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# Psychological Distance and Response to Human Versus Non-Human Victims of Climate Change

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## Abstract

Despite the serious threat of climate change to sustainability, people in the United States feel little urgency to address the issue. The goal of this research project was to use psychological methods to better understand why Americans respond to climate change the way they do, and to assess strategies to spur a

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stronger action-oriented response. Using Construal Level Theory as a foundation, three psychological studies explored the perceived psychological distance of climate change, empathy toward victims of climate change, and people's willingness to take action. Past research suggests that perceptions of low psychological distance toward climate change are associated with higher concern and willingness to take action. In the current research, participants read short scenarios about climate change and how it impacts specific victims, such as geographically and socially similar people (low psychological distance) or a geographically and socially dissimilar social agent such as an animal (high psychological distance). Using both self-report surveys and implicit methods, our studies examined the relationship between psychological distance and response to climate change. Consistent with other research, we found that psychologically closer framings of climate change do not always effectively ameliorate psychological distance, nor result in greater intention to act. Our results further suggest that people may engage in psychological distancing when faced with climate change suffering. These findings provide important insights for effective communication about challenging sustainability issues.

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**Keywords**

Psychological distance • Climate change • Empathy • Sustainability communication • Framing

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## 1 Introduction

Despite scientific consensus that climate change is a serious concern, the American public has been slow to respond. If we are to achieve the social equity, economic viability, and environmental stability inherent in long-term, global sustainability we must make earnest progress to solve climate change. One of the challenges, perhaps especially in the United States, of eliciting significant ameliorative action is that climate change is perceived as far away and not relevant to most Americans' personal experience. Indeed, research from the social science discipline of psychology suggests that one potential barrier to action on climate change may stem from this perception that climate change is a faraway, future problem. From the perspective of Construal Level Theory (Trope and Liberman 2010), this subjective sense, called psychological distance, likely decreases our emotional and behavioral response (Marx et al. 2007; Weber 2006). The present research builds upon the theoretical framework of Construal Level Theory to explore whether the psychological distance of climate change could be mitigated, and how. By exploring individual response to climate change using the methods of psychology, we hope to offer a new perspective on ways to communicate climate change to promote action, and progress toward sustainability.

Construal Level Theory (CLT) offers a compelling theoretical framework to investigate the psychological distance of climate change. According to CLT, psychological distance occurs along four dimensions: spatial distance (how geographically far away the event is), temporal distance (how far in the past or the future), hypotheticality (how uncertain the event is), and social distance (whether the entities affected by the event are important or related to the referent individual) (Trope and Liberman 2010; Spence et al. 2012). Climate change is arguably high on all dimensions of distance (Milfont 2010). Its risks are characterized by “high levels of uncertainty, by strongly delayed consequences, and by consequences that occur at distant places and are – therefore – borne by others” (Gattig and Hendrickx 2007, p. 22).

A key premise of CLT is that psychologically distant objects and events are represented, or construed, differently than those that are psychologically near. Essentially, the more distant something is in psychological space, the more abstractly we think about it and represent it in the brain. Objects and events perceived as psychologically distant are encoded in high construal representations that retain only the high-level, superordinate features of the entity. Scholars suggest that because climate change is widely perceived as psychologically distant, and not an immediate or personal threat (e.g., Spence et al. 2012), it is likely mentally encoded in a high-level construal as predicted by CLT (Milfont 2010). This high level construal thus strips the issue of its low level details, such as sensory information, specific contexts, visceral emotions, or other tangible qualities that tend to evoke a sense of urgency, engagement, and motivation to act (e.g., Marx et al. 2007; Weber 2006).

Researchers have speculated that it should be possible to spur people to greater concern and action through lowering psychological distance. Studies supporting this facilitative relationship include, for example, an interview study by Spence et al. (2012), which found a correlation between lower psychological distance and increased concern. In a framing study by Jones et al. (2016), participants exposed to a more proximal framing of climate change showed higher concern and intention to act. Similarly, Scannell and Gifford (2011) found that a geographically local (and thus spatially close) depiction of climate change increased participant self-reported engagement with the issue (e.g., “How likely are you to seek out information about climate change?”).

Not all studies have shown support for a relationship between psychological distance and individual response to climate change; recent results are mixed (Brügger et al. 2016; McDonald et al. 2015). One reason for these mixed findings likely stems from the wide variation in operational definitions and manipulation of psychological distance, as well as the wide range of dependent variables used to measure its effects, such as ‘concern’, ‘engagement’, ‘motivation’, and ‘intention’ or ‘willingness’ to act. In addition, McDonald et al. (2015) suggest that an attempt to lower psychological distance by making climate change more proximal may in fact cause people to emotionally distance themselves from it (McDonald et al. 2015).

The current set of studies adds to this growing literature on psychological distance and climate change, exploring how lower distance along different dimensions of climate change may promote individual concern and action. Across our three studies, we use scenarios describing those suffering impacts of climate change. We focus in particular on the social distance dimension by varying, in all three studies, whether the sufferer is human or non-human. Past research suggests that lowering social distance increases engagement with otherwise psychologically distant issues. For example, Pahl and Bauer (2013) found that perspective taking with future humans facing severe environmental degradation increased people's intention to take action as well as their time spent looking at information about environmental degradation. Schultz (2000) also showed that perspective taking with images of animals being harmed by human actions correlated with higher environmental concern. Other studies suggest that forming an empathy or compassion bond with otherwise psychologically distant social agents, human and non-human, results in greater willingness to take action (e.g., Berenguer 2007) or increased support for climate mitigation policy (e.g., Lu and Schuldt 2016), for emotions such as empathy and compassion lower social distance by increasing sense of similarity with the 'other' through shared emotions (Decety and Lamm 2009).

The following three studies examine these predictions of Construal Level Theory by examining how both empathy and psychological distance may vary in response to different victims of climate change impacts. The studies use social science methods, namely implicit and explicit measures of psychological responses, to understand why challenging and urgent sustainability issues such as climate change seem to lack behavioral traction, at least in the United States.

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## 2 Study 1

In Study 1 we examined the effect of two dimensions of psychological distance, spatial and social, on people's perceptions of climate change distance and their stated willingness to take action. We hypothesized that the presence of a human social agent would decrease psychological distance and increase willingness to donate, and that spatial proximity would have the same effect.

### 2.1 Participants

One hundred sixty-one adult Minnesota residents (ages 18–73) participated in the study. Fifty-eight percent identified as male, 39% female, and 3% did not identify a gender.

## 2.2 Design and Materials

We used a  $2 \times 2$  experimental design. Participants read a scenario describing impacts of climate change on a particular group. Within the scenario we varied two dimensions of psychological distance: spatial distance (climate change was described as impacting Minnesota or Kenya) and social distance (the group who was impacted was either people or an iconic bird species). We measured the effects of the different scenario versions on participants' perceptions of climate change using a set of 14 questions we created to assess the dimensions of distance as well as the issue's general salience. Participants indicated their agreement with each of 14 statements using a 7-point Likert scale (ex. "The idea of climate change makes me want to take action."). Responses ranged from "Strongly Disagree" to "Strongly Agree." We also measured participants' willingness to make a donation to address climate change with a single question answered on a 7-point Likert scale.

## 2.3 Procedure

Participants were recruited through local Minnesota online networks such as Facebook and email listservs. They completed the study online. Participants were randomly assigned to one of four conditions and they read a short text-based scenario describing the effects of climate change on their assigned group (Minnesota loons, Minnesotans, Kenyan flamingos, Kenyans). After reading the scenario, participants answered the set of survey questions including the psychological distance scale, willingness to donate, and demographic questions.

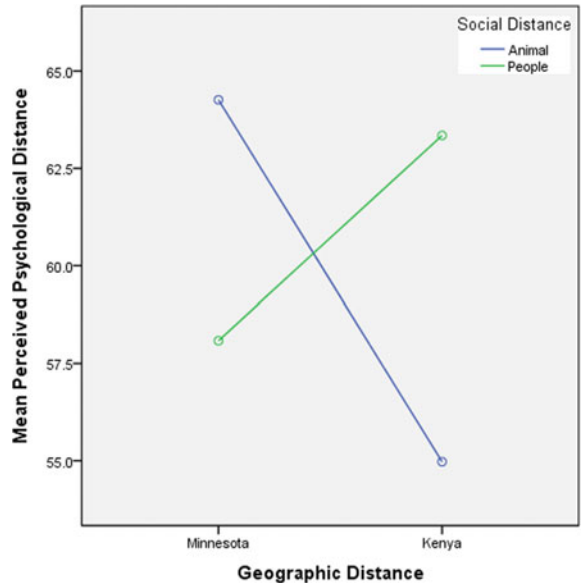
## 2.4 Results

We found no significant main effect for spatial distance or social distance, however, we observed a significant interaction between spatial distance and social distance ( $F(1, 94) = 5.912, p = 0.017$ ) on participants' level of psychological distance (see Fig. 1), with lowered psychological distance for Loons in Minnesota and People in Kenya, and conversely higher psychological distance for People in Minnesota and Flamingoes in Kenya. We also found a marginally significant interaction for willingness to donate ( $F(1, 94) = 3.581, p = 0.062$ ); see Fig. 2), showing the same pattern.

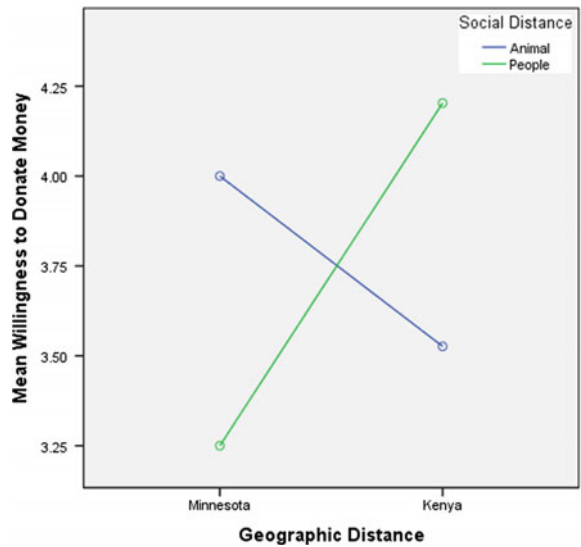
## 2.5 Discussion

Our findings suggest that framing climate change as solely impacting humans versus non-humans does not affect psychological distance. Similarly, presenting the effects of climate change in a local context alone also does not change the psychological distance of climate change. However, the interaction between social

**Fig. 1** Participants’ Psychological Distance in the four conditions of Study 1



**Fig. 2** Participants’ willingness to donate in the four conditions of Study 1



distance and spatial distance indicates that we respond differently to humans and animals affected in local as opposed to distant contexts. Participants expressed less sense of distance to climate change, and greater willingness to donate, when presented with loons in Minnesota, but when reading of climate change in Kenya, the mention of people being affected elicited significantly lower psychological distance than the mention of flamingos. This suggests that whether we understand climate

change as a local or a faraway issue changes our responsiveness to human and non-human social agents.

Our findings may in part be explained by an unintended confound in our materials. That is, Americans tend to believe that climate change is more likely to impact people in distant countries (Leiserowitz 2005), and news reports often emphasize climate vulnerability in developing lands. Thus, the suffering of people in Kenya may be more believable to participants than the suffering of Minnesotans. Spence et al. (2012) similarly found among their participants a higher willingness to act in response to impacts in developing countries compared to local impacts. Their study, however, explored impacts only on people, and not non-human species.

It is also possible that our participants engaged in psychological distancing to resist the idea that climate change could affect people like them, a response suggested by McDonald et al. (2015). When our scenarios described climate change as impacting geographically close people (i.e., Minnesotans), participants expressed greater psychological distance than when our scenarios depicted geographically distant people (i.e., people in Kenya) or socially different sufferers (i.e., loons in Minnesota), suggesting that participants may have psychologically distanced themselves from information that may have made climate change too personally close.

Study 2 was designed to address two questions that arose from Study 1. First, we wanted to remove the potential confounding factor of the use of a developing land (Kenya) in our scenarios, and (2) use a new, implicit measure of people's response to climate change, to test whether psychological distancing might be taking place.

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### 3 Study 2

Research suggests that psychological distance effects manifest implicitly as well as explicitly. Bar-Anan et al. (2006) found that participants associated words that implied more distance with words implying higher level of construal on an Implicit Associations Test (IAT). Implicit attitudes are defined as “introspectively unidentified (or inaccurately identified) traces of past experience that mediate favorable or unfavorable feeling, thought, or action toward social objects” (Greenwald and Banaji 1995). They often differ from self-reported attitudes because they are not identified on the conscious level and therefore cannot be reported explicitly.

Study 2 had three conditions: a distant climate change scenario (describing *future* climate change impacts on *cactus wrens* in *Arizona*), a near climate change scenario (describing *present* climate change impacts on *loons* in *Minnesota*), and a control condition with no scenario. In this study, we again measured participants' perceived level of psychological distance after reading a scenario. In addition, we added an implicit measure to gauge participants' implicit, below-conscious-awareness perception of psychological distance. We administered a Go/No-go Association Test (GNAT), which assesses implicit associations between two concepts, and in the current study, we constructed the GNAT to measure implicit

connections participants held between climate change and the concept of distance. We predicted that if participants read a spatially, socially, and temporally distant climate change scenario, they would implicitly associate “climate change” with “far”, whereas participants who read a proximal climate change scenario would implicitly associate “climate change” with “near”.

In addition to evaluating participants’ implicit perception of psychological distance toward climate change, we also added an additional explicit measure of pre-existing ideology in Study 2 by asking participants to place themselves in one of the categories of the “Climate change 6 Americas” analysis (Leiserowitz et al. 2011).

3.1 Participants

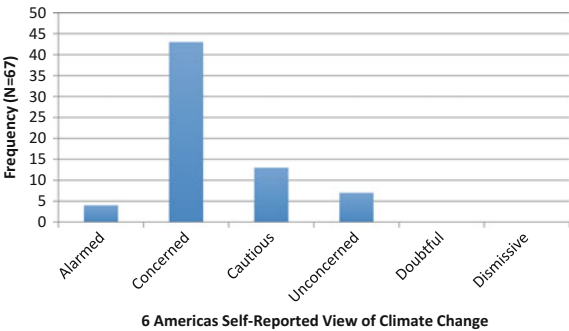
Ninety-five residents of Minnesota between the ages of 18–80 participated in the study. Forty-three identified as male, 51 female, and one did not specify a gender. Twenty-eight participants were dropped from the data analysis due to either missing more than half of the survey questions or not properly completing the GNAT portion of the study, for a total remaining participant set of 67. Figure 3 shows the remaining participants’ 6 Americas categorization breakdown.

3.2 Design and Materials

Participants in Study 2 were randomly assigned to one of three conditions: high distance, low distance, and no scenario. We measured the effects of the different conditions on participants’ perceptions of climate change using the same set of 14 Psychological Distance questions used in Study 1.

Additionally, we measured participants’ implicit perception of the psychological distance of climate change using the GNAT which assesses “the strength of association between a target category and two poles of an attribute dimension” (Nosek and Banaji 2001, p. 627). Specifically, the GNAT is comprised of a number

**Fig. 3** Six Americas breakdown for participants in Study 2





of trials that pair a category word (e.g., “climate change”) with one of two attribute words (e.g., “far in time” or “near in time”) at the top of the computer screen. In the center of the screen (beneath the target and attribute words) different stimuli words flash one after another in quick succession on a set time interval (ex. 750 ms). Participants must quickly hit the spacebar if the word in the center of the screen is associated with *either* of the two words at the top of the screen (the category or the attribute word irrespectively), indicating that the word is a “go”. If the word in the center of the screen is *not* associated with either of the two words above, then participants are instructed to do nothing, thus indicating that the word is a “no-go”.

Participants’ responses favor one target-attribute pairing over the other based on their implicit attitudes. If a participant implicitly feels that Attribute A is more congruent with the target category, they respond more accurately during trials in which Attribute A is paired with the target category. Conversely, they respond less accurately during trials in which Attribute B is paired with the target category. The stronger the implicit association between the given target and attribute, the more accurate the participant’s responses will be during those trials. Thus, the GNAT interprets more accurate responses as indicative of a strong implicit association between the given category and attribute, which in turn suggests an implicit attitude that reflects this preference.

Our target category was “climate change” and our two attributes were “near in time” and “far in time”. We selected these two attributes because they represent the two poles of temporal psychological distance. We also chose to test a second category, “presidential election”, which at the time of data collection in August 2012 was three months in the future, as a distractor task that was not evaluated, pairing it with the same two attributes. Stimuli words belonged to one of the four groups mentioned above (“climate change”, “presidential election”, “near in time”, or “far in time”).

Our GNAT was composed of 8 trials. The first two trials were practice trials—the first trial presented only one category word (“fruit”) and required participants to press the spacebar when a word associated with “fruit” appeared on the screen. The second trial presented the category “fruit” and the attribute “good” and operated like a regular GNAT trial. The last six trials presented randomized pairings of “climate change” and “near in time” or “far in time”, and “presidential election” and “near in time” or “far in time”. We expected that participants who had been primed to think about climate change distantly (high-distance scenario) would have greater sensitivity in the *climate change* + *far* condition. We expected that participants who had been primed to think about climate change as near (low-distance scenario) would have greater sensitivity in the *climate change* + *near* condition. Finally, we expected that participants who received no scenario (control) would demonstrate greater sensitivity in the *climate change* + *far* condition. The two climate change pairings were repeated once in each trial, as were the distractor pairings. In total, the test took about 12 min to complete.

To identify pre-existing ideological stance on Climate change, participants were presented with the name and a short description of each of the six groups described in the Climate Change 6 Americas segmentation analysis of Americans, created by

Leiserowitz and colleagues (Leiserowitz et al. 2011). Participants select the category they feel most describes their response to climate change. The categories are: Alarmed, Concerned, Cautious, Unconcerned, Doubtful, and Dismissive.

### 3.3 Procedure

Participants were recruited in person at the Minnesota State Fair. After agreeing to take part in the study, participants were randomly assigned to one of three conditions. Depending on the condition they were assigned, participants read no scenario at all, or they read either the high distance or low distance version of a short text. All participants answered a few preliminary questions, including a question asking them to categorize themselves according to the “Climate Change 6 Americas” analysis. After reading the scenario and answering the preliminary survey questions, participants completed the GNAT test on a laptop computer. Each received a US\$5 prize for completing the 15-minute study.

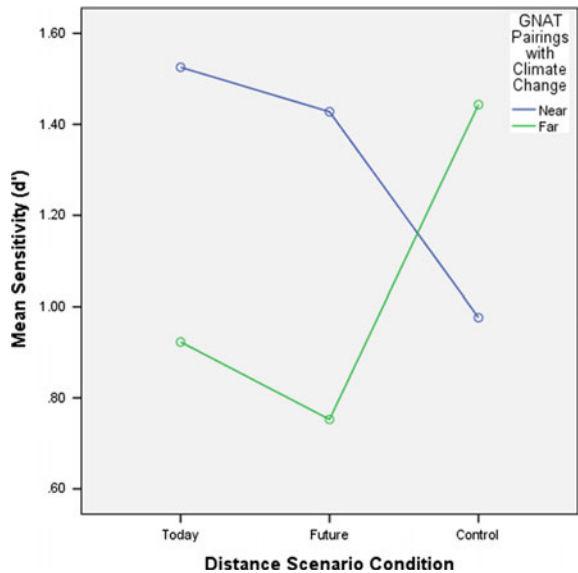
### 3.4 Results

We analyzed our GNAT data using a 3-way mixed design ANOVA. Between-subjects independent variables were scenario condition (manipulated independent variable: high distance, low-distance, or none) and the 6 Americas category (quasi-independent variable). The Attribute distance within the GNAT (*near* vs. *far*) was a within-subject independent variable. Our survey dependent variable was psychological distance as measured by the 14-item Psychological Distance scale. Our GNAT repeated-measures dependent variable was sensitivity ( $d'$ ) for Attribute *near* and Attribute *far*.

D-prime ( $d'$ ) represents the discriminability of signal from noise in the GNAT. In other words,  $d'$  is a measure of the extent to which participants were able to identify the GNAT targets from the GNAT distractors. In the GNAT, stimuli are *signals*, or targets, when they are rightly associated with the target category or attribute. Stimuli are *noise*, or distractors, when they are unrelated to the given category or attribute. The GNAT operates by recording hits (correct identification of a target) and false alarms (incorrect identification of a distractor). Sensitivity ( $d'$ ) is calculated, following Nosek and Banaji (2001), using Signal Detection Theory and converting hit rates and false alarm rates into z-scores and then calculating a difference score. In the GNAT, higher sensitivity in a pairing condition (e.g., *climate change* + *near* shows higher sensitivity than *climate change* + *far*) reflects a stronger association and implicit attitude (Nosek and Banaji 2001). In analyzing our results, we calculated means of sensitivity ( $d'$ ) to both the Attribute *near* and the Attribute *far*.

We found no main effect on the GNAT for sensitivity between Attribute *near* or Attribute *far*. We furthermore found no significant main effect for the 6 Americas self-categorization on either the survey or on the GNAT. Additionally, there was no

**Fig. 4** Average sensitivity across the three scenario conditions



significant interaction between GNAT Attribute and 6 Americas category, nor was there a significant interaction between the three independent variables (GNAT Attribute, scenario condition, and 6 Americas self-categorization). However, there was a significant interaction between GNAT Attribute and scenario condition,  $F(2, 56) = 6.43, p = 0.003$ . The average sensitivity ( $d'$ ) for both Attribute conditions (*near* and *far*), across the three scenario conditions are shown in Fig. 4. These results suggest that Attribute and scenario condition together, controlling for the 6 Americas category, significantly impacted participants' sensitivity to signal stimuli, such that those participants who had received either of the scenarios, high-distance or low-distance, were more sensitive to the *climate change + near* pairing than the control group who did not read a scenario. In contrast to the GNAT data, we found no significant effect of scenario condition on participants' psychological distance scores, recorded on their surveys and analyzed in a separate 3-way ANOVA.

**3.5 Discussion**

Our results indicate that participants who received any concrete scenario about climate change, regardless of whether the scenario described climate change as near or distant, had a stronger implicit associate between climate change and the idea of nearness. Conversely, participants who did not receive a scenario responded with more sensitivity to the pairing *climate change + far*, implying a stronger implicit associate between climate change and the idea of distance. These implicit findings were not replicated on the survey responses. Instead, participants who received concrete scenarios did not differ from the control group (no scenario) in their

psychological distance scores. Study 2 findings indicate, at an implicit level, unconscious psychological distance does appear to be decreased by reading anything concrete about climate change—even something that describes it as distant temporally and geographically, and affecting non-human social agents. During an explicit evaluation of climate change, such as the process participants engaged in when answering our survey questions, however, may indeed prompt psychological distancing from the issue, as suggested by McDonald et al. (2015).

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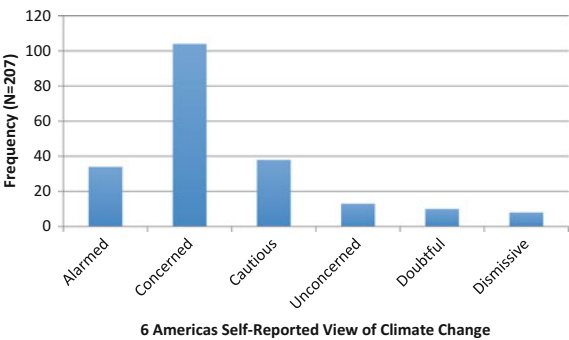
## 4 Study 3

Our results from Study 2 suggest that the high psychological distance response to Minnesotans in Study 1 could be a result of participants' inability to explicitly express their internal responses to climate change, or even intentional psychological distancing. Study 3 was thus designed to reexamine the question raised by Study 1: do people respond differently to human vs. non-human victims of climate change, and why? In Study 3, we added several new elements. First of all, we created a brief description of a forest fire, and we varied within our survey the social agent who was impacted by the forest fire: a person, a moose, or a tree. Secondly, we added two perspective-taking conditions: participants were instructed to either imagine how the sufferer feels in the situation (empathy condition) or to remain objective and focus only on the facts (objectivity condition). Third, we chose to examine a new set of dependent variables drawn from the literature: behavioral intention (Gifford and Comeau 2011) and moral obligation to help the sufferer (Lu and Schuldt 2016). Following Lu and Schuldt (2016) and others, we hypothesized that the differences in our dependent variable would be mediated by emotion such as empathy, and we thus added measures of empathy and personal distress. Finally, in Study 3 we chose to control for participants' 6 Americas identification in several of our analyses, as other studies suggest that individuals who hold extreme viewpoints are unlikely to be swayed by new information, such as our stimulus materials, when that information does not align with their beliefs. This is likely to be true for people who identify themselves at either extreme of the 6 Americas (Leiserowitz et al. 2011; Kahan et al. 2010).

### 4.1 Participants

Participants ( $N = 253$ ) residing throughout the United States were recruited through Amazon Mechanical Turk and compensated US\$1.00 for their participation in the study. Forty-seven of these were excluded from analyses due to inordinately short survey completion times (under seven minutes) that led the researchers to believe that not all questions were fully read or answered to the best of subjects' abilities; this yielded a final sample size of  $N = 207$ . Figure 5 shows the remaining participants' 6 Americas categorization breakdown.

**Fig. 5** Breakdown of Study 3 participants' 6 Americas placements



4.2 Design

A 3 × 2 factorial design was used, and both variables, social agent and perspective-taking condition were between-subjects variables. The social agent variable had three levels (human, moose, and tree), and perspective-taking had two levels (empathy and objectivity).

4.3 Materials

A total of six survey versions were created to represent each combination of social agent and empathy level conditions. All surveys included a preliminary set of questions about participants' feelings toward climate change, as well as the Climate Change 6 Americas categorization. This was followed by a short passage about one of three social agents living in and depending on a forest, which was accompanied by an image of that social agent or, in the case of the human condition, a house, in a forest. The survey included several multiple choice questions about specific climate change impacts (e.g., drought, extreme storms, rising temperatures) and their effects on forests like the one previously described. Participants were instructed to answer the questions either objectively or by actively thinking about how the social agent would feel in the situation. Each question was followed by an explanation of the correct answer. After the questionnaire, participants responded to questions measuring empathy and personal distress (Berenguer 2007), moral obligation toward the social agent and climate change in general, intentions to engage in pro-environmental behaviors (adopted from Gifford and Comeau 2011), moral obligation to help the social agent, and brief demographic questions.

4.4 Procedure

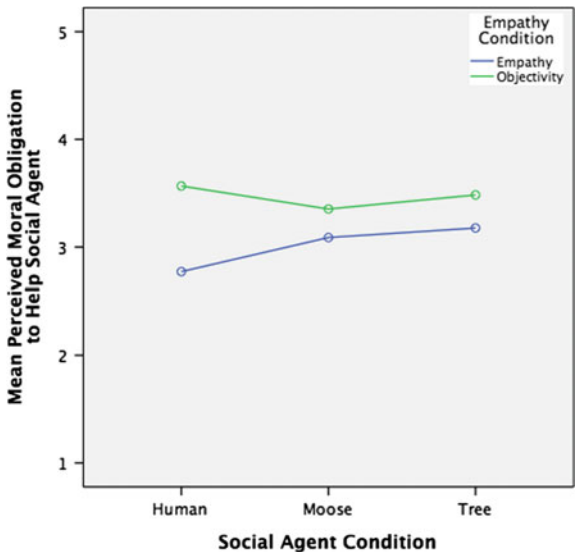
After clicking on the Mechanical Turk survey link, and agreeing to participate, participants were randomly assigned to one of the six experimental conditions. The survey began with the 6 Americas measure. Participants then read their assigned

scenario and viewed a picture of the relevant social agent (person, moose, tree), and were given instructions to either answer the subsequent multiple choices questions with either a focus on the objective facts (objectivity condition) or a focus on how the social agent would feel in the situation (empathy condition). Questions were presented one at a time, and after giving a response, participants were told whether they had answered correctly, and given an explanation of the correct answer. After answering the multiple choice questions, participants completed the rest of the survey, including measures of empathy, personal distress, moral obligation toward the social agent, intentions to engage in pro-environmental behaviors, and demographics. The survey took about 10 minutes to complete.

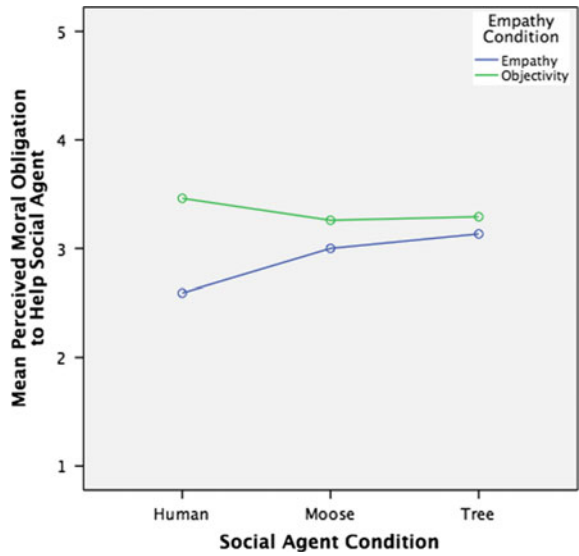
4.5 Results

We examined differences in three dependent variables: reported moral obligation to help the relevant social agent, moral obligation to do something about climate change, and behavioral intentions, across the six combinations of social agent (human, moose, or tree) and perspective conditions (empathy, objectivity) using a factorial MANOVA. Results showed a significant between-subject main effect for empathy level on participants’ moral obligation to help the social agent ( $F(1147) = 3.994, p < 0.048$ ) Contrary to our hypothesis, a pairwise comparison found participants in the perspective taking condition reported lower moral obligation to help the social agent ( $M = 2.960$ ) than those receiving objectivity instructions ( $M = 3.394$ ),  $p = 0.010$  (See Fig. 6). Unlike Study 1, in Study 3 we observed no differences across our three different social agents (person, moose, tree).

**Fig. 6** Mean perceived moral obligation to help the social agent focused on in each condition



**Fig. 7** Mean perceived moral obligation to help the social agent focused on in each condition, excluding data from participants at each extreme end of the 6 Americas



We conducted the remaining analyses excluding participants who marked themselves as one of these extreme positions (excluded:  $N = 41$ ). An ANOVA for the remaining data set again revealed a similar main effect for perspective taking on moral obligation to help the social agent,  $F(1159) = 5.796, p = 0.017$ . Again, there were no significant differences among the groups' reported moral obligation to help against climate change (See Fig. 7).

A final ANOVA was conducted with participants' 6 Americas ratings as a fixed factor. No significant differences were found among the groups in this analysis.

To examine the relationship between empathy and our dependent variables, we performed a correlation analysis and found a positive correlation between participants' empathy score and moral obligation to help the social agent ( $r = 0.542, p = 0.000$ ), motivation to address climate change ( $r = 0.545, p = 0.000$ ), and behavioral intentions ( $r = 0.436, p = 0.000$ ). When the 6 Americas categorization was included, partial correlations were no longer significant between empathy and the three dependent variables.

4.6 Discussion

The overarching conclusion of Study 3 is that beliefs about climate change are deeply rooted and difficult to change through short-term manipulations or interventions such as reading a brief scenario describing climate change impacts. Participant moral obligation to help was most strongly predicted by pre-set attitude toward climate change as recorded in the self-reported 6 Americas categorization.

Individuals are likely to view new information regarding climate change through the lens of their previously established opinions, knowledge, and values.

Longer-term, more personally compelling experiences may be more effective at changing opinions or eliciting motivating emotional reactions than merely spreading information. This finding also underscores the importance of accurately evaluating any given audience's pre-existing feelings about climate change before designing a strategy to maximize the obligation they feel to help those suffering from the effects of climate change.

However, this will not always be possible; few situations outside of controlled research settings grant those leading pro-environmental efforts the opportunity to assess the exact views of each individual whom they are trying to motivate. The other results of this study provide insight into ways to frame climate change when information about pre-existing views is not readily available. The finding that specific instructions to empathize with a victim of climate change actually decrease moral obligation to help that victim—particularly when that victim is human—aligns with previous findings about defensive psychological distancing of distressing topics. McDonald et al. (2015) discuss a behavior pattern of defensive and avoidant reactions to climate change when people are faced with the dangers that it poses to humanity. The instructions given to participants in the empathy condition in the present study may have made the climate change impacts covered by the stimulus materials too personally relevant, and participants thus engaged in a process of distancing to avoid emotional discomfort. This is further supported by the non-significant trend participants in the human social agent condition showed the greatest difference between the two perspective taking conditions.

Furthermore, the consistent discrepancy between reported moral obligation to help the specific social agent and moral obligation to do something to combat climate change in general suggests that while concern for specific victims of climate change can be elicited, it does not necessarily translate into general concern about climate change. This partially explains why famous images related to specific victims of climate change do not necessarily make climate change a concrete or low-construal enough issue for people to be more willing to act to combat it. This aligns with the findings of Leviston et al. (2014) that the famous image of a polar bear standing on a melting iceberg elicits strong emotional arousal from viewers, but it does not translate to more general concern and willingness to help against climate change.

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## 5 Conclusions

Our research began with the premise that the psychological distance of climate change is a significant barrier to an effective response. We examined whether framing climate change in proximal terms could lower psychological distance, increase empathy for those suffering from climate change impacts, and increase people's willingness to act. Our results suggest two main conclusions.



First, across three studies, we found support for the idea that people engage in a process of psychological distancing when faced with information that could potentially make climate change more personally relevant. When our scenarios described climate change as impacting geographically close people (i.e., Minnesotans), participants expressed greater psychological distance than when our scenarios depicted geographically distant people (i.e., people in Kenya) or socially different sufferers (i.e., loons in Minnesota). The findings of our second study, using an implicit measure, suggest that the results from our first study were, indeed, due to participants attempting to psychologically distance themselves. In Study 2 we found a discrepancy between our results from implicit and explicit measures. Implicit measures suggested that participants implicitly perceived lower psychological distance after reading concrete information about climate change compared to a control group who did not read about climate change. When asked explicitly through a survey, however, the same participants showed no effect from having read about climate change. Finally, participants in our third study also appeared to engage in psychological distancing: those participants who were instructed to intentionally empathize with a sufferer of climate change actually showed lower empathy than those participants instructed to remain objective. Though the results of each study are not conclusive by themselves, the pattern across our three studies is consistent and suggests that people engage in motivated cognitive processes to keep climate change psychologically distant. These findings align with those of other researchers, such as McDonald et al. (2015), who suggest that people may psychologically distance themselves when confronted with troubling information about climate change.

Second, the findings of Study 3 indicate that people's response to climate change is probably relatively stable and unlikely to change in response to information such as the climate change scenarios we presented. Participants' self-reported 6 Americas category was a far stronger predictor of moral obligation to help a victim of a climate-change-fueled forest fire than our experimental manipulations. However, the interaction we saw in Study 1 between social and geographic distance, leading to both lower psychological distance and higher willingness to donate for people in Kenya compared to people in Minnesota, suggests there may be an exception to this inflexibility in people's response to climate change. It is unclear why this is the case, but other studies also suggest that people in industrialized countries such as the UK and US feel a sense of responsibility toward climate change victims in less developed lands (e.g., McDonald et al. 2015; Spence et al. 2012).

Our findings, however, also suggest it may be possible to tap into empathy to lessen psychological distancing and increase individuals' willingness to help others. Further research can provide greater insight into this. Future studies should furthermore examine whether real-world, personal encounters with climate change, rather than hypothetical ones like the scenarios created for our studies, may impact psychological distance differently, and in doing so, prevent intentional defensive distancing.

Our studies were limited by several factors, for example, our participants tended to already be somewhat concerned about climate change. Our findings are thus not generalizable to a more general American, much less the international, population. In addition, because the studies took place on Mechanical Turk or at a state fair, participants may have not given their full attention to the questions; a laboratory study or measures which require less time and cognitive effort could address this.

This research examined a critical aspect of sustainability, response to climate change, through the social science perspective of psychology. Our findings add to the growing literature advising caution regarding how the urgency of climate change is communicated. The implications of our findings are relevant to all efforts to increase people's awareness of the challenging and often intimidating issues of sustainability. Though it is intuitively appealing to make climate change and other threats to sustainability personally relevant to people, this approach seems to backfire. Much more research is needed to understand how to inform people about the real and growing dangers we face in ways that motivate an effective response.

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