Controversy: Silence Is a Scientist's Worst Enemy

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How can the average person tell good science from bad, and what role should the rest of the scientific community play in helping us through the maze?

Imagine that a leading scientist becomes convinced that drinking tea causes ovarian cancer. The researcher might have read a few articles about the negative effects of tannin and heard several anecdotal but compelling stories of women with cancer who were also obsessive tea drinkers. The expert develops a "gut feeling" and looks for evidence that supports this view. Ignoring (or perhaps not looking for) a wealth of evidence to the contrary, the scientist then writes a book, declaring that all women must immediately stop drinking tea to avoid the risk of infertility or death. The book gets lots of media coverage and policy-makers feel compelled to enforce warning labels on all packages of black tea.

Would or should all women stop drinking tea on the basis of such advice? Should policy-makers make public health decisions because of it?

To the scientifically trained eye the answer is clearly "no". After all, how could one scientist's untested viewpoint justify such drastic action? To them it seems obvious that the researcher should run the experiments necessary to find out if their gut feeling has any scientific basis, publish their results in the peer-reviewed literature and write a book on the basis of a synthesis of all the evidence. Surely such an important health issue would warrant the attention of a large group of credible experts, and significant doubt about the issue should lead to funding of further research and plenty of healthy scientific discussion and debate on which sound policy can be based.

Indeed the world of public opinion and media hype is a bewildering place where scientific credibility is confused with scientific evidence, and people can become convinced by persuasive commentators with gut feelings.

The trouble is, most people would be understandably confused and feel unsure about the most appropriate response. The book is well written and the author credible and eloquent. Why shouldn't we all take heed?

This apparent conflict comes about because of a lack of understanding of the scientific process and the tendency for media hype and public opinion to translate into policy decisions.

And indeed the world of public opinion and media hype is a bewildering place where scientific credibility is confused with scientific evidence and people can become convinced by persuasive commentators with gut feelings.

Importantly, it is also a place where most scientists feel terribly uncomfortable and prefer not to venture.

And this is, I believe, the crux of the issue.

A current parallel to my opening piece of fiction is the book *Heaven and Earth. Global Warming: The Missing Science* by Professor Ian Plimer, a well-respected geologist with numerous awards to his name. His book amasses scientific evidence that claims to turn several decades of climate science on its head and open the whole issue of human-induced climate change up to debate. Although numerous books on climate change have been published recently, this one has attracted a lot of media interest and a growing band of supporters. This is not surprising given that its author takes the opposite view of the majority of scientists working in the climate change arena, and thus has all the right ingredients for a good media story: conflict, opposition, the lone voice and a topic with political and social relevance.

Unfortunately for society, these ingredients are the same ones that make scientists most nervous and least likely to engage.

I don't deny that debate is healthy and that Professor Plimer has every right to express his viewpoints. Also, I believe that the scientific community owes to society some public engagement with the issue and clarification of the confusion such a book creates.

When the Australian Science Media Centre sought comment on the book from a large pool of over 120 credible climate experts in the country, we were stunned by the silence. When pressed their excuses were many: "I don't have time"; "I don't want to give the book airplay by commenting on it"; "I'm not in a position to comment"; "I can't be bothered reading such a book"; "I'd love to but I'm going away tomorrow". This was exacerbated by the fact that the book was difficult to get hold of from bookshops.

But while scientists were looking the other way, the media hype and the book's influence were growing. The book didn't need their help to get airplay.

We bought multiple copies of the book and farmed them out to experts, begging them to take it seriously. After a considerable amount of time (in news terms) the comments began to trickle in. Some even began to see that it was a book that could not be ignored. But by this time the initial news wave had already peaked.

One can forgive a certain amount of fatigue in the climate science community given that

this is by no means a new debate and most of the arguments put forward by Plimer are ones that scientists have discussed *ad nauseam* many times before. But this doesn't change the fact that a lot of people are now confused and need to know what and who to believe.

This confusion was further fuelled by recent headlines claiming that ice in Antarctica is increasing, not decreasing as one might intuitively think would happen in a warming world. There was a very logical scientific explanation for this that did not require throwing out years of accepted wisdom on climate change, but how many people registered the voice of scientists in the ensuing fray?

Climate science is a very complex and difficult field involving many different types of experts, very few of whom have a picture of the whole system. This complexity is the very reason why people are confused and why the answers cannot be provided by a single person or even a group of experts within a single discipline (as Professor Plimer himself points out).

This is why the Intergovernmental Panel on Climate Change is necessary, and why its primary reason for existence is to sift through all the peer-reviewed evidence, of which there is a colossal amount, and draw meaningful conclusions. As with most mechanisms of knowledge transfer, it is not a perfect system and yet it is the best we have.

One should no more change climate policy on the basis of a single book than ban tea on the gut feeling of a well-meaning expert. And yet, most public policy is influenced by public opinion as much as by scientific evidence. This is why scientists must engage directly with the public through the news media and not hold back, no matter how hot the topic or heated the debate.

The problem with all types of scientific controversy, whether it's genetically modified organisms, the MMR vaccine, animal experimentation or climate change, is that the immediate void created following a breaking news story is usually filled by media-savvy people with a specific agenda. And why shouldn't they use this opportunity? Such groups and individuals recognise that each news wave provides them with a chance to get their voice heard. After all, big issues deserve a range of responses from different sectors of the community.

The imbalance comes when scientists, doctors and engineers are not part of this mix. Such experts can and do have agendas (I can't think of a human being who doesn't), which is why coming back to what the evidence tells us is so important. Also helpful is a variety of experts who can comment and add layers of information to build up a more complete picture.

It is often forgotten that scientists are not a cohesive group with a single message. The science research game is just as competitive as any other, and this helps to keep the evidence at the fore – for every claim not supported by the evidence there's a scientist to point this out with references and citations (the so-called "healthy scientific debate"). The problem is that this all happens out of public view, in conference rooms and scientific publications. But when there's a major public issue at stake, the absence of expert opinion in the public domain becomes critical.

One reason this occurs is that most experts lack an avenue into the news. They wait for journalists to contact them, and are rarely proactive in providing expertise into news stories. This is perfectly understandable and is the primary reason why the Australian Science Media Centre was set up.

However, a more common reason is that scientists want time to review all the facts and consider all the issues before commenting on breaking news. But by this time the wave may well have passed them by. As Fiona Fox, Director of the London-based Science Media Centre puts it, "the search for truth and respect for evidence and accuracy that drives the pursuit of knowledge by scientists is about as far removed as it could be from the media's needs at times of breaking stories... But it's exactly because of this integrity and respect for evidence that I want the public to hear from this expert".

When scientists take this opportunity and run with it, the results can be very powerful.

Few will forget the incredible debate over the abortion drug RU486 that was waged through the Australian media during late 2005 and early 2006. It had all the hallmarks of a good media story: passion, politics, diametrically opposed voices, confessions of the well-known, and even anger. But where was the science?

There is plenty of science in RU486 and yet

Professor Ian Plimer is no stranger to controversy, having attracted this media scrum outside the Federal Court in 1997 after challenging creationist Allen Roberts' claims of discovering Noah's Ark. Photo: Peter Pockley

for much of the debate the science was almost entirely missing. The gap was filled with shocking misinformation designed to scare, and the scientists and doctors stood by, silently shaking their heads. But when the Science Media Centre approached them for comment they jumped in with gusto, speaking at a national briefing and providing comment that resulted in a wave of basic scientific information into the public domain for the first time.

In August last year a paper was published in the *Journal of Investigative Dermatology* that suggested that some moisturisers may cause skin cancer. Given the almost universal use of moisturising creams, such a study was bound to become a classic scare story.

We sent the embargoed paper to a number of cancer specialists who immediately saw some fundamental flaws in the research conclusions. Their comments to the news media as the story broke changed the headlines and powerfully influenced the way the public perceived the issue. They did not say that the link did not exist, but simply pointed out the caveats in the research and that other conclusions could have been drawn from the results. They also called for more research to clarify the issue. In the meantime it was made clear that there certainly was nothing like enough evidence to pull all moisturisers off the shelves.

A similar scenario occurred in September when a New Zealand researcher found evidence that the use of paracetamol during infancy was associated with an increased risk of developing asthma in later childhood. Independent expert comment pointed out that the increased risk could also have been associated with more frequent illness during infancy and that the use of paracetamol was not necessarily causal. They also tried to calm the concerns of parents who had given their small children pain relief thinking they were doing the best for their child.

With insufficient evidence, one would not deny a sick child pain and fever relief. But you might also limit the use of the drug to times when it was absolutely necessary as a precautionary measure. Again, no one said the link was false and the paper was taken as a serious indication that more research was needed.

It's not that the scientists who publish such research are wilfully trying to mislead the public. It's that their message, once translated into press releases and news stories, loses its qualifiers. Most scientific publications explore various interpretations of the research, but usually only one interpretation is communicated to the public. By providing independent and nuanced comment on these stories, scientists help fill this gap and offer the public help in interpreting the information.

There is a view that scientists should reach consensus over controversial issues before airing them in public. Indeed, I once held this view myself. However, not only is it impractical to keep newly published research from the media, such control assumes that people can only take on board a limited amount of information and can't make up their own minds on the basis of a mix of viewpoints.

Returning to Plimer's book, what could or should other climate scientists have done? I believe they could have jumped into the debate head-first, put forward their own arguments and allowed the public to come to their own conclusions having heard a rich mix of competent voices.

Ultimately, it's what most of us would want, including, I suspect, Ian Plimer.