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Climate Change Helplessness and the (De)moralization of Individual Energy Behavior

Abstract

Although most people understand the threat of climate change, they do little to modify their own energy conservation behavior. One reason for this gap between belief and behavior may be that individual actions seem un-impactful and therefore are not morally relevant. This research investigates how *climate change helplessness*—belief that one's actions cannot affect climate change—can undermine the moralization of climate change and personal energy conservation. In Study 1, climate change efficacy predicted both moralization of energy use and energy conservation intentions beyond individual belief in climate change. In Studies 2 and 3, participants read information about climate change that varied in efficacy message, that is, whether individual actions (e.g., using less water, turning down heat) make a difference in the environment. Participants who read that their behavior made no meaningful impact reported weaker moralization and intentions (Study 2), and reported more energy consumption one week later (Study 3). Moreover, effects on intentions and actions were mediated by changes in moralization. We discuss ways to improve climate change messages to foster environmental efficacy and moralization of personal energy use.

Keywords: climate change, helplessness, moralization, efficacy

Climate Change Helplessness and the (De)moralization of Individual Energy Behavior

The majority of Americans are now convinced that human-caused climate change is real and that its effects will be felt in their lifetimes (Gallup, 2013). Still, most people do little to translate their concern into concrete behavior (Poortinga, Steg, & Vlek, 2004). Making matters worse, people generally do not see energy use as moral issue (Kurz, Donaghue, Rapely, & Walker, 2005; Markowitz, 2012), which may be key to disengaging from conservation and environmental behaviors (Markowitz & Shariff, 2012). We argue here that climate change moralization and action is impeded by *climate change helplessness*—the belief that climate change is beyond personal control. Though people generally believe in climate change and are concerned about the threat, there is a psychological disconnect between individual actions and their consequences for climate change that prevents people from seeing their own energy behavior as morally relevant. Climate change helplessness lowers intentions toward energy conservation by demoralizing individual efforts to conserve energy. However, climate change helplessness may be overcome if people view individual behaviors as impactful on the environment (*climate change efficacy*) and so meaningfully affecting their own and others' welfare. Climate change helplessness can demoralize individual efforts to conserve energy, but climate change efficacy re-moralizes individual efforts to conserve energy and thereby increases individual motivation to prevent climate change.

Climate Change Helplessness and Efficacy

Climate change is a grave threat to humankind on a greater scale than any other we have faced in our history. Scientists predict that climate change will bring stronger and deadlier storms, disease, drought, and food shortages within the coming decades and urge the public to reduce

their personal energy use to prevent the worst-case climate scenarios (EPA, 2014; IPCC, 2014). But ironically, the gravity of the threat may be too great for people to believe their actions matter. That is, people experience *climate change helplessness* and so fail to see the harmful effects of their actions. We borrow the term *helplessness* from the literature on learned helplessness, as they share key attributes. Helplessness is best characterized by behavioral inhibition in response to the threat of negative events beyond personal control (Abramson, Seligman, & Teasdale, 1978; Fosco & Geer, 1971; Hiroto, 1974; Hiroto & Seligman, 1975). For example, Seligman and colleagues first observed learned helplessness in dogs who were exposed to uncontrollable electric shocks (e.g., Overmier & Seligman, 1967; Seligman & Maier, 1967). The dogs quickly learned that their actions were futile and instead of trying to escape would just lie down, accept the shocks, and cry.

Climate change shares these fundamental features of the helpless situation: the prospect of extreme negative outcomes that seem beyond personal control. The size of the problem of climate change feels wholly unmatched to the size of our individual actions. It is hard to imagine, for example, that turning up the air conditioning on a hot day has anything to do with the average global temperature and its harmful consequences for life on our planet. Even when we do make energy-conscious choices, the true effects of our actions are invisible to us: we do not see the droughts prevented or the lives saved by our personal energy conservation. Instead, we are bombarded with ever more severe warnings about the devastation that climate change will bring—such as the string of alarming headlines ("Climate change: We have no solution yet" [Samuelson, 2014], "The Heat Is On: In the U.S., Climate Change Is Here and Now and the Future" [Plait, 2014]) in the wake of the 2014 U.S. National Climate Assessment (Melillo, Richmond, & Yohe, 2014). Like Seligman's dogs, those who believe climate change is

unstoppable may be prepared to just lie down and take it, rather than act to prevent the negative

consequences.

But on the bright side, this also suggests that climate change helplessness may be

overcome by drawing a closer connection between individual actions and their effects on climate

change—*climate change efficacy*. People are less likely to take action on issues if they feel little

personal efficacy over the problem (Strecher, DeVellis, Becker, & Rosenstock, 1986) but are

more likely to take action if they believe that actions are effective, i.e., both easy to enact and

likely to produce desired results (Ajzen, 1985; 1991; Bandura, 1977; 1994; Deci & Ryan, 2000).

Research in the health domain, for example, has shown that people are more likely to intend to

change behavior (e.g., quitting smoking, using condoms) if they are convinced that their

behavior can actually improve their health outcomes (Maddux & Rogers, 1983; Witte, 1994).

Likewise for climate change behaviors, if people believe their own energy use makes a

difference in preventing climate change, they should be more likely to take those preventative

actions and reduce personal energy use (Fielding & Head, 2012). Thus, interventions targeting

the apparent ineffectiveness of individual action against climate change may be key to undoing

the paralyzing effects of climate change helplessness.

Moralization and Demoralization

We argue that climate change helplessness can arise because it is difficult for people to

see the effects of their individual actions on the greater problem. But further, climate change

helplessness also carries implications for the *moralization* of individual behavior. Moralization is

the process by which an issue is imbued with moral value—ideas about right vs. wrong behavior

that carry implications for how one *should* behave and their associated moral judgments. Climate

change carries terrible potential for destruction and is therefore an issue ripe for moralization through judgments of harm caused by energy waste (for a discussion of other barriers to moralization of climate change, see Markowitz & Shariff, 2012). Harm to others (e.g., pain, injury, death, property loss) is central to most theories of morality and an important source of moral judgment (Graham, Haidt, & Nosek, 2009; Gray, Young, & Waytz, 2012; Kohlberg, 1969; Nucci, 1981; Piaget 1932/1965; Shweder, 1990; Turiel, Killen, & Helwig, 1987). For example, acts thought to help or harm others (e.g., reckless driving) are more likely to be seen as moral (Gray & Schein, 2012; Gray et al., 2012) and evoke stronger moral judgment (Young & Saxe, 2011; Uhlmann & Zhu, 2014). Unchecked, climate change will subject billions of people to death, disease, and loss of livable land. If one's actions are believed to make a genuine impact on the environment, it is understood that this impact is either destructive or constructive to others' welfare. In other words, if actions make a difference, then those actions make a *moral* difference.

Moralization may therefore play a key meditational role between climate change helplessness/ efficacy and the motivation to conserve energy. Across various social issues, people are more likely to vote (Morgan, Skitka, & Wisneski, 2010; Skitka & Bauman, 2008), to devote political and scientific resources (Rozin, 1999), and to advocate for change even against their material interests (Effron & Miller, 2012; Skitka & Morgan, 2014) for issues that carry greater moral meaning. Moralization of such issues has social consequences as well—for example, distancing oneself from others who do not share one's values (Skitka, Bauman, & Sargis, 2005; Skitka et al., 2013; Wright, Cullum, & Schwab, 2008) and censuring those who fail to act morally (Rozin, 1999). Likewise, getting people to moralize their own actions can be a powerful motivator to changing individual behaviors that impact climate change. In other contexts, ratings of "moral obligation" predict intentions to perform energy conservation

behavior (Markowitz, 2012), and moralizing environmental issues influences people to shift their attitudes (Feinberg, & Willer, 2013), take action (Stern, 2000; van Zomeren, Postmes, & Spears, 2011; Whitmarsh, 2009), and support pro-environmental policies (Poortinga et al., 2004; Nilsson, von Borgstede, & Biel, 2004). But moralization of an issue will only occur to the extent that people believe their behavior can *actually* harm or help others (Gray et al., 2012; Young & Saxe, 2011), i.e., that their actions are effective and make a real difference. Without such belief, people can morally disengage from their actions and can more easily justify selfish behavior (Bandura, 1999). Climate change helplessness obscures the causal connection between personal energy waste and its harmful effects, robbing it of its moral value. But climate change efficacy illuminates the harm caused by personal energy use and so moralizes and motivates individual efforts to conserve energy and prevent climate change.

This also model departs from previous work on learned helplessness in considering the special role of moralization. In classic helplessness scenarios, moralization plays no role in behavior or motivation because the consequences of (in)action affect only the self. For example, when Seligman's dogs learned to helplessly take shocks they could have controlled, they caused themselves pain, but no one else was hurt by their inactions. Likewise, efficacy itself should not be enough to moralize any given behavior without additional implications for that behavior, such as harm to others. This is where climate change actions depart from those considered in the learned helplessness literature. If people fail to act against climate change, millions (or even billions) of people will be lose their homes and livelihoods and be victims of hunger, disease, and death. In this way, climate change helplessness acts as a double-whammy against motivation to conserve personal energy use: it not only severs the cognitive link directly between actions and outcomes (as in classic helplessness) but also blinds people to the harmful consequences that

would add moral fuel to action. Increasing the apparent efficacy of individual energy conservation behaviors to harm others should moralize climate change and energy conservation and, in turn, motivate people to conserve.

These ideas—that climate change helplessness demotivates individual energy conservation by demoralizing those actions—are tested in the present research.

The Present Research

These studies investigate climate change helplessness as an obstacle to energy conservation behavior and how it may be overcome by an emphasis on the impact of individual actions. Further, we investigate the key role of moralization as a mediator between helplessness/ efficacy beliefs and energy conservation behavior. To believe that one is helpless against climate change means that one's own actions do not matter—to either harm or help others—and so do not have a moral impact. But belief in the efficacy of personal actions imbues those actions with moral value and so increases motivation to perform them.

Important, we focus here on the power of individual or *personal efficacy* beliefs toward climate change (Bandura, 2000), rather than *collective efficacy*. Climate change is a global problem that requires the combined actions of millions of individuals working together, so we recognize it may also be improved by collective efficacy (van der Linden, Maibach, & Leiserwitz, 2015). But we focus here on personal efficacy beliefs as a way to moralize *personal* actions.

We make an analogy to learned helplessness as a model for climate change helplessness, but we note that there are also differences from classic helplessness theory. Classical learned helplessness is acquired when one tries and fails to control a negative stimulus, such as an

electric shock. Climate change helplessness does not rely on this kind of direct behavioral feedback. Instead, people may infer that their behavior would be ineffective simply from the overwhelming nature of the problem.

From this theory we derive three hypotheses. First, belief that individual actions against climate change are effective will predict seeing climate change and energy conservation behavior in a moral light. Second, belief in the efficacy of individual behavior will predict motivation to perform those behaviors. Finally, we predict that moralization will mediate the link between efficacy and motivation. We test these predictions in three studies. Study 1 measured the correlational relationships among various climate change attitudes, including climate change efficacy, belief in climate change, moralization of climate change, and intentions to conserve energy. Study 2 tested the causal relationships among these variables by manipulating an efficacy message, i.e., whether individual actions (using less water, turning down the heat) make a meaningful difference in the local environment, and measuring climate change moralization and intentions to conserve energy. Study 3 extended this design to observe changes in energy use and moralization over time. Energy use behavior was measured at two times: (1) immediately following the message and (2) one week later. Data, manipulations, and measures from these studies are available for download from https://dataverse.harvard.edu/dataverse/cch.

STUDY 1

Individuals may vary in the extent they believe they are personally effective against climate change, moralize climate change actions, and are motivated toward those actions. The goal of Study 1 was to examine the relationships among these variables. We expect that climate change efficacy should predict greater moralization and intentions, even when controlling for

other related variables such as overall belief in climate change, negative emotions toward climate

change, and political conservatism. We further expect that moralization will mediate the

relationship between climate change efficacy and intentions. Climate change actions (e.g.,

conserving energy) should be moralized to the extent they are believed to be effective (i.e., make

a difference on the environment), and this moralization should predict motivation to perform

these actions.

Method

        Participants. 145 participants (70 men; 75 women; M_{age} = 33.7) were recruited from

Amazon's MTurk service for a small fee. Five additional participants were tested but excluded

for duplicate or non-US IP addresses.[1]

        Measures. Participants completed five scales to assess various climate change attitudes,

each measured on 7-point scales. First, participants completed a 7-item *Climate Change Beliefs*

scale (adapted from Sinatra, Kardash, Taasoobshirazi, & Lombardi, 2011; α = .93) that measured

belief in human-caused climate change (e.g., "Scientific evidence points to a warming trend in

global climate"; "Global warming presents a serious threat to human life"; 1 = *strongly disagree*;

7 = *strongly agree*). Second, the four-item *Climate Change Efficacy scale* (α = .95) assessed

feelings of personal climate change efficacy (e.g., "How effective is individual effort in

combating climate change?"; "How much control do individuals have over climate change?";

scales varied by item content, but 1 represented low control and 7 represented high control for all

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[1]**Note on sample size.** For all studies, it was our goal to obtain an adequate sample size to reliably detect an effect of efficacy beliefs, erring on side of more participants where possible. It is important to note that norms around sample sizes in psychology have been changing rapidly in recent years and have affected what members of our laboratory consider an optimal sample size. The studies reported here were conducted over several years in the following order: Pilot Study, Study 3, Study 1, Study 2. Thus, what we viewed as reasonable sample and effect sizes evolved with the changing norms in our discipline and as we observed the effects in these studies. So we began this project with comparatively smaller samples in the earlier studies and increased sample sizes as time passed.

items). Third, participants completed a 5-item Negative Emotions scale (α = .80; e.g., "How

severe is climate change?"; "How scary is global warming?"; scales varied by item content, but 1

represented low negativity and 7 represented high negativity for all items).[2] Fourth, participants

completed the 12-item *Energy Conservation Intentions scale* (α = .86), which measured

intentions to perform energy conservation actions such as using a driving less and using a

clothesline instead of a dryer over the following year (1 = *not at all*; 7 = *definitely*). And fifth,

participants completed the 11-item *Climate Change Moralization scale* (α = .90) that measured

the extent to which they saw climate change individual energy conservation as moral issues (e.g.,

"Preventing global warming protects others' rights"; "Using too much energy is morally wrong";

1 = *strongly disagree*; 7 = *strongly agree*). Finally, participants answered demographic questions,

including a single item measure of Political Conservatism (1 = *very liberal*; 7 = *very

conservative*) and were debriefed.

Results

   We scored each of the scales by averaging responses to all items. Overall, the scales were

positively correlated with one another (.40 < rs < .72) and negatively correlated with Political

Conservatism (-.48 < rs < -.23). Despite these intercorrelations, none of the predictors in our

models showed variance inflation factors higher than 2.05, suggesting that multicolinearity was

not a problem for the models we fit. Means for each of these scales are presented in Table 1. See

the supplemental materials for intercorrelations (Table S1) among the measured variables.

   Our central question here was whether climate change efficacy would predict

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[2] In Study 1 only, this scale included an item, "How helpless do you feel about climate change?", that measured participants' *feelings* of helplessness, rather than their apparent lack of control over climate change. This item correlated strongly with the Negative Emotion scale (corrected item-scale correlation: r = .39) and so was included in its average. Removing this item from the scale does not affect our conclusions.

moralization of energy use and intentions to conserve, and if moralization might explain efficacy's relationship with increased motivation to conserve. We report the results of these analyses below. Confidence intervals (95%) are presented in brackets. Full regression tables for these analyses are available in Tables S5 and S6 in the supplemental materials.

Moralization. If climate change helplessness reduces moral concern about the consequences of global warming, then conversely, belief in personal climate change efficacy should be associated with moralization of those behaviors. We tested three linear regression models predicting Climate Change Moralization scores from Climate Change Efficacy scores. First, Efficacy predicted Moralization when entered into a model alone ($\beta = .59$ [.45, .72], $t(143) = 8.66, p < .001$). Further, we predicted that this relationship should not be explained by general belief in climate change, political attitudes or other potential third variables. Our results were consistent with this prediction. Efficacy predicted Moralization when Climate Change Belief was added as an additional predictor ($\beta = .43$ [.30, .56], $t(143) = 6.42, p < .001$). Efficacy also remained a significant predictor in a third model when controlling for Climate Change Belief, Negative Emotion, and Political Conservatism ($\beta = .27$ [.13, .40], $t(143) = 4.00, p < .001$).

Intentions. If climate change helplessness acts as a barrier to environmentally conscious action, climate change efficacy should be positively related to intentions to conserve energy. This is indeed what we found. Efficacy predicted Intentions when entered into a model as the sole predictor ($\beta = .42$ [.27, .57], $t(143) = 5.58, p < .001$). This relationship remained significant in a second model, when Climate Change Belief scores were entered as an additional predictor ($\beta = .30$ [.14, .45], $t(143) = 3.76, p < .001$). Moreover, Efficacy remained a significant predictor in a third model when controlling for Climate Change Belief, Negative Emotion, and Political Conservatism ($\beta = .18$ [.01, .35], $t(143) = 2.12, p = .04$).

But more than the simple relationship between perceived efficacy and motivation, we predicted that moralization mediates the relationship between personal efficacy and motivation. We tested this prediction by estimating the indirect effect of Climate Change Efficacy on Energy Conservation Intentions through Climate Change Moralization via product-of-coefficients implemented in the PROCESS module for SPSS (Hayes, 2013). Using 5,000 bootstrap resamplings, the mediating relationship was estimated to be significant (*indirect effect* = 0.27 [0.17, 0.39], *SE* = 0.05; see Figure 1). This effect remained significant when Climate Change Beliefs, Negative Emotion and Political Conservatism were added as covariates (*indirect effect* = 0.10 [0.05, 0.19], *SE* = 0.04). The results of this mediation analysis are consistent with our claim that moralization is a critical mechanism for increasing the motivation to act against climate change.

[Figure 1 about here]

Discussion

As predicted, Study 1 found evidence that climate change helplessness is associated with demoralization of individual energy use and, in turn, lack of motivation to act against climate change. People who felt more personal efficacy toward climate change reported stronger intention to conserve energy, a relationship that was explained by their moralization of those behaviors. Often climate change campaigns target the public belief in climate change, with the assumption that getting people to accept the realities of climate change should result in more action. But these findings suggest that the moral value of climate change behaviors may be critical to convincing the public to conserve. However, the present results are correlational, and

so we cannot yet make conclusions abut the causal relationship between efficacy beliefs, moralization, and behavior. In Study 2, we test whether we can directly change moralization and intentions through messages that promote individual efficacy.

STUDY 2

Study 1 found that individual differences in feelings of control over climate change predicted moralization of energy use and intentions to conserve energy. In Study 2, we tested the *causal* influence of efficacy beliefs on moralization and intentions by manipulating apparent individual control over climate change. Participants read articles on climate change that framed individual actions as either effective and impactful (High Efficacy) or ineffective and un-impactful (Low Efficacy). We predict that the High Efficacy message will increase moralization and intentions relative to the Low Efficacy message, as people would see a stronger connection between their own actions and the harmful effects on others. Moreover, we predict that moralization will mediate the effect of Efficacy message on intentions.

Method

Participants. Data collection for Study 2 was conducted in two waves. In the first wave, 301 participants were recruited from Amazon's MTurk service for a small fee; 9 were excluded for duplicate or non-US IP addresses, leaving $N = 292$ participants. After analysis of this initial wave, data were collected from an additional 151 participants, 7 of whom were excluded due for duplicate or non-US IP addresses. This resulted in a full sample of 452 participants (196 men; 240 women; $M_{age} = 36.0$). Because of the danger of inflated Type I error rates when data sets are augmented in this way (Simmons, Nelson, & Simonsohn, 2011), we report an additional statistic,

$p_{augmented}$, that provides a 95% confidence interval for the Type I error rate of each test (Sagarin, Ambler, & Lee, 2014).

Manipulation. Participants were randomly assigned to a High or Low Efficacy condition. All participants were told the study was about science communication and that they would read a short science article and answer some questions. The science article described the issue of climate change and consisted of two paragraphs. Paragraph 1 described facts about climate change. Paragraph 2 manipulated Efficacy Message. Individual action was described as either easy to implement and having a strong impact on personal carbon emissions (High Efficacy), or as difficult to implement and having almost no impact on global carbon emissions (Low Efficacy).

Measures. Following the article, a manipulation check item asked participants to rate the effectiveness of individual action against climate change on a seven-point scale (1 = *not at all effective*; 7 = *very effective*). Next, participants completed four of the measures from Study 1: a four-item version of the *Negative Emotion scale* and the *Climate Change Beliefs scale*, *Energy Conservation Intentions scale*, and *Climate Change Moralization scale*. They also completed a 7-item *Climate Change Policies scale*, on which they indicated with *yes/no* responses their support for seven different policies designed to reward energy conservation (e.g., "Tax credits for purchasing hybrid and electric vehicles") or punish energy waste (e.g., "A fee for each disposable plastic shopping bag used"). This scale measured endorsement for policies aimed to change behaviors of society, not the individual. We were interested in whether moral prescriptions would influence support for governmental intervention in others' behavior, but we made no specific predictions for this scale. Finally, participants answered demographic questions and were debriefed.

Results

We scored the Negative Emotions (α = .88), Climate Change Beliefs (α = .94), Climate Change Moralization (α = .92), and Energy Conservation Intentions (α = .86) scales as in Study 1 and summed the number of *yes* responses to the Climate Change Policies scale (i.e., the total number of policies supported) for each participant (α = .72). Means for each of these variables are presented in Table 1. Their intercorrelations are reported in the supplemental materials (Table S2).

Efficacy manipulation check. As expected, participants who read the High Efficacy message rated personal actions as more effective against climate change (M = 4.96, SD = 1.59) than did participants who read the Low Efficacy message (M = 3.37, SD = 1.93, $t(434)$ = 9.43, p < .001, $p_{augmented}$ = [.05, .05], d = 0.90 [0.71, 1.10]), indicating the Efficacy manipulation was successful.

Climate change beliefs. We predicted that efficacy should have a motivational—not informational—effect on attitudes and so did not expect any effects on Climate Change Beliefs. No effects were observed for Efficacy condition ($t(434)$ = 1.03, p = .31, $p_{augmented}$ = [.62, .31], d = 0.10 [-0.09, 0.29]).

Negative emotions. Participants in the Low Efficacy condition (M = 4.99, SD = 1.48) reported marginally less Negative Emotions about climate change than those in the High Efficacy condition (M = 5.23, SD = 1.41, $t(434)$ = 1.74, p = .08, $p_{augmented}$ = [.10, .10], d = 0.17 [-0.02, 0.35]).

Moralization of energy use. We predicted that high efficacy messages would lead to greater moralization of climate change behaviors. There was a significant effect of Efficacy on

moralization (t(434) = 2.94, p = .004, $p_{augmented}$ = [.05, .05], d = 0.28 [0.09, 0.47]), such that

participants in the High Efficacy condition (M = 4.76, SD = 1.33) moralized energy use more

than participants in the Low Efficacy condition (M = 4.40, SD = 1.26). This difference remained

significant in a regression model predicting standardized Climate Change Moralization scores

from standardized Climate Change Beliefs, standardized Negative Emotions, standardized

Political Conservatism, and effect coded condition (-0.5 = Low Efficacy, 0.5 = High Efficacy, b

= 0.18 [0.04, 0.29]$,$ t(431) = 2.55, p = .01, $p_{augmented}$ = [.06, .05], see Table S6 in the supplemental

materials).

Intentions to conserve energy. We further predicted that those who read the High

Efficacy message would report stronger intentions to conserve energy than those who read the

Low Efficacy message. We observed a significant effect of Efficacy condition (t(434) = 3.21, p =

.001, $p_{augmented}$ = [.05, .05], d = 0.31 [0.12, 0.50]). As expected, those who read the High Efficacy

message (M = 4.85, SD = 1.21) formed stronger intentions to conserve energy than those who

read the Low Efficacy message (M = 4.48, SD = 1.22). This difference remained significant in a

regression model predicting standardized Energy Conservation Intentions scores from

standardized Climate Change Beliefs, standardized Negative Emotions, standardized Political

Conservatism, and effect coded condition (b = 0.21 [0.06, 0.35]$,$ t(431) = 2.80, p = .005, $p_{augmented}$

= [.06, .05], see Table S7 in the supplemental materials).

We again used indirect path analysis to test our prediction that efficacy messages increase

motivation to conserve energy through moralization of energy use. Using 5,000 bootstrap

resamplings, the mediating relationship was estimated to be significant (*indirect effect* = 0.22

[0.08, 0.38], *SE* = 0.07; see Figure 1) and remained significant when controlling for Climate

Change Beliefs, Negative Emotions, and Political Conservatism (*indirect effect* = 0.08 [0.02,

0.16], *SE* = 0.03).

Support for energy policies. We included a Climate Change Policies scale as a measure of support for collective response to climate change but made no specific prediction for the results. There were no differences in the number of energy policies supported between the High and Low Efficacy conditions ($t(434) = 0.33$, $p = .75$, $p_{augmented} = [1.49, .74]$, $d = 0.03$ [-0.16, 0.22]), even when standardized and regressed on standardized Climate Change Beliefs, standardized Negative Emotions, standardized Political Conservatism, and effect coded condition ($b = -0.04$ [-0.20, 0.11]$, $t(431) = -0.55$, $p = .58$, $p_{augmented} = [1.17, .58]$, see Table S8 in the supplemental materials). This is unsurprising given our focus on individual efficacy and its implications for personal—not collective—moralization and action.

Discussion

Study 2 provided support for our causal predictions about climate change helplessness. Namely, climate change efficacy motivates individual intentions to conserve energy (at least in part) by enhancing the moral value of those actions. Participants who read the High Efficacy climate change message indeed believed their individual actions made more impact, were more likely to moralize personal energy use, and had stronger intentions to conserve energy. Efficacy message did not affect endorsement of social policies. But because we focus here on *individual* efficacy, not *collective* efficacy (e.g., Bandura, 2000), we would not necessarily expect to motivate collective action, as social policies aim to do, and we found no difference in policy support. Efficacy message also had no effect on climate change belief—people who read high vs. low efficacy information were no more or less likely to believe in human-caused climate change. We did not expect efficacy to affect belief that climate change is real, only the belief that

personal actions make a difference on climate change. This also highlights that absolute belief/ denial of climate change is not always the best predictor of motivation to prevent climate change. Rather, motivation also requires the expectation that actions can make a difference (efficacy). But most important, these results show the impact of efficacy message on intention was mediated by moralization—efficacy message increased the moralization of individual actions, and this in turn increased intentions. These results suggest that a focus on personal efficacy may be promising antidote to climate change helplessness and also demonstrate the key role of moral attitudes in motivating action.

STUDY 3

In Study 2, messages that emphasized the effect of individual action on the environment led to greater moralization of climate change and stronger personal motivation to conserve energy. Do these intentions and moralizations translate to conservation behavior? Study 3 investigated whether climate change efficacy could impact individuals' actions in a one-week period after reading a climate change message. Participants were randomly assigned to one of three conditions, Low Efficacy, High Efficacy, and a Control condition with no efficacy information. Participants completed the same measures as in Study 2, but we also included a measure of energy conservation behavior. Follow-up measures were completed one week after initial testing. We predict that efficacy message will improve energy conservation behavior reported one week later (Time 2), mediated by the moralization and intentions reported at Time 1.

Method

296 (130 men; 165 women; 1 not reporting gender; M_{age} = 35.3) participants were

recruited through MTurk for a small payment at Time 1. Nine additional participants were

excluded for non-US IP addresses. 221 (95 men; 126 women; 1 not reporting gender; M_{age} =

35.2) participants returned to complete the second survey at Time 2, an average of 8.23 days

later, for an additional payment.[3] At Time 1, participants were randomly assigned to read one of

three articles about climate change. All participants first read a single paragraph describing

climate change as a scientific topic. In the High Efficacy and Low Efficacy conditions, this

paragraph was followed by the High/ Low Efficacy message, as in Study 2. Those assigned to

the Control condition did not receive additional information. All participants then completed

climate change measures from Studies 1 and 2 and an additional Energy Use scale consisting of

10 questions (e.g., "Compared to a typical week, did you drive more or fewer miles this week?")

with seven-point response scales (1 = *many fewer/much less than normal*; 7 = *many/much more*

than normal). One week later, all participants were invited by email to complete the second part

of the study. This second survey included the same measures as Time 1 and asked participants to

rate four statements about general motivation to conserve energy (e.g., "I have made an effort to

conserve energy in the last week") on seven-point Likert scales (1 = *strongly disagree*; 7 =

strongly agree).

Results

We scored the Climate Change Beliefs (Time 1: α = .93; Time 2: α = .92), Negative

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[3]Attrition did not differ among conditions (χ^2 (2, N = 296) = 0.10, p = .95), with 25, 27, and 23 participants lost in
the Low Efficacy, Control, and High Efficacy conditions, respectively. There were no differences on any of the
Time 1 outcome variables between those who completed the second survey and those who did not (ts ≤ 1.64, ps ≥
.10)

Emotions (Time 1: α = .85; Time 2: α = .90), Intentions (Time 1: α = .84; Time 2: α = .81),

Moralization (Time 1: α = .89; Time 2: α = .91), and Climate Change Policies (Time 1: α = .71;

Time 2: α = .65) scales as in Studies 1 and 2. We coded responses to the behavior items so that

higher scores indicated greater energy conservation (and lower scores indicated greater energy

waste) and calculated a mean for each participant (Time 1: α = .42; Time 2: α = .60).[4] We

averaged the four items about motivation to conserve energy given at Time 2 to create a

composite score for each participant (α = .88). Means for each of the measured variables are

presented in Table 1. Their intercorrelations are reported in the supplemental materials (Table

S3). We report results separately for Time 1 and Time 2 below.

Time 1 manipulation check. Immediately following message exposure, an ANOVA

revealed a significant effect of Condition on the perceived effectiveness of individual action ($F(2,$

$293) = 31.16, p < .001$). Planned contrasts found that the High Efficacy condition raised belief in

the effectiveness of individual action relative to the Control condition ($t(293) = 4.44, p < .001, d$

$= 0.64$ [0.35, 0.93]), and the Low Efficacy condition reduced this belief relative to the Control

condition ($t(293) = 3.63, p < .001, d = 0.51$ [0.23, 0.79]), indicating that the that High and Low

Efficacy conditions successfully changed participants' beliefs about the efficacy of individual

action. Based on these results showing that the High Efficacy, Control, and Low Efficacy

conditions bear a rank-ordered relationship with the construct they were intended to manipulate,

we analyzed the remaining measured variables using a rank correlation, Somer's d.[5] This statistic

is similar to other rank correlations (e.g., Spearman's ρ, Kendall's τ) in that it quantifies the

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[4] The difference in reliability between time points may be an effect of the manipulation. If participants did not
initially see the behaviors we asked about (e.g., recycling, water conservation, thermostat usage) as related, the
behaviors themselves may have had weak correlations. However, after completing a survey in which these behaviors
are framed as sharing an underlying motivation—energy conservation—participants' behavior (and responses) may
have been more consistent across items, leading to stronger inter-item correlations.
[5] Contrasts between conditions on the remaining dependent variables are reported in Table S9 in the Supplemental
Materials.

association between two ordinal variables with values ranging from –1 to 1. However, unlike other rank correlations, Somer's *d* is intended to measure a uni-directional, *causal* relationship between an independent and dependent variable (Ferguson, 2009; Pearson, 2010). This is in line with our methods and hypotheses: We expect our ordinal manipulation of efficacy (-1 = *Low Efficacy*, 0 = *Control*, 1 = *High Efficacy*) to causally influence our dependent variables, though this relationship might not be linear due to potentially different strengths of the High and Low Efficacy manipulations. Thus, significant positive relationships observed with Somer's *d* may be interpreted as evidence for a rank-ordered relationship among conditions. Confidence intervals (95%) based on 5,000 bootstrap samples are given in brackets.

Time 1 dependent variables. As in Study 2, Condition did not affect belief in climate change (Somer's *d* = .01 [-.11, .12], *p* = .90). Nor did it affect ratings of Negative Emotions about climate change (Somer's *d* = .06 [-.04, .17], *p* = .24).

As in Study 2, there was a significant positive effect of Condition on Moralization scores (Somer's *d* = .15 [.04, .26], *p* = .005), indicating that higher efficacy messages increased moralization of climate change and energy use. To control for Time 1 Climate Change Beliefs, Time 1 Negative Emotions, and Political Conservatism, we regressed Climate Change moralization on these variables and then subjected the residuals of Climate Change Moralization from this model to a Somer's *d* analysis with Condition as the independent variable. The effect of Condition on Climate Change Moralization remained significant in this analysis (Somer's *d* = .16 [.06, .27], *p* = .002).

Efficacy condition also positively influenced participants' mean scores on the Energy Conservation Intentions scale (Somer's *d* = .14 [.03, .25], *p* = .01), indicating that participants who read messages promoting a greater sense of personal efficacy formed stronger intentions to

conserve energy. Condition still significantly affected Energy Conservation Intentions when they were residualized on Time 1 Climate Change Beliefs, Time 1 Negative Emotions, and Political Conservatism (Somer's d = .16 [.04, .27], p = .006). Bootstrapped (5,000 samples) product-of-coefficient mediation analyses showed a significant indirect effect of Condition through Climate Change Moralization on Energy Conservation Intentions (*indirect effect* = 0.12 [0.02, 0.23], *SE* = 0.05; see Figure 1). This indirect effect was also significant when Climate Change Beliefs, Negative Emotions, and Political Conservatism were added as covariates (*indirect effect* = 0.08 [0.02, 0.15], *SE* = 0.03).

Condition marginally affected the total number of Climate Change Policies supported (Somer's d = .09 [-.01, .19], p = .09). However, this effect was non-significant when Climate Change Policies scores were residualized on Time 1 Climate Change Beliefs, Time 1 Negative Emotions, and Political Conservatism (Somer's d = .08 [-.02, .18], p = .11). As in Study 2, personal efficacy did not affect support for collective action against climate change. We also did not expect any differences in reported behavior in the previous week at Time 1 (before the manipulation took place), and there was no relationship observed regardless of whether raw scores (Somer's d = .08 [-.03, .18], p = .15) or scores residualized on Time 1 Climate Change Beliefs, Time 1 Negative Emotions, and Political Conservatism (Somer's d = .07 [-.05, .17], p = .24) were used as the dependent variable.

Time 2. One week after message exposure, the effect of condition on perceived effectiveness remained positive and significant (Somer's d = .19 [.07, .32], p = .001), suggesting that the manipulation was still active. Condition was again unrelated to Climate Change Beliefs (Somer's d = .01 [–.11, .14], p = .88) and to ratings of Negative Emotions (Somer's d = .06 [-.06, .18], p = .36). The effect of Efficacy condition on Moralization remained positive and significant

(Somer's d = .15 [.03, .26], p = .02), even when these scores were residualized on Time 1

Climate Change Belief, Time 1 Negative Emotions, and Political Conservatism (Somer's d = .14

[.01, .26], p = .03), with participants who read high-efficacy messages reporting greater

moralization of climate change and energy use one week later. In contrast to Time 1, there was

no direct effect of condition on Intentions whether raw scores (Somer's d = .01 [–.12, .14], p =

.88) or scores residualized on Time 1 Climate Change Beliefs, Time 1 Negative Emotions, and

Political Conservatism (Somer's d = -.01 [-.13, .12], p = .92) were used as the dependent variable.

However, a mediation model examining the indirect effect of condition on Time 2 intentions

through Time 1 moralization was significant (*indirect effect* = 0.11 [0.03, 0.23], SE = .05; see

Figure 1), even when controlling for Time 1 Climate Change Beliefs, Time 1 Negative Emotions,

and Political Conservatism (*indirect effect* = 0.07 [0.02, 0.14], SE = .03). There was no effect of

condition on Time 2 Climate Change Policies whether raw scores (Somer's d = .04 [–.08, .17], p

= .50) or scores residualized on Time 1 Climate Change Belief, Time 1 Negative Emotions, and

Political Conservatism (Somer's d = .03 [-.10, .15], p = .64) were used as the dependent variable.

As predicted, Efficacy condition had a positive effect on reported energy conservation

behavior in the week following the manipulation (Somer's d = .15 [.03, .27], p = .01), indicating

that participants who read messages promoting greater efficacy reduced their energy use over the

following week. This effect remained significant when using Time 2 Energy Conservation

Behavior scores residualized on Time 1 Climate Change Belief, Time 1 Negative Emotions, and

Political Conservatism (Somer's d = .12 [.00, .25], p = .05).

Our longitudinal design allowed us to test a critical mediation model, examining the

indirect effect of condition on behavior at Time 2 through moralization and intentions formed at

Time 1. This model circumvents a common inferential problem of indirect path analyses. When

the mediators and dependent variables are measured simultaneously (as in Studies 1 and 2 here),

causal order cannot be established through indirect path analysis (Kline, 2015). However, by

measuring behavior one week *after* intentions and moralization, we are able to establish the

temporal precedence of our mediators. This path was significant in a bootstrapped (5,000

samples) product of coefficients analysis (*indirect effect* = 0.014 [0.003, 0.034], *SE* = .02; see

Figure 2) and remained significant when controlling for Time 1 Climate Change Beliefs, Time 1

Negative Emotions, and Political Conservatism (*indirect effect* = 0.008 [0.002, 0.022], *SE* =

.005). That is, participants who read low efficacy messages moralized climate change less, which

led them to form weaker intentions to conserve energy and to use more energy over the

following week. Means across conditions (see Table 1) suggest that the low efficacy message

may have a stronger effect than the high efficacy message. In other words, climate change

helplessness may hurt climate change moralization and action more than efficacy helps.

[Figure 2 about here]

Discussion

Study 3 examined the effect of efficacy messages on attitudes and behavior at two times:

following initial exposure to the message and one week later. As in Study 2, efficacy messages

increased the intentions to conserve energy and moralization of climate change at Time 1

(reported immediately after the manipulation). But most important, measures taken at Time 2

allowed us to observe changes in self-reported energy behavior, rather than just intentions to

perform behaviors. This method also allowed a closer examination of moralization as a mediator,

by observing the effects of moralization at Time 1 and on self-reported behavior at Time 2.

Those who read Low Efficacy messages reported greater energy use at Time 2, mediated by

Time 1 Moralization and Time 1 Intentions. In other words, after people read that their behavior

has little impact on climate change, they demoralized energy use and dampened their intentions

to conserve, and subsequently reported more energy use over the following week.

This provides behavioral evidence that efficacy affects individual climate change actions

and also addresses the causal relationship between moralization and intentions/ actions more

directly than Studies 1 and 2. However, there are some limitations to this study. We did not

assess actual behaviors but self-reported behavior that may be subject to some presentation

biases and demand characteristics. For example, it is possible that at Time 2 participants recalled

the materials they had seen at Time 1, and this may motivate them to report behavior consistent

with the message. However, the broader pattern of results found in the study does not support

demand characteristics as the primary driver of our results. If recalling reading a high or low

efficacy message caused participants to respond in ways that confirmed these messages, we

would expect this to be evident in their support for policies that prohibit others from performing

these behaviors and in their *intentions* to perform these behaviors. But, there were no direct

effects on policy support or intention items at Time 2, suggesting that participants were not

simply reporting what they thought they should based on the messages they read.

Overall, we find that participants exposed to higher efficacy messages cast greater moral

judgment on energy waste and are willing to refrain from it themselves, but they are not willing

to legally proscribe these behaviors for others.

GENERAL DISCUSSION

Climate change is an ominous threat with devastating potential costs to humanity. For

this reason, environmental and social leaders such as Al Gore (*An Inconvenient Truth*, Bender, Burns, David, & Guggenheim, 2006) and Pope Francis (Burton, 2014) hope to inspire action with impassioned pleas to see climate change as a moral issue. But the moralization of action against climate change relies on the belief that actions do have meaningful effects. Climate change helplessness obscures the effect of individual actions on the environment and so robs those actions of their moral meaning. In three studies, we show that climate change helplessness represents a substantial motivational barrier to individual action by demoralizing individual energy conservation and waste. In Study 1, people who felt less control over climate change were less likely to see climate change as a moral issue and had lower intentions to conserve energy. Perhaps climate change helplessness could be overcome by emphasizing the efficacy of individual actions on the environment: participants who read high efficacy messages moralized their own actions and reported stronger intentions to conserve energy than those who read low efficacy messages in Studies 2 and 3. But perhaps low efficacy does more to impede action by fostering helplessness than high efficacy does to improve action. People who read low efficacy messages translated their apathy into behavior by increasing their reported energy use the following the week.

Role of Moralization

These studies support the idea that climate change efficacy affects motivation for personal energy conservation. Moreover, all three studies found evidence that moralization was a critical predictor of intentions and conservation behavior, mediating the effects of efficacy. Important, we also show this relationship using a longitudinal design in Study 3, where we find that moralization at one time point predicts *later* intentions and behavior. This design overcomes

a common criticism of statistical mediation models where the mediator and dependent variable are measured at the same time. In such cases, the causal role of the mediator cannot be inferred because it cannot be said to precede its supposed effect (Kline, 2015). In contrast, we demonstrate the temporal order of variables by measuring the behavioral effects a week later.

Notably, moralization predicted these outcomes when controlling for effects of belief in climate change, and belief in climate change did not differ across efficacy conditions. That is, efficacy beliefs moralized the issue, even though people were no more likely to believe that climate change is real. This goes against common wisdom that energy conservation can be encouraged by addressing belief in climate change. Though awareness of climate change and its dangers is certainly important, knowledge itself may not be enough to motivate action (Kellstedt, Zahran, & Vedlitz, 2008). And even if people do believe and understand the threat of climate change, they will not moralize their own behavior if they do not see its consequences. To impact individual behavior, climate change messages should also address motivational factors (Reser & Swim, 2011), including moralization. Our studies demonstrate the power of simple efficacy messages to change moralization.

This link between efficacy and prescriptive moral norms has been overlooked by traditional models of behavior, such as the theory of planned behavior (Ajzen, 1985; Ajzen, 1991) and expectancy-value theories (e.g., Wigfield & Eccles, 2000; for a similar argument, see Sparks & Shepherd, 2002), which propose that efficacy beliefs influence behavior primarily by directly increasing intentions to act. In contrast, we propose that moralization is a key mediator between efficacy and intentions to prevent climate change. When people see their energy behavior as effective against climate change, they recognize its harmful consequences and moral implications, improving their motivation to act.

We demonstrate that this link occurs within the domain of climate change, but our findings may apply to other domains as well. In scenarios typical of the moral psychology literature, the efficacy of actions is readily apparent and/ or made explicit by the experimenters. For example, in the famous footbridge dilemma, participants are told that pushing a man off a bridge *will* kill him (e.g., Greene, Sommerville, Nystrom, Darley, & Cohen, 2001); high efficacy is a given. Yet, little is known about whether people moralize actions with low efficacy. For example, there is debate over whether a murderer's skill with a weapon (i.e., his/her effectiveness in using it) affects moral judgment (c.f., Guglielmo & Malle, 2010; Sousa, & Holbrook, 2010). Even less is known about the role of *outcome* efficacy in moral judgment: Does moral judgment vary by whether an attempted murderer uses a highly effective weapon (a gun) or a less effective one (a letter opener)? More important, this literature does not speak to the generalized mediational role of moralization in linking efficacy to intentions. Future research should examine this link by explicitly manipulating the perceived efficacy of individual actions and measuring moral attitudes, intentions, and behavioral outcomes in domains beyond climate change.

Alternative Routes to Climate Change Moralization

Moralization of climate change may be essential to changing intentions (Feinberg & Willer, 2013; Markowitz, 2012). And climate change helplessness may be only one obstacle to moralization (Gifford & Nilsson, 2014; Markowitz & Shariff, 2012). Harm is not the only criterion people use when deciding whether an action has moral weight (e.g., Graham et al., 2009), and so activating other moral goals could also increase climate change moralization. For example, both climate change and moral values are politically polarized (McCright & Dunlap,

2011; Graham et al., 2009). Messages that target conservative audiences might find special moral weight in focusing on the particularly conservative value of purity/sanctity (Feinberg & Willer, 2013; Rottman, Kelemen, & Young, 2015). By addressing other barriers to moralization in addition to helplessness, climate change communication might be made even more impactful.

Likewise, insights from the moral disengagement literature (e.g., Bandura, 1999) may point to additional paths to moralization. We argue moralization of climate change is hindered because people fail to see the causal link between their own energy conservation behaviors and the harmful effects of climate change. Making that connection more apparent to people can enhance the moralization of those actions and the issue of climate change more generally. But even when people do see an issue as moral, they may be motivated to disengage from their moralization in order to pursue self-interest (e.g., keeping their homes warmer in the winter; Rottman et al., 2015; Shu, Gino, & Bazerman, 2011).

Believing individual actions to be ineffective is just one way to morally disengage from climate change and justify personal energy consumption. Maintaining the public's moral eye on climate change may require combatting other mechanisms of moral disengagement. For example, it may be easy to dehumanize people likely to be harmed by climate change if they live in far off places and times and thereby fail to see them as moral patients (Bandura, Barbaranelli, Caprara, & Pastorelli, 1996; Gray et al., 2012). Likewise, to the extent that energy-wasting behavior can be construed as serving a good purpose (e.g., increasing economic well-being through manufacturing), people can further justify moral apathy to climate change (Bandura et al., 1996). Future research should investigate how to combat these additional mechanisms of moral disengagement. For example, emphasizing the availability of alternative energy sources and the viability of low-energy solutions to problems may help circumvent these sources of

disengagement.

Increasing energy conscious attitudes in response to climate change will be made easier through moralization, and public communication about climate change will need to be mindful not only of efficacy but also of additional routes to moralization.

Implications for Research and Application

Aside from the role of moralization, our findings point to some ways that climate change messages can be framed to improve energy conservation. In Study 3, we looked at the effects that high and low efficacy messages have on moralization, prospective behavioral intentions, and self-reported changes in energy conservation behavior one week later. Though high efficacy messages had a positive effect on moralization and intentions at Time 1, only low efficacy messages appeared to affect behavior one week later. But this does not mean that high efficacy messages have no impact. The strength of high efficacy messages may be that they counter the typical moral disengagement people experience with climate change helplessness – and that without high efficacy messages this disengagement worsens with time. Thus, successfully promoting efficacy in the long term may require more than a single intervention to make a lasting impact on action. After participating in the study, our participants would have been subject to the same bleak public messages and experiences as before the study, potentially undoing the positive effects our manipulation. Maintaining high efficacy beliefs may require regular ongoing information to reinforce those beliefs. Direct feedback about the impact of specific actions could be effective in this regard. For example, the Bay Area Rapid Transit (BART) in the San Francisco area provides riders with feedback on the amount of carbon saved for each trip they make. Other built-in feedback systems in home heating and water usage,

transportation, and recycling could help to reinforce efficacy beliefs by making individual impacts more salient. Climate awareness campaigns could persuade action by pairing messages about the potential harms of climate change with specific information about energy used or saved by certain activities, thereby directing attention to the moral impact of individual actions. But presently, climate change messages often focus on the "big picture" problem (e.g., icecaps melting, acidification of oceans, disappearing farm land) in order to demonstrate the importance of climate change. This can help highlight the severity of the threat, but too much attention on the big picture can obscure the role of the individual. An alternative could be to begin messages with the big picture perspective, and then shift to the personal level by showing the significance of individual contributions to the whole. The impacts of repeated efficacy messaging and direct feedback systems on efficacy beliefs and conservation behavior are important avenues for research and application.

Our research used such messages to promote belief in individual efficacy, (i.e., level of the person). We also explored whether individual efficacy could motivate collective action (i.e., individuals working together) through support for energy policies aimed to curb individual energy waste. After all, if one person's actions can make a difference, that impact increases with the actions of many people. But we found no effects on support for these policies. Still, collective action will likely be necessary to mitigate the worst outcomes of climate change. Collective efficacy can have a profound effect motivating action as part of a social movement (Sampson, Raudenbush, & Earls, 1997), and future research might explore combining information about individual efficacy and collective efficacy as a way of moralizing collective solutions to climate change through government and other organizations.

Efficacy, whether individual or collective, may be just one component of impactful

climate change communication. Persuasive messages in many domains often pair efficacy with

fear. Efficacy and fear are effective individually (e.g., Bandura, 1982; Leventhal, Watts, &

Pagano, 1967), but together, fear of negative outcomes and the efficacy to prevent them are a

particularly powerful combination in motivating behavioral change (Tannenbaum et al., 2015).

Thus, it is reasonable to ask whether climate change efficacy would be even more powerful when

paired with a scary message about the severe and threatening consequences of climate change.[6]

However, the data from Studies 1 through 3 show that our participants are already afraid of

climate change. The modal response to the question "How scary is climate change?" was 7 (out

of 7) in all studies. Moreover, the interaction between efficacy (either measured or manipulated)

and fear significantly predicted intentions or moralization in only one out of 14 such tests (see

Tables S10 through S23 in the supplemental materials), suggesting that fear did not enhance the

value of efficacy in climate change action.[7] People *already* fear climate change and, thus, there is

more to be gained by emphasizing efficacy rather than fear in public communication about

climate change.

Conclusion

Climate change is a grave threat that endangers our species' physical and economic well-

being. Solutions to climate change are still possible but will depend on the actions of millions of

individuals across the world. According to the EPA, the small behavioral changes described in

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[6] Indeed, a pilot study for this research ($N = 282$) manipulated both efficacy message (High vs. Low) and emotional content (Fear vs. Disgust vs. Control) to directly test such an interaction (data and materials for this study are included in the online archive). However, we found no difference in *fear* between conditions (high levels of fear across conditions), and so no effect of the emotion manipulations on our critical dependent variables, and no interaction between efficacy and emotion on any variables (see Tables S24 through S31 for means, correlations, and inferential statistics).

[7] Specifically, in Study 3, measured (but not manipulated) Time 1 efficacy interacted with Time 1 fear to predict Time 2 Energy Conservation Intentions, an especially unlikely result given no such interaction on Time 1 intentions.

our manipulations could eliminate 6 tonnes of carbon emissions per household every year (EPA, 2013). In American households alone, this would amount 688,566,000 tonnes of CO_2, 2% of the 34 billion tonnes of CO_2 emitted globally each year (Olivier, Janssens-Maenhout, & Peters, 2012). But people can be blinded to the true impact of their own actions by climate change helplessness. Breaking its paralyzing hold is critical for real behavioral change and for spreading this influence to the behavior of others. Messages that promote efficacy beliefs promote moralization and thereby empower people toward these small, but meaningful, actions.

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Figure Captions

Figure 1. Path models linking Climate Change Efficacy (Study 1)/ Efficacy Condition (Studies 2

and 3) to Energy Conservation Intentions through Climate Change Moralization. For

Study 3, Efficacy Condition and Climate Change Moralization are always observed at

Time 1, with Energy Conservation Intentions being observed at either Time 1 or Time 2,

as indicated. Study 3 *a* paths vary because of participant attrition between Time 1 and

Time 2. *c* = total effect; *c'* = direct effect; *ab* = indirect effect. * $p < .05$. ** $p < .01$. *** *p*

$< .001$.

Figure 2. Path model linking Efficacy to Energy Conservation Behavior through Climate Change

Moralization and Energy Conservation Intentions, Study 3. *c* = total effect; *c'* = direct

effect; a_1b_1 = indirect effect through Climate Change Moralization only; a_2b_2 = indirect

effect through Energy Conservation Intentions only; a_1db_2 = indirect effect through both

Climate Change Moralization and Energy Conservation Intentions. † $p < .10$. * $p < .05$.

** $p < .01$. *** $p < .001$.

Figure 1

Study 1: $c = 0.32$***
Study 2: $c = 0.15$**
Study 3, Time 1: $c = 0.28$**
Study 3, Time 2: $c = 0.06$

| Climate Change Control/ Efficacy | → | Energy Conservation Intentions |

Study 1: $a = 0.43$***
Study 2: $a = 0.37$**
Study 3, Time 1: $a = 0.19$*
Study 3, Time 2: $a = 0.24$*

Climate Change Moralization

Study 1: $b = 0.62$***
Study 2: $b = 0.61$***
Study 3, Time 1: $b = 0.63$***
Study 3, Time 2: $b = 0.48$***

Climate Change Control/ Efficacy

Energy Conservation Intentions

Study 1: $c' = 0.05$; $ab = 0.27$ [0.17, 0.39]
Study 2: $c' = 0.15$; $ab = 0.22$ [0.07, 0.38]
Study 3, Time 1: $c' = 0.15$*; $ab = 0.12$ [0.02, 0.23]
Study 3, Time 2: $c' = -0.06$; $ab = 0.12$ [0.02, 0.23]

Figure 2

$c = 0.08$†

Efficacy (Time 1) → Energy Conservation Behavior (Time 2)

$a_1 = 0.24*$

Climate Change Moralization (Time 1)

$d = 0.62***$

Energy Conservation Intentions (Time 1)

$b_2 = 0.09*$

$a_2 = 0.18*$

$b_1 = 0.05$

Efficacy (Time 1)

Energy Conservation Behavior (Time 2)

c' $= 0.04$
a_1b_1 $= 0.01\ [-0.002, 0.04]$
a_2b_2 $= 0.01\ [0.003, 0.03]$
a_1db_2 $= 0.02\ [0.003, 0.04]$
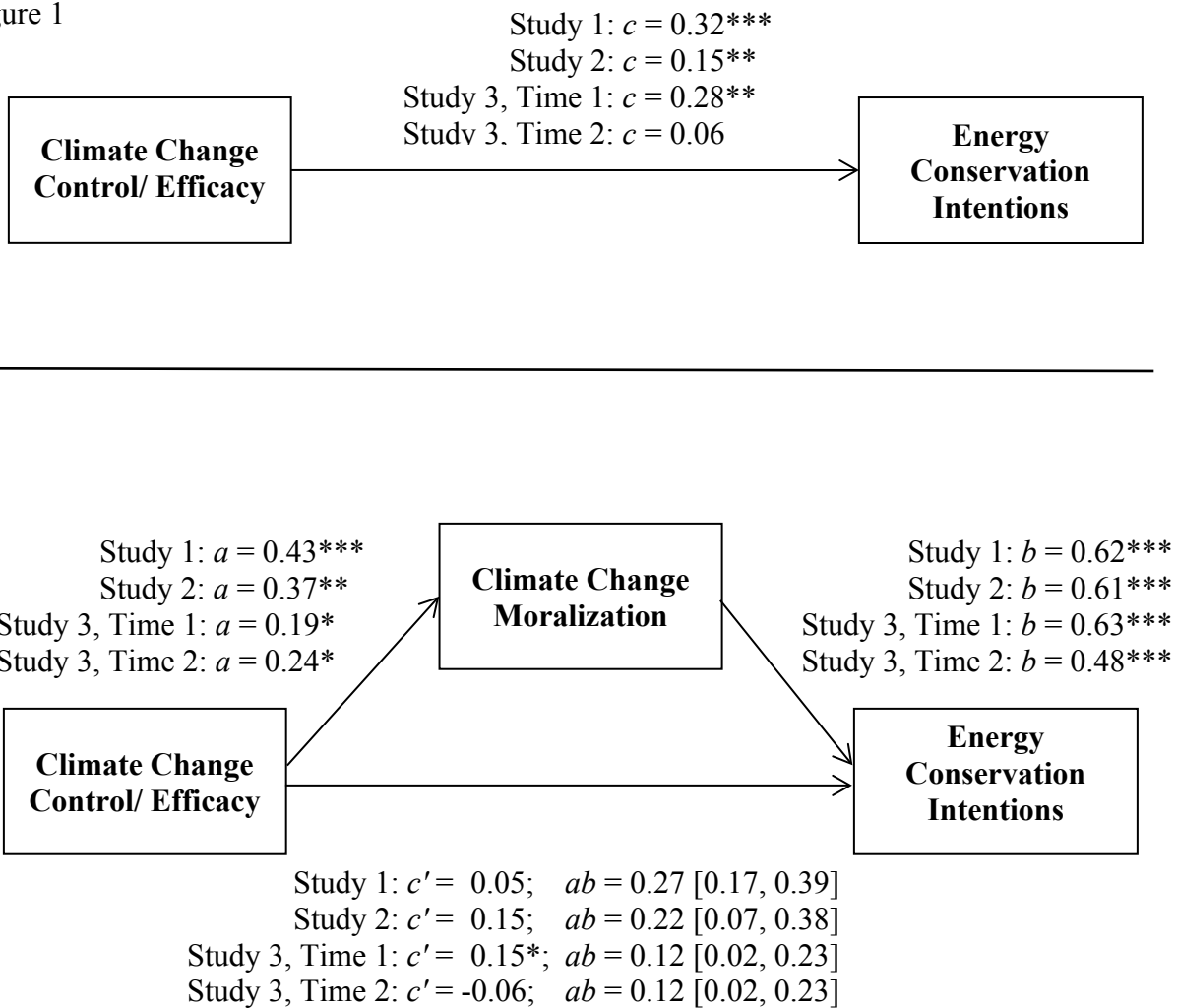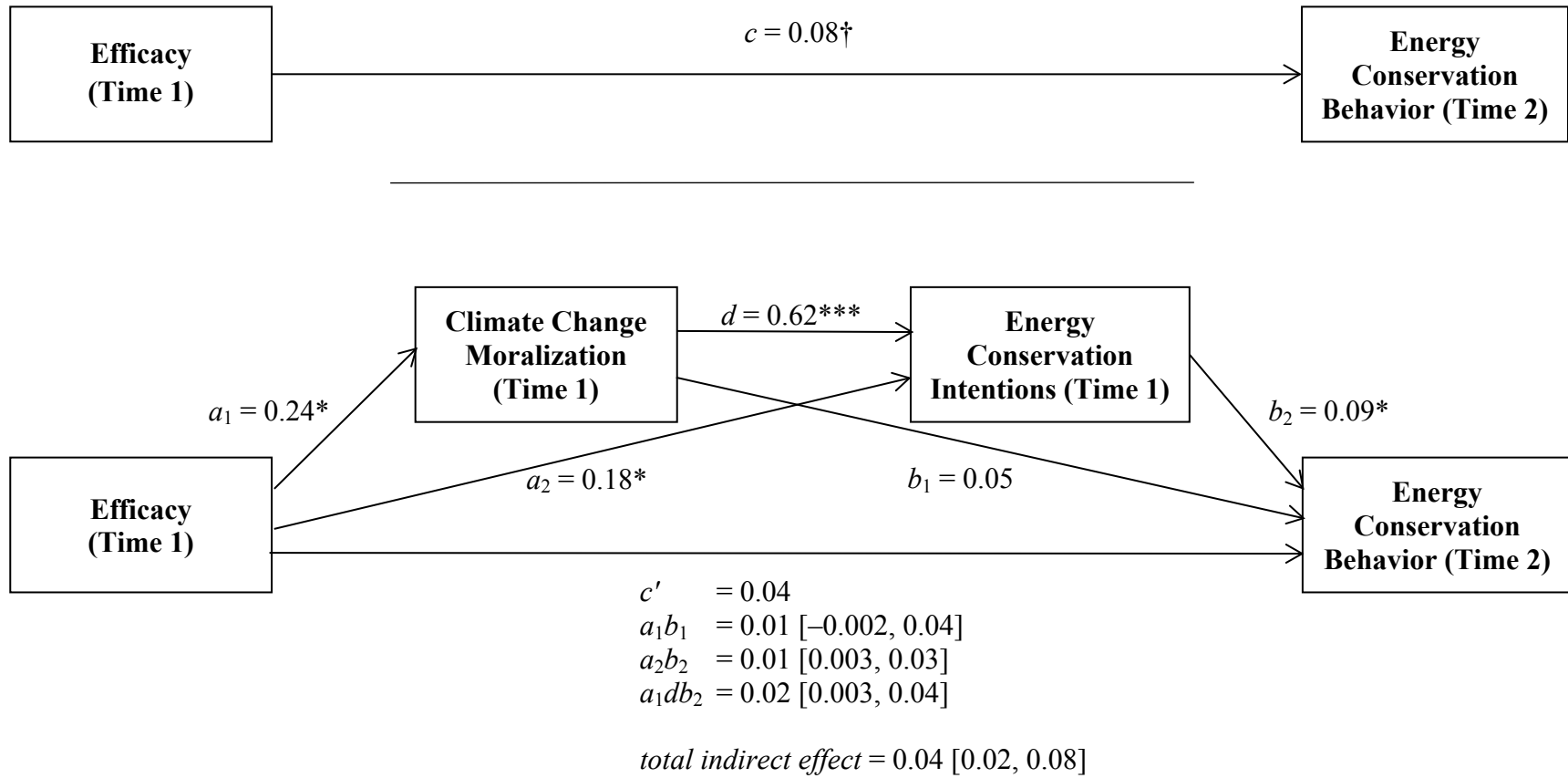
total indirect effect $= 0.04\ [0.02, 0.08]$

Table 1. Means (*Standard Deviations*) for Measured Variables, Studies 1 Through 3.

	Overall	Low Efficacy	Control	High Efficacy
Study 1	N = 145			
Climate Change Beliefs	5.34 (*1.22*)			
Climate Change Efficacy	4.24 (*1.58*)			
Negative Emotions	4.85 (*1.19*)			
Climate Change Moralization	4.65 (*1.17*)			
Energy Conservation Intentions	4.61 (*1.20*)			
Political Conservatism	3.28 (*1.57*)			
Study 2	N = 436	N = 217		N = 219
Climate Change Beliefs	5.31 (*1.39*)	5.24 (*1.42*)		5.38 (*1.36*)
Climate Change Efficacy	4.17 (*1.94*)	3.37 (*1.93*)		4.96 (*1.59*)
Negative Emotions	5.11 (*1.45*)	4.99 (*1.48*)		5.33 (*1.41*)
Climate Change Moralization	4.58 (*1.31*)	4.40 (*1.26*)		4.76 (*1.33*)
Energy Conservation Intentions	4.67 (*1.23*)	4.48 (*1.22*)		4.85 (*1.21*)
Climate Change Policies	4.21 (*1.85*)	4.18 (*1.83*)		4.24 (*1.86*)
Political Conservatism	3.42 (*1.65*)	3.42 (*1.65*)		3.41 (*1.66*)
Study 3, Time 1	N = 296	N = 96	N = 105	N = 95
Climate Change Beliefs	5.20 (*1.31*)	5.26 (*1.32*)	5.08 (*1.29*)	5.28 (*1.33*)
Climate Change Efficacy	4.07 (*1.80*)	3.17 (*1.72*)	4.01 (*1.58*)	5.04 (*1.64*)
Negative Emotions	5.05 (*1.28*)	4.93 (*1.22*)	5.09 (*1.32*)	5.12 (*1.30*)
Climate Change Moralization	4.64 (*1.18*)	4.43 (*1.11*)	4.68 (*1.19*)	4.81 (*1.20*)
Energy Conservation Intentions	4.52 (*1.22*)	4.25 (*1.32*)	4.50 (*1.14*)	4.80 (*1.13*)
Climate Change Policies	4.18 (*1.81*)	3.97 (*1.61*)	4.17 (*2.03*)	4.41 (*1.75*)
Energy Conservation Behavior	4.00 (*0.30*)	3.96 (*0.24*)	4.00 (*0.31*)	4.03 (*0.33*)
Political Conservatism	3.28 (*1.69*)	3.18 (*1.67*)	3.54 (*1.66*)	3.39 (*1.75*)
Study 3, Time 2	N = 221	N = 71	N = 78	N = 72
Climate Change Beliefs	5.24 (*1.24*)	5.25 (*1.39*)	5.15 (*1.18*)	5.32 (*1.17*)
Climate Change Efficacy	4.40 (*1.60*)	3.96 (*1.69*)	4.40 (*1.61*)	4.83 (*1.39*)
Negative Emotions	4.96 (*1.40*)	4.82 (*1.51*)	4.98 (*1.37*)	5.07 (*1.33*)
Climate Change Moralization	4.66 (*1.21*)	4.38 (*1.22*)	4.76 (*1.19*)	4.83 (*1.20*)
Energy Conservation Intentions	4.67 (*1.14*)	4.56 (*1.27*)	4.77 (*1.04*)	4.68 (*1.11*)
Climate Change Policies	4.46 (*1.67*)	4.39 (*1.71*)	4.38 (*1.68*)	4.61 (*1.63*)
Energy Conservation Behavior	4.37 (*0.52*)	4.27 (*0.52*)	4.42 (*0.52*)	4.43 (*0.52*)

Note. Climate Change Policies measured on 0 to 7 scale. All other measures on 1 to 7 scales.