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# Apocalypse Soon? Dire Messages Reduce Belief in Global Warming by Contradicting Just-World Beliefs

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## Abstract

Though scientific evidence for the existence of global warming continues to mount, in the United States and other countries belief in global warming has stagnated or even decreased in recent years. One possible explanation for this pattern is that information about the potentially dire consequences of global warming threatens deeply held beliefs that the world is just, orderly, and stable. Individuals overcome this threat by denying or discounting the existence of global warming, and this process ultimately results in decreased willingness to counteract climate change. Two experiments provide support for this explanation of the dynamics of belief in global warming, suggesting that less dire messaging could be more effective for promoting public understanding of climate-change research.

## Keywords

global warming, just world, framing, political psychology

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Although scientific evidence attests to the existence and severity of global warming, high percentages of people in the United States and elsewhere increasingly see global warming as nonexistent, exaggerated, or unrelated to human activity (BBC Climate Change Poll, 2010; Gallup Poll, 2009, 2010; Pew Research Center for the People and the Press, 2009). Because scientists agree that large-scale action will be necessary to counteract the effects of global warming, environmental advocates often engage in public appeals designed to increase rates of proenvironmental behaviors and promote support for initiatives aimed at counteracting climate change. These appeals often emphasize the severity of potential consequences, relying on messages that highlight the dire risks associated with unchecked global warming (Kerr, 2007).

But what if these appeals are in fact counterproductive? We contend that one cause of skepticism concerning global warming may be that such dire messages threaten individuals' need to believe that the world is just, orderly, and stable, a motive that is widely held and deeply ingrained in many people (Lerner, 1980; Lerner & Miller, 1978). Research shows that many individuals have a strong need to perceive the world as just, believing that rewards will be bestowed on individuals who judiciously strive for them and punishments will be meted out to those who deserve them (Dalbert, 2001; Furnham, 2003). Research on just-world theory has demonstrated that

when individuals' need to believe in a just world is threatened, they commonly employ defensive responses, such as dismissal or rationalization of the information that threatened their just-world beliefs (for reviews, see Furnham, 2003; Hafer & Bégue, 2005).

Information regarding the potentially severe and arbitrary effects of global warming should constitute a significant threat to belief in a just world, and discrediting or denying global warming's existence could serve as a means of resolving the resulting threat. Many dire messages aimed at stopping global warming make salient the impending chaos and unpredictable catastrophe that global warming will bring with it. Moreover, these messages often emphasize the harm that will be done to children and future generations who have done nothing themselves to cause global warming. Such messages contradict the belief that the world is predictable and fair by suggesting that good people will suffer and that the innocent will be the primary victims. Because these messages contradict just-world beliefs, individuals who most strongly hold such beliefs should be the most threatened. When such people are exposed to dire

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messages concerning global warming, they are thus likely to discount the evidence. By increasing skepticism about global warming, these dire messages should, in turn, also reduce people's willingness to engage in behaviors aimed at combating global warming.

We conducted two experiments testing these claims. In the first, we measured participants' tendencies to hold just-world beliefs, varied the type of global-warming message participants were exposed to, and then measured their levels of skepticism regarding global warming. In the second study, we investigated the role of just-world beliefs more directly, manipulating the salience of these beliefs before exposing participants to a dire global-warming message. We then measured both levels of skepticism and participants' willingness to curb their daily carbon emissions.

## Study 1

The purpose of Study 1 was to test whether dire global-warming messages can actually promote skepticism regarding the existence of global warming among individuals with strong just-world beliefs. To test for possible attitudinal changes, we measured participants' views of global warming before and after exposure to either a dire or an optimistic global-warming message. In addition, we measured participants' pretreatment levels of belief in a just world in order to examine whether those who were the most likely to perceive the world as fair and predictable would become the most skeptical after exposure to a dire message. We expected that participants high in belief in a just world would find the dire messages uniquely threatening and would report greater skepticism as a result. In contrast, we expected no change in skepticism, or even a decrease in skepticism, among participants exposed to the positive message, because that message should not threaten just-world beliefs.

## Method

**Participants.** A total of 97 undergraduate students (25 male, 72 female) participated in this study in return for extra credit.

**Materials and procedure.** The study included two parts. At Time 1, participants completed a political attitudes questionnaire containing a six-item General Belief in a Just World Scale (Cronbach's  $\alpha = .68$ ; Dalbert, Montada, & Schmitt, 1987). At Time 2, 3 to 4 weeks later, participants took part in a laboratory session. On arrival, participants were randomly assigned to read one of two articles. These articles, written in the style of a newspaper article, were identical for the first four paragraphs, providing information about climate change reported by the United Nations' Intergovernmental Panel on Climate Change (2007), but they differed in the final two paragraphs. (See the Supplemental Material available online.) The dire-message article detailed the devastation and the possibly apocalyptic consequences that could result from global

warming, whereas the positive-message article focused on potential solutions to global warming, highlighting how technological ingenuity could potentially reverse the effects of global warming and find solutions to carbon emissions. As a manipulation check, participants then answered the following question: "How certain are you that science will find a solution that solves the global-warming problem?"

At both Times 1 and 2, participants completed a survey that included a brief measure of skepticism concerning global warming. This measure consisted of the following two items: "How certain are you that global warming is actually occurring?" and "How likely is it that the scientific evidence used to demonstrate global warming is wrong?" (Cronbach's  $\alpha = .67$ ).

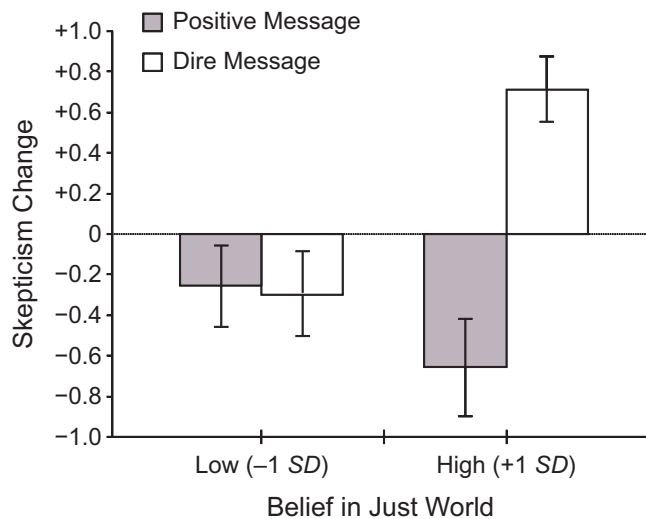
## Results and discussion

There was a significant difference between the two conditions on the manipulation-check item,  $t(94) = 2.41, p < .05$ . Thus, the manipulation effectively influenced belief in science's ability to find solutions to global warming.

An examination of the effect of message condition, just-world beliefs, and time of assessment on participants' levels of skepticism yielded the expected three-way interaction,  $F(1, 93) = 4.57, p < .05$ . To interpret this interaction, we examined the relationship between just-world beliefs and skepticism within each message condition. For the dire-message condition, a two-way analysis of variance (ANOVA) yielded a marginally significant effect of time,  $F(1, 49) = 3.31, p = .08$ , but showed that this trend, as hypothesized, was moderated by the interaction between time and level of just-world beliefs,  $F(1, 49) = 4.25, p < .05$ . The greater participants' belief in a just world, the more skeptical they became about global warming when exposed to the dire message (see Fig. 1). Among participants in the positive-message condition, we found a significant decrease in levels of skepticism from Time 1 to Time 2,  $F(1, 45) = 3.92, p = .05$ ; in other words, the positive message led to increases in reported belief in global warming. This result was not moderated by participants' levels of just-world beliefs,  $F(1, 44) = 0.86, p = .36$  (see Fig. 1). Thus, whereas the dire message led to increased skepticism among participants who held strong beliefs in a just world, the positive message, by not contradicting individuals' just-world beliefs, led to an overall decrease in skepticism.

## Study 2

Results of Study 1 suggest that dire messages can increase skepticism regarding global warming by contradicting individuals' underlying just-world beliefs, as evidenced by the heightened skepticism found among participants higher in such beliefs after exposure to dire global-warming messages. In Study 2, we sought to demonstrate the moderating role of just-world beliefs experimentally. Specifically, we hypothesized that making just-world beliefs salient to participants would increase the levels of global-warming skepticism they



**Fig. 1.** Results from Study 1: change in participants' skepticism regarding global warming (from pre- to postmanipulation) as a function of message condition and belief in a just world (1 SD above the mean vs. 1 SD below the mean). Error bars represent  $\pm 1$  SEM.

expressed after watching a dire global-warming video. We also included an additional dependent measure, which asked participants about their desire to help fight global warming by reducing their carbon footprint (Weidema, Thrane, Christensen, Schmidt, & Løkke, 2008).

## Method

**Participants.** A total of 45 participants (10 male, 34 female, and 1 unspecified) were recruited via an advertisement posted on the craigslist.org Web sites of 15 different American cities. The recruitment advertisement offered a chance to win a new iPod or a \$50 gift certificate in exchange for participation.

**Materials and procedure.** After completing a basic demographic questionnaire, participants were presented with what was ostensibly a brief language comprehension test. This test was actually used to prime participants with views of the world as either just or unjust. Participants were presented with 14 scrambled sentences consisting of six words each. The instructions asked participants to unscramble each set of words to form a coherent sentence made up of five of the six words. Depending on condition, 8 of the unscrambled sentences described the world as highly fair, stable, and predictable (e.g., "The world is highly predictable," "Somehow justice will always prevail") or as highly unfair, unstable, and unpredictable (e.g., "The world is highly unpredictable," "Often, justice will not prevail"). The remaining 6 sentences served as fillers and were unassociated with the primes.

Next, participants watched a 60-s dire-message video. This video consisted of two short videos that had been disseminated as Internet and television advertisements aimed at educating the public about global warming. The first segment used a

speeding train heading toward a small girl as a metaphor for the imminent catastrophe that awaits the children of the world, and the second showed anxious-looking children who verbally simulated the ticking of a clock as they described the potential devastation that is coming because of global warming. These segments were selected because coders blind to the study's hypothesis rated them as highly "negative," "scary," and "apocalyptic," and because they emphasized that innocent children would be the ones most likely to suffer from the dire effects of global warming.

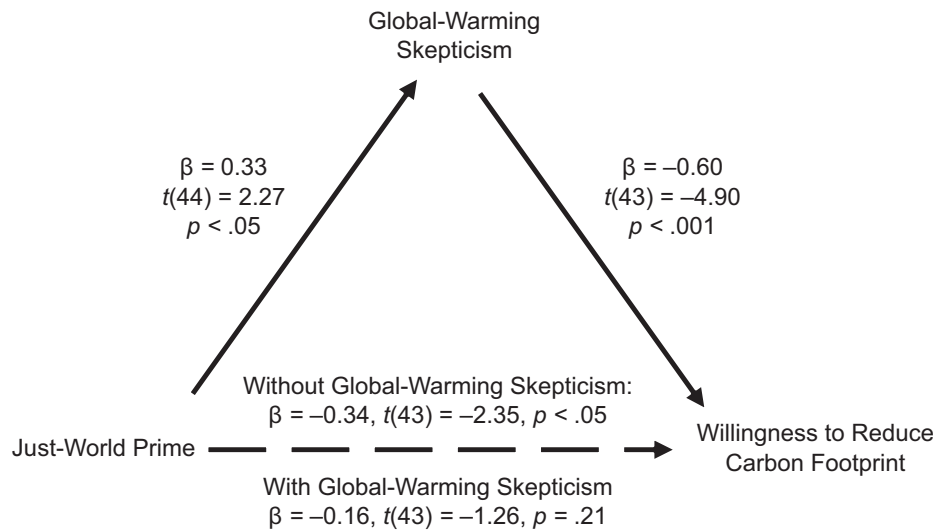
After watching the video, participants completed an expanded seven-item battery measuring skepticism regarding global warming. This measure included the two items used in Study 1 plus five additional items (e.g., "How solid is the evidence that the earth is warming?"; Cronbach's  $\alpha = .86$ ). All items in the battery were rated on six-point scales, with higher values indicating higher skepticism. In addition to the seven-item battery, there was one item that asked, "Overall, how willing are you to change your current lifestyle in order to reduce your carbon footprint (i.e., to decrease the amount of greenhouse gases you emit both directly and indirectly)?"

## Results and discussion

Participants who were primed with just-world statements reported higher levels of global-warming skepticism ( $M = 2.95$ ) than did those who were primed with unjust-world statements ( $M = 2.29$ ),  $t(43) = 2.27$ ,  $p < .05$ . This result is consistent with our argument that dire messages lead to increased global-warming skepticism because they conflict with just-world beliefs. We also found a significant effect of priming condition on how willing participants were to change their lifestyle to reduce their carbon footprint. Those primed with just-world statements reported less willingness to change their lifestyle to reduce their carbon footprint ( $M = 4.18$ ) than did those primed with unjust-world statements ( $M = 5.05$ ),  $t(42) = -2.35$ ,  $p < .05$ . A mediation analysis indicated that the effect of the priming on individuals' willingness to change their lifestyle to reduce their carbon footprint was fully mediated by the measure of global-warming skepticism (Sobel's  $Z = 2.06$ ,  $p < .05$ ). Figure 2 depicts this mediation analysis.

## General Discussion

These results demonstrate how dire messages warning of the severity of global warming and its presumed dangers can backfire, paradoxically increasing skepticism about global warming by contradicting individuals' deeply held beliefs that the world is fundamentally just. In addition, we found evidence that such dire messaging led to a reduction in participants' intentions to reduce their carbon footprint—an effect driven by increased global-warming skepticism. Our results imply that because dire messaging regarding global warming is at odds with the strongly established cognition that the world is fair and stable, people may dismiss the factual content of messages that



**Fig. 2.** Results from Study 2: analysis of global-warming skepticism as a mediator of the effect of just-world primes on individuals' willingness to change their lifestyle in order to reduce their carbon footprint. The dotted arrow indicates a relationship that is statistically insignificant ( $p < .05$ ) in the full model.

emphasize global warming's dire consequences. But if the same messages are delivered coupled with a potential solution, the information can be communicated without creating a substantial threat to deeply held beliefs in a just world.

Our findings extend past research showing that fear-based appeals, especially those not coupled with a clear solution, can backfire and undermine the intended effects of the messages (Witte, 1992, 1994). In addition, our results complement recent research showing that framing environmentalism as patriotic can successfully increase proenvironmental behavioral intentions in individuals most attached to the status quo (Feygina, Jost, & Goldsmith, 2010). Taken together, these findings emphasize the importance of framing global-warming messages so that they do not contradict individuals' deeply held beliefs. In addition, our results suggest that reducing individuals' just-world beliefs could result in decreased skepticism regarding global warming. Although we were able to manipulate just-world beliefs in Study 2, it remains to be seen how such beliefs could be changed in field settings over a longer period of time.

Future research could examine skepticism about global warming across countries. For example, it may be that the relatively high levels of skepticism about global warming in the United States reflect stronger just-world beliefs among Americans than among inhabitants of other countries. Indeed, some evidence suggests that Americans have stronger just-world beliefs than the citizens of many other countries do (Bénabou & Tirole, 2006; Furnham, 1985, 1993). Also, future research could investigate more specifically which parts of just-world beliefs (e.g., fairness, predictability) conflict with dire global-warming messages.

Our research also advances just-world theory. In the past, research on belief in a just world has focused on explaining interpersonal attributions of responsibility for unjust outcomes

and events (e.g., victim derogation; cf. Kaiser, Vick, & Major, 2004). Here, we found that the same principles can help explain reactions to larger systemic threats that are less social in nature, such as natural disasters. Researchers may wish to examine the role that just-world beliefs play in reactions to other major threats, such as devastating earthquakes. It is possible that dire appeals for donations to help victims of natural disasters may actually reduce people's generosity (Pancer, 1988).

Overall, we believe that our findings should be informative for politicians and environmental advocates who are interested in understanding public reaction to climate-change research and advocacy efforts. More generally, our research responds to recent calls for psychologists to become actively involved in the study of climate-change attitudes and behaviors (Kazdin, 2009; Nordhaus & Shellenberger, 2007) and complements the small but growing body of insights psychology has contributed to this topic (e.g., Feygina et al., 2010; Swim et al., 2009).

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The authors declared that they had no conflicts of interest with respect to their authorship or the publication of this article.

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### Supplemental Material

Additional supporting information may be found at <http://pss.sagepub.com/content/by/supplemental-data>

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