



COMMENTARY

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Key Points:

- Most people do not know that there is a scientific consensus about climate change
- This lack of awareness undermines public engagement in climate change
- Setting the record straight will have important positive consequences

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Climate scientists need to set the record straight: There is a scientific consensus that human-caused climate change is happening

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Abstract Nearly all climate scientists are convinced that human-caused climate change is occurring, yet half of Americans do not know or do not believe that a scientific consensus has been reached. That such a large proportion of Americans do not understand that there is a near-unanimous scientific consensus about the basic facts of climate change matters, a lot. This essay briefly explains why, and what climate science societies and individual climate scientists can do to set the record straight.

Human-caused climate change is happening and is accelerating; dangerous impacts are becoming evident around the world, and are projected to get worse in the decades to come, possibly much worse (*IPCC*, 2013). Nearly all climate scientists are convinced of these basic facts, but more than half of Americans do not currently understand that this scientific consensus has been reached (*Leiserowitz et al.*, 2013).

Americans are not alone in this regard, although relatively less is known about the views of people in other nations. While 57% of Britons aged 15 and older agreed with the statement “most scientists agree that humans are causing climate change” (*Poortinga et al.*, 2011), a separate 16-nation World Public Opinion Poll (Public attitudes toward climate change: Findings from a multi-country poll, 2009, <http://worldpublicopinion.org/pipa/articles/btenvironmentra/649.php?lb=brglm&pnt=649&nid=&id=>) found that only a minority of citizens in seven nations said “most scientists think the problem is urgent and enough is known to take action”; these were the United States (38%), Russia (23%), Indonesia (33%), Japan (43%), Brazil (44%), India (48%), and Mexico (48%). Across all 16 nations, 51% selected this response option, while 16% said “most (scientists) think the problem is not urgent, and not enough is known yet to take action,” and 24% said “views are pretty evenly divided,” another 10% indicated “don’t know.” This public misperception about the state of scientific consensus regarding the reality and causes of climate change matters, a lot.

Different methods have been used to estimate the degree of scientific consensus about human-caused climate change—including surveys of experts (e.g., *Doran and Zimmerman*, 2009; *Cook et al.*, 2013) and reviews of the peer-reviewed literature (e.g., *Oreskes*, 2004; *Anderegg et al.*, 2010; *Cook et al.*, 2013). Both methods converge on the following conclusion: 97% or more of climate scientists are convinced that human-caused climate change is happening.

Yet widespread misunderstanding of this scientific consensus persists among the American public. In 2013, only 42% of American adults said that “most scientists think global warming is happening,” 33% said “there is a lot of disagreement among scientists about whether or not global warming is happening,” 20% said they “don’t know enough to say,” and 6% said “most scientists think global warming is not happening” (*Leiserowitz et al.*, 2014). When asked to estimate the proportion of climate scientists who are convinced that human-caused climate change is happening (in quintiles), only 22% of American adults correctly selected 81%–100% (*Leiserowitz et al.*, 2014).

This misperception among Americans is not only pervasive but also highly consequential (*Ding et al.*, 2011; *McCright et al.*, 2013). Those who do not understand the scientific consensus about human-caused climate change are, in turn, less likely to believe that climate change is happening, human-caused, will have serious consequences, and is solvable (i.e., can be mitigated through concerted action). In addition,

not understanding this scientific consensus undermines Americans' support for a broad societal response to the threat. As a result, knowledge of the scientific consensus on human-caused climate change can be considered a "gateway" cognition; as members of the general public come to understand the consensus, they more likely come to the conclusion that human-caused climate change is happening and harmful.

The pervasiveness of this misperception is not an accident. Rather, it is the result of a disinformation campaign by individuals and organizations in the United States—and increasingly in other nations around the world (Norgaard, 2006; Dunlap and McCright, 2011)—who oppose government action to reduce carbon emissions (e.g., Oreskes and Conway, 2010). The claim that climate scientists are still arguing over the reality of human-caused climate change was designed to resonate with the sensibilities of political conservatives who are inherently suspicious of government intervention in markets and societies. This targeted disinformation campaign has been highly effective in the United States: far more political conservatives (49%) than liberals (18%) currently believe that there is "a lot of disagreement among the experts about global warming" (Leiserowitz *et al.*, 2013). While originally launched in the United States, this disinformation campaign is now being pursued in Canada, the UK, Australia, and New Zealand as well (Dunlap and McCright, 2011).

This disinformation campaign has impeded the implementation of strategies to reduce the risks of climate change (McCright and Dunlap, 2003; Pooley, 2010). Moreover, as an intentional effort to obscure and dispute the conclusions of climate science, the campaign should be seen as an attack on climate science itself.

Fortunately, an effective, nonpolitical response is available to scientists and their professional societies. A recently published Australian study (Lewandowsky *et al.*, 2013)—and a series of studies conducted at research centers in the United States (Maibach *et al.*, 2013; Kotcher *et al.*, 2014)—demonstrates that clear messages that simply state the extent of the scientific consensus can help correct this widespread misperception. In controlled experiments, a single exposure to a message describing the extent of scientific consensus on human-caused climate change (i.e., 97%) significantly increased participants' subsequent estimates of the consensus—by as much as 10 to 20 percentage points. Importantly, these simple messages were most effective with the very people who are currently the least likely to understand the scientific consensus: political conservatives.

The potential benefits of setting the record straight are considerable. By working to overcome this barrier to public understanding of climate change, scientists can help a broader cross section of American society—and perhaps people in other nations as well—to better understand the realities and risks of climate change, as well as the range of potential solutions. Furthermore, an effort to communicate the scientific consensus can also help bridge the (manufactured) divide between conservatives and liberals about the reality of human-caused climate change and help Americans begin the real debate about climate change—how the nation should best respond. Ideally, a debate about climate solutions should harness the best ideas of people across the political spectrum. Now is the time for citizens, together with government and industry leaders, to engage in a serious conversation about how to manage the risks of climate change.

In the end, scientists cannot insist that the public accept the realities of climate change, but they can and should inform the public that based on the evidence, the vast majority of climate experts are convinced that human-caused climate change is happening. Because public understanding of climate change has been intentionally distorted by vested interests, the scientific community has an obligation to set the record straight.

Methods of effective scientific communication are well known in some parts of the scientific community (National Research Council, 1989; Maibach and Parrott, 1995; Hornik, 2002; Wakefield *et al.*, 2010; Lundgren and McMakin, 2013). The public health and medical communities, for example, have mounted highly effective campaigns to reduce sudden infant death syndrome (Markestad *et al.*, 1995), human immunodeficiency virus/acquired immunodeficiency syndrome (McCombie *et al.*, 2002; Wellings, 2002), stroke (Roccella, 2002), tobacco use among adults and teens (Pierce *et al.*, 2002a, 2002b; Worden and Flynn, 2002), and to promote seat belt use (Williams *et al.*, 2002). While each of these successful campaigns had unique

circumstances, they all conformed to a relatively simple formula: *simple clear messages, repeated often, by a variety of trusted voices.*

We urge scientific organizations to patiently, yet assertively inform the public that, based on the evidence, more than 97% of climate experts are convinced that human-caused climate change is happening. Some scientific organizations may argue that they have already done this through official statements. We applaud them for their efforts to date, yet survey data clearly demonstrate that the message has not yet reached or engaged most Americans. Occasional statements and press releases about the reality of human-caused climate change are unfortunately not enough to cut through the fog—it will take a concerted, ongoing effort to inform Americans about the scientific consensus regarding the realities of climate change.

Fischhoff (2007) suggests that climate change communication campaigns are best approached as a team effort between climate scientists (who best understand the nature of the risks and potential responses), social and decision scientists (who best understand how to structure information in a manner that is most helpful to members of the intended target audience), and communication professionals (who best understand how to get the information conveyed with sufficient reach and frequency that it will be noticed and considered by members of the target audience). This is a model that any scientific organization can implement by engaging their members, relevant social science colleagues, and in-house or consulting communication professionals.

Individual climate scientists can and should also play a role in setting the record straight. In media interviews, public presentations, and even neighborhood and family gatherings, climate scientists should remember that many people do not currently understand that there is an overwhelming scientific consensus about human-caused climate change. Tell them, and give them the numbers. Contextualize the numbers with your own experience, e.g., “I personally know hundreds of climate scientists who are convinced that human-caused climate change is happening, and not a single one who isn’t.”

This is not a call for scientists to become policy advocates, but rather a request that scientists take the initiative to inform the public about the empirically determined conclusions of their field—consistent with several recent prominent calls by climate scientists asking their peers to get more involved in public dialogue (Ellis and Trachtenberg, 2013; Schmidt, 2013; Mann, 2014). There is a critical need to educate the public about one of the most fundamental and important facts to have emerged from climate science, that virtually the entire climate science community is now convinced, based upon the evidence, that human-caused climate change is happening. This may seem self-evident to many scientists; however, it is not yet understood by a majority of the American public.

Such an effort to set the record straight—through simple clear messages, repeated often, by a variety of trusted voices in the climate science community—will improve public understanding of, and engagement in, the issue of climate change. A large majority of Americans—across political lines—are willing to listen.

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