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Undesirable effects of threatening climate change information: A cross-cultural study

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Abstract

Why is the fight against climate change so challenging? Research suggests that climate change information may trigger symbolic defense strategies such as derogative outgroup behaviors (e.g., ethnocentrism) instead of direct attempts to address the problem itself (e.g., proenvironmental behavior). Ingroup affirmation may help decrease symbolic responses. We conducted a 2 (Affirmation: ingroup vs. no affirmation) $\times$ 2 (Message: threat vs. control) $\times$ 2 (Nation: Austria vs. Argentina) experiment ($N = 243$) to assess responses to climate change information (direct and symbolic) in participants from individualist and collectivist cultures. Participants responded with higher levels of ethnocentrism and a lower intention to engage in proenvironmental behavior after reading climate change information. This effect was significant in Austria. Using ingroup affirmation as an intervention tended to foster rather than reduce ethnocentrism. Thus, across cultures people resolve climate change threat in symbolic ways rather than by trying to address the problem itself.

Keywords

climate change threat, cultural differences, ethnocentrism, ingroup affirmation, proenvironmental behavior intention

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In Paris in December 2015, in what France's then-president François Hollande called a "major leap for mankind" (quoted in Vidal, Vaughan, Goldenberg, Taylor, & Boffey, 2015), 195 nations accepted the first legally binding deal to address climate change by restricting global temperatures to a maximum rise of 1.5 to 2 °C above preindustrial levels. The emission of greenhouse gases, which causes global warming, is causally linked to human behavior (Intergovernmental Panel on Climate Change, 2013). In response, governments and involved stakeholders have tried to

motivate citizens to adopt more environmentally friendly lifestyles by presenting threatening information about the severe consequences of climate change. At first glance, this approach makes

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intuitive sense. One would expect threatening consequences to motivate people to change their behavior in an effort to solve the problem. However, psychological research suggests that this strategy might be a double-edged sword (Jonas et al., 2014). More precisely, this research suggests that people tend to evade threats that they have low control over and try to relieve anxiety by turning to rewarding aspects of life that are unrelated to the actual threat or its solution (Jonas et al., 2014). This often involves heightened commitment to ingroups (Agroskin & Jonas, 2013; Burke, Martens, & Faucher, 2010; Fritzsche, Jonas, & Fankhänel, 2008). In the current study, drawing on research and theory from environmental psychology on responses to environmental threat (e.g., Bolderdijk, Gorsira, Keizer, & Steg, 2013), experimental social psychology on threat (e.g., Jonas et al., 2014), and cultural psychology (e.g., Bizumic, Duckitt, Popadic, Dru, & Krauss, 2009), we explored both direct (proenvironmental behavior intention) and symbolic (ethnocentrism) responses to a climate change threat exposure. Because climate change constitutes a global threat, we also assessed responses in two cultures (i.e., Austria and Argentina). Finally, we tested the potential of ingroup affirmation (i.e., making an ingroup's positive characteristics salient) as an intervention strategy to reduce symbolic responses following climate change information, and to promote proenvironmental behavior. Previous research has shown that ingroup affirmation can function as a buffer against threat (McGregor, Haji, & Kang, 2008; Sherman, Kinias, Major, & Kim, 2007; Spencer-Rodgers et al., 2016). We predicted ingroup affirmation to have a stronger effect in a collectivist culture such as Argentina that emphasizes the collective more strongly than individualist cultures (Markus & Kitayama, 1991).

Direct and Symbolic Responses to Threat

Threat induces anxiety, avoidance motivation, and vigilance against threatening stimuli (Gray & McNaughton, 2000; Jonas et al., 2014). Although

individuals often attempt to suppress threat-induced anxiety before it enters consciousness, an unpleasant state may still result (Pyszczynski, Greenberg, & Solomon, 1999). One way to overcome anxiety is to pursue and commit to important personal goals and ideals, whereby the pursued goal can, but does not necessarily have to, represent a solution to the anxiety-causing problem (McGregor, Nash, Mann, & Phills, 2010; McGregor, Zanna, Holmes, & Spencer, 2001; Proulx & Inzlicht, 2012). Alternatively, individuals may respond to threat by dealing directly with its source. Consistent with this research, climate change information has been found to foster proenvironmental attitudes and behavior among environmentally friendly people (Bolderdijk et al., 2013; Uhl, Jonas, & Klackl, 2016). In Bolderdijk et al.'s (2013) study, watching a movie about the negative consequences of using bottled water increased proenvironmental intention and acceptance of stricter bottled water policies among individuals who endorsed environmental values.

However, climate change can seem intractable, and purely individual activities will not make a difference, causing feelings of uncontrollability and helplessness. Research has shown that when people are confronted by such unsolvable, existential threats, they often commit to unrelated goals, ideals, and values and show responses that at first glance do not have a connection to the source of the threat (for a review, see Jonas et al., 2014). Such a symbolic defense might not provide a solution to the (environmental) threat but might nevertheless indirectly help people overcome anxiety. For example, ingroup bias, ethnocentrism, and nationalism are believed to be defensive processes fueled by and aimed against existential anxiety (for a review, see Burke et al., 2010). Previous research (Fritzsche, Cohrs, Kessler, & Bauer, 2012; Uhl et al., 2016) also found this type of response following climate change threat. After reading threatening environmental messages (vs. nonthreatening messages) participants evaluated groups constituting a danger to the collective (e.g., terrorists, drug addicts) more negatively, and groups who enforce social norms (e.g., lawyers, police) more positively than did participants in a control group (Fritzsche

et al., 2012). Furthermore, Uhl et al. (2016) showed that this form of symbolic responding was present in both environmentally friendly people (i.e., high environmental self-identity) and people who care little about the environment (i.e., low environmental self-identity). Both evaluated individuals who deviate from the social norm more negatively.

To summarize, after confrontation with an environmental threat, individuals may respond by dealing with the source of the threat directly, but severe threats such as climate change often cause symbolic responses instead. Climate change has the unique characteristic of having tremendous consequences for the whole globe. Do these unwanted side effects occur across cultures?

Cultural Differences in Responding to the Threat of Climate Change

A large body of research has shown that in individualist cultures, a symbolic response to existential threat confrontation predominates (Burke et al., 2010; Jonas et al., 2014). Recent research has also revealed that these responses occur in more collectivist cultures as well (Du, Fritzsche, Talati, Castano, & Jonas, 2016; Du et al., 2013; Heine, Harihara, & Niya, 2002; Kashima, Halloran, Yuki, & Kashima, 2004; Ma-Kellams & Blascovich, 2011; Routledge, Juhl, Vess, & Cathey, 2012). However, a better understanding of how people respond to existential threats will be gained by studying indirect (symbolic) and direct responses to threat simultaneously. Furthermore, to the best of our knowledge, direct and symbolic defensive behaviors as a response to threatening climate change information have not been compared across individualist and collectivist societies within one study. In view of previous research (Du et al., 2013; Fritzsche et al., 2012; Uhl et al., 2016) and because climate change is a global, uncontrollable threat, we predicted that participants in both individualist and collectivist cultures would respond to threatening climate change information with decreased proenvironmental behavior intention (i.e., direct defensive

behavior; Hypothesis 1a) and increased ethnocentrism (i.e., symbolic defensive behavior; Hypothesis 1b).

People often respond to threat with suppression or avoidance (Brock & Balloun, 1967; Taber & Milton, 2006). For example, smokers avoid information that reveals a connection between smoking and cancer (Brock & Balloun, 1967). In addition, people who feel unknowledgeable about a threatening social issue avoid acquiring further information about it (Shepherd & Kay, 2012), creating a vicious cycle in which ignorance caused by threat breeds further ignorance. Such suppression and avoidance of threat have been argued to underlie symbolic defensive behavior (Jonas et al., 2014; Pyszczynski et al., 1999; Shepherd & Kay, 2012). For these reasons, we have assumed that many people fail to act against climate change and instead engage in suppression, followed by symbolic responses, to control their anxiety (Hypothesis 1). Acting symbolically can be a more effective way of reducing anxiety related to climate change by shifting cognitive focus away from negative consequences and toward cherished ideals, ingroups, and values that are not fraught with discrepancy. Fighting climate change, on the other hand, requires focusing on—rather than avoiding—the problem (climate change). For this reason, low levels of reported threat after reading climate change messages may in part result from suppression and may thus indicate problem avoidance. In contrast, high levels of reported threat may result from confrontation rather than suppression, and thus increased willingness to respond in a direct way. On these grounds, we predicted that low reported threat levels following exposure to climate change information would reduce proenvironmental behavior intentions (Hypothesis 2a) and promote ethnocentrism (Hypothesis 2b).

Reduction of Symbolic Responses Through Ingroup Affirmation

What can be done to reduce symbolic responses (i.e., ethnocentrism) and promote direct responses

(i.e., proenvironmental behavior) following exposure to climate change information? A promising intervention that has been tested for different kinds of threats, such as group failure or sexism, is ingroup affirmation (McGregor et al., 2008; Sherman et al., 2007; Spencer-Rodgers et al., 2016). Research has shown that ingroup affirmation, or making an ingroup's positive characteristics salient, can reduce outgroup derogation (McGregor et al., 2008). Accordingly, we predicted that making an important ingroup and its positive characteristics salient before threat exposure (i.e., ingroup affirmation) would reduce symbolic responses and promote direct resolution (Hypothesis 3). Because collectivist cultures emphasize the collective more strongly than do individualist cultures (Markus & Kitayama, 1991), we assumed this effect would be stronger in a more collectivist culture (i.e., Argentina) and less pronounced in a more individualist culture (i.e., Austria).

Current Research

The aim of the current research was to assess responses to climate change information (direct and symbolic) in participants from individualist and collectivist cultures. We selected Austria as the more individualist and Argentina as the more collectivist culture (Hofstede, 2001) and presented Austrian and Argentinian participants with a threatening climate change message (threat condition) or neutral information about planet Earth (control condition). Then, we assessed direct (proenvironmental intention) and symbolic (ethnocentrism) defensive threat responses. Furthermore, we tested the influence of ingroup affirmation as a potential intervention to reduce symbolic responses following exposure to a climate change threat: Half of the participants in each sample identified with a group to which they belonged and that was important to them before reading the threatening or neutral information.

We conducted two pilot studies and one experiment. In Pilot Studies 1 and 2 we developed a scale to assess proenvironmental actions and to identify climate change threats that were

equally relevant in the Argentinian and Austrian cultures (for the importance of adapting research materials to different cultural contexts, see, e.g., Adams, Dobles, Gómez, Kurtiş, & Molina, 2015). In the main study, we tested our hypotheses.

Pilot Study 1

In Pilot Study 1 we sought to document proenvironmental actions that people engage in with the same frequency in both countries and relevant environmental threats that people experience in Argentina and Austria.

Method

Study materials were first developed in German and English and then translated from English into Spanish and then back-translated into English by native speakers. Eleven Austrian (seven women, four men; $M_{\text{age}} = 41$ years, $SD = 16.80$) and 11 Argentinian (seven women, four men; $M_{\text{age}} = 36$ years, $SD = 14.60$) participants completed a short online survey in which they were asked to list activities they had engaged in to protect the environment as well as the consequences of climate change their country faced.

Results and Discussion

The Austrian participants listed a total of 79 proenvironmental actions and 62 climate change consequences, and the Argentinian participants listed 56 actions and 57 consequences. Nine proenvironmental actions (e.g., avoid littering) and 20 consequences of climate change (e.g., growing frequency of natural disasters) were mentioned by participants from both countries. We further selected eight actions that were frequently mentioned in one country and also common in the other, but not mentioned by the participants in Pilot Study 1 (e.g., using public transportation). From these items we developed one scale with 17 items to assess proenvironmental action and three scales to measure relevant aspects of the consequences of climate change: knowledge (i.e., knowledge of the consequence),

probability (i.e., estimated probability of occurrence), and effect (i.e., the extent to which participants believe they will be affected).

Pilot Study 2

Method

We asked 25 Austrians (18 women, seven men; $M_{\text{age}} = 41$ years, $SD = 13.50$) and 21 Argentinians (12 women, nine men; $M_{\text{age}} = 34$ years, $SD = 11.50$) to indicate on a scale ranging from 1 (*never*) to 5 (*always*) how often they had performed the 17 proenvironmental actions in the last month ($M = 3.40$, $SD = 0.69$). The scale showed good reliability ($\alpha = .73$), and we computed one scale for proenvironmental action. Next, we asked participants to complete the three 5-point (1 = *not at all*, 5 = *very much/likeh*) aspect scales: knowledge ("Please indicate to what extent you already know about this consequence"; $M = 3.80$, $SD = 0.98$; $\alpha = .95$), probability ("Please indicate the probability of the consequence occurring"; $M = 3.80$, $SD = 0.96$; $\alpha = .96$), and effect ("Please indicate to what extent you will be affected by this consequence"; $M = 3.80$, $SD = 0.92$; $\alpha = .96$). Each of the three scales showed very good reliability, and we therefore combined them into one consequence scale ($M = 3.81$, $SD = 0.89$; $\alpha = .97$).¹

Results and Discussion

Inspection of the mean level per country showed that four proenvironmental actions significantly differed by country (all $ps < .05$; reducing meat consumption, recycling, bringing own bag to supermarket, turning light off when leaving home), showing that people in one country engaged in these actions more than in the other country. Thus, we excluded these items from further investigations. The final proenvironmental action scale thus included 12 items ($M = 3.35$, $SD = 0.71$; $\alpha = .82$, see Table 1).

We ranked the items of the combined consequence scale in each country from highest to lowest relevance and identified items with equivalent relevance in both countries. This resulted

in 10 climate change information statements for the threat condition used in the main study (see Table 2).

Main Study

In the main study we tested the impact of climate change threat and level of reported threat on direct (proenvironmental behavior intention) and symbolic (ethnocentrism) behaviors. Furthermore, we investigated the role of ingroup affirmation as a potential buffer against symbolic responses.

Method

Design and participants. We employed a 2 (Affirmation: ingroup affirmation vs. no affirmation) $\times$ 2 (Message: threat vs. control) $\times$ 2 (Nation: Austria vs. Argentina) experimental design. We recruited 120 Austrian (66 women, 54 men; $M_{\text{age}} = 24.28$ years, $SD = 3.80$) participants to complete an online survey. Among these participants, 56 had a university degree, 54 a high school diploma, and 10 an education below high school level. A total of 123 Argentinian participants took part in the survey (84 women, 39 men; $M_{\text{age}} = 28$ years, $SD = 9.50$). Among the Argentinian sample, 78 had a university degree, 42 a high school diploma, and three were below high school level. In sum, the two samples differed with respect to gender and age. Closer inspection of the correlations between these two variables and all dependent variables showed no differences. Thus, we did not control for gender and age in the reported analyses.

Procedure and measures. Study materials were first developed in German and English and then translated from English into Spanish and then back-translated into English by native speakers. Participants were invited to participate in the study via social networks and university mailing lists. After they received a written description of the study, interested individuals were required to provide written informed consent to participate. Participants were first asked to provide demographic information. Then, half completed an

Table 1. Mean ratings (and standard deviations) for the items of the Proenvironmental Behavior Action Scale used in the main study.

Item	Austria <i>M (SD)</i>	Argentina <i>M (SD)</i>
Decline plastic bags at the supermarket	3.54 (1.18)	3.54 (1.46)
Turn off unnecessary lighting (e.g., in unoccupied rooms)	4.32 (0.77)	4.66 (0.63)
Turn off electronic devices when not in use (instead of standby mode)	2.87 (1.37)	3.66 (1.19)
Make sure that windows/doors are closed when the radiator or air conditioning is on	4.30 (0.79)	3.88 (1.99)
Turn off tap while brushing teeth	3.82 (1.20)	4.22 (1.00)
Reuse packaging (plastic bottles, glass bottles)	3.31 (1.32)	3.75 (1.17)
Wash only complete loads in washing machines	3.78 (1.10)	4.48 (0.97)
Print double-sided	3.24 (1.24)	4.05 (1.20)
Use rubbish bin in public spaces instead of littering	4.75 (0.49)	4.76 (0.76)
Join or support an environmental organization	2.36 (1.36)	1.92 (1.48)
Protest against companies that pollute the environment	2.80 (1.27)	2.12 (1.52)
Choose less environmentally harmful modes of travel to reach a vacation destination (e.g., train or bus instead of plane)	3.02 (0.98)	3.07 (1.66)

ingroup affirmation manipulation. After this, participants read information about climate change (threat condition) or about the Earth (control condition) and then indicated their proenvironmental behavior intention and level of ethnocentrism. Finally, all participants were fully debriefed, thanked, and dismissed.²

Ingroup affirmation (manipulation) versus neutral thoughts (control). We randomly assigned participants to the ingroup affirmation ($n = 123$) or control ($n = 120$) condition in each country. We chose an ingroup affirmation manipulation that has been applied in previous research (McGregor et al., 2008; Sherman et al., 2007; Spencer-Rodgers et al., 2016). This manipulation aims to make the affiliation and positive characteristics of an ingroup salient to an individual. We followed procedures similar to those used by McGregor et al. (2008).

Specifically, we asked participants to name a group that was important to them, that they belonged to, identified with, and felt part of. It could be a cultural, ethnic, national, religious, or other social group that had high significance to them. Next, we asked them to list positive qualities and values that in their opinion characterize

members of this group and that are the reason why the group is important to its members. Thereafter, using a 4-point scale ranging from 1 (*totally disagree*) to 4 (*totally agree*), participants indicated their agreement with six statements about this group (e.g., “I identify with this group,” “This group is important to me,” “I share the same values as the other group members”; $\alpha = .79$; $M = 3.53$, $SD = 0.47$). In the control condition, participants named and described a current thought. Then, they indicated how most of their thoughts normally make them feel (e.g., happy, sad, angry, surprised) on a 4-point scale from 1 (*totally disagree*) to 4 (*totally agree*; e.g., “My thoughts normally make me happy”).

Climate change information (threat) versus nonthreatening information (control). Participants were randomly assigned to one of two conditions: information about negative consequences of climate change ($n = 115$) or neutral information about planet Earth ($n = 128$). In the threat condition, we used the 10 climate change consequences that resulted from Pilot Study 2 (see Table 2). To ensure that participants were reading the items, we asked them to indicate whether they already knew about the respective consequence (1 = yes, 2 = no; sum

Table 2. Items used for inducing climate change threat in the main study and percentage of participants in each country who were already familiar with the items.

Statement	Austria (%)	Argentina (%)
Fresh water captured from melting glaciers is an important source of drinking water. Predicted complete melting of glaciers will result in an extreme and intrusive oversupply of water.	73.70	93.10
Warmer climate conditions provide an optimal habitat for harmful insects that constitute a danger to agriculture.	61.40	62.10
Due to an increase in extreme weather events, agriculture as a food supply is particularly affected. This increases the risk of an insufficient food supply.	57.9	81
Warmer climate conditions and increasing temperatures contribute to proliferation of pathogens and spread of insect-borne diseases. In future, diseases such as malaria are predicted to spread rapidly.	40.40	60.30
Scientific results suggest a rise in sea level of 0.5–2.0 m is expected by the year 2100. Within 300 years, an increase of 2.5–5.1 m is possible. Essentially, two factors are responsible for the rise in sea level: first, ocean water expands more at higher temperatures and second, higher temperatures lead to increased glacial melting.	26.30	50
Rising sea levels are particularly threatening to islands and countries with wide coastal areas and low-lying hinterlands. Further, poorer countries are at a higher risk than wealthy industrialized countries, which typically invest in advanced coastal protection measures.	86	96.60
Global warming alters global distribution and quantity of rain: that is, rain falls at different intervals and its distribution differs over the seasons. Therefore, the probability of extreme weather events is higher in future. For example, on the one hand there will be more heavy rainfalls and floods, and on the other, a higher risk of water scarcity, aridity, and drought.	40.40	79.30
By the year 2025, parts of the globe will no longer be habitable due to floods and droughts.	28.10	15.50
It is now considered very likely that with global warming, species extinction will accelerate. If no measures are taken to combat climate change, 1 in 6 species will be threatened worldwide. By 2050, over 1 million animal and plant species will be extinct.	43.90	46.60
Global warming (e.g., extreme weather events, rising sea levels) will lead to worsening of agricultural production conditions and further crop failures. This in turn leads to rising food prices and more starving people.	61.40	75.90

= 13.94). In the control condition, we presented nonthreatening geographical and climate-related facts about planet Earth (e.g., “Planet Earth has a surface temperature ranging from -89 to $+58$ °C. On average, the temperature is 14.3 °C”). Following Fritsche et al. (2012), we asked participants to read 10 statements in both conditions. Subsequently, in both the threat and control conditions, participants were asked to write down which three statements they found most important. To assess their perceived feeling of threat we asked how threatened they felt after reading the

statements on a scale ranging from 1 (*not at all*) to 6 (*extremely*).

Positive and Negative Affect Schedule. We used the Positive and Negative Affect Schedule (PANAS) as a delay task, which is common practice in studies investigating defensive behavior in response to existential threat (Burke et al., 2010). Participants filled out the 20-item version of the PANAS (Watson, Clark, & Tellegen, 1988) as a delay task after the threat manipulation. Participants indicated how they felt on a scale from 1 (*very slightly*)

to 5 (*very much*). We calculated a difference score between the negative emotions (10 items; e.g., distressed, upset, guilty, ashamed; $M = 2.21$, $SD = 0.89$; $\alpha = .90$) and the positive emotions (10 items; e.g., interested, attentive, strong, active; $M = 2.75$, $SD = 0.80$; $\alpha = .86$). Higher values indicate more positive and less negative affect ($M = 5.50$, $SD = 9.60$).

Direct and symbolic defensive behavior. We assessed proenvironmental behavior intention and ethnocentrism in a randomized order. Half of the participants filled out the direct response task first, and the other half completed the task indicating their symbolic response first.³ Participants evaluated their willingness to engage in 12 proenvironmental behaviors in the coming year (Table 1; $M = 3.60$, $SD = 0.70$; $\alpha = .80$) on a 5-point scale from 1 (*not at all*) to 5 (*very much*).

We assessed symbolic defensive behavior using the Purity subscale of Bizumic et al.'s (2009) Ethnocentrism Scale. Participants rated their agreement with 10 statements about interactions with outgroup members on a 6-point scale from 1 (*not at all*) to 6 (*extreme*), for example, "I don't think it is to our advantage to mix with people from other cultural or ethnic groups; our culture would be much better off if we could keep people from different cultures out" ($M = 2.13$, $SD = 1.00$; $\alpha = .88$).

Results

Manipulation check. To test whether the threat condition evoked more feelings of threat than the control condition, we ran a univariate analysis of variance with condition (control vs. threat) as independent variable and perceived threat as dependent variable. As expected, this analysis revealed a significant main effect of condition, $F(1, 242) = 138.60$, $p = .000$, $\eta^2 = .55$, indicating that participants who read the climate change information experienced more threat ($M = 5.09$, $SD = 1.08$) than participants who read the neutral information ($M = 2.94$, $SD = 1.67$).

We next ran a correlation analysis for the two dependent variables *proenvironmental behavior* and

ethnocentrism. The results revealed that they correlated negatively, $r(243) = -.64$, $p = .000$.

Proenvironmental intention (direct defense). Then, we tested our predictions that confrontation with climate change threat (Hypothesis 1a) and low reported threat level (Hypothesis 2a) would reduce direct responses in both countries. Furthermore, according to Hypothesis 3, ingroup affirmation should function as an intervention that promotes direct responses and this effect should be stronger in the more culturally collectivist country (Argentina).

We calculated a linear regression analysis in R (R Development Core Team, 2008) with affirmation (ingroup affirmation vs. no affirmation: no affirmation = 0, affirmation = 1), message (threat vs. control: control = 0, threat = 1), and nation (Austria vs. Argentina: Austria = 0, Argentina = 1) as independent variables, reported threat level as moderator, and proenvironmental behavior intention as dependent variable (see Figure 1). The analysis revealed a significant main effect of message, $b = -0.81$, $SE = 0.24$, $t(234) = -3.38$, $p = .001$, indicating that threat reduced proenvironmental behavior intention.

The main effect of reported threat level was significant, $b = 0.33$, $SE = 0.11$, $t(234) = 3.10$, $p = .002$. In contrast to the effect of manipulated threat, reported threat positively predicted proenvironmental behavior intention. There were no main effects of nation ($p = .11$) or ingroup affirmation ($p = .61$). The interaction between message and nation was significant, $b = 0.66$, $SE = 0.27$, $t(234) = 2.44$, $p = .02$. Among Austrians, manipulated threat lowered proenvironmental behavior intention, $b = -1.81$, $SE = 0.24$, $t(234) = -3.38$, $p = .001$. This effect was absent in the Argentinian sample ($p = .34$). The interactions between message and reported threat level ($p = .41$), message and affirmation ($p = .99$), and message, affirmation, and nation ($p = .43$) were not significant.⁴

Ethnocentrism (symbolic defense). Next, we tested our predictions that confrontation with climate change threat (Hypothesis 1b) and low reported

Figure 1. The effects of message (threat vs. control) and nation (Austria vs. Argentina) on proenvironmental behavior (PEB) intention. Plotted values reflect willingness to engage in PEB, at 1 *SD* below (low reported threat) and above (high reported threat) the reported threat mean.

Figure 2. The effects of message (threat vs. control) and nation (Austria vs. Argentina) on the level of ethnocentrism. Plotted values reflect the level of ethnocentrism, at 1 *SD* below (low reported threat) and above (high reported threat) the reported threat mean.

threat level (Hypothesis 2b) would elicit more symbolic responses in both countries. Furthermore, according to Hypothesis 3, ingroup affirmation should function to reduce ethnocentrism, and this effect should be stronger in Argentina.

We calculated a linear regression analysis in R (R Development Core Team, 2008) with affirmation (ingroup affirmation vs. no affirmation: no affirmation = 0, affirmation = 1), message (threat vs. control: control = 0, threat = 1), and nation (Austria vs. Argentina: Austria = 0, Argentina = 1) as independent variables, reported threat level as moderator, and ethnocentrism as dependent variable (see Figure 2). The analysis revealed a significant main effect of message, $b = 0.86$, $SE = 0.34$, $t(234) = 2.54$, $p = .01$, indicating that participants in the threat condition showed more ethnocentrism than those in the control condition.

The main effect of reported threat level was significant, $b = -0.41$, $SE = 0.15$, $t(234) = -2.71$, $p = .007$. Again, and in contrast to the effect of manipulated threat, the more threat participants reported, the lower their level of ethnocentrism. There was a marginal effect of ingroup affirmation, $b = 0.30$, $SE = 0.17$, $t(112) = 1.77$, $p = .077$, indicating that participants in the affirmation condition had a marginally higher level of ethnocentrism than those in the control condition. There was no main effect of nation ($p = .27$).

The interaction between message and nation was marginally significant, $b = -0.72$, $SE = 0.38$, $t(234) = -1.87$, $p = .06$. Austrians in the threat condition showed more ethnocentrism than those in the control condition, $b = 0.86$, $SE = 0.34$, $t(234) = 2.54$, $p = .01$. The threat message condition and control condition did not differ within the Argentinian sample $p = .52$.⁵ The interactions between message and reported threat level ($p = .97$), message and affirmation ($p = .69$), and message, affirmation, and nation ($p = .47$) were not significant.⁶

Exploratory analysis. Following a reviewer's recommendation, we also ran two mediation analyses to see whether affect mediated the effect of threat on ethnocentrism and proenvironmental behavior intention.⁷ First, we calculated a mediation analysis with message (threat vs. control: control = 0, threat = 1) as independent variable, affect (as measured by the PANAS) as mediator, and proenvironmental intention as dependent variable.

The analysis on the potential mediator *affect* as outcome variable revealed a significant main effect of message, $b = -7.91$, $SE = 1.13$, $p = .000$, 95% CI $[-10.13, -5.70]$, indicating that people in the threat condition expressed more negative affect than people in the control

condition. The analysis on the outcome variable *proenvironmental behavior intention* revealed a significant main effect of affect, $b = 0.01$, $SE = 0.01$, $t(241) = 2.32$, $p = .02$, 95% CI [0.001, 0.02], indicating that negative affect predicted lower proenvironmental intention. The main effect of message on proenvironmental intention was no longer significant ($p = .64$). The total effect of the model was not significant, $b = -0.48$, $SE = 0.10$, $t(241) = -0.53$, $p = .60$, 95% CI [-0.23, 0.13]. The indirect effect was tested using a bootstrap estimation approach with 5,000 samples. Affect mediated the effect of message on proenvironmental behavior intention, $b = -0.94$, $SE = 0.04$, 95% CI [-0.19, -0.01].

Next, we calculated a mediation analysis with message (threat vs. control: control = 0, threat = 1) as independent variable, affect (as measured by the PANAS) as mediator, and ethnocentrism as dependent variable.

The analysis on the potential mediator *affect* as outcome variable is reported in the previous lines. The analysis on the outcome variable *ethnocentrism* revealed a significant main effect of affect, $b = -0.02$, $SE = 0.01$, $t(241) = -2.29$, $p = .02$, 95% CI [-0.03, -0.002], indicating that negative affect predicted a higher level of ethnocentrism. The main effect of the predictor message was no longer significant ($p = .35$).

The total effect of the model was not significant, $b = 0.001$, $SE = 0.13$, $t(240) = -0.004$, $p = .99$, 95% CI [-0.25, 0.25]. The indirect effect was tested using a bootstrap estimation approach with 5,000 samples. Affect mediated the effect of message on ethnocentrism, $b = 0.13$, $SE = 0.07$, 95% CI [0.02, 0.28].

Discussion

We sought to systematically investigate the impact of threat, reported threat level, and ingroup affirmation on responses to climate change information across two cultures, one more individualist (Austria) and the other more collectivist (Argentina). Austrian and Argentinian participants were exposed to threatening information about climate change

and indicated their threat level as well as direct and symbolic defense responses.

Threat Hypotheses

Being confronted with the climate change threat reduced proenvironmental behavior intention. In line with Hypothesis 1a, reading a threatening climate change message resulted in a lower willingness to act in an environmentally friendly way. However, this effect was significant only in Austria. These results are in contrast to our predictions based on previous research (Du et al., 2013; Heine et al., 2002; Ma-Kellams & Blascovich, 2011), which suggested similar responses to existential threat across cultures. The exploratory mediation analysis indicates that the effect of climate change threat on proenvironmental behavior is mediated by affect. People in the threat condition expressed more negative affect, which resulted in a lower willingness to show proenvironmental behavior, suggesting that affect is causally involved in the process.

We also explored the role of self-reported threat level in combination with manipulated threat in the occurrence of proenvironmental behavior intention (Hypothesis 2a). Interestingly, high levels of reported threat were conducive to direct proenvironmental responses. The more threatened people felt, the more proenvironmental behavior they intended to display. Yet, contrary to our prediction, the level of reported threat in combination with manipulated threat did not influence individuals' proenvironmental behavior intention. Thus, manipulated climate change threat seemed to undermine proenvironmental behavior regardless of the level of reported threat.

Although confrontation with a climate change message lowered proenvironmental behavior intention, it fostered ethnocentrism. In line with previous research (Fritzsche et al., 2012; Uhl et al., 2016) and Hypothesis 1b ethnocentrism was higher after reading about the threatening consequences of climate change. That effect was significant in Austria, but not in Argentina. The effect was also mediated by affect. Participants

who read the climate change message experienced more negative affect. People experiencing more negative affect indicated higher levels of ethnocentrism, which also suggests that affect is causally involved in the process.

Whereas reading a climate change message induced ethnocentrism, a high level of reported threat predicted low ethnocentrism. The more threatened people felt, the less ethnocentrism they expressed. Again, this might indicate that suppressing or avoiding threat is more likely to elicit a symbolic response. Contrary to our prediction (Hypothesis 2b), the level of reported threat in combination with a climate change message did not influence individuals' ethnocentrism level.

We found higher levels of symbolic defense to predict lower levels of direct responding. This is inline with previous research (Kay, Gaucher, Napier, Callan, & Laurin, 2008) that reported hydraulic relationships between different means of coping with threat. The negative correlation between proenvironmental behavior intention and ethnocentrism might result from such a relationship. Being presented with threatening climate change information weakened participants' intention to act on the issues (especially in the individualist culture) and instead fostered ethnocentrism.

Another (possibly related) process that might play a role in the effect of climate change threat (and other threats) on ethnocentrism is scapegoating (Allport, 1948, 1979; Douglas, 1995; Rothschild, Landau, Sullivan, & Keefer, 2012). Scapegoating is the strategy of trying to symbolically purge (often implicit) feelings of guilt over one's responsibility for a specific negative outcome. People often project these feelings onto individuals or groups, resulting in expulsion, isolation, or punishment of the scapegoated target (Allport, 1948, 1979; Douglas, 1995; Rothschild et al., 2012). Although there is no evidence that participants engaged in scapegoating in our study, it is likely that in the course of climate change, people will try to blame certain groups (i.e., industrialized nations) for climate change to reduce feelings of guilt. If a hydraulic

relationship exists between scapegoating and proenvironmental behavior, this could potentially reduce future proenvironmental behavior, aggravating climate change. This question should be addressed in future research.

Ingroup Affirmation Hypothesis

Furthermore, given that threatening climate change information leads to ethnocentric tendencies, we asked whether ingroup affirmation could function as an intervention to promote direct defense and minimize symbolic defense. Strengthening group membership has been shown to reduce outgroup derogation, presumably by increasing self-worth (e.g., McGregor et al., 2008). Our prediction (Hypothesis 3) was that bolstering people's self-worth should allow them to remain calm in the face of climate change threat, boosting their proenvironmental intentions. The ingroup affirmation had no effect on proenvironmental behavior intention, neither in Austria nor in Argentina. To our surprise, and in contrast to previous research, the affirmation manipulation had a marginal positive influence on the occurrence of symbolic defense. This suggests that ingroup affirmation may even increase ethnocentrism. It is possible that in our study ingroup affirmation worked more like a prime than a buffer.

Limitations and Future Research

The current research has three important limitations. First, we assessed different aspects of proenvironmental actions by measuring participants' intentions. The gap between intentions and behavior should be addressed in future research. Promising evidence has been provided by previous research (e.g., Rees, Klug, & Bamberg, 2015).

Second, in line with previous research (Kay et al., 2008), the results of our study suggest a hydraulic response mechanism between direct and symbolic coping strategies following a confrontation with climate change threat. However, another study found that environmentally friendly

individuals responded in a direct (i.e., higher willingness to act proenvironmentally) as well as symbolic way after reading climate change information (Uhl et al., 2016). This suggests that direct and symbolic coping strategies do not necessarily work in a hydraulic fashion. Future research should further investigate the nature of the response pattern (hydraulic vs. simultaneous) following climate change information and to what extent the type of symbolic defense has an influence on it.

Third, in contrast to previous research (McGregor et al., 2008) showing that ingroup affirmation decreases symbolic response (i.e., outgroup derogation), ingroup affirmation even marginally fostered symbolic response (i.e., ethnocentrism) in our study. These results are in line with research that suggests that making a person's membership in a group salient does not reduce defensive behavior (Čehajić-Clancy et al., 2011) and even increases support for institutions, perceptions of ingroup homogeneity, and group formation (Ashforth & Mael, 1989; Haslam, Oakes, Reynolds, & Turner, 1999; Oakes, Haslam, Morrison, & Grace, 1995; Tajfel & Turner, 1989). Our ingroup manipulation was similar to McGregor et al.'s (2008). The group participants listed could, but did not necessarily have to be associated with a wrongdoing as in Čehajić-Clancy et al. (2011) or with a certain stereotype that was relevant in the context of our study. Thus, we cannot theoretically determine if the manipulation worked like a social identity salience manipulation rather than an ingroup affirmation. An idea for future research would be to systematically investigate this topic by clearly contrasting an ingroup affirmation versus an identity salience manipulation in the context of climate change.

Our results offer three interesting ideas for future research that may enrich the understanding of the underlying processes of threat responses in order to promote direct defensive behavior. First, future studies should further investigate how the anxiety triggered by threat messages can be channeled into direct instead of symbolic defenses (Fritzsche et al., 2012; Shepherd & Kay, 2012; Uhl et al., 2016). Given the results

presented here, an ingroup affirmation intervention is not recommended as it marginally fostered ethnocentrism instead.

Future research should continue to take moderators into account. For example, political ideology (liberalism vs. conservatism) influences responses to climate change threat information (e.g., McCright, Charters, Dentzman, & Dietz, 2016; McCright & Dunlap, 2011). Climate change skepticism plays a crucial role in the United States and to some extent in Australia and some European countries such as the United Kingdom (Capstick, Whitmarsh, Pidgeon, & Upham, 2015; Daniels, Krosnick, Tichy, & Tompson, 2012; Ipsos MORI, 2014; Lee, Markowitz, Howe, Ko, & Leiserowitz, 2015). However, in the two countries of our study, skepticism does not seem to have much influence. According to the Eurobarometer survey on climate change, Austria is among those European countries that see climate change as one of the biggest problems of our time and stress the importance of acting upon it (European Commission, 2015). The same applies to Argentina. In the global trend survey that assessed attitudes and behaviors of citizens in 20 key countries around the world, Argentina was the second country when it came to agreement with the idea of human-caused climate change (Ipsos MORI, 2014). One important goal of future research should be to explore the influence of climate change skepticism on the management of climate change threat in countries such as the US.

Another possible explanation for our result could be the cultural derivation of risk theory that posits that people evaluate risk-related information in patterns that fit the values they share with others (Kahan, Braman, Monahan, Callahan, & Peters, 2010). Individuals' orientation (hierarchical and individualist vs. egalitarian and communitarian) influences the direct evaluation of climate change messages (e.g., a professor pointing out the risk of anthropogenic climate change; Kahan, Jenkins-Smith, & Braman, 2011). In our study participants did not directly evaluate the climate change message. Thus, we cannot empirically explore the process of motivated reasoning of our results. Future research should implement

a direct climate change information evaluation and carefully investigate the two explanations.

Theoretical Implications

The application of psychological theory to investigations in cultural contexts other than individualist societies may need to be adapted. In the current paper, we analyzed responses to climate change in individualist and collectivist cultures. Yet, it is important to broaden the field of psychology's knowledge base beyond the Euro-American area (Adams et al., 2015). This is especially true for urgent issues, such as societal responses to climate change. A failure to address conditions beyond Euro-American cultures could "facilitate growth for a privileged minority but undermine sustainability for the global majority" (Adams et al., 2015, p. 213). Moreover, the careful development of experimental materials and methods is crucial for avoiding bias.

We have shown here that exposure to climate change information, with the aim of motivating direct behavior, can result in an undesired side effect, that is, fostering the symbolic response of ethnocentrism. For this reason, we suggest that research in environmental psychology should also consider symbolic defense mechanisms. So far, the majority of studies in the field have focused mainly on proenvironmental behavior (direct response). However, current and previous results (Fritsche et al., 2012; Uhl et al., 2016) point to the importance of investigating direct and indirect responses simultaneously.

Practical Implications

The results reported herein reveal one of the main barriers to fostering engagement in social issues such as climate change. Not only did climate change statements undermine desired behavior, but they also fostered ethnocentrism in individuals from two different cultures, namely, Austria and Argentina. Therefore, international campaigns aimed at tackling climate change should consider the cross-cultural issue of overcoming psychological defense strategies following threat.

Furthermore, our results suggest caution should be taken in applying the technique of ingroup affirmation. Campaigns referring to a specific country or calling on a person's nationality might even backfire by raising symbolic responses such as ethnocentrism instead of inducing proenvironmental actions. We believe that coupling threatening information with a behavior guideline might be a successful approach (e.g., Witte, 1994; Witte, Berkowitz, Cameron, & McKeon, 1998). Clear instructions on how to face climate change could reduce an individual's lack of control and, consequently, the need to suppress the threat (Fritsche et al., 2013). We assume that this would likely result in a direct rather than symbolic response.

Conclusion

The aim of this study was to shed further light on individuals' responses to climate change information in samples from two different cultures. We provide new evidence that confronting people with climate change information resulted in lower proenvironmental behavior intention, especially in Austria, and a higher level of ethnocentrism in participants from both countries. Furthermore, using ingroup affirmation as a potential intervention increased the negative side effects of climate change communication. Thinking about an important group made participants in general marginally more ethnocentric. We hope that this research will stimulate future investigation into symbolic responses in different cultures and testing of potential intervention strategies. A culturally sensitive and collaborative research approach will help foster direct action against the threat of climate change, in keeping with the ambitious goals of the Paris Declaration.

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Notes

1. Correlation scores: knowledge and probability: $r(45) = .68, p < .01$; knowledge and effect: $r(44) = .56, p < .01$; probability and effect: $r(44) = .80, p < .01$.
2. We also assessed environmental self-identity (van der Werff, Steg, & Keizer, 2014), tightness and looseness (Gelfand et al., 2011), right-wing authoritarianism (Duckitt, Bizumic, Krauss, & Heled, 2010), and participants' attributed importance to some groups (e.g., family, friends). The measures are not relevant for the present manuscript but results can be requested from the authors.
3. The order of presentation did not have an influence on the results.
4. The three-way interaction must be interpreted with caution because the achieved power is low (see supplementary materials—power analysis).
5. Because p values cannot be used to determine whether an effect is null (Dienes, 2016), we conducted a supplemental Bayesian analysis. We used the effect size of the threat manipulation on proenvironmental behavior and ethnocentrism in the Austrian sample to construct an expected distribution for the effect of threat on proenvironmental behavior and ethnocentrism in Argentina. The Bayes factors were $B = 0.45$ and $B = 0.50$, respectively, indicating that the data from the Argentinian sample are insensitive and therefore, additional data are needed to corroborate whether climate change threat does or does not reduce proenvironmental behavior intention and/or increase ethnocentrism in Argentina.
6. The three-way interaction must be interpreted with caution because the achieved power is low (see supplementary materials—power analysis).
7. We conducted all the reported moderations using the software Process 2.11 (Hayes, 2013, Model 4).

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