177/0093650202250881

Nisbet, M. C. (2009). Communicating climate change: Why frames matter for public engagement. *Environment: Science and Policy for Sustainable Development*, *51*(2), 12-23. doi:10.3200/ENVT.51.2.12-23

Ockwell, D., Whitmarsh, L., & O'Neill, S. (2009). Reorienting climate change communication for effective mitigation. *Science Communication*, *30*, 305-327. doi:10.1177/1075547008328969

O'Neill, S., & Nicholson-Cole, S. (2009). "Fear won't do it": Promoting positive engagement with climate change through visual and iconic representations. *Science Communication*, *30*, 355-379. doi:10.1177/1075547008329201

O'Keefe, D. J. (2003). Message properties, mediating states, and manipulation checks: Claims, evidence, and data analysis in experimental persuasive message effects research. Communication Theory, *13*(3), 251-274. doi: 10.1111/j.1468-2885.2003.tb00292.x

Romero-Lankao, P., Smith, J. B., Davidson, D. J., Diffenbaugh, N. S., Kinney, P. L., Kirshen, P., & Villers Ruiz, L. (2014). North America. In V. R. Barros, C. B. Field, D. J. Dokken, M. D. Mastrandrea, K. J. Mach, T. E. Bilir, . . . L. L. White (Eds.), *Climate change 2014: Impacts, adaptation, & vulnerability. Part B: Regional aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* (pp. 1439-1458). Cambridge, England: Cambridge University Press. Retrieved from http://www.ipcc.ch/pdf/assessment-report/ar5/wg2/WGIIAR5-Chap26_FINAL.pdf

Rosenstone, S. J., & Hansen, J. M. (2003). *Mobilization, participation, and democracy in America* (1st ed.). New York, NY: Pearson.

Roser-Renouf, C., Maibach, E. W., Leiserowitz, A., & Zhao, X. (2014). The genesis of climate change activism: From key beliefs to political action. *Climatic Change*, *125*, 163-178. doi:10.1007/s10584-014-1173-5

Smith, C. A., & Ellsworth, P. C. (1985). Patterns of cognitive appraisal in emotion. *Journal of Personality and Social psychology*, *48*, 813-838. doi:10.1037/0022-3514.48.4.813

Smith, N., & Leiserowitz, A. (2014). The role of emotion in global warming policy support and opposition. *Risk Analysis*, *34*, 937-948. doi:10.1111/risa.12140

Stedman, R. C. (2004). Risk and climate change: Perceptions of key policy actors in Canada. *Risk Analysis*, *24*, 1395-1406. doi:10.1111/j.0272-4332.2004.00534.x

Taber, C. S., & Lodge, M. (2006). Motivated skepticism in the evaluation of political beliefs. *American Journal of Political Science*, *50*, 755-769. doi:10.1111/j.1540-5907.2006.00214.x

Tausch, N., Becker, J. C., Spears, R., Christ, O., Saab, R., Singh, P., & Siddiqui, R. N. (2011). Explaining radical group behavior: Developing emotion and efficacy routes to normative and nonnormative collective action. *Journal of Personality and Social Psychology*, *101*, 129-148. doi:10.1037/a0022728

Valentino, N. A., Brader, T., Groenendyk, E. W., Gregorowicz, K., & Hutchings, V. L. (2011). Election night's alright for fighting: The role of emotions in political participation. *Journal of Politics*, *73*, 156-170. doi:10.1017/S0022381610000939

Valentino, N. A., Gregorowicz, K., & Groenendyk, E. W. (2009). Efficacy, emotions and the habit of participation. *Political Behavior*, *31*, 307-330. doi:10.1007/s11109-008-9076-7

Witte, K. (1992). Putting the fear back into fear appeals: The extended parallel process model. *Communication Monographs*, *59*, 329-349. doi:10.1080/03637759209376276

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