

# Exploring the role of incidental emotions in support for climate change policy

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**Abstract** What role, if any, do incidental emotions play in people’s beliefs about climate change and support for climate mitigation policies? This question has received surprisingly little attention, despite a growing recognition that reactions to climate change information are shaped by various contextual factors beyond the information itself. Drawing on recent perspectives in psychology and communication, we conducted an experiment ( $N=719$ ) in which participants were randomly assigned to one of two emotion-induction treatments (guilt or anger) or to a no-emotion (neutral) control condition immediately before reading a news story about negative climate impacts and reporting on related policy preferences (e.g., support for taxing carbon polluters). Results revealed a number of significant effects, some of which emerged for the sample overall (e.g., guilt increased support for particular climate mitigation policies) and some that depended on personal and message factors suggested by prior research (e.g., political affiliation and social distance). Overall, these findings suggest that emotions may play an important role in guiding how the public processes and reacts to information about climate change.

## 1 Introduction

Despite mounting scientific evidence of the anthropogenic causes and potential harms of climate change (IPCC 2013), the perceptions and attitudes of the general public frequently fail to match the urgency expressed by the scientific community (Leiserowitz et al. 2014). As a result, understanding the factors that underlie public opinion on climate change has become a core research area, with studies highlighting the role of individual differences (e.g., political orientation; Dunlap and McCright 2008) as well as situational variables (e.g., weather

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fluctuations; Li et al. 2011). Surprisingly, however, the role of emotions—an omnipresent situational variable that has been shown to influence public opinion about other timely and consequential issues of international import (Lerner et al. 2003)—has received little attention in this domain. As an initial step toward addressing this gap, we report on an experiment involving more than 700 U.S. respondents that investigated how the incidental activation of either of two discrete negative emotions—namely, guilt and anger—might influence people’s support for different policy proposals aimed at mitigating climate change.

### 1.1 Climate change, discrete emotions, and policy preferences

According to Heede (2014), just 90 companies are responsible for the majority of manmade carbon emissions since the Industrial Revolution; at the same time, individuals’ daily carbon footprint, especially when examined at the cumulative and collective level, is a substantial contributor to global greenhouse gas emissions (Walser 2013). It is therefore not surprising that climate change mitigation policies often target both industries and individuals (Leiserowitz et al. 2014). However, previous work suggests that many people are not willing to support climate change mitigation policies that can cause personal hardship, though they generally recognize the effectiveness of these policies (e.g., Rosentrater et al. 2012).

In seeking to better understand the factors that shape policy preferences about climate change, research in psychology and communication on discrete emotions provides a largely overlooked but potentially fruitful perspective. Results from numerous studies suggest that beyond general affective states, discrete emotions can influence how people process information in ways that carry specific implications for everyday judgments including policy preferences (e.g., Nabi 2003)—even when the emotions are evoked earlier and by a source that is incidental (i.e., irrelevant) to the judgment at hand (Small and Lerner 2008; for overviews, see Angie et al. 2011; Schwarz 2000). According to the appraisal-tendency framework (Lerner and Keltner 2000, 2001), once an incidental emotion is activated, it can shape perceptions of subsequent, irrelevant events, and guide ensuing behaviors in line with the central appraisal patterns characterizing that emotion. With regards to individual- versus industry-targeted climate policies, this framework suggests that guilt and anger may be particularly relevant and worth investigating, given the cognitive appraisals and action tendencies that are theorized to underlie them. Specifically, whereas anger is thought to increase the tendency to condemn and punish perceived perpetrators of negative events, guilt is thought instead to motivate people to make reparation for harms done and to seek punishment for their own wrongdoing (Lazarus 1991). In this vein, when people are presented with the same information about negative impacts related to climate change, they may come to different conclusions about whether a given climate mitigation policy deserves support depending on which of these emotions they happen to be experiencing at the time of judgment.

The present experiment explores this possibility, and in particular, whether incidentally activated anger and guilt influence support for industry- versus individual-targeted climate policies in ways that are consistent with prevailing cognitive appraisal theories of emotion. That is, does incidental anger increase the perception that fossil fuel industries are primarily responsible for negative climate effects and thus promote support for policies that appear to hold industries accountable (e.g., a tax on industry for each ton of CO<sub>2</sub> produced)? Likewise, does incidental guilt increase the perception that individuals are primarily responsible and thus promote support for policies that appear to place the burden on everyday citizens like themselves (e.g., a tax on gasoline purchased at the pump)?

Although limited research exists on this topic, scholars have recently called for more research on the role of emotion processes in relation to climate change (Roeser 2012). In this vein, Smith and Leiserowitz (2014) found that discrete emotions not only strongly predicted support for climate mitigation policies, but that they emerged as stronger predictors than did cultural worldviews or common socio-demographic variables (e.g., political orientation). While these data hint that discrete emotions may affect the public's support for climate policies, their correlational nature limits inferences about a causal relationship. In the current study, we seek to address this gap by experimentally varying the experience of discrete emotions to investigate their effect on policy preferences and behavioral modification willingness. Specifically, we explore whether incidental anger and guilt may produce differential carry-over effects on subsequent judgments about climate change, while accounting for the well-established role of political orientation (e.g., Dunlap and McCright 2008). Moreover, in light of recent findings on the moderating role of social distance in climate policy support (Hart and Nisbet 2012; Spence and Pidgeon 2010), we explore whether this variable similarly moderates any observed effects of emotion, our main focus here.

## 2 Method

We recruited a diverse sample of 719 U.S. adults (342 females, 377 males; mean age = 34.8 years,  $SD=13.2$ ) to participate in a Web experiment via the online worksite Amazon Mechanical Turk for which they received a nominal payment of \$0.50 (see Paolacci and Chandler 2014, for a detailed discussion of this participant population). Political party affiliation was distributed as follows: Republican ( $n=111$ ), Democrat ( $n=312$ ), Independent ( $n=251$ ), and "None of the above" ( $n=45$ ). Each participant was randomly assigned to one of six experimental conditions as part of a 3 (emotion induction: anger, guilt, or control)  $\times$  2 (social distance: proximal or distal) between-subjects factorial design.

### 2.1 Experimental procedure

Participants were directed through an experimental procedure comprised of two steps. The first was an ostensible "memory recall test" in which they completed a two-part writing exercise to elicit either anger, guilt, or neutral feelings (i.e., a no-emotion control condition), which involved writing a short passage about a past autobiographical event that made them feel either angry or guilty ("so that someone reading this might even feel angry/guilty just from learning about the situation") or about their evening routine ("so that someone reading this might be able to reconstruct the way in which you, specifically, spend your evenings") (see Small and Lerner 2008). Immediately after, all participants completed a manipulation check in which they indicated the extent to which they were feeling each listed emotion at that moment (1 = none to 7 = a lot). Anger was assessed by *angry*, *annoyed*, and *irritated* ( $\alpha=0.93$ ;  $M=2.82$ ,  $SD=1.91$ ) and guilt was assessed by *guilty*, *regretful*, and *remorseful* ( $\alpha=0.94$ ;  $M=2.59$ ,  $SD=1.99$ ) (items were randomly ordered for each participant). Suggesting that the emotion induction was successful, participants in the anger condition reported more anger ( $M=4.58$ ,  $SD=1.81$ ) than those in each of the other two conditions ( $M_{guilt}=2.44$ ,  $SD=1.46$ ;  $M_{control}=1.58$ ,  $SD=0.96$ ), whereas participants in the guilt condition reported more guilt ( $M=4.62$ ,  $SD=1.87$ ) than the other two conditions ( $M_{anger}=1.84$ ,  $SD=1.28$ ;  $M_{control}=1.47$ ,  $SD=0.99$ ) ( $t > 13.93$ ,  $ps < .001$ ).

Participants were next asked to participate in a “message evaluation test” in which they read an ostensible news article about negative effects linked to climate change—namely, the rising incidence of Lyme disease and its implications for public health and safety. Modeled after the method used by Hart and Nisbet (2012), this fictional news article was created on the basis of facts reported by major news Web sites and did not contain any explicit political partisan cues. Furthermore, participants were randomly assigned to one of two versions of the article that varied in the terms of social distance: one version detailed how Lyme disease was becoming a greater threat to people in the United States (the proximal condition), whereas the other version detailed how Lyme disease was becoming a greater threat to people in France (the distal condition). In every other respect, the two articles were the same (see the electronic supplementary material for article text).<sup>1</sup>

## 2.2 Dependent variables

**Support for climate mitigation policies (individual vs. industry)** Immediately after reading the news article, participants reported the likelihood they would support each of six climate mitigation policies on 7-point Likert-style scales (1=very unlikely to 7=very likely) that were adapted from previous research (Leiserowitz et al. 2011b, 2013) (see Table 1). Three policy items primarily targeted industry ( $\alpha=0.72$ ) (top 3 in Table 1), whereas another three policy items primarily targeted individuals ( $\alpha=0.80$ ) (bottom 3 in Table 1), corresponding to the theorized carry-over effects of anger and guilt on attributions of responsibility (i.e., directed at others vs. the self, respectively).

**Behavioral modification willingness** Next, participants indicated their willingness (1=very unwilling to 7=very willing) to adopt two behaviors in the next 6 months. One behavior involved punishing individuals like themselves for their role in contributing to climate change (“Paying 5 % more on your monthly utility bill to get your electricity from renewable energy sources, like wind or solar”) ( $M=4.48$ ,  $SD=1.98$ ) (Leiserowitz et al. 2011a). The other behavior involved punishing industry for their role in contributing to climate change (“Punishing companies that are opposing steps to reduce global warming by NOT buying their products”) ( $M=5.03$ ,  $SD=1.82$ ) (Leiserowitz et al. 2014).

## 3 Results

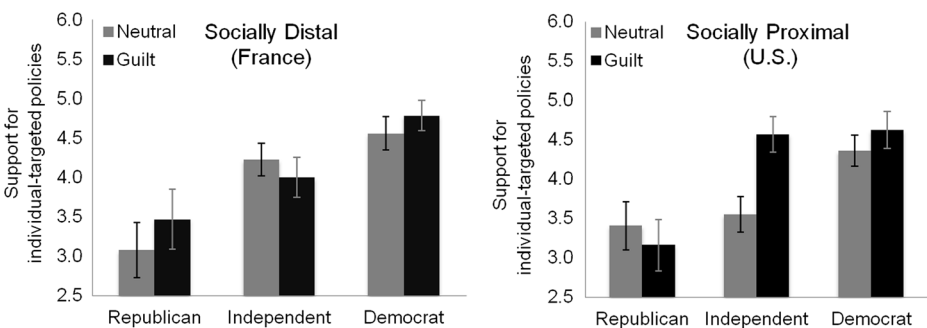
We used multiple regression models in which policy support and behavioral modification willingness were regressed separately onto emotion-induction condition (anger, guilt, control; dummy-coded with control as the referent group), social distance (proximal vs. distal; coded +0.5 and -0.5, respectively), and their interaction terms. This analysis revealed a significant main effect of guilt on policy support. Specifically, compared to the control condition, participants who were induced to feel guilty reported greater support for climate change policies that targeted industry, ( $M_{\text{guilt}}=5.15$ ,  $SD=1.60$ ;  $M_{\text{control}}=4.86$ ,  $SD=1.50$ ),  $b=0.30$ ,  $t(714)=2.07$ ,  $p<.05$ . No other significant main or interaction effects were observed.

<sup>1</sup> We opted not to employ a no-article control condition to keep the informational context in which participants reported their policy preferences roughly equivalent and to help bolster the credibility of the cover story.

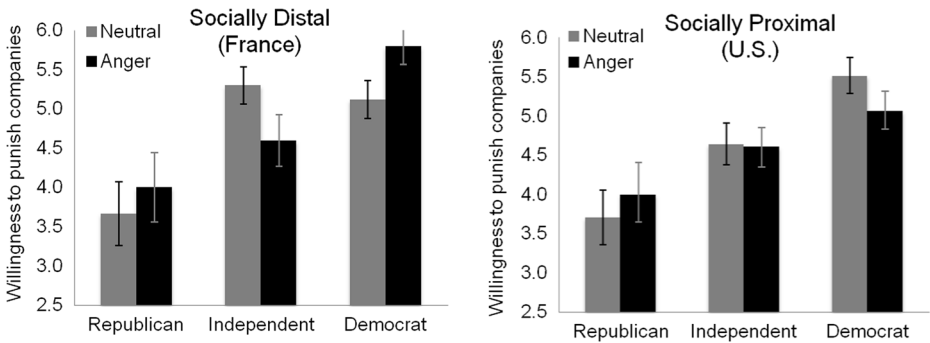
**Table 1** Mean and standard deviations for each of the six climate change mitigation policies

	Mean	SD
<b>Individual-targeted policies</b>		
Require electric utilities to produce at least 20 % of their electricity from wind, solar, or other renewable energy sources, even if it cost the average household an extra \$100 a year	4.58	1.91
A \$5-a-month increase in property taxes, to provide funding to help homeowners make energy-efficiency improvements to their homes (such as replacing old, inefficient furnaces, water heaters, air conditioners, and insulation)	4.23	1.93
A 10-cent fee added to each gallon of gasoline you buy, to fund local programs to improve public transportation	3.47	2.00
<b>Industry-targeted policies</b>		
Create a carbon tax that directly taxes companies that emit greenhouse gases with a fixed fee per ton of pollutants released into the atmosphere	5.07	1.89
Eliminate all federal subsidies for the fossil fuel industry (oil, and natural gas), which currently total an estimated \$10.4 billion a year	4.56	1.92
Set strict carbon dioxide emission limits on existing coal-fired power plants	5.22	1.78
Mean support, individual-targeted policies	4.10	1.56
Mean support, industry-targeted policies	4.95	1.58

Recall that we were also interested in the potential moderating role of political affiliation in effects of emotion on climate-related judgments. To examine this possibility, multiple regression models separately regressed policy support and behavioral modification willingness onto emotion-induction condition, social distance condition, and political affiliation (Republicans, Democrats, Independents; dummy-coded with Democrats as the referent group) and all interaction terms. Results revealed a significant 3-way interaction on support for individual-targeted policies,  $b=1.21, t(657)=1.95, p=.05$ . More specifically, induced guilt led to greater support for individual-targeted policies among Independents in the socially proximal condition, ( $M_{\text{guilt}}=4.57, M_{\text{control}}=3.55$ ),  $b=1.02, t(657)=3.19, p<.01$  (see Fig. 1). In contrast, this effect was not observed among either Democrats or Republicans in our sample,  $|b|s<.27, |t|s<.88, ns$ . No other significant interactions were observed. Turning to behavioral modification willingness, a significant 3-way interaction again emerged,  $b=1.80, t(657)=2.50, p<.05$ . Diagnosing this interaction revealed that induced anger led to greater willingness to “punish businesses” among Democrats in the socially distal condition,  $b=0.67, t(657)=2.03, p<.05$  ( $M_{\text{anger}}=5.79, M_{\text{control}}=$



**Fig. 1** Graphs depicting the effect of guilt on support for individual-targeted policies, by social distance and political affiliation. Error bars represent mean standard errors



**Fig. 2** Graphs depicting the effect of anger on willingness to punish companies that obstruct climate efforts, by social distance and political affiliation. Error bars represent mean standard errors

5.12) (see Fig. 2). In contrast, this effect was not observed among either Independents or Republicans,  $|b|s < .71$ ,  $|t|s < 1.75$ , *ns*. No other significant interactions were observed.

## 4 Discussion

Scholars have long acknowledged the fundamental role of emotions in the public's reactions to information about climate change (e.g., Meijnders 1998; Leiserowitz 2006). Yet, scant research has considered how the experience of incidental emotions, which infuse everyday life and routinely shape human judgment and decision making, may influence support for specific climate policies and reported behavioral modifications. Results from the present experiment suggest that discrete emotions may be capable of exerting differential influences on the public's support for climate policy proposals that vary by political partisanship. In doing so, our findings complement previous calls highlighting the importance of discrete emotion in climate change decision-making (Roeser 2012) as well as emerging findings from psychology and communication on the role of motivated reasoning in this domain (Hart and Nisbet 2012; Schuldt and Roh 2014).

In terms of their fit with cognitive appraisal theories of emotion, however, the present findings are somewhat mixed. On the one hand, they affirm some of the earlier theoretical assumptions about the attributes and appraisal tendencies that co-occur with experienced anger and guilt (Lazarus 1991). When some participants were primed to feel angry, they more strongly endorsed behavioral modification intentions that entailed punishing others (i.e., by not purchasing products from companies that obstruct climate efforts). Likewise, when some participants were instead primed to feel guilty, they reported greater support for climate mitigation policies that placed the burden on individuals (people like themselves) (e.g., supporting individual-targeted policies). On the other hand, we observed a main effect of guilt on support for policies that targeted industry, a pattern that would appear to be at odds with the self-directed nature of guilt as posited by cognitive appraisal theories. We speculate that an explanation may reside in the complex motivations that accompany the experience of guilt. In line with the fundamental social-cognitive motive to draw conclusions that paint the self in a positive light (Kunda 1990), guilt may not only lead people to hold themselves responsible for negative outcomes they cause, but it may also lead them to attempt to purge their guilt and responsibility by scapegoating others (Rothschild et al. 2012). In addition, in the case of such highly polarized issues as climate change, the attribution pattern for blame and responsibility is rather complex, perhaps even more so than

in the context of terrorism (Lerner et al. 2003). For instance, given that large oil industries produce products that consumers purchase, who is to blame for the burning of fossil fuels—industry or individuals? Such ambiguity may well have contributed to the nuanced results found here.

The present findings also complement a growing body of literature in climate change communication and public opinion on the moderating role of political partisanship (e.g., Dunlap and McCright 2008; Hart and Nisbet 2012; Schuldt and Roh 2014), as well as recent work suggesting that the social distance at which climate effects are portrayed may affect climate policy preferences (e.g., Hart and Nisbet 2012; Spence and Pidgeon 2010). In particular, our findings suggest that effects of emotion on climate judgments may interact both with political partisanship and social distance in complex ways, as when guilt increased support for individual-targeted policies among Independents (but not Democrats or Republicans) in the socially proximal (U.S.) condition only. We surmise that in a time when opinions about climate change reflect deep-seated political divisions, some carryover effects of incidental emotions may be more pronounced among Independents and others who perhaps hold less crystallized beliefs on this partisan issue (Hamilton and Stampone 2013)—effects that may be most likely when climatic consequences are depicted as occurring close to home, where one's vote counts (in this case, in the U.S.). Further research is necessary to establish the reliability of such interactive effects.

Finally, we note some limitations of this research. Although we focused on anger and guilt in this initial investigation given their theoretical relevance to support for common mitigation policies, we do not mean to imply that these are the only (or the most important) emotions to consider in this context. Our participants also read about the specific case of Lyme disease consequences, which may have felt unfamiliar and may not generalize to other types of news. However, Lyme disease was chosen because scientific evidence has linked its prevalence in part to climate change (Mills et al. 2010) and public health framing has been promoted recently to raise more concern about climate change among the public (Myers et al. 2012). Moreover, while we adopted the incidental emotion priming paradigm as a clean and reliable test of the effects of discrete emotions (anger and guilt) on climate-related judgments, we acknowledge that it would be difficult to use incidental emotions to achieve strategic communication goals. However, given that climate change news and imagery is known to elicit affective responses (Leiserowitz 2006), further research may explore whether guilt and anger function similarly as integral (as opposed to incidental) emotions in this context. Finally, while our present focus on testing experimental effects guided our choice of a diverse but non-representative sample of U.S. adults, future work may wish to explore these processes with nationally representative survey samples given the national-level policy implications of climate beliefs.

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