The Chill of the Moment: Emotions and Proenvironmental Behavior

Daniel Schwartz and George Loewenstein

Many serious problems, including those associated with the environment, warrant a sustained response, but the emotions that motivate action are often transient. The authors conducted five online experiments examining the impact of affective ads about global warming on proenvironmental behaviors. They find that sadness-inducing videos lead to more time devoted to an energy-footprint calculator and greater donations to an environmental organization than nonaffective videos. However, once emotions have cooled off after a delay, there are no differences in induced behavior between affective and nonaffective messages. Warning people that emotions, and their effects on behavior, cool off does not reverse the effects of the time delay unless people make a nonbinding commitment just after watching the affective ad. These results help to explain why emotion-evoking ads designed to promote proenvironmental behaviors, such as cutting energy use, often fail to produce sustained behavior change, and they suggest that those who seek to promote a sustained response may need to elicit behavioral commitments in moments of high emotion.

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Much of the literature on the role of emotion in decision making has focused on the problem of excessive emotions (Loewenstein 1996; Metcalfe and Mischel 1999). However, insufficiency of emotion can be an even bigger problem (Loewenstein 2010). As many authors have pointed out, and the very term suggests, emotions are essential for motivation and action, and our failure to act in situations in which action is warranted can often be traced to an insufficiency of emotion (Slovic 2007; Witte 1998; Witte and Allen 2000).

One important cause of such insufficiency is the adaptive nature of emotions; emotions respond strongly to changes in our situation, but, probably for evolutionary reasons, they tend to weaken over time when a situation persists (Frederick and Loewenstein 1999). Even past events that were strongly emotionally charged are perceived as much less intense as new emotional events occur (Van Boven, White, and Huber 2009). If emotions adapt and are essential for motivation and action, it follows that for many individual and societal problems—especially those that unfold gradually and can be adapted to—there may only be brief windows of opportunity for promoting constructive action or changing destructive patterns of behavior.

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Consistent with such a prediction, the academic literature on "teachable moments" has found that specific emotional events may offer clear opportunities for behavioral change (for conceptual reviews, see, e.g., Lawson and Flocke 2009; McBride, Emmons, and Lipkus 2003). For example, hospitalization has been identified as a propitious time to encourage smoking cessation (Emmons and Goldstein 1992). Yet, research suggests that there are definite limits to the exploitability of teachable moments. For example, patients receiving cancer diagnoses or lung-cancer screenings fail to quit smoking, or quickly relapse, despite their initial motivation (Gritz et al. 2006; Shi and Iguchi 2011). In fact, consistent with the implication of the "moment" part of the term, some research suggests that the length of time during which a teachable moment can be exploited is exceedingly brief. Williams et al. (2005), for example, report that for alcohol-abusing patients who contacted an emergency department, the "half-life" of the teachable moment was two days: patients' attendance at an appointment with an alcohol counselor dropped by half when there was a two-day delay prior to the appointment, compared with those whose appointments were for the same or the following day.

Although much of the literature on teachable moments focuses on naturalistic events, such as diagnosis and hospitalization, the social marketing literature has mainly studied the effects of emotional events that are deliberately triggered by ads or other marketing interventions. Research in this vein has examined the impact of emotional messages relative to informational messages on behavioral and attitudinal measures; it has generally found positive effects of emotion-evoking ads but mixed (Hartmann, Apaolaza Ibáñez, and Forcada Sainz 2005; Hartmann et al. 2016; Matthes, Wonneberger, and Schmuck

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2014) or even negative (Small, Loewenstein, and Slovic 2007) impacts of informational messages.

In the Internet age, visual emotional appeals have gained a broader audience and thus attracted great attention from marketing researchers, as many short videos or ads are shared online. These types of short videos, which often request some immediate action (e.g., a video about world hunger followed by requests for donations or for the viewer to share the message), have become an important tool used to promote action on public policy issues. Yet the great strength of such interventions—the momentary intensity of the emotions they evoke—is also closely related to what is arguably their greatest limitation: the limited duration of this impact. One important question, therefore, is whether social marketing campaigns motivate actions after a time delay that allows emotions to cool off. This question is especially important for environmental policies because many actions (e.g., energy-saving behavior or purchasing a green product) are likely to be taken only after a time delay. In focusing on the interaction between emotional appeals and time delay, the current research thus contributes insights to an issue of central importance to social marketing, especially as applied to proenvironmental behaviors. The research also examines the effectiveness of two interventions aimed at offsetting the cooling-off effect of time delay. One of these interventions does not turn out to be effective in maintaining action intentions generated by transient emotions, whereas the other is effective.

Emotional Messages and Proenvironmental Behavior

Climate change is not only an important problem in terms of its scale and impact, but it may also be an especially appropriate target for interventions exploiting insights from emotional messaging because it has almost all the hallmarks of a problem about which people are likely to experience insufficient emotion. It unfolds slowly (although the gradual progression is punctuated by dramatic events that may or may not be attributable to climate change) and is difficult to discern in one's immediate environment (Loewenstein and Schwartz 2010; Marshall 2014; Weber 2006), which may help explain the apparent lack of perceived urgency on the part of the public (Leiserowitz 2005). Previous research has highlighted the importance of emotions in environmental issues (e.g., Leiserowitz 2006). A representative survey in the United States that included questions about demographics, cultural worldviews, and emotions associated with climate change (disgust, worry, hope, etc.) reveals that emotions toward climate change explain half of the variance in environmental policy support (Smith and Leiserowitz 2014). However, it is important to examine the strengths and limitations of pursuing, for example, communication efforts based on emotional content.

In one study closely related to the ones we report on in this article, people surveyed after watching *The Day After Tomorrow*, a science-fiction film showing catastrophic consequences of an abrupt change in the earth's climate, report being motivated to take action to mitigate climate change (Leiserowitz 2004). Consistent with the idea of a teachable moment, Leiserowitz (2004, p. 35) notes that "it is possible that the observed shift in public perceptions and behavioral intentions represents a momentary blip"; however, the study does not track participants over time, and the dependent variable is self-reported motivation, as opposed to actual action. Responding to the first issue, Lowe et al. (2006) conduct a focus group one month after participants viewed the same movie to check whether people subsequently changed their behavior. Some did, but, as the authors note, the people who had actually attended the focus group may have been a self-selected proenvironmental group. Using the same movie, Hart and Leiserowitz (2009) find a positive correlation between its release and online searches on climate change websites. This correlation lasted only a few days, which may reflect emotional cooling off, but also possibly some form of nonemotional salience or the marketing of the movie. Furthermore, the previous studies do not include direct questions about emotional states.

Ferguson and Branscombe (2010) do include questions about emotional responses in their study. They find that reading that global warming is caused by humans (vs. by nature) and that something can be done about it (i.e., that the consequences for future generations are reparable) increased participants' feelings of guilt, which in turn increased their stated willingness to perform energy-saving actions and pay green taxes. However, they do not follow participants over time either, and, as noted by the authors, the dependent measure is hypothetical action rather than real action entailing real costs.

Research examining the impact of emotional ads on environmental concern has mainly measured attitudes toward green products or brands. For example, Matthes, Wonneberger, and Schmuck (2014) expose research participants to an emotional printed ad (an eco-friendly detergent with pictures of nature) and find that it has a positive effect on brand attitudes. Hartmann et al. (2016) elicit fear related to climate change using pictures of its consequences (e.g., floods, droughts) and observe a positive effect on intention to adopt renewable energy. Neither of these studies measures any effect over time; nor do they examine the effect of the manipulations on real behaviors (as opposed to attitudes or behavioral intentions). Behavioral intentions most likely overstate willingness to take actions (since hypothetical actions are easier to take than real ones), but they may actually understate the effect of emotion-evoking stimuli by failing to provide real opportunities to dispel negative emotions. In the present research, we expose research participants to emotional and nonemotional videos related to global warming and elicit their willingness to engage in a real, costly behavior—donating to an environmental organization—either immediately after watching an emotional ad or after a time delay.

Given findings that emotions affect proenvironmental attitudes and behavioral intentions, a remaining key distinction when it comes to the impact of emotional stimuli on proenvironmental behaviors, is the role of discrete emotions. Smith and Leiserowitz (2014) find that being "worried" about global warming has a strong relationship with people's policy support for global warming issues and that being "disgusted" has a strong negative association. Fearful messages about climate change have been shown to have perverse (negative) effects on people's engagement with global warming (O'Neill and Nicholson-Cole 2009), perhaps replicating the common finding in the "fear appeals" literature that fear can have negative results when there is a lack of perceived self-efficacy (Witte and Allen 2000). More broadly, prior research on prosocial behavior has shown that sadness, in particular, triggers prosocial behavior, which proenvironmental decisions could be considered an example of. Sadness seems to elicit actions to help others, perhaps as a way to repair or regulate one's emotions (Cialdini,

Schaller, and Houlihan 1987; Small and Verrochi 2009). In addition, among emotions with negative valence, the appraisal-tendency framework (Lerner and Keltner 2000) posits that sadness causes people to try to improve their current circumstances. In contrast, anger is associated with dispositional factors that trigger attributing responsibility for adverse situations, such as global warming, to other people. Supporting such a link, Small and Lerner (2008) find that sadness leads to greater provision of assistance to a welfare cause compared with a neutral stimulus, whereas anger discourages altruistic action.

In this article, in a preliminary study we first explore the impact of elicited discrete emotions on proenvironmental behavior using a selection of videos and find that sadness, compared with other negative emotions, has the greatest effect on proenvironmental action. In the studies that follow, we use emotional ads focused on sadness. On the basis of our previous discussion about the effect of emotional ads on proenvironmental behavior and sadness, we hypothesize:

H_1: Sadness-evoking ads promote a greater willingness to take proenvironmental action than nonemotional ads immediately after viewing, and this effect is mediated by self-reported sadness.

On the basis of the research discussed on the brief effects of emotional interventions, we further hypothesize:

H_2: The impact of sadness-evoking ads diminishes after a cooling-off period, but the same time delay does not have this effect for nonemotional ads. Self-reported sadness mediates this effect.

One interesting prediction made by Matthes, Wonneberger, and Schmuck (2014) is that emotional ads should mainly work on people who are not concerned with the environment. This is explained through theories such as the elaboration-likelihood model (ELM; Petty and Cacioppo 1990), in which people with low involvement may use affect as a cue, resulting in potential attitude change. In contrast, those who are already highly involved should, according to the ELM theory, be less affected by the affective content and more by the informational content of the ad. However, Matthes, Wonneberger, and Schmuck (2014) fail to confirm this hypothesis, finding no difference in the impact of an emotional green ad on participants who differed in level of environmental concern. One possible reason for this null result is that environmental concern does not translate into attitudes toward brands or ads (their outcome variables). It is also possible that environmental concern was itself affected by the ad.

Here, we use a measure of involvement based on asking participants to rank global warming concern, among other environmental issues, and then examine whether it affects a behavioral measure. On the basis of ELM theory, we hypothesized:

H_3: Participants with low global warming concern are more affected by sadness-evoking ads than those with high global warming concern.

Regarding policy, a question unaddressed by prior research is whether people are aware that the emotion-evoking videos they are exposed to affect their behavior, as well as whether they are aware that as time passes, emotions and their effects on behavior are likely to diminish. If people are aware that the intensity or behavioral consequences of emotions fade over time, they may use this insight to strategically delay responding and not incur the cost of acting. This would be consistent with situations in which people strategically prefer to remain unaware that actions that benefit themselves may harm others (Dana, Cain, and Dawes 2006; Dana, Weber, and Kuang 2007). Whether people use delay strategically or are simply subject to its effects, warning them that emotions and emotion-driven behaviors tend to diminish over time should make the act of delaying appear selfish. Thus, we hypothesize:

H_{4a}: Sadness-evoking ads that contain an emotional cooling-off warning promote greater willingness to take proenvironmental action (vs. an ad without the warning) after a time delay.

In addition to the warning, we test the impact of another intervention that can be categorized as a form of "libertarian paternalism" (Thaler and Sunstein 2003): campaigners could ask individuals to make nonbinding commitments for future behavior when emotions are elevated, while giving them the option to change their decision in the future. Previous research on intention–goal achievement, though not related to emotional advertising or environmental reaction, has found that stating intentions affects future behavior by promoting goal attainment (for a meta-analysis, see Webb and Sheeran 2006). This literature has shown that intentions predict a moderate part of behavior (Gollwitzer and Sheeran 2006) and that affective attitudes may change intentions (French, Sutton, and Hennings 2005). Nonbinding commitments can also have an impact if people are motivated to behave in a fashion consistent with their own declared intentions (Cialdini 2009). Suggestive of such a mechanism, Baca-Motes et al. (2013) find that guests at a hotel take more environmentally friendly actions when they are asked, at check-in, for a written agreement to take such actions. Therefore, we expect:

H_{4b}: Sadness-evoking ads that request an immediate intention have a greater impact on behavior after a delay than sadness-evoking ads not accompanied by such a request.

From the previous hypotheses, we can state that the present research makes several contributions to the reviewed literature, and especially to the public policy space, that may inform practitioners. First, it tackles methodological issues from the previous literature using dependent variables that involve real costs, such as time and money, and explicitly manipulating the time delay in the experiments. Because we expect emotions evoked by videos to cool off quickly, we use a cooling-off period of one hour in one study and one day in two studies; most prior experimental research has not contrasted decisions taken immediately with those following a delay during which emotions have an opportunity to dissipate. Furthermore, drawing on ELM theory, we examine whether people with lower (vs. higher) concern over global warming may be more affected by the sadness-evoking ad and, therefore, by the effect of a time delay.

Second, the research tests two different interventions to offset the effect of the time delay, expanding the literature on social marketing. One intervention involves warning people that emotions affect behavior and that these emotions tend to cool off with time delay. This intervention is important because practitioners may assume that warning people about the consequences of time delay after watching a sadness-evoking ad will increase their motivation to act on their current perspective,

increasing the ad's effectiveness. Another intervention involves eliciting behavioral intentions immediately after exposure to an emotional stimulus. Such intentions can be viewed as a form of voluntary commitment, which has been shown to be an effective tool in promoting behavior change (e.g., Schwartz et al. 2014). We add to this literature by testing whether the motivation to take action activated by emotional appeals can be made to "stick"—that is, to persist over time—if accompanied by the elicitation of behavioral intentions.

The article reports findings from five studies, plus a preliminary study that was conducted with the goal of selecting stimuli for subsequent studies. The preliminary study compares four emotion-evoking and one nonemotional video, all related to global warming, and their effect on willingness to devote time to an energy-footprint calculator. Study 1 then compares the impact on donations to a global warming cause of a sadness-evoking video related to global warming and a nonemotional video. This study also includes a sadness-evoking stimulus unrelated to global warming to test whether the content of the video is important or whether, in contrast, any impact arises from the effect of sadness per se. Study 2 incorporates a time delay and shows that the impact on behavior of the sadness-evoking stimulus diminishes with time delay but that the same decline does not occur for a nonemotional stimulus. In these studies, we examine whether sadness mediates the differences in donations between videos and before and after a delay, as well as whether the sadness-evoking videos particularly affect the behavior of people who are less concerned about global warming. The next two studies (3 and 4) test the effectiveness of interventions intended to overcome the diminishing donation effect of time delay. Study 3 examines the effect of announcing that the emotions evoked by the videos will fade as time passes, as well as the effect of allowing the participant to choose whether to delay making a choice about taking action to help mitigate climate change. Study 4 examines a different intervention: adding a nonbinding commitment after participants watch the sadness-evoking video. We conclude with a discussion of policy implications, limitations, and directions for future research.

Preliminary Study

The goal of the preliminary study is to examine the immediate effect of watching either nonemotional or emotional ads related to global warming. The study tests different affective and nonaffective videos for potential use in the subsequent studies. It further examines the effect of specific emotions on willingness to take proenvironmental action.

Method

Participants (N = 520), recruited from Amazon Mechanical Turk (MTurk; Paolacci, Jesse, and Ipeirotis 2010) to answer a five-minute online study, were randomly assigned to watch one of five short (less than three-minute) videos about the consequences of climate change. An online tool enabled us to track the time spent on each part of the study, and 48 participants who did not watch the videos were excluded from the analysis (analyses including these participants can be found in the Web Appendix), leaving 472 participants (mean age = 32.4 years; 57% female) included in the analysis.

Four videos, all of which had been found to evoke similarly strong levels of emotions in a pretest, but which varied in information content, were selected from a longer list of film clips. One video was a short clip with sad background music showing how polar bears and penguins are affected by global warming. Two videos were based on scenes from the movie *An Inconvenient Truth*: one showed the dramatic rise in global temperatures, and the other was about the effect of higher temperatures at the poles. The fourth video showed dramatic images and graphs of how the earth has been warming in recent decades. A fifth video was selected with the intention of evoking no emotional reaction—hereafter, the "nonemotional" video. This video showed a person explaining the science of global warming (mainly about the effect of greenhouse gases accumulating in the earth's atmosphere).

After watching one randomly selected video, each participant responded to the prompt "Please rate how you felt when watching the video for each of the following emotions," reporting the intensity of five negative emotions (anger, disgust, fear, sadness, and anxiety) on a scale anchored by 1 = "not at all" and 7 = "very strongly." Next, they answered a few questions about the video (e.g., whether they learned new things, whether they thought the video was about an important topic, whether they thought the video was credible). As a behavioral measure, participants were then requested to volunteer their time (between zero and five minutes) to complete an energy-footprint calculation at the end of the study. Participants were instructed that this was an optional task, that they would receive their payment independent of their decision, and that answering more questions would take more time but would also be "a way of taking more action about global warming." Before finishing the study, participants were asked additional questions (about demographics and attitudes toward the environment; for details, see the Web Appendix), including an open-ended question: "Please tell us why you decided (not) to answer the energy and water calculator earlier in the survey." There was no deception; at the end of the study, participants answered a version of the energy-footprint calculator question tailored to the amount of time they had specified they were willing to devote to the task. We also asked whether participants had watched the video before, along with other questions intended to measure potential problems with the studies, to characterize the sample, and as manipulation checks (all questions available in the Web Appendix).

Results and Discussion

Across conditions, there were no differences in whether the research participants failed to watch the whole video (9.23% on average; $p = .90$). A linear regression (with robust standard errors) revealed that participants who watched the emotion-evoking videos decided to spend more time on the energy-footprint calculator (M = 2.08 minutes, SD = 1.94) than those who watched the nonemotional video (M = 1.67 minutes, SD = 1.63; $\beta = .41$; $t(467) = 2.08$, $p = .04$). Individually, each emotion was reported to be more intense by those who had watched an emotion-evoking video than by those who had watched the nonemotional video (all $p < .01$). However, sadness was the only emotion that was significantly related to time volunteered, once all emotions were included as regressors ($\beta = .14$, $p = .04$; variance inflation factor [VIF] = 2.82). A mediation analysis using a percentile bootstrap procedure with 1,000 replications

(Preacher and Hayes 2008) indicated that sadness mediated time volunteered on the calculator (b = .29, 95% confidence interval [CI] = [0.13, .49]). Specifically, watching the emotion-evoking videos (vs. the nonemotional video) increased reported sadness ($\beta = 1.91$, $p < .01$). Once sadness was included in the model as a regressor, it still caused more time to be volunteered ($\beta = .15$, $p < .01$), but watching the emotion-evoking videos (vs. the nonemotional video) did not ($\beta = .12$, $p = .60$). Because participants reported their emotions before the behavioral measure was taken, we must consider that reported sadness, or any other emotion, may have increased the time volunteered because participants attempted to repair a negative emotional state that was made salient through a direct question (Chen, Zhou, and Bryant 2007). This possibility was confirmed in a pilot study detailed in the Web Appendix, which showed that asking participants to report emotions before requesting a charity donation increased donations versus when emotions were asked about after the request had been made. In addition, most online social marketing campaigns request an action, such as donating money, without first asking for a report of emotions. For these reasons, the subsequent studies asked about emotional states only after requesting that an action be taken.

The participants' responses to the question about their reason for volunteering (or not volunteering) to engage with the energy-footprint calculator were coded. We found that the majority of participants answered this question (94.9%) but, consistent with prior research showing that people are often unaware of the factors that influence their behavior (Nisbett and Wilson 1977), only .9% of them mentioned the video they watched among their reasons (e.g., "I found the video interesting and wanted to see what the energy and water calculator was about"), with no difference found across videos (χ^2 (4) = 3.60, $p = .46$). Most of the participants' reasons were based on environmental concerns (e.g., "I felt that it would allow me to measure how I was affecting the environment"), time constraints (e.g., "do not have time today"), or other reasons (e.g., "curiosity").

The results of this preliminary study support the idea that, at least immediately after exposure to the stimuli, more emotionally evocative videos about global warming have a greater impact than a nonemotional video on the likelihood that people will take proenvironmental actions. They also indicate that this is especially true when sadness is evoked (supporting H_1).

Study 1

Study 1 replicates the finding of an immediate impact of emotional videos, using the most effective sadness-evoking video, as well as the nonemotional video, from the preliminary study; however, it incorporates a different dependent variable. To avoid the problem from the preliminary study whereby self-reporting of emotions may have amplified the videos' impact on time volunteered, in this study, participants made action decisions before self-reporting their emotions. This study also includes an additional sadness-evoking ad not related to global warming, to examine whether it was important for the elicitation of proenvironmental behaviors that sadness was evoked by a video that dealt with climate change or whether sadness evoked by a video unrelated to climate would have a similar impact. Finally, this study also examines differences in responses to the stimuli between people who were high and low in concern about global warming.

Method

Participants (N = 738) were recruited from Prolific Academic, a U.K.-based crowdsourcing platform (for demographics and a comparison between this crowdsourcing platform and MTurk, see Peer et al. 2016), to participate in a five-minute study "evaluating a video about environmental issues." As in the previous study, some people (63) did not watch the whole video and were excluded from the analysis. The analyses were conducted with 675 participants (mean age = 32.1 years; 51.8% female). In addition to a payment of £.50 for each participant, five prizes of £60 were offered.

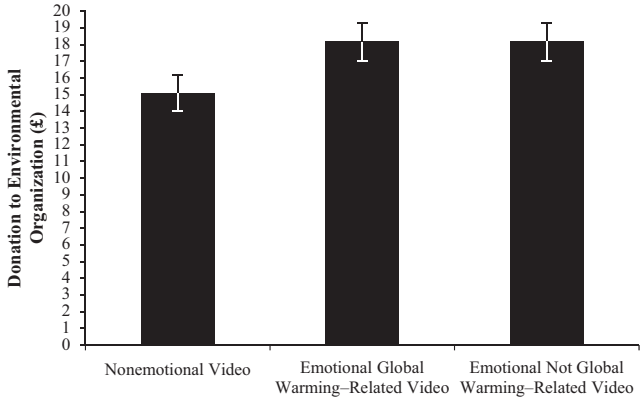
Participants were randomly assigned to watch one of three videos. Two videos were selected from the preliminary study because they evoked the largest difference in emotional response: the sad video (the short musical clip showing how polar bears and penguins are affected by global warming) and the nonemotional video (of a person explaining the science of global warming). In addition, participants in the preliminary study reported that these videos were no different in credibility or importance ($p = .34$ and $p = .76$, respectively) (participants did learn "new things," as expected, from the nonemotional video; $p < .01$). A third sad video, not related to global warming, was selected because it evoked, in a pretest, similar levels of self-reported sadness as the sad video on global warming ($p = .56$). The theme of this video, in which a child has to pick up food from the floor, is related to poverty, and it uses the same sad music as the global-warming video.

After watching the videos, participants were asked to take a proenvironmental action, either immediately or one hour later: "As you know, five people who participate in this study will receive a £60 bonus payment. In case you are one of them, we would like to give you the opportunity to donate part or all of the £60 to an environmental organization—the World Wildlife Fund (WWF)—to contribute to climate change mitigation." Participants entered a number between £0 and £60 (donations and bonuses were paid when the study ended). Then, they reported their current emotional state ("Please rate how you feel for each of the following emotions"), based on the same list of emotions used in the previous study. Next, participants answered demographic questions. Finally, we included a question from the Gallup poll (Saad 2011) to measure their concern about global warming relative to other environmental issues (e.g., "pollution of rivers, lakes, and reservoirs"). At the end of the study, participants were asked to explain how they had made their donation decision.

Results and Discussion

There were no differences across conditions in whether participants failed to watch the whole video (8.6% on average, $p = .51$). Pairwise comparisons revealed, and Figure 1 shows, that participants entered a 21% larger donation after watching the sadness-evoking, global-warming-related video (M = £18.2, SD = 16.9) than after watching the nonemotional video (M = £15.1, SD = 16.4; F(1, 672) = 3.87, $p = .05$). Those who watched the sadness-evoking video about poverty also offered a 21% larger donation (M = £18.2, SD = 17.0) than those who watched the nonemotional video (F(1, 672) = 3.82, $p = .05$). There was no difference between the two affective videos (F(1, 672) < .01).

Figure 1. Mean Donations (£) by Participants in Each Condition: Study 1



Notes: Error bars represent ±1 SE.

Even though the videos may have evoked different emotions, when all emotions are included as regressors, replicating the finding from the preliminary study, sadness is the only emotion that significantly affects the outcome variable (the donation decision) ($\beta = 1.64$, $t(669) = 3.81$, $p < .01$; VIF = 2.36). To further examine whether sadness could explain the difference in donations across videos, we conducted a mediation analysis, as performed in the previous study. We found that sadness fully mediated the donation decision when people had watched either the global-warming-related emotional video (b = 3.11, 95% CI = [1.59, 4.77]) or the poverty-related emotional video (b = 3.26, 95% CI = [1.58, 4.87]) instead of having watched the nonemotional video. First, watching the emotion-evoking video related to global warming, or the video not related to global warming, increased self-reported sadness ($\beta = 2.21$, $p < .01$; and $\beta = 2.30$, $p < .01$, respectively). As we showed earlier, watching an emotion-evoking video increased the donation amount for the global-warming-related and poverty-related videos ($\beta = 3.08$, $p = .05$; and $\beta = 3.07$, $p = .05$, respectively) (vs. the nonemotional video). However, sadness accounts for a major part of this effect: Neither of the emotion-evoking videos explains any of the difference in donation amount ($p > .90$ in both cases) once sadness is included in the model, whereas this emotion still affects the outcome ($\beta = 1.40$, $p < .01$).[1] This replicates the findings from the preliminary study, supports H_1, and strongly points to sadness per se being the cause of the effect, as opposed to the specific content of the ad.

Not surprisingly, donations are positively related to concern about global warming, as ranked by participants among other environmental issues ($\beta = .69$, $p = .02$).[2] There was no difference in global warming concern across conditions ($F(2, 669) = .41$, $p = .66$), indicating that the different stimuli did not affect individuals' inherent concern. Pairwise comparisons revealed that those who indicated lower global warming concern, based on a median split of the sample,[3] donated 35% more money just after watching the global-warming-related emotional (vs. nonemotional) video ($F(1, 352) = 3.91$, $p = .05$). This effect was fully mediated by reported sadness (b = 2.65, 95% CI = [.39, 4.90]). This difference was not significantly different from zero for those with high global warming concern (5.6% difference; $F(1, 314) = .18$, $p = .67$). However, the linear interaction using the whole sample was not significantly different from zero ($\beta = 3.69$, $p = .24$). Consistent with ELM theory and H_3, these results suggest that the global-warming-related emotion-evoking video is especially effective in raising donations from participants with lower global warming concern. In the following studies, we examine whether a similar pattern can be seen when there is a time delay between the video and the participant's decision—that is, whether the time delay has a bigger impact on people who are less concerned about global warming (vs. people who are more concerned).

The differences between the donations made by those who had watched the poverty-related video and those who had watched the nonemotional video were similar regardless of concern about global warming: for participants with low global warming concern, the difference was 19.4% ($F(1, 352) = 1.65$, $p = .20$), and for those with high global warming concern, it was 21.8% ($F(1, 314) = 2.17$, $p = .14$). These results indicate that the theme of the video does not need to be related to the target behavior, consistent with the literature on incidental emotions and evidence on sadness as a driver of altruistic behavior (Small and Lerner 2008). However, from a policy perspective, it is often inappropriate to use videos that are unrelated to the target behavior (e.g., a video about AIDS ending with a request for donations to save pandas). In the following studies, we continue to use the video related to global warming to evoke sadness, even though the effect of the video unrelated to global warming does seem to suggest that the effect comes from the emotion rather than the topic itself.

When asked how they had made their donation decision, the large majority of participants provided a reason (91.3%), but only a few (3.9% on average, but 5.4% for the climate-related sad video) mentioned the video, with no difference across

[1]Elements other than emotional states may differ between the videos. Specifically, people reported having learned more from watching the nonemotional video than the emotional videos. We found that when we controlled for "learning new things," donations after watching the sad climate-related video and the sad poverty-related video actually increased (vs. after watching the nonemotional video; $\beta = 4.08$, $p = .01$; $\beta = 4.31$, $p = .01$, respectively). Differences between the videos are detailed in the Web Appendix.

[2]A very small number of participants left this question unanswered. We conducted the analysis replacing missing values with corresponding means, and the results were practically the same. Analyses replacing these few missing values are presented in the Web Appendix.

[3]There is an ongoing debate about the use of median splits (Iacobucci et al. 2015a, b; McClelland et al. 2015). The conditions in which median splits may be justified are related to cases where there is no correlation between X (the experimental conditions) and Z (the continuous variable) in large samples. In this research, across the studies, the maximum correlation was $|r| = .06$, with all $p > .10$, and this was the highest value (in general, $|r| < .02$). In addition, the ranking of global warming among other environmental issues can be considered a noisy measure of concern, as people would undoubtedly rank it first or second if they really cared about global warming, but after third or fourth, they would probably find it difficult to rank, given that the issue was not a priority. The decision to use the median split for these reasons was made after Study 2 had been conducted and before Studies 1, 3, and 4. We describe the order in which the studies were conducted in the Web Appendix.

conditions ($\chi^2(2) = 2.35$, $p = .31$). Many reasons were related to environmental issues (e.g., "I don't believe that global warming is a big deal") or monetary issues (e.g., "I am completely poor and need money"). As in the preliminary study, few participants recognized any influence of the stimuli.

Study 2

Study 2 replicates Study 1, examining the differential impact of the sadness-evoking and nonemotional videos, but it includes a time delay between the video and the participants' decisions. As described in the introduction, we expected the time delay to cause emotions to cool off and to reduce or eliminate any difference between the effects of the ads.

Method

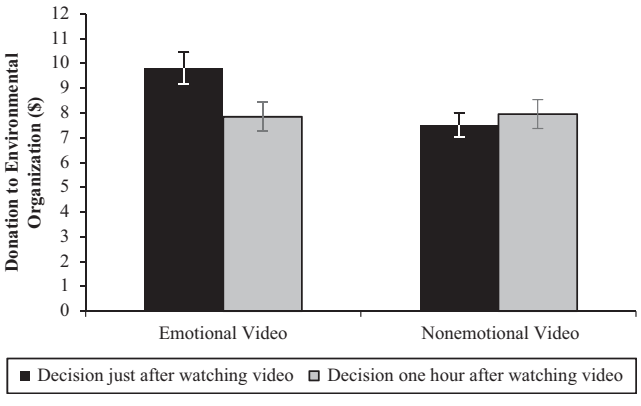
Participants (N = 783) were recruited using MTurk. In this study, participants were again entered into an announced raffle for five prizes, this time for $30. They were randomly assigned to one cell of a 2 × 2 between-subjects factorial design with two levels of emotional videos (emotional vs. nonemotional) and two levels of timing regarding when they were asked to take an action (immediately after watching the video vs. one hour after watching the video), using the same global-warming-related sadness-evoking video and nonemotional video used in the preliminary study and Study 1. In all conditions, participants had to answer both parts of the study; conditions only differed in *when* participants were asked how much they would like to donate to the WWF. After they had made this decision, they reported their current emotional state (based on the same emotions as in the previous studies). Participants could spend their time on any activity between parts, and after one hour, they automatically received a reminder by e-mail to complete the second part of the study. Participants also answered demographic questions, ranked their concern about global warming relative to other environmental issues, and answered the open-ended question about how they had made their donation decision. We excluded 46 participants because they did not watch the whole video and 50 more because they did not complete both parts of the study.[4] This left 687 participants (mean age = 31.5 years; 49.3% female) included in the analysis.

Results and Discussion

Between conditions, there were no differences in failure to watch the whole video (5.9% on average, $p = .27$) or attrition rate (6.8% on average, $p = .26$). We suspect that participants who failed to complete the study did so as a result of not checking their e-mail (and thus not receiving the reminder) or because they entered an email address with typos (emails were sent automatically using the information they provided). However, the reminder worked: almost all participants continued completing the study after one hour; the 50th, 75th, and 90th percentiles were 60.1, 60.3, and 72.4 minutes, respectively, with no significant difference across conditions (all $p > .10$). Linear regressions with robust standard errors and pairwise comparisons revealed that participants who had watched the sadness-evoking video offered to donate 25% more money when they had just watched the video (M = $9.81, SD = 8.58) than when they had watched it one hour earlier (M = $7.85, SD = 7.78; $F(1, 683) = 5.04$, $p = .03$). In contrast, time had no impact on those who had watched the nonemotional video; those who made a donation decision just after watching the video (M = $7.52, SD = 6.58) offered a similar amount as those who made the donation decision one hour later (M = $7.96, SD = 7.46; $F(1, 683) = .33$, $p = .57$). As depicted in Figure 2, in addition, participants who watched the sadness-evoking video offered to donate more money (30%) than participants who watched the nonemotional video when donations were made just after watching the video ($F(1,683) = 7.82$, $p < .01$). However, one hour after watching the video, there was no difference in the donation amount between those who had watched the sadness-evoking video and those who had watched the nonemotional one ($F(1, 683) = .02$, $p = .89$). Consistent with these patterns, we find a significant interaction between the emotional (vs. nonemotional) video and whether participants made their donation decision just after (vs. one hour after) watching the video ($\beta = 2.40$, $t(683) = 2.06$, $p = .04$).

We conducted a mediation analysis as in the previous studies, but now examining the effect of the delay on those who had watched the emotion-evoking video. We again focused on sadness because it was the only emotion that affected the donation decisions of the participants who had watched the emotion-evoking video, either immediately or one hour later ($\beta = .78$, $p = .10$; VIF = 2.65). First, linear regressions revealed that sadness was reported as weaker by those who reported their emotions one hour after watching the video than by those who reported their emotions just after watching the video ($\beta = -1.51$, $t(348) = -6.98$, $p < .01$). Second, donations were smaller when participants made their decisions one hour after watching the emotional video ($\beta = -1.96$, $t(348) = -2.23$, $p = .03$) than when they made their decisions immediately after watching the video. However, third, this effect became nonsignificant when sadness was included in the regression model ($\beta = -1.09$, $t(347) = -1.15$, $p = .25$), while sadness still affected the outcome ($\beta = .57$, $t(347) = 2.53$, $p = .01$). These results suggest that the cooling-off

Figure 2. Mean Donations ($) by Participants in Each Condition: Study 2



Notes: Error bars represent ±1 SE.

[4]For this and the following studies, we used MTurk IDs and the Prolific Academic prescreening tool to exclude any person from participating in a study more than once.

of participants' sadness, as reported by participants one hour after watching the sadness-evoking video, explains why they decided to donate less to the WWF. The indirect effect, using a percentile bootstrap method, indicates significant mediation by sadness (b = –.87, 95% CI = [–1.62, –.16]), supporting H_2. We also conducted a mediation analysis for those who made their donation decision just after watching either the emotional or the nonemotional video, as we did in the previous studies. In this case, not only did greater sadness affect donations at the 5% significance level (β = .71, p = .01; VIF = 3.05), but greater disgust also did so, reducing donations (β = –1.05, p = .03). This last negative coefficient can be explained by previous research that has found that feelings of disgust are negatively associated with support for climate change policies (Smith and Leiserowitz 2014). However, disgust does not mediate the effect on donations (b = .04, 95% CI = [–.27, .35]), whereas sadness does mediate the effect (b = .55, 95% CI = [.04, 1.09]), replicating the previous results.

Finally, we analyzed the impact of the manipulation by breaking participants down according to their concern about global warming. Again, participants with greater concern about global warming, relative to other environmental issues, donated a larger amount (β = .48, t(676) = 3.77, p < .01), and global warming concern was not different across conditions (F(3, 677) = 1.64, p = .18). Further analysis revealed the pattern to be consistent with ELM theory and H_3: pairwise comparisons revealed that those who indicated lower global warming concern decided to donate marginally significantly more money (28.2%) just after (vs. one hour after) watching the emotion-evoking video (F(1, 343) = 2.74, p = .10), and this effect was mediated by reported sadness (b = –1.17, 95% CI = [–2.41, –.15]). For those with a high level of concern, the difference in donations between time delay conditions (15.0%) was not significantly different from zero (F(1, 330) = 1.15, p = .28). The effect of the interaction between the delay and the type of video for those with a low level of concern was β = 3.24 (p = .04), and that for those with a high level of concern was β = 1.11 (p = .51). However, the effect of the three-way interaction between video type, time delay, and level of concern, using the whole sample, was not significantly different from zero (β = 2.13, p = .36).

As in the previous studies, nearly all participants answered the question about how they had chosen the amount to be donated (97.8%). Many reasons were related to whether they liked the WWF, their beliefs about global warming, and monetary constraints (e.g., "The chosen charity, although well-known and well respected, is not one of my favorites..." or "I felt it was a worthwhile organization to donate to. I am also short on money, so I didn't donate the entire amount"). Only 1.3% expressed reasons associated with the videos they had watched (e.g., "I made my decision based on the amount of bonus I'd receive and [be]cause I was very inspired by the video"), with no difference across conditions ($\chi^2(3) = 5.52$, p = .14).

The previous studies showed the impact of watching a sadness-evoking video (vs. a nonemotional video) on the decision to donate or volunteer time immediately after watching. This study replicates this effect and shows that after a time delay, once emotions have cooled off, there is no difference in donations between those who watched the sadness-evoking video and those who watched the nonemotional one. From the perspective of a policy maker or marketing campaigner, it would be desirable to translate the effect of emotions exhibited immediately after watching the ads into decisions that happen following a delay, since many important decisions are not made immediately after receiving an emotional stimulus. The next study tests the impact of an intervention that fits the definition of "light paternalism"—specifically, warning participants that emotions cool off—on the behaviors that emotions motivate.

Study 3

The goal of Study 3 is to examine an informational intervention in which participants are warned of the effect of emotions on behavior. A warning may help participants realize that they could end up donating less if they postpone their decision. It may also block participants' strategic behavior, in terms of using the delay to donate less, as discussed in the introduction to this article. To avoid any sort of coercion, the study also provides a choice mechanism, by asking people to choose whether they prefer to donate immediately after watching the sadness-evoking video or after a delay. This study interacts choice and warning, in different experimental conditions, to tease them apart.

Method

Participants (N = 610) were recruited from Prolific Academic. As in Study 1, they could earn an extra bonus, one of five prizes of £60. Like the previous study, this one unfolded in two parts. In the first part, all participants watched an emotion-evoking video (a shorter version of the emotional video used in Study 2). The second part was sent to participants the next day using Prolific's "Send Message Participants" function, which allows messages to be sent to a list of participants. We excluded 48 participants because they did not watch the whole video and 42 more because they completed the first part but not the second part. The final sample comprised 520 participants (mean age = 32.3 years; 46.3% female).

Participants were randomly assigned to one of five experimental conditions. The first two were replications of the conditions in Study 2, in which participants watched the global-warming-related sadness-evoking video. The other conditions examined the effect of a "warning message" and the effect of choosing to postpone a donation. The conditions were, therefore, as follows:

1. Baseline—first part condition: After watching the video, participants were asked to donate part of the £60 to the WWF.
2. Baseline—second part condition: Same as condition 1, but the donation decision was requested the day after they had watched the video.
3. Choice—first part condition: Participants were given the option either to make the donation decision right after watching the video—if so, a box popped up for them to enter an amount—or to postpone this decision until the next day: "You can choose an amount to donate either today or tomorrow (in the second part of the study). Would you prefer to choose the amount to donate now or when you do the second part of the study (tomorrow)?" Those who postponed making a donation offer were asked to enter an amount the next day.
4. Choice and warning—first part condition: Same as condition 3, but before participants decided whether they wanted to donate their money, and right after watching the video, they read the following warning message: "Before you make a decision, please consider the following: In previous studies we have found that people are more likely to donate, and to donate

more, right after they watch the video. When time has passed since people have watched the video, and the emotions that the video evokes have cooled down, people are less likely to donate, and when they do donate, they donate smaller amounts."

5. Warning—second part condition: Same as condition 2, in which participants made the donation decision the day after watching the video, but before deciding on any donation amount, they saw the same warning message as in condition 4.

The first four columns of Table 1 summarize the five conditions. At the end of the second part of the study, in all conditions, the participants answered the question from the Gallup poll (Saad 2011) used in Study 2, which measured their concern about global warming.

Results and Discussion

The last three columns of Table 1 summarize the results. Across conditions, there were no differences in whether participants failed to watch the whole video (7.9% on average, $p = .23$). In addition, as in the previous studies, and despite the longer time window, attrition rates were low (7.47% on average) for all conditions, with no differences across them ($p = .45$). In addition, given that the link to the second part was only sent out on the morning of the next day, participants continued completing the study after a delay of at least eight hours: the 50th, 75th, and 90th percentiles were 1.16, 1.92, and 2.05 days between parts, respectively. Those in the first condition continued the study a little sooner (Mdn = .96 days, $p < .01$).[5] As shown in Table 1, pairwise comparisons between conditions revealed that participants donated 45.0% more when they had just watched the video (baseline—first part; M = £17.80, SD = 16.15) than when they were asked to make a donation the day after watching the emotion-evoking video (baseline—second part; M = £12.28, SD = 12.84; $F(1, 515) = 7.11$, $p < .01$). When participants were given a simple choice between donating just after watching the video or postponing this decision to the next day (choice—first part), 49% chose to offer a donation, offering an average of £21.92 (SD = 16.3). Donations among the 51% who postponed the decision were lower: £11.28 (SD = 12.1). Considering both parts, regardless of whether they postponed the decision, these participants offered an average donation of £16.50 (SD = 15.2), which is 34% more than those who were only given the option of donating the next day (baseline—second part; M = £12.28, SD = 12.84; $F(1, 515) = 4.65$, $p = .03$) but very similar to the amount donated by those asked to donate right after watching the video (baseline–first part; M = £17.80, SD = 16.15; $F(1, 515) = .35$, $p = .56$). This indicates that presenting individuals with a choice may have been a useful strategy to sort people who wanted to donate (49% of participants) from those who did not (51%): final donations (choice–first part) were as high as they were when participants were only allowed to donate on the first day (baseline—first part) and higher than when they were only allowed to donate on the second day (baseline—second part).

The warning message had no effect on whether people chose to donate on the first or second day ($p = .63$). Nor did it affect people's donation amounts offered when the warning was introduced in either the first part of the study (choice and warning—first part vs. choice—first part; $p = .65$), or the second part (warning—second part vs. baseline—second part; $p = .64$). This suggests that explicitly warning participants that emotions will diminish and affect their donations has no effect, thus failing to support H_{4a}.

As in the previous studies, greater global warming concern increased the donation offered ($\beta = .57$, $t(513) = 1.85$, $p = .07$), and there was no difference across conditions ($F(4, 514) = .34$, $p = .85$). Among participants with lower global warming concern (defined by the median split), those who were asked for a donation immediately after watching the video (baseline–first part), offered a much larger amount (82.9%, on average) than those who were asked for a donation on the day after watching the video (baseline—second part; $F(1, 237) = 5.91$, $p = .02$). This difference was much smaller (21.6%, but in the same direction), and not significantly different from zero, among those who reported greater concern about global warming ($F(1, 272) = .40$, $p = .53$). However, as in the previous studies, the interaction effect between time and concern was not significantly different from zero using the whole sample ($\beta = 3.78$, $p = .32$). Results for each condition, grouped by global warming concern, are detailed in the Web Appendix.

When asked to explain their donation decision, 96.9% gave a reason, but only a small percentage of participants (2.3%) mentioned the videos among their reasons, with no difference across conditions ($\chi^2(4) = 3.36$, $p = .50$). Reasons were more often related to the amount donated or the environment (e.g., "It's a good cause that deserves donations," "I need the money but would also like a charity to benefit").

Study 4

Pursuing the finding that people who could choose to donate right after watching the emotion-evoking video donated more than those who could only donate after a time delay, Study 4 adds a nonbinding commitment, intended to increase the likelihood that decisions adopted at a moment of emotional arousal will translate into actions after emotions have cooled off. For people who would have preferred to donate immediately after watching the sadness-evoking video, a nonbinding commitment should not make any difference because they can enter the same amount the next day. On the other hand, for people who would have chosen to donate after a delay, a nonbinding commitment allows them to enter a donation and then change it the next day if they choose to.

Method

Participants (N = 579) recruited from Prolific Academic could, as in the previous studies, win a bonus of £60. Participants again had to complete two parts; in the first, they watched the emotional video. Then, they were randomly assigned to one of two groups: (1) a group that saw no extra messages or requests but simply completed the first part of the study and then the second part (control group, or baseline) or (2) a group that saw the same warning message from Study 3 (without any choice), but with a request to enter a nonbinding donation amount: "We would like to ask you how much you would like to donate in the second part of the study" (nonbinding donation group). Participants were told, "The amount is not binding." All participants received an

[5]There was a technical problem sending the reminders that caused this difference. There was no difference in attrition rates across conditions, and the results were almost identical when we controlled for the time between parts (emotions should have cooled off after a few hours, as shown in Study 2).

Table 1. Mean Donations (£) by Participants in Each Condition: Study 3

Condition	Warning	Choice on Day 1	Timing of Donation	Donation Both Days	Donation Day 1	Donation Day 2
Baseline—first part	No	No	Day 1	17.8 (16.2)	17.8 (16.2)	
Baseline—second part	No	No	Day 2	12.3 (12.8)		12.3 (12.8)
Choice—first part	No	Yes	Day 1 or 2	16.5 (15.2)	21.9 (16.3)	11.3 (12.1)
Choice and warning—first part	Yes (day 1)	Yes	Day 1 or 2	15.5 (16.3)	20.2 (19.0)	10.4 (10.8)
Warning—second part	Yes (day 2)	No	Day 2	13.1 (13.6)		13.1 (13.6)

Notes: Standard deviations in parentheses.

automatic email with the second part of the study 24 hours after finishing the first part and were asked to enter a donation amount for the WWF, out of the possible £60 bonus. Participants in the nonbinding donation group read the same text as the control group; that is, the invitation to donate did not mention anything about their previous intention the day before. As in the previous study, participants answered demographic questions and ranked their concern about global warming relative to other environmental issues. We excluded 39 participants who did not watch the whole video in the first part and 64 more who did not complete the second part of the study. The final sample comprised 476 participants (mean age = 33.2 years; 55.9% female).

Results and Discussion

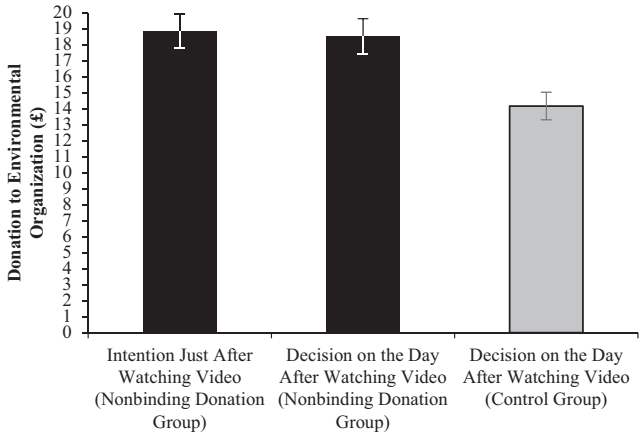
Across conditions, there were no differences in whether participants failed to watch the whole video (6.7% on average, $p = .38$) or in the attrition rate (11.9% on average, $p = .71$). Most participants responded to the second part right after receiving it; the 50th, 75th, and 90th percentiles were 1.04, 1.17, and 1.49 days between parts, respectively. As shown in Figure 3, participants' nonbinding donations entered just after watching the video were greater (by 33.1%; M = £18.90, SD = 16.77) than the amounts entered by the control group, who made their donation decisions one day after watching the video (M = £14.20, SD = 13.26; $F(1, 474) = 11.56$, $p < .01$). This replicates the finding from Study 2, even though participants in the nonbinding donation condition knew they would be able to change their decision the next day. Nevertheless, adding a nonbinding donation request caused participants in the nonbinding group to decide to donate, one day later, a very similar amount to what they had proposed the previous day ($r = .96$, $p < .01$). This high correlation between immediate intention and actual donation decision after a delay resulted in greater donation amounts on the second day of the study for participants in the nonbinding condition (30.8% difference; M = £18.57, SD = 17.01) compared with those in the control group ($F(1, 474) = 9.81$, $p < .01$), supporting H_{4b}. From a policy perspective, this suggests that asking people for a nonbinding commitment may be a useful tool for affecting behavior after a delay.

When we combined the two conditions, global warming concern did not significantly increase the amounts entered after the delay in this study ($\beta = .48$, $p = .18$) and there was no difference across conditions ($F(1, 471) = .17$, $p = .68$). More importantly, the same pattern as in the previous studies is evident: the greater amount entered after the delay was strongly driven by participants with lower global warming concern. Participants in the nonbinding group and those with a low level of global warming concern offered 41.2% more than participants in the control group ($F(1, 256) = 8.03$, $p < .01$). This difference was much smaller for participants with higher global warming concern (18% higher for those in the nonbinding donation group), and it was nonsignificantly different between conditions ($F(1, 213) = 1.98$, $p = .16$). Again, as in the previous studies, this indicates that an emotional message may be more effective for people who are less concerned about global warming (vs. people who are more concerned). Also, as in the previous studies, the effect of the interaction between experimental condition and concern was not significantly different from zero when the whole sample was used ($\beta = 2.88$, $p = .30$). This consistent result across studies should be treated with caution for two reasons: (1) like any heterogeneous effect, this effect is correlational; and (2) the interaction effect was not significantly different from zero in any of the individual studies. This may be due to lack of statistical power (because for the low- and high-concern groups, the emotional stimuli positively affected donations, the interaction effect is smaller than the individual effects). When all studies are pooled together, the effect of the interaction between high (vs. low) global warming concern and making an immediate (vs. delayed) decision after watching the climate-related sadness-evoking video is significantly different from zero at a 5% significance level ($p = .04$).[6]

Finally, and in line with all the prior studies, although 96.4% of participants provided a reason for their donation decision, only 2.3% of these recognized an effect of the video, with no difference between conditions ($\chi^2(1) = 2.18$, $p = .14$). Many reasons were related to monetary issues and/or ideas about global warming (e.g., "I am in kind of a difficult position right now and the money would be really helpful. In addition, I don't think it's up to the general citizens to be responsible for the environmental damage caused by large corporations."). Only one participant in the nonbinding donation group mentioned their previous decision: "I was affected and more generous

[6]Despite the reason described in footnote 3, we conducted the analysis using concern as a continuous variable ($\beta_{\text{sad video}\times\text{concern}} = .46$, $p = .14$). The positive coefficient means that donations were greater when people had just watched the sadness-evoking video and their concern about global warming was low (1 indicated the most important environmental concern and 7 the least).

Figure 3. Mean Donations (£) by Participants in Study 4



Notes: Error bars represent ±1 SE.

immediately after watching the video. After a day I was used to the idea and decided to honor it."

General Discussion and Policy Implications

The negative effects of excessive emotions have captured more attention in the emotion literature than those arising from a deficit of emotions. Yet, insufficient emotional reactions may represent an even more daunting problem for issues that change gradually and are difficult to discern at any moment, such as global warming. Even when problems such as climate change do evoke emotions, perhaps because of an episode of extreme weather, these emotions are likely to dissipate quickly. As a result, even stimuli that evoke powerful emotions, such as vivid images of polar bears drowning or fears elicited by short-lived extreme weather events, may fail to trigger sustained behavioral change.

Consistent with our initial predictions, our results suggest that when emotion, and specifically sadness, is activated, it can produce robust and substantial changes in behavior. In Studies 1 and 2, people donated 21%–30% more to an environmental organization after watching a sadness-evoking ad than after watching a nonemotional ad. Study 1 also suggests that this effect is driven by the emotion raised by the video and not by the topic of global warming itself. Furthermore, consistent with our second prediction, participants in Studies 2 and 3 offered to donate 25% and 45% more money to an environmental organization immediately after watching the emotion-evoking video than when asked to donate one hour or one day after watching it, respectively. We find that these results are explained by changes in self-reported intensity of sadness, and we do not observe a similar decrease after a time delay for nonemotional ads. Therefore, these findings suggest that organizations or individuals who would like to exploit emotions to induce behavior change must "strike while the iron is hot"—that is, lock in commitments when emotions (or at least sadness) are running high.

By the same token, policy makers should recognize that sadness-evoking ads are more conducive to some types of behavior change than to others. Specifically, they may be more applicable to one-time behavioral changes, such as installing energy-efficient light bulbs or purchasing a fuel-efficient car, than to ongoing behavioral changes, such as carpooling, which require people to take an action repeatedly. Broadly, our results suggest that successful public policy campaigns using emotional ads should elicit hard-to-change commitments after delivering an emotion-arousing stimulus. Insurance companies take advantage of emotional reactions after a calamity (e.g., Browne and Hoyt 2000), and, once insured, people probably tend not to take the time to cancel their policies when the emotions linked to the tragedy have quelled. Most environmental and energy-saving actions, however, are performed in contexts in which emotions have not recently arisen, which will limit the usefulness of messaging with emotional content.

Because many social marketing campaigns make requests for action that may take place after a time delay, our studies could guide practitioners about which interventions might be effective when using emotional appeals. In particular, Study 3 does not provide support for the efficacy of an intervention that we hoped might be a way to lengthen the effect of the sadness-evoking video; we do not find evidence that warning people that their donations may decrease as time passes results in increased donations. One explanation for this null result might be that people are not aware of the impact of emotional stimuli and therefore do not believe that such warnings apply to them. This interpretation is consistent with the small percentage of people across all studies who acknowledged (in response to the open-ended question) that the videos had affected their donation decisions. Policy makers may be tempted to introduce interventions that explain to people how a policy may affect its constituents (e.g., with a warning about how emotions may affect people's actions). Our results suggest that this strategy may be fruitless. However, this type of warning may be necessary (and desirable), especially considering the effect of a stimulus that people do not acknowledge as such. Research on preferences for policies that use behavioral "nudges" has shown that people prefer interventions that trigger a conscious behavioral change (Sunstein 2016).

Study 4, in contrast to Study 3, provides an effective way to reduce the decline in donations: by requesting a nonbinding commitment immediately after people watch an emotion-evoking ad. By comparing this study with the previous one, we may conclude that a certain segment of people might have reduced their donation amount after a time delay if they had not been asked for a nonbinding commitment. Even though we did not mention their intention from the previous day when we asked for their actual donation, most people decided to donate the same amount after the time delay that they had entered immediately after watching the sadness-evoking ad (the correlation was almost perfect). This suggests that a nonbinding commitment may trigger reasons (a cognitive process) to maintain donations when emotions have cooled off. For example, people may want to avoid thinking (again) about the issue and donate the same amount as the previous day, or they may try to be consistent with their previous answer (although only one person in Study 4 mentioned a desire for consistency among their reasons for donating the same amount as indicated

in their previous decision). This replicates previous research on commitment (Cialdini 2009) and extends it through the addition of an emotional appeal made just prior to the moment when the commitment can occur. Compared with previous studies in which participants have been asked to commit to a future behavior in the form of a pledge (e.g., in Baca-Motes et al. [2013], guests were asked to agree that "as a friend of earth, I will do my best to practice environmentally-friendly behavior during my stay"), however, in our study, participants were explicitly told that their intention was not binding. This intervention has practical implications for policy makers and social marketing campaigners using emotional ads. A video may end by asking people to state an intention (e.g., through Facebook) that entails some future behavioral change (e.g., "This month I will start donating to WWF and help the planet"), or by inviting people to donate but stating that they may change the amount or cancel their donation at any time. Cooling-off periods help people get out of decisions that they make under duress (e.g., Loewenstein, Sah, and Cain 2012), but in this case, they seem to have the effect of encouraging people to opt for, and subsequently adhere to, prosocial decisions. Results from all studies also suggest that policy makers and social marketing campaigners may benefit from targeting their campaigns toward people with lower concerns about global warming, who may be more affected by an emotional stimulus. Targeting emotional appeals toward those who seem least concerned about a problem is a strategy that is unlikely to occur naturally to marketers, but our results suggest that it may be the most effective one.

The responses to the open-ended questions in our surveys further suggest that people may not be aware of, or acknowledge, an emotional event acting as a trigger for behavioral change, raising a question about the ethical use of emotional cues. However, recent research has found that awareness of a nudge intervention does not necessarily eliminate its impact (Loewenstein et al. 2015). Moreover, even if participants were not aware of the impact of the emotion-evoking videos on their own behavior, they were certainly acutely aware of having viewed the video itself. Asking people for a nonbinding donation may be a relevant strategy for increasing the effectiveness of emotional ads, while at the same time avoiding any negative effect of being perceived as manipulative, which may create negative attitudes toward the ad itself (Verrochi Coleman and Williams 2013).

Limitations and Future Research

The studies presented are subject to limitations that commonly arise in laboratory and online experiments. In particular, participants may have tried to guess the objective of the research (demand effect). The preliminary study and Study 1 help rule out these demand effects by asking participants to donate their time or money. Future research could include a field experiment in which participants do not know they are participating in a study.

As shown in this and previous research, videos can effectively increase emotional arousal (Andrade and Cohen 2007). However, they typically activate more than one specific emotion (Gross and Levenson 1995). The main stimulus we used in these studies was intended to (and did) evoke sadness, but we did not systematically test the effect of videos intended to evoke different emotions in order to isolate the effect of specific emotions. Future research could productively compare whether the propensity to take action in response to an emotion-evoking stimulus depends on the specific emotion or emotions that are evoked.

The current studies underline the delicacy of the interaction between emotional and nonemotional approaches to behavior change. The emotion- and non-emotion-evoking videos used may have differed in other aspects than their emotional content—although the differences in their effects were shown to dissipate after a time delay. Given the absence of a control group with no stimulus, either informational or emotional, this study does not tackle whether informational videos are useful, a question that has been examined in other research (e.g., Grimmer and Woolley 2014).

Although one might conclude that the best approach would be to provide an emotion induction along with complementary information, Small, Loewenstein, and Slovic (2007) find that adding statistics to a picture of a single needy girl reduced charity donations to the same level as donations that were produced by statistics alone; the statistics seemed to undo the emotional impact of the picture. Future research could study long-term effects, comparing emotional and informational public policy interventions. In the short run, emotional public policy interventions seem more effective, and if it is possible to lock in commitments, they might be the best strategy for eliciting prosocial behaviors. If it is not possible to lock in a behavior, to the extent that information provision does change behavior, it seems likely to have a longer-term impact than inducing emotions, which tend to die out quickly. Future work could address the question of how long induced emotions continue to have an effect (we do not suggest that emotions evaporate immediately). Future research could also measure a behavior over time as an emotion-evoking stimulus is presented repeatedly. It would be interesting to see whether, with repeated presentation, emotion-evoking videos maintain their effect, produce a diminished effect over time, or even backfire.

Cooling-off periods are generally proposed as a solution to poor decisions made in situations in which emotions distort one's thinking (e.g., Lerner et al. 2015). The same logic suggests, however, that when emotions play a positive role, cooling-off periods can have an adverse effect. Here, we show that in situations in which beneficial actions are lacking, emotions open a brief window of opportunity for successfully promoting action.

In conclusion, we note that despite the prosocial focus of our studies, as the science of behavior change progresses, we cannot assume that any emerging insights will be used for the betterment of the individual or society. Different organizations have different interests and beliefs and will naturally seek to mold other people's beliefs and behaviors to conform to their own beliefs and satisfy their own interests. In the case of climate change, whether for reasons of cultural affinities (Kahan, Jenkins-Smith, and Braman 2011), economic interests, or simply a different interpretation of the data, people differ in their beliefs about whether climate change is real, caused by human activity, and able to be remedied through human action. Those on different sides of the issue will have a similar motivation to exploit any insights that arise from behavioral research and so advance what they perceive to be the collective interest. As compelling is the need to find ways to change behavior, therefore, there is a similarly urgent need for research

on ways to reach agreement, based on science, about the directions such behavior change should take.

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