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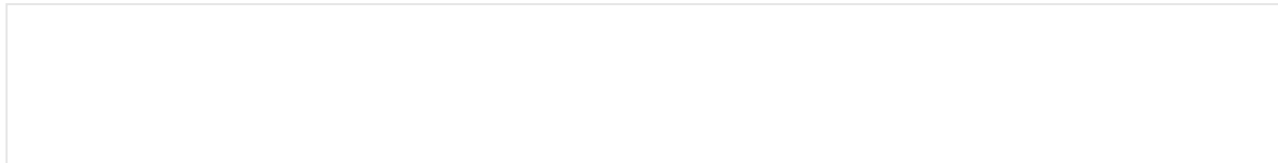
How to Determine the Scientific Consensus on Global Warming

An academic feud swirls around how best or even whether to express the scientific consensus around climate change

By Gayathri Vaidyanathan, ClimateWire on July 24, 2014



The climate debate is now ethical and political; it comes down to what Americans are willing to do today to address a problem that will largely affect their grandchildren. *Credit: Ron Cogswell via Flickr*



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Academic disputes are different from bar fights. At a House hearing last month, someone suggested to Sarah Green she meet Richard Tol, a climate change economist who had attacked her research moments before in front of a panel of lawmakers. Green declined politely, with a wry smile.

Tol, a professor of economics at Britain's University of Sussex, had no idea Green was in the hearing room. The two have never met, although they have been tussling in obscure journals.

The point of contention is a peer-reviewed study published last year by Green, a chemistry professor at Michigan Technological University; John Cook, a research fellow at the Global Change Institute at the University of Queensland in Australia; and 10 other scientists who blog under the collective name of Skeptical Science. The scientists examined 4,014 abstracts on climate change and found 97.2 percent of the papers assumed humans play a role in global warming (*ClimateWire*, May 16, 2013).

That statement quickly got boiled down in the popular media to a much simpler message: that 97 percent of *scientists* believe climate change is caused by humans. President Obama tweeted the 97 percent consensus. Comedian John Oliver did a segment on it that went viral on the Internet.

Predictably, climate change skeptics challenged the study. The Skeptical Science group fended off their attacks. Then fame beckoned. The paper has been downloaded more than 200,000 times, making it among the most popular scientific studies of 2013.

Lately, the Skeptical Science researchers have been battling a rear guard attack from within the climate science community itself. Some social scientists, political scientists, climate change communicators—and Tol—question whether informing people of a scientific consensus serves any purpose.

To them, climate change is no longer a debate over science. The latest surveys show that 89 percent of Democrats, 79 percent of independents and 70 percent of Republicans already believe global warming is happening and is at least partly caused by human actions.

Rather, the climate debate is now ethical and political; it comes down to what Americans are willing to do today to address a problem that will largely affect their grandchildren. In this realm of moral choice, the 97 percent consensus can be polarizing, said Dan Kahan, a professor of psychology at Yale University.

He brandishes as proof a video by the group Organizing for Action (OFA), which was once Obama's re-election campaign. The implicit message is that the people who disagree with 97 percent of scientists must be very stupid, Kahan said.

"We live in a world where the people who make the videos like the OFA one have attached a meaning to this argument—97 percent of scientists [believe in human-caused global warming]," he said. "It's a bumper sticker, and it says 'fuck you' on it."

A road paved with good intentions and footnotes

Cook, 42, began Skeptical Science (SkS) in 2007 as a database of peer-reviewed studies rebutting climate skeptics. Since then, SkS has grown into one of the most highly trafficked blogs on climate science. Its content is used in classrooms, textbooks, public lectures and documentaries.

There's no doubt that Cook regards climate change as a moral issue.

"As a father, I realized that we are handing over a world to our children that is worse than the world we were given," he said over the phone from Brisbane, Australia. "And as a Christian, I saw climate change as a social justice issue."

Propelled by that burden, as well as the more real-world needs of his Ph.D. thesis, Cook immersed himself in climate communication. He wanted to help effect climate action, which has been spectacularly hard to achieve even as world leaders have met and disbanded at successive United Nations meetings over the past two decades. In the U.S., Republicans have blocked any sort of climate progress.

Cook thinks that politicians are not acting because the public is not pressuring them enough. If people realize that the majority of scientists agree on human-caused climate change, they will absorb that knowledge like empty vessels and become more convinced of the threat, he said. They will then be more amenable to picking up their phones and calling their legislators.

"If the public think that climate scientists agree about what is causing global warming, then the public thinks we need to act on it," he said. "If the public thinks scientists disagree, then we might as well wait until the scientists work it out before we do anything about it."

The idea is not new; several studies over the past 10 years have found a scientific consensus on climate change. Naomi Oreskes, a historian of science at Harvard University, in 2004 found that 75 percent of published studies supported anthropogenic global warming. Since then, six other studies have been published with widespread media attention.

And yet, the chain of events Cook mentioned, where people hear of the scientific consensus and call their lawmakers, has not happened. In fact, consensus messaging over the past decade has not convinced any more or any fewer Americans to believe in global warming.

Cook thinks the failure is partly because the consensus studies were not publicized enough. Another reason, he believes, is that American minds have been poisoned by climate contrarians like Frank Luntz, a Republican strategist under President George W. Bush, who advised skeptics to create an illusion of scientific discord and challenge established climate scientists. Such messaging has made people think the scientific consensus is much lower than it is in reality, Cook said. He calls this phenomenon the "consensus gap."

'Closing that consensus gap'

So, in 2011, Cook decided to do one more consensus study and promote the heck out of it. He collected 11,944 papers from the ISI Web of Science database that contained the words "global warming" or "global climate change." He and 11 Skeptical Science volunteers went through the abstracts and coded the authors' positions on anthropogenic global warming. Cook set it up as a video game, almost, where five abstracts would pop up on screen and the volunteers would code them and then hit "go." Then five more would pop up.

Green, the professor from Michigan Technological University, was the most prolific and coded about half the abstracts.

"It was winter in Michigan so I'd just come home and do them, and my husband was out of town, sometimes I'd do 50, sometimes I'd do five, sometimes I'd do more," she said, sipping on iced hibiscus tea on a muggy day in Washington, D.C.

Green and her colleagues found 4,014 papers that endorsed global warming, rejected global warming or explicitly stated they did not hold a position on it. Of these papers, 97.2 percent endorsed the "consensus" that global warming is human caused.

Once results were in, Cook put together a publicity strategy.

"There's no point in doing scientific research if you are not looking to publicize it," he said. "A part of what we were doing was closing that consensus gap, and the consensus gap is delaying climate action. We wanted it to have a tangible impact."

He published the study in the open access journal *Environmental Research Letters*. The co-authors released press releases through their universities to media in the U.S., United Kingdom, Australia and Canada. They publicized findings through Twitter and Facebook. And a public relations firm, SJI Associates, volunteered to design a website.

The blowback began soon enough from the climate skeptic community. Soon after came challenges from the scientific community. Tol, the economics professor at the University of Sussex, was among the most vehement.

What is a consensus?

Tol attacked the Cook study partly because of his personality. He takes to controversy like a fly to a jam sandwich. Most scientists preface comments about the latest Tol controversy with some variation of, "I actually like Tol."

Tol dislikes, in principle, the idea of a consensus. After all, the point of science is to challenge accepted wisdom and refine it, a process that runs somewhat counter to the idea of a consensus.

"I'm a hopeless romantic for the Enlightenment: I'd rather convince people with arguments than with an appeal to authority or consensus," Tol said via email.

One of the problems with Cook's appeal to authority is this: So far, *no one* has quantified the consensus among natural scientists on global warming. In fact, it cannot be done

easily, said Jon Krosnick, a social psychologist at Stanford University who has been studying communication strategies for decades.

While the Cook study may quantify the views expressed in published literature, it does not establish the beliefs of any defined group of scientists, Krosnick said.

"How do you determine who qualifies to be surveyed and who doesn't qualify?" he asked. "Personally, I haven't seen anyone accomplish that yet."

The response has led to some head scratching by Cook and his colleagues.

"I expected the criticism from climate deniers because they've been attacking the consensus for 20 years," Cook said. "I'm a bit disappointed that scientists who accept the consensus and who are trying to work towards climate action are criticizing this method of communication because the reason why we did it was based on a lot of social science research."

In a laboratory experiment, scientists interviewed 90 people in Perth, Australia, and asked them to estimate the scientific consensus on global warming. The subjects said that only 70 percent of scientists agreed on climate change. The scientists then informed the subjects that the consensus was closer to 97 percent.

Upon receiving that information, some people more strongly believed in climate change.

How big is the middle?

So, what kinds of people are receptive to the message? People in the middle, ones who are uncertain in their beliefs, Cook said.

There is just one problem with this theory: The middle is sparsely populated.

Just 26 percent of Americans who believe in climate change are in it, said Krosnick, who computed the statistics for *ClimateWire*. And just 10 percent of Americans who disbelieve in climate change may switch sides and become believers, he said.

Kahan of Yale University disagreed with Cook that people, even in the middle, will change their minds when exposed to consensus messaging. In fact, most people are already broadly aware of the scientific consensus on climate change, he said.

To prove this point, Kahan tested Republicans and Democrats on their scientific knowledge of global warming. He found that an overwhelming majority of both Republicans and Democrats know scientists believe CO₂ causes global temperatures to rise. They also know that scientists believe that human-caused global warming leads to coastal flooding, rising temperatures and other ill effects.

And yet, when questioned outright, even highly educated Republicans underestimated the scientific consensus on climate change.

Kahan thinks this is because the question "What do scientists believe?" no longer measures people's climate knowledge. Rather, it indicates their ideology and worldview. The conflation is due to inflammatory advertising using the 97 percent consensus message that has politicized the message.

"I don't think it is conceivable that people who are highest in science literacy know less about climate change than other people," he said. "They know more. If you measure that, you would find that out. But instead, if you want to measure who they are, you will find out who they are."

That is why, outside laboratory conditions, the consensus message has not worked over the past decade, Kahan said.

A new question arises: 'So what?'

Even assuming the consensus message does work, it will not necessarily lead to climate action by policymakers, said Mike Hulme, professor of climate and culture at King's College London.

"Even if one takes the Cook et al. study at face value then how does a scientific consensus of 97.1 percent make policy-making about climate change any easier?" he wrote in an upcoming book on the consensus that he shared with *ClimateWire*.

A majority of Americans already believe in climate change and support climate policy, but this has not budged the political needle. Hulme argues that climate policy—and indeed,

action on popular initiatives like gun control or immigration—requires more than just broad public support. It requires getting people with different worldviews and perspectives on climate change together at the government level to consider solutions, he wrote.

In the political theater, people with different visions for the future should be able to discuss policy without polarizing messages, he wrote. In other words, dissent is welcome.

As for Cook of the SkS group, he roughly agrees with Hulme that people ought to be working on solutions to the climate problem. But he thinks that attacks by credible scientists on the consensus can act as a roadblock on the path toward action.

In fact, the most challenging week for the SkS group was when Tol challenged its paper on Capitol Hill, Cook said. After that hearing, Republican lawmakers issued a press release saying the Cook paper had been "debunked."

"[Tol] has even said there is no doubt in his mind that there is an overwhelming scientific consensus, so everyone is a little bit amused by the fact that he agrees with our results and yet he has been attacking our research," he said.

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