Fixing the communications failure

People's grasp of scientific debates can improve if communicators build on the fact that cultural values influence what and whom we believe, says **Dan Kahan**.

In a famous 1950s psychology experiment, researchers showed students from two Ivy League colleges a film of an American football game between their schools in which officials made a series of controversial decisions against one side. Asked to make their own assessments, students who attended the offending team's college reported seeing half as many illegal plays as did students from the opposing institution. Group ties, the researchers concluded, had unconsciously motivated students from both colleges to view the tape in a manner that favoured their own school[1].

Since then, a growing body of work has suggested that ordinary citizens react to scientific evidence on societal risks in much the same way. People endorse whichever position reinforces their connection to others with whom they share important commitments. As a result, public debate about science is strikingly polarized. The same groups who disagree on 'cultural issues' — abortion, same-sex marriage and school prayer — also disagree on whether climate change is real and on whether underground disposal of nuclear waste is safe.

The ability of democratic societies to protect the welfare of their citizens depends on finding a way to counteract this culture war over empirical data. Unfortunately, prevailing theories of science communication do not help much. Many experts attribute political controversy over risk issues to the complexity of the underlying science, or the imperfect dissemination of information. If that were the problem, we would expect beliefs about issues such as environmental risk, public health and crime control to be distributed randomly or according to levels of education, not by moral outlook. Various cognitive biases — excessive attention to vivid dangers, for example, or self-reinforcing patterns of social interaction — distort people's perception of risk, but they, too, do not explain why people who subscribe to competing moral outlooks react differently to scientific data.

A process that does account for this distinctive form of polarization is 'cultural cognition'. Cultural cognition refers to the influence of group values — ones relating to equality and authority, individualism and community — on risk perceptions and related beliefs[2,3]. In ongoing research, Donald Braman at George Washington University Law School in Washington DC, Geoffrey Cohen at Stanford University in Palo Alto, California, John Gastil at the University of Washington in Seattle, Paul Slovic at the University of Oregon in Eugene and I study the mental processes behind cultural cognition.

For example, people find it disconcerting to believe that behaviour that they find noble is nevertheless detrimental to society, and behaviour that they find base is beneficial to it. Because accepting such a claim could drive a wedge between them and their peers, they have a strong emotional predisposition to reject it.

Picking sides

Our research suggests that this form of 'protective cognition' is a major cause of political conflict over the credibility of scientific data on climate change and other environmental risks. People with individualistic values, who prize personal initiative, and those with hierarchical values, who respect authority, tend to dismiss evidence of environmental risks, because the widespread acceptance of such evidence would lead to restrictions on commerce and industry, activities they admire. By contrast, people who subscribe to more egalitarian and communitarian values are suspicious of commerce and industry, which they see as sources of unjust disparity. They are thus more inclined to believe that such activities pose unacceptable risks and should be restricted. Such differences, we have found, explain disagreements in environmental-risk perceptions more completely than differences in gender, race, income, education level, political ideology, personality type or any other individual characteristic[4].

P. DEJONG/AP

Citizens experience scientific debates as contests between warring cultural factions.

Cultural cognition also causes people to interpret new evidence in a biased way that reinforces their predispositions. As a result, groups with opposing values often become more polarized, not less, when exposed to scientifically sound information.

In one study, we examined how this process can influence people's perceptions of the risks of nanotechnology. We found that relative to counterparts in a control group, people who were supplied with neutral, balanced information immediately splintered into highly polarized factions consistent with their cultural predispositions towards more familiar environmental risks, such as nuclear power and genetically modified foods[5].

Of course, because most people aren't in a position to evaluate technical data for themselves, they tend to follow the lead of credible experts. But cultural cognition operates here too: the experts whom laypersons see as credible, we have found, are ones whom they perceive to share their values. This was the conclusion of a study we carried out of Americans' attitudes towards human-papillomavirus (HPV) vaccination for schoolgirls. This common, sexually transmitted virus is the leading cause of cervical cancer. The US government's Centers for Disease Control and Prevention (CDC) recommended in 2006 that the vaccine be routinely administered to girls aged 11 or 12 — before they are likely to become exposed to the virus. That proposal has languished amid intense political controversy, with critics claiming that the vaccine causes harmful side effects and will increase unsafe sex among teens.

To test how expert opinion affects this debate, we constructed arguments for and against mandatory vaccination and matched them with fictional male experts, whose appearance (besuited and grey-haired, for example, or denim-shirted and bearded) and publication titles were designed to make them look as if they had distinct cultural perspectives. When the expert who was perceived as hierarchical and individualistic criticized the CDC recommendation, people who shared those values and who were already predisposed to see the vaccine

J. AMIS/AP

Political controversy stalled a plan to vaccinate US girls against a virus that causes cervical cancer.

as risky became even more intensely opposed to it. Likewise, when the expert perceived as egalitarian and communitarian defended the vaccine as safe, people with egalitarian values became even more supportive of it. Yet when we inverted the expert-argument pairings, attributing support for mandatory vaccination to the hierarchical expert and opposition to the egalitarian one, people shifted their positions and polarization disappeared[6].

Rooting for the same team

Taken together, these dynamics help to explain the peculiar cultural polarization on scientific issues in the United States and beyond. Like fans at a sporting contest, people deal with evidence selectively to promote their emotional interest in their group. On issues ranging from climate change to gun control, from synthetic biology to counter-terrorism, they take their cue about what they should feel, and hence believe, from the cheers and boos of the home crowd.

But unlike sports fans watching a game, citizens who hold opposing cultural outlooks are in fact rooting for the same outcome: the health, safety and economic well-being of their society. Are there remedies for the tendency of cultural cognition to interfere with their ability to reach agreement on what science tells them about how to attain that goal?

Research on how to control cultural cognition is less advanced than research on the mechanisms behind it. Nevertheless, two techniques of science communication may help.

One method, examined in depth by Geoffrey Cohen, is to present information in a manner that affirms rather than threatens people's values[7]. As my colleagues and I have shown, people tend to resist scientific evidence that could lead to restrictions on activities valued by their group. If, on the other hand, they are presented with information in a way that upholds their commitments, they react more open-mindedly[8].

For instance, people with individualistic values resist scientific evidence that climate change is a serious threat because they have come to assume that industry-constraining carbon-emission limits are the main solution. They would probably look at the evidence more favourably, however, if made aware that the possible responses to climate change include nuclear power and geoengineering, enterprises that to them symbolize human resourcefulness. Similarly, people with an egalitarian outlooks are less likely to reflexively dismiss evidence of the safety of nanotechnology if they are made aware of the part that nanotechnology might play in environmental protection, and not just its usefulness in the manufacture of consumer goods.

> **"People endorse whichever position reinforces their connection to others with whom they share important commitments."**

The second technique for mitigating public conflict over scientific evidence is to make sure that sound information is vouched for by a diverse set of experts. In our HPV-vaccine experiment, polarization was also substantially reduced when people encountered advocates with diverse values on both sides of the issue. People feel that it is safe to consider evidence with an open mind when they know that a knowledgeable member of their cultural community accepts it. Thus, giving a platform to a spokesperson likely to be recognized as a typical traditional parent with a hierarchical world view might help to dispel any association between mandatory HPV vaccination and the condoning of permissive sexual practices.

It would not be a gross simplification to say that science needs better marketing. Unlike commercial advertising, however, the goal of these techniques is not to induce public acceptance of any particular conclusion, but rather to create an environment for the public's open-minded, unbiased consideration of the best available scientific information.

As straightforward as these recommendations might seem, however, science communicators routinely flout them. The prevailing approach is still simply to flood the public with as much sound data as possible on the assumption that the truth is bound, eventually, to drown out its competitors. If, however, the truth carries implications that threaten people's cultural values, then holding their heads underwater is likely to harden their resistance and increase their willingness to support alternative arguments, no matter how lacking in evidence. This reaction is substantially reinforced when, as often happens, the message is put across by public communicators who are unmistakably associated with particular cultural outlooks or styles — the more so if such advocates indulge in partisan rhetoric, ridiculing opponents as corrupt or devoid of reason. This approach encourages citizens to experience scientific debates as contests between warring cultural factions — and to pick sides accordingly.

We need to learn more about how to present information in forms that are agreeable to culturally diverse groups, and how to structure debate so that it avoids cultural polarization. If we want democratic policy-making to be backed by the best available science, we need a theory of risk communication that takes full account of the effects of culture on our decision-making. ■

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