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The Science Communication Problem: So What Should We Do About It?

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Q. "How can the problem be addressed at all then?" [Question from *ScienceInsider*.]

A. By *removing* the conditions that disable the faculties that individuals (of all levels of "science comprehension") use to reliably orient themselves with regard to what is known by science.

Is it okay if I answer w/ a short essay? Because, seriously, it isn't possible to answer the question in a sentence or even 2 or 3.

Maybe the impossibility of communicating the answer **to** this question in a sound bite is the reason that the conversation keeps returning to this point -- & then staring over.

"So what should we do, then" -- it's some kind of singularity or black hole, into which intelligent, evidence-based discussion of the "science communication problem" is inevitably drawn and then disappears, dissipating all the understanding that has been generated up to that point in the exchange.

This is your problem, though. [I only study science communication; I don't do it.](#) *Your* craft has to be up to the challenge of helping people get what those using mine are able to discover...

1. Cultural cognition & the science communication environment

To start, we will get *nowhere* if we fixate only on the spectacle of conflict over decision-relevant science & [ignore the vast, boring "denominator."](#)

The number of issues on which we see cultural conflict over relevant science is minuscule in relation to the ones in which we don't. The U.S. public is not polarized over the utility of antibiotics in treating bacterial infections, the public health benefits of pasteurization of milk, the health risk of cell phone radiation, the efficiencies associated with governmental provision of public safety services such as fire and police protection,

the disadvantages of relying on a system of bartering or privately guaranteed commercial paper rather than a common currency issued by and guaranteed by the government, etc.

Why not? The reason -- believe me! -- is not that people have a better grasp of biology, toxicology, economics and political science than they do of climate science!

The expertise individuals need to make effective use of decision-relevant science consists less in *understanding* particular bodies of specialized knowledge than in *recognizing* what has been validly established by other people—countless numbers of them—using methods that *no one person* can hope to master in their entirety or verify have been applied properly in all particular instances. A foundational element of human rationality thus necessarily consists in the capacity to reliably identify *who knows what about what*, so that we can orient our lives to exploit genuine empirical insight and, just as importantly, steer clear of specious claims being passed off by counterfeiters or by those trading in the valueless currency of one or another bankrupt alternative to science's way of knowing (Keil 2010).

Individuals naturally tend to make use of this collective-knowledge recognition capacity within particular affinity groups whose members hold the same basic values (Watson, Kumar & Michelsen 1993). People get along better with those who share their cultural outlooks, and can thus avoid the distraction of squabbling. They can also better “read” those who “think like them”—and thus more accurately figure out who *really* knows what they are talking about, and who is simply BS'ing. Because all such groups are amply stocked with intelligent people whose knowledge derives from science, and possess well functioning processes for transmitting what their members know about what's collectively known, culturally diverse individuals tend to converge on the best available evidence despite the admitted insularity of this style of information seeking.

By supplying individuals with an abundant and rich supply of cues and processes for reliably orienting themselves with regard to valid collective knowledge, these plural communities of certification constitute a liberal democratic society's "science communication environment." *Cultural cognition* comprises the collection of psychological mechanisms by which individuals rationally extract the guiding signal these cues and process supply.

2. A polluted science communication environment

Any influence that disconnects these cues and processes from what's known to science *damages* the science communication environment—and puts individual and collective well-being at risk every bit as much as damage to the natural environment.

Persistent public conflict over climate change is a consequence of one particular form of damage to the science communication environment: the entanglement of societal risk risks with *antagonistic cultural meanings*, which transform positions on them into badges of membership in and loyalty to opposing cultural groups (Kahan 2012).

When that happens, the stake individuals have in maintaining their standing within their group will often dominate whatever stake they have in forming accurate beliefs. Because nothing an ordinary member of the public does—as consumer, voter, or public advocate—will have a material impact on climate change, any mistake that person makes about the sources or consequences of it will not actually increase the risk that climate change poses to that person or anyone he or she cares about. But given what people now understand positions on climate change to signify about others' character and reliability, forming a view out of line with those in one's group can have devastating consequences, emotional as well as material.

In these circumstances individuals will face strong pressure to adopt forms of engaging information—whether it relates to what most scientists believe (Kahan, Jenkins-Smith & Braman 2011) or even whether the temperature in their locale has been higher or lower than usual in recent years (Goebbert, Jenkins-Smith, et al. 2012)—that more reliably connect them to *their group* than to the position that is most supported by the best available scientific evidence.

Indeed, those members of the public who possess the most scientific knowledge and the most developed capacities for making sense of empirical information are the ones in whom this “myside bias” is likely to be the strongest (Stanovich & West 2007). Under these pathological circumstances, such individuals be expected to *use* their knowledge and abilities to search out forms of identity-supportive evidence that would likely evade the attention of others in their group, and to rationalize away identity-threatening forms that others would be saddled with accepting.

Confirmed experimentally (Kahan 2013b; Kahan, Peters, Dawson & Slovic 2013), the power of critical reasoning dispositions to *magnify* culturally biased assessments of evidence explains why those members of the public who are highest in science literacy and quantitative reasoning ability are in fact the *most* culturally polarized on climate change risks (Kahan, Peters, Wittlin, Slovic, Ouellette, Braman, & Mandel 2012). Because these individuals play a critical role in certifying what is known to science within their cultural groups, moreover, their errors propagate and percolate through their communities, creating a state of persistent collective confusion.

The entanglement of risks and like facts with culturally antagonistic meanings is thus a form of pollution in the science communication environment. It *literally* disables the faculties of reasoning that ordinary members of the public rely on—ordinarily

to *good* effect—in discerning what is known to science and frustrates the common stake they have in recognizing how decision-relevant science bears on their individual and collective interests. It thus deprives them, and their society, of the *value* of what is collectively known and the investment they have made in their own ability to generate, recognize, and use that knowledge.

3. The *solution*: Science-communication environment protection

So here is what we must do: we must protect the science communication environment from these antagonistic meanings.

Risks and like facts are not born with the affective resonances that make them into divisive symbols of group identity . They acquire them as a result of processes that admit of empirical examination.

Using evidence based means (using our *reason!*), we can thus learn to identify the conditions that imbue policy-relevant facts with antagonistic meanings, and fashion procedures and processes to help steer clear decision-relevant science clear of them.

Consider [the human papilloma virus \(HPV\) vaccine](#) (Kahan 2013a). Introduced in 2006, the HPV vaccine combats an extremely common, sexually transmitted disease that causes cervical cancer. The CDC’s proposal for universal immunization of 12 year-old girls provoked intense political controversy, however, after the safety of the vaccine became entangled in divisive meanings relating to gender roles and parental sovereignty versus collective mandates of medical treatment for children.

But there was nothing necessary about this entanglement. The HBV vaccine is likewise aimed at a sexually transmitted disease--hepatitis-b—that causes cancer (of the liver). After the CDC recommended universal childhood immunization for HBV, the vaccine was progressively added to mandatory immunization requirements of nearly every state, and now has coverage rates of 90-plus percent year in & year out—compared to the anemic 33% for adolescent girls, and 7% for adolescent boys, today.

Why did the HPV vaccine *not* travel this route?

The answer was the marketing strategy followed by Merck, the manufacturer of the HPV vaccine Gardasil. Merck did two things that made it highly likely the vaccine would become entangled in conflicting cultural meanings: first, it decided to seek fast-track FDA approval of the vaccine for girls only (only females face an established “serious disease” risk—cervical cancer—from HPV); and second, it orchestrated a nationwide campaign to press for adoption of mandatory vaccine policies by state legislatures. This

predictably provoked conservative religious opposition, which in turn provoked partisan denunciation.

Neither decision was necessary. If the company hadn't pressed for fast-track consideration, the vaccine would have been approved for *males* and females within 3 years. If the company had not initiated a high-profile nationwide effort to press state legislatures to enact mandates, the HPV vaccine would almost certainly have made its way onto state mandatory vaccination schedules in the usual manner--by routine administrative regulations issued by public health officials operating outside the political realm.

That might not have been as advantageous for Merck, which was pushing to establish a dominant market position for Gardasil before competitor GlaxoSmithKline obtained approval for *its* HPV vaccine, Cervarix.

But it would have been better for our society, because then instead of learning about the vaccine from squabbling partisans, parents would have learned about it from their *pediatricians*, in the same way that they learn about the HBV vaccine.

The risk that Merck's campaign would generate a political controversy that jeopardized acceptability of the vaccine was [forecast in empirical studies](#) (Kahan 2007). It was also foreseen by commentators as well as by many medical groups, which argued that mandatory vaccination policies were unnecessary.

The FDA and CDC ignored these concerns, not because they were "in Merck's pocket" but because they were simply out of touch. There was no mechanism for assessing the impact that Merck's strategy might have or for taking the risks this strategy was creating into account in determining whether, when, and under what circumstances to approve the vaccine.

This was a fully avoidable **disaster**.

If this happens again, the fault will *not* lie "religious zealots" or "greedy corporations."

It will lie with us.

We have tremendous scientific intelligence at our disposal for promotion of the common welfare. But we put the value of it at risk because we have no national science-communication intelligence geared to warning us of, and steering us clear of, the influences that generate the disorienting fog of conflict that results when policy-relevant facts become entangled in antagonistic cultural meanings.

4. A “new political science”

Because individuals must [inevitably accept as known by science many more things than they can comprehend](#), their well-being depends on their becoming reliably informed of what science knows. *Cultural cognition* is what makes this possible.

In a pluralistic society, however, the cultural communities in which individuals exercise this rational faculty of recognition numerous and diverse. Normally they will converge; ways of life that fail to align their members with the best available evidence on how to live well will not persist. Nevertheless, accident and misadventure, compounded by strategic behavior, create the persistent risk of antagonistic meanings that impede such convergence—and thus the permanent risk that members of a pluralistic democratic society will fail to recognize the validity of scientific evidence essential to their common welfare.

This [tension is built into the constitution](#) of the [Liberal Republic of Science](#). The logic of scientific discovery, Popper teaches us (1945, 1959), [depends on the open society](#). Yet the same conditions of liberal pluralism that energize scientific inquiry inevitably multiply the number of [independent cultural certifiers](#) that free people depend on to **recognize** what is collectively known.

In such conditions, conflicts among the plural communities of certification (even if rare) are statistically certain to arise. Because they disable the faculty that reasoning individuals use to know what is known to science, such conflicts compromise the capacity of a democratic society to *make use of* the immense knowledge that science furnishes them for securing its members’ welfare. And because they pit against one another groups whose members share identity-defining affinities, such conflicts infuse the public deliberations of the Open Society with antagonistic meanings inimical to liberal neutrality.

But history is not driven by supra-individual “spirits” or by inevitable “laws” (Popper 1957). The pluralistic certification of truth is not an inherent contradiction; it is a challenge. In fact, it is a problem—a [science communication problem](#)—that can be solved, but by only one means: the use of human reason guided by the signature methods of disciplined observation and valid inference that are the signature of *science*.

At the birth of modern democracy, Tocqueville (1838) famously called for a “new political science for a world itself quite new.”

The culturally diverse citizens of fully matured democracies face an unprecedented challenge, too, in the form of the science communication problem. To overcome it, they

likewise are in need of a new political science—a *science of science communication* aimed at generating the knowledge they need to avoid the tragic conflict between converging on what is known by science and being who they are.

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