

APOCALYPSE SOON?  
DIRE MESSAGES REDUCE BELIEF IN GLOBAL WARMING BY  
CONTRADICTING JUST WORLD BELIEFS

RUNNING HEAD: GLOBAL WARMING CONTRADICTS JUST WORLD BELIEFS

Matthew Feinberg<sup>\* ‡</sup>

Robb Willer<sup>†</sup>

<sup>\*</sup> Psychology Department, University of California, Berkeley, 4125 Tolman Hall,

Berkeley, CA, 94720-5050; and

<sup>†</sup> Sociology Department, University of California, Berkeley, 466 Barrows Hall, Berkeley,

CA, 94720-5050.

<sup>‡</sup> To whom correspondence should be addressed. Email: [matthewfeinberg@berkeley.edu](mailto:matthewfeinberg@berkeley.edu)

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ABSTRACT

Though scientific evidence for the existence of global warming continues to mount, in the U.S. 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, ultimately resulting 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.

Although scientific evidence attests to the existence and severity of global warming, high rates of people in the U.S. and elsewhere increasingly see global warming as non-existent, exaggerated, or unrelated to human activities (BBC 2010; Gallup, 2009, 2010; Pew Research Poll, 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 pro-environmental 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 counter-productive? We contend that one cause of global warming skepticism 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 future rewards await those who judiciously strive for them, and punishments are 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 dismissing or rationalizing the information that threatened their just world beliefs (for reviews, see Furnham, 2003; Hafer & Bégué, 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 be punished, and that the innocent will be the greatest victims. Because these messages contradict just world beliefs, those who most strongly hold such beliefs should be the most threatened. When such people are exposed to dire messages they are thus likely to discount evidence for global warming. 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 individuals' tendencies to hold just world beliefs, varied the type of global warming message they 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 do this, we measured participants' views of global warming

before and after being exposed to either a dire or optimistic global warming message to test for possible attitudinal changes. Additionally, we measured participants' pre-treatment levels of "belief in a just world" in order to examine whether those who are 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. On the other hand, we expected no change, or even a decrease, in skepticism among participants exposed to the positive message since that message should not threaten participants' just world beliefs.

## Method

### *Participants*

A total of 97 (25 male, 72 female) undergraduate students participated in the two-part study in return for extra credit.

### *Materials and Procedure*

The study included two parts. First, participants completed a political attitudes questionnaire containing a 6-item General Belief in a Just World Scale (Cronbach's  $\alpha = .68$ ; Dalbert, Montada, & Schmitt, 1987). Participants then took part in a laboratory session three to four weeks later. Upon 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 Nation's IPCC (IPCC, 2007), but differed in their final two paragraphs. These articles are available as supporting information online. The "dire

message” article detailed the devastation and possibly apocalyptic consequences that could result from global warming, while 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 brief measure of global warming skepticism embedded in a larger survey, made up 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,  $t(94) = 2.41, p < .05$ , verifying that the manipulation effectively fostered a greater belief in science’s ability to find solutions to global warming. Next, an examination of the effect of message condition and just world beliefs on participants’ levels of skepticism yielded the expected three-way interaction of message x belief in a just world x time,  $F(1, 93) = 4.57, p < .05$ . To interpret this interaction, we next examined the relationship between just world beliefs and skepticism within each message condition. For the dire message condition, a two-way ANOVA yielded a marginally significant difference of skepticism from time 1 to time 2,  $F(1, 49) = 3.31, p = .08$ , but showed that this trend, as hypothesized, was fully qualified by the interaction between time and levels of just world beliefs,  $F(1, 49) = 4.25, p < .05$ . As portrayed in Figure 1, these results

show that the higher participants were in belief in a just world, the more skeptical they became about global warming when exposed to the dire message,  $F(1,49) = 4.25, p < .05$ . Among participants exposed to the positive message, we found a significant decrease in levels of skepticism from time one to time two,  $F(1, 45) = 3.92, p = .05$ , indicating that the positive message led to increases in reported belief in global warming. This result was not moderated by participants' levels of just world beliefs,  $F(1, 44) = .86, p = .36$ . Thus, while the dire message led to increased skepticism among participants who hold strong beliefs in the world as just, 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 those higher in such beliefs exposed to dire 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 expressed after watching a dire-themed global warming video. We also added an additional dependent measure to the study 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 (10 male, 34 female, and 1 did not indicate) participants were recruited to the study via an advertisement posted on the Craigslist.org websites of 30 different American cities. The recruitment advertisement offered a chance to win a new iPod or \$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, actually used to prime participants with views of the world as either just or unjust. Participants were presented with 14 scrambled sentences consisting of 6 words each. The instructions asked participants to unscramble the order of the words to form a coherent sentence made up of 5 of the 6 words. Eight of the sentences, when unscrambled, yielded sentences describing the world as highly fair, stable, and predictable (e.g., “The world is highly predictable”, “Somehow justice will always prevail”), or highly unfair, unstable, and unpredictable (e.g., “The world is highly unpredictable”, “Often, justice will not prevail”), depending on condition. The remaining 6 scrambled sentences served as filler and were unassociated with the primes. Next participants watched a 60-second dire message video. This video consisted of two existing videos selected from a collection of short videos disseminated as internet and television advertisements that aimed to educate 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 a clock’s ticking as they also described the potential devastation that is coming due to global

warming. Both videos were selected because coders blind to the study 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 7-item battery measuring global warming skepticism that included the two items used in study 1, as well as several additional items (e.g., “How solid is the evidence that the earth is warming?”) (Cronbach’s  $\alpha = .86$ ). We also included a single 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 the just world statements indicated greater levels of global warming skepticism ( $M = 2.95$ ) than did those 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 an unjust world ( $M = 5.05$ ),  $t(42) = -2.35, p < .05$ . 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  $Z = 2.06, p < .05$ ). 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 this dire messaging led to reduced intentions among participants to reduce their carbon footprint – an effect driven by their 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 emphasize global warming's dire consequences. But if the same messages are delivered coupled with a potential solution, it allows the information to be communicated without creating substantial threat to these individuals' deeply held beliefs.

Our findings extend past research showing that fear-based appeals, especially when not coupled with a clear solution, can backfire and undermine the intended effects of messages (Witte, 1992; 1994). In addition, our results complement recent research showing that framing environmentalism as patriotic can successfully increase pro-environmental behavioral intentions in those most attached to the status quo (Feygina, Jost, & Goldsmith, 2010). Taken together, these findings stress the importance of framing global warming messages so they do not contradict individuals' deeply held beliefs. Additionally, our results suggest that reducing individuals' just world beliefs could result in decreased global warming skepticism. Although we were able to

manipulate such beliefs in Study 2, it remains to be seen how just world beliefs could be changed longer-term in field settings.

Future research could examine varying levels of 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 held by Americans than inhabitants of other countries. Indeed, some evidence suggests that Americans are higher in just world beliefs than the citizens of many other countries (Furnham, 1985; 1993; Bénabou & Tirole, 2006). Also, future research could investigate more specifically exactly 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; c.f., Kaiser, Vick, & Major, 2004). Here we find that the same principles can help explain reactions to larger systemic threats, less social in nature, such as natural disasters. Future research may wish to examine the role just world beliefs play in explaining reactions to other major threats, such as devastating earthquakes. Possibly, more 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 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 in so doing

complements the small but growing body of insights psychology has contributed to this topic (e.g., Feygina et al., 2010; Swim, Clayton, Doherty, Gifford, Howard, Reser, et al., 2009).

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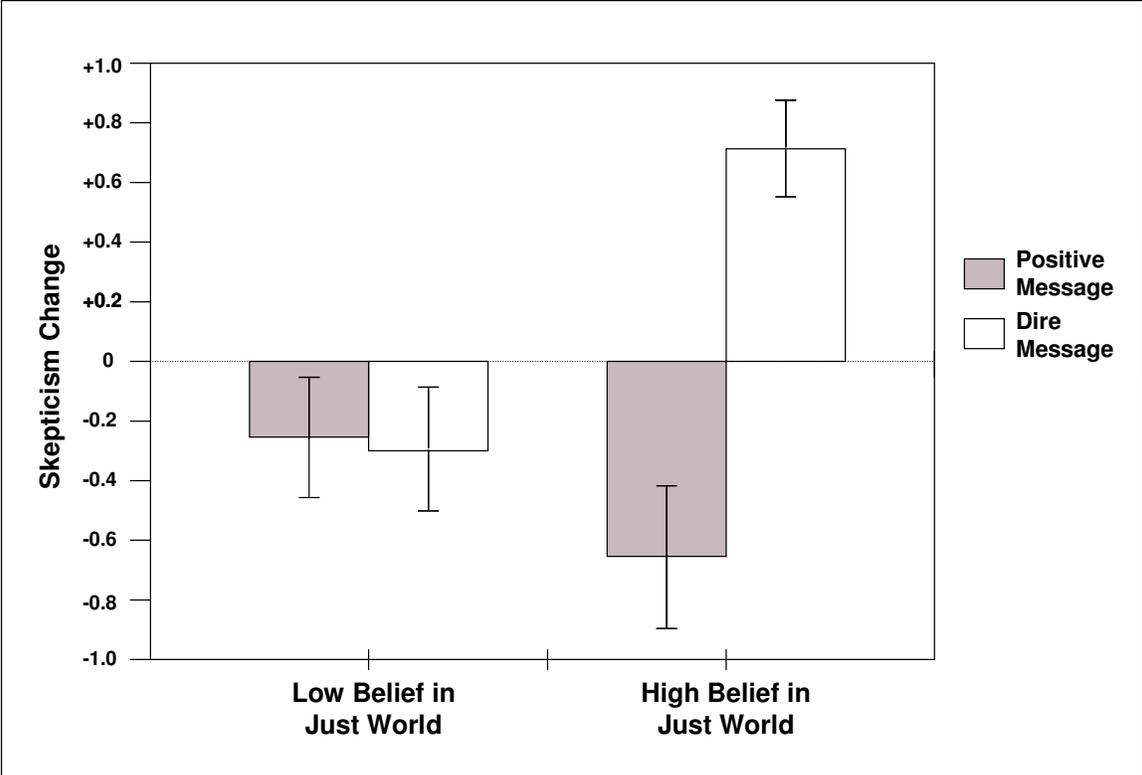
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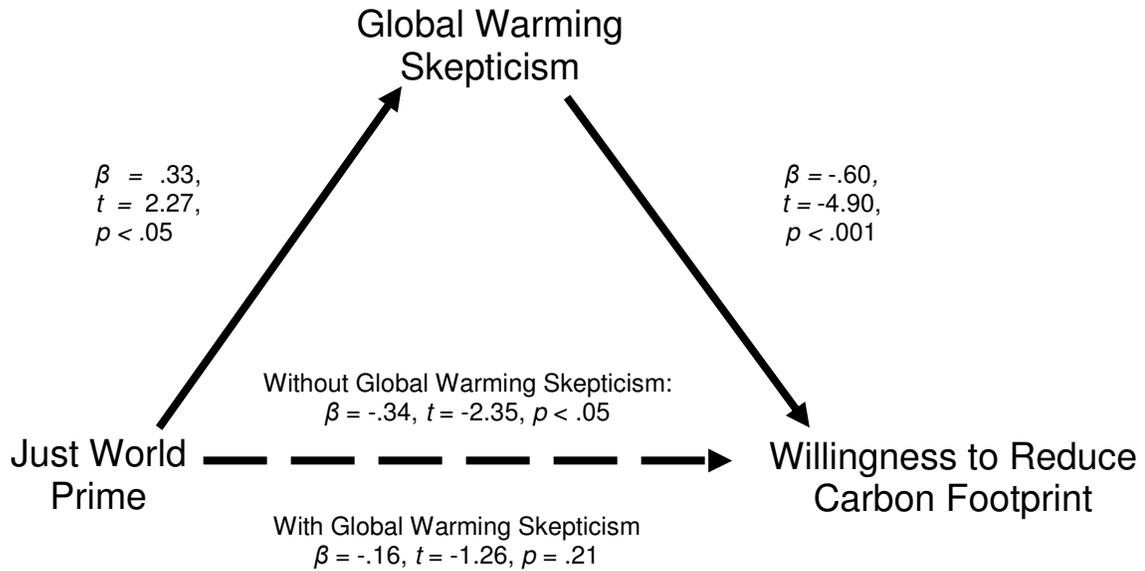
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**Fig. 1.** Changes in skepticism from pre- to post-manipulation. The x-axis depicts participants scoring high on belief in a just world (+1 SD above the mean) versus those scoring low on belief in a just world (-1 SD below the mean). Error bars represent  $\pm 1$  standard error.



**Fig. 2.** Results of a mediation analysis of the effect of just world prime on individuals' willingness to change their lifestyle in order to reduce their carbon footprint, with global warming skepticism as the hypothesized mediator. Dotted arrow indicates that a relationship is statistically insignificant ( $p < .05$ ) in the full model.