



How Scientific Controversies — Inappropriately — End Up at the Center of Bigger Political Battles

Daniel J. Hicks, University of California, Davis

On issues ranging from vaccines to genetically modified crops, to climate change, hot button public controversies about science shape public opinion and influence policymakers. I study these controversies and find they are often not actually about science. Instead, science provides an arena in which public figures debate deeper issues — such as the relationship between capitalism and the environment or how society should deal with risk. Science, in other words, serves as a playing field for these much broader political and philosophical disagreements.

But science is often an inappropriate focus for discussions that are really about other issues. Scientific debates are typically restricted to elites and use narrow conceptual frameworks. As a result, debates about science and scientific consensus can conceal broader concerns and distract from more important discussions about shared values and disagreements about how to solve societal problems. Several current debates are all cases in point.

Debates about Genetically Modified Foods

The debate over genetically modified foods — called GMOs for short — is typically framed as a debate over safety: will eating these foods give you cancer? I first encountered this debate in a local food cooperative in northern Indiana, where many members were opposed to GMOs. Even though members sometimes raised concerns about safety or environmental impacts, they often seemed more concerned about certain large agricultural biotechnology companies that control much of the commodity seed market and have a reputation for aggressively protecting their intellectual property. Widely circulated rumors suggested that lawyers were harassing farmers. There is no solid evidence of this practice, but out-of-court settlements would not necessarily leave a paper trail. In short, deeper concerns than scientific findings about GMO safety are involved here. Many opponents see GMOs as the flagship technology for “industrial agriculture,” which they oppose on cultural and environmental grounds. So being “anti-GMO” is often a shorthand way to express a broader opposition to the heavy use of synthetic pesticides and fertilizers and the role of the profit motive in agriculture.

Vaccine Statistics and Different Understandings of Risk

Much like GMOs, the vaccine controversy is typically framed as a debate over safety. But recent work has uncovered some more complicated social dynamics. Many parents who are hesitant to vaccinate their children are highly educated, middle class, white women. People in this privileged demographic are not likely making choices out of simple ignorance. A better explanation starts by recognizing that epidemiologists and parents typically work with very different conceptions of risk.

- Epidemiologists study whole populations using statistical conceptions of risk. For vaccines, they ask how many will get sick from a preventable disease versus how many will suffer vaccine side effects. The vaccine is judged safe and effective if it reduces the rate of disease more than it causes side effects.
- By contrast, parents hold to an individual conception of risk. They are rightfully concerned with risks to their child, who is not interchangeable with other children. Parents want to know whether their

particular child is more or less susceptible to a disease or a severe side effect from vaccination. Statistical studies do not provide the answers parents want.

Climate Change Controversies

Over 99% of climate scientists agree that climate change is real, will have severe effects, and can be affected by human choices. But there are still some persistent critics, by which I do not mean conspiracy theorists but refer to some experts with backgrounds in economics, engineering, or physics, who offer highly technical criticisms of the mathematical methods used in climate science. The notion of “inductive risk” can help understand why these critics are so persistent. This is the idea that standards for scientific claims depend, in part, on their downstream policy or social consequences. If the downstream consequences of a claim are mild, then it would be appropriate for the standards of evidence to be relatively low; if the downstream consequences are severe, then much higher standards of evidence are appropriate.

If scientific claims about climate change are correct, of course, that means humanity should work quickly to make a drastic change, to transition away from fossil fuels. Many of the technical critics of those claims have connections to the fossil fuels industry, which would be devastated by such a transition. From their perspective, the downstream consequences of climate change findings are severe — and the principle of inductive risk indicates that, from their perspective, very high standards of evidence are appropriate. At the same time, many mainstream climate scientists argue that the transition would cost much less than climate inaction. For these climate scientists, the inductive risk of climate change is low, and so the standards of evidence are more modest. From the mainstream perspective, critics are pointing to relatively minor doubts.

What Can be Done?

There is no silver bullet for preventing narrow scientific debates from distracting from the deeper, more difficult conversations that need earnest attention on the public stage. Nevertheless, policymakers, media outlets, and other civic leaders should recognize that clashing public values can imply different scientific research questions and standards of evidence. Science that is relevant to one social group may not address other concerns and interests.

Often the important political issue is whose interests — whose science — should shape policies affecting everyone. Public actors might do better to stop privileging science and instead articulate the deeper issues that are at play in hot button scientific controversies. Increased transparency about what is really at stake in these controversies could make them less confusing and help leaders and citizens decide on effective solutions to the underlying challenges.

Read more in Hicks, Daniel J, “Scientific Controversies as Proxy Politics.” *Issues in Science and Technology*, 33, no. 3 (2017); and Daniel J. Hicks, “The Safety of Autonomous Vehicles: Lessons from Philosophy of Science.” *IEEE Technology and Society Magazine* 37, no. 1 (2018): 62–69.