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The Myth of the 98 Percent

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Do 98 percent of climate scientists really believe in man-made global warming? A little research reveals that the often-cited figure is a confused and erroneous reference to two different studies that both fail to prove what those who cite them believe or allege.

A little research reveals the often-cited "98 percent" figure is a confused and erroneous reference to two studies that both fail to prove what those who cite them claim.

Doran and Zimmerman

The first study, by Doran and Zimmerman, appeared in EOS, the journal of the American Geophysical Union (AGU) in 2009. You can retrieve it at http://tigger.uic.edu/~pdoran/012009_Doran_final.pdf. This article reports the results of a survey, but it was a meaningless one.

The researchers – a professor at the University of Illinois and a graduate student – sent a two-minute online survey to 10,257 Earth scientists working for universities and government research agencies, generating responses from 3,146 people. Only 5 percent of respondents self-identified as climate scientists. The survey asked two questions:

> "Q1. "When compared with pre-1800s levels, do you think that mean global temperatures have generally risen, fallen, or remained relatively constant?"
>
> Q2. "Do you think human activity is a significant contributing factor in changing mean global temperatures?"

Overall, 90 percent of respondents answered "risen" to question 1 and 82 percent answered "yes" to question 2. The authors get their fraudulent "98 percent of climate scientists believe" sound bite by focusing on only 79 (not a typo) scientists who responded and "listed climate science as their area of expertise and who also have published more than 50 percent of their recent peer-reviewed papers on the subject of climate change."

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Given that there are tens of thousands or even hundreds of thousands of scientists with real expertise in basic sciences related to climate, a survey that looks at the views of only 79 climate scientists is ridiculous. Its tiny sample size makes it meaningless.

Even worse than the sample size, though, is the complete irrelevance of the questions asked in the survey to the real debate taking place about climate change. Most skeptics would answer those two questions the same way as alarmists would.

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At issue is not whether the climate warmed since the Little Ice Age or whether there is a human impact on climate, but whether the warming is unusual in rate or magnitude; whether that part of it attributable to human causes is likely to be beneficial or harmful on net, and by how much; and whether the benefits of reducing the human contribution will outweigh the costs, so as to justify public policies aimed at reducing it. The survey is silent on these questions.

The survey by Doran and Zimmerman fails to produce evidence that would back up claims that there is a "scientific consensus" about the causes or consequences of climate change. They simply asked the wrong question. And the "98 percent" figure so often attributed to their survey refers to the opinions of only 79 climate scientists, which is not a representative sample of scientific opinion.

Anderegg et al.

The Doran and Zimmerman survey is often confused or conflated with a second study, Anderegg et al., "Expert credibility in climate change," in the *Proceedings of the National Academies of Sciences*: http://www.pnas.org/content/early/2010/06/04/1003187107

From the abstract:

> Here, we use an extensive dataset of 1,372 climate researchers and their publication and citation data to show that (i) 97–98% of the climate researchers most actively publishing in the field support the tenets of ACC outlined by the Intergovernmental Panel on Climate Change, and (ii) the relative climate expertise and scientific prominence of the researchers unconvinced of ACC are substantially below that of the convinced researchers.

Note that this is not a survey of scientists, whether "all scientists" or specifically climate scientists. Instead, Anderegg et al. counted the number of articles published in academic journals by 908 "climate researchers," defined as people who had signed petitions opposing or

supporting the IPCC's positions or had coauthored IPCC reports and had published a minimum of 20 climate publications.

They found that 97 to 98 percent of the most prolific 200 climate researchers, so defined, appeared to believe that "anthropogenic greenhouse gases have been responsible for 'most' of the 'unequivocal' warming of the Earth's average global temperature over the second half of the 20th century."

Observe that this counting exercise did not determine how many of these authors believe global warming is a crisis, or that the science is sufficiently established to be the basis for public policy, or even that future global warming would be bad (or good). Anyone who cites this study in defense of these views is mistaken.

What, exactly, did Anderegg et al. discover? That a small clique of climate alarmists got their writing published hundreds of times in academic journals.

Anderegg et al. also didn't count as "skeptics" the scientists whose work exposes gaps in the man-made global warming theory or contradicts claims that climate change will be catastrophic. Dennis Avery identified several hundred scientists who fall into this category, even though some profess to still "believe" in global warming.

Looking past the flashy "97-98%" claim by Anderegg et al., you will see the study found the average skeptic has been published about half as frequently as the average alarmist – 60 versus 119 articles. Most of this difference was driven by the hyper-productivity of a handful of alarmist climate scientists –the 50 most prolific alarmists were published an average of 408 times, versus only 89 times for the skeptics.

So what, exactly, did Anderegg et al. discover? That a small clique of climate alarmists got their writing published hundreds of times in academic journals, something that probably would have been impossible just a decade or two ago. Anderegg et al. simply assert that those "top 50" are more credible than scientists who publish less, but they make no effort to prove this.

Why Alarmists Publish More

Anderegg et al.'s assertion that "he who publishes the most must be the most credible" is implausible. There are at least four reasons why skeptics appear in print less frequently than do alarmists, and none of them has to do with credibility or expertise. They are:

Publication bias. Articles that "find something" – such as a statistically significant correlation that might imply causation – are much more likely to get published than those that do not. Such "findings" are newsworthy and important to other researchers, while experiments that do not "find something" are less so. Even though falsifying hypotheses with experimental data is the essence of true science, it is the experiment that seems to generate or support a hypothesis that

gets all the attention and is most likely to be published, even if that experiment had a small sample size, limited duration, or other defects that increased the odds of a false positive finding.

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Publication bias is also caused by heavy government funding of the search for one result, but little or no funding for other results. In the case of climate change, hundreds of millions of dollars in government grants have gone to scholars who say they are trying to find a discernible human impact on climate, or of climate change on plants, animals, fish, human health, or a litany of other things. Much less funding is available to scholars who say they are seeking to find natural causes for climate change, or explanations of natural phenomena that don't involve climate change.

Publication bias helps explain why most published research findings are false, not only in climate science but in all disciplines. Thousands of researchers are being paid to "find something," and they publish whenever they think they might have found something, no matter how slim the evidence. We seldom read that other scholars have tried and failed to replicate their findings, but it happens all the time.

Resumé padding. Climate scientist Phil Jones, before the Climategate scandal revealed that he was hiding data and illegally blocking FOIA requests, was identified as a coauthor on articles appearing in science journals an average of once a week, an astounding pace if the findings he was reporting were being carefully vetted. (As reported by Fred Pearce in The Climate Files). His data are still being cited in footnotes for scores of other published articles every week or month.

This extraordinary productivity is a function of several things, but one is the practice of having large numbers of coauthors on scientific papers, so that a dozen or even two dozen writers get to list the paper in their resumé. This makes objective peer review difficult or impossible, helping to ensure publication. This practice became pervasive in climate research only in the past decade, and it is entirely a phenomenon of alarmist scientists. Most skeptics continue to publish alone or with only a few coauthors.

Age and academic status. Climate scientists who are skeptics tend to be older, and more are emeritus, than scientists in the alarmist camp. This could be the result of two things: Either they are willing to speak out because they either have tenure or are retired and do not fear retaliation for taking an unpopular stance, or they are less impressed by the current fixation on computer models.

These "old school" scientists recognize that computer models' outputs are not data but hypotheses that must be tested by data (empirical observation) – a relationship that many younger scientists, accustomed to working constantly with computers and far less with observations of the natural world, tend to get exactly backward. These older scientists also were considered respected and successful if they published once or twice a year and devoted time to

classroom teaching, if they are not fully retired.

Climate alarmists tend to be younger, trying to get tenure by appearing in academic journals, and more likely to team up with other scientists to appear more frequently in those journals. Alarmists also are more likely to be environmental activists, drawn to the field by their interest in environmental issues rather than by pure interest in science itself. This again makes them more likely to write and publish articles specifically on the hot topic of climate change.

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Editorial bias. We know from the leaked Climategate emails that a small clique of influential government scientists worked behind the scenes to get academic journal editors to reject papers that would otherwise have qualified for publication. These scientists even arranged for editors who dared to publish such papers to be fired or pressured into resigning. This is gross editorial bias and likely contributed to some of the disparity in publishing numbers between skeptics and alarmists. More subtle bias, which might not be apparent even to the editors who exercise it, probably accounts for still more of the disparity.

So … the Anderegg et al. article should never be cited as proof that there is a "consensus" on the causes or consequences of climate change, or even on the matter of whether alarmists are more credible than skeptics.

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In conclusion, neither of these studies supports the claim that "98 percent of scientists believe in man-made global warming." For more research and commentary on the dubious claim of a "scientific consensus" on the causes and consequences of climate change, Google "You Call This Consensus?" by this author.