

Understanding Outrage: How Scientists Can Help Bridge the Risk Perception Gap

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The popular press often portrays environmental health risks as scarier than most scientists would portray them. The press tends to present these risks from the general public's perspective. This paper describes a widely used approach to understanding how the views of scientists and the public differ and gives an example of how the gap between these views can be bridged. Because the media's presentation of environmental health issues is key in establishing the terms of public discourse, such an approach can further fruitful dialogue in the policymaking process.

The task is to help define a research agenda for protecting children—and thus all of us—from environmental health hazards. Because this agenda will ultimately be some combination of the ideas put forward by scientists, public health officials, and the public, the role of the media is critical in this policy-development process. Reporters are the link between scientists and the public. This paper provides a framework for understanding the ways in which scientists and the public view and define risk. How we all perceive risks is key to decisionmaking about the investment of research funds.

Newspapers and magazines, television and radio, and on-line news services and bulletin boards report to us daily about conflicting views between scientists and the public. An example is the series of experiments using radiation that were carried out by various government agencies during the Cold War and announced by Department of Energy Secretary Hazel O'Leary in

December 1993. While Secretary O'Leary expressed grave concern about informed consent procedures and the nature of some of the work, many scientists stepped forward to give assessments of the risks of certain of the procedures, such as radioactive tracers, that were intended to counter the public's more worried assessment. Those of us in scientific institutions usually feel that reporters—and certainly writers of headlines and television news "teasers"—give prominence to the public's views and fears, or elements that play on those fears (1). A few headlines from California news stories illustrate this:

Town where cancer lives

Killing fields

Still clueless after all these years - state survey reveals little about 'mystery disease'

Town with a hex on it

Poison underfoot

The mystery disease — strange parasite breeds nightmares for families

Why don't scientists and the public think alike about environmental hazards? Drawing on the work of Baruch Fischhoff, Paul Slovic, and other social scientists, Peter Sandman (2,3) developed a helpful formulation for us that says when scientists calculate environmental health risks, they take four steps: they evaluate a substance's toxicity, they assess the exposure to people, they estimate the likelihood of harmful health effects, and they arrive at a level of hazard. Their equation according to Sandman looks like this:

$$\text{RISK} = \text{HAZARD}$$

Most of us—and this seems especially true of scientists—believe that reasonable people would agree with that "hazard" conclusion if they were given the information that led to it. We believe that information leads to understanding, acceptance, and

appropriate action. Scientists and policy makers often view the public as alarmingly irrational when the public does not agree with their conclusions, and even as willfully ignorant when they refuse to listen when scientists try to explain themselves. Obviously something is missing from the scientists' risk formula. What is left out are the more qualitative aspects of risk: values, emotions, power relations, and the need for action. Sandman developed this alternative risk equation (3):

$$\text{RISK} = \text{HAZARD} + \text{OUTRAGE}$$

The "outrage factors" make up the aspects of risk that scientists tend to ignore or fail to acknowledge. Outrage factors are key components of risk; they are quite real—as real as the scientists' hazard component—and not at all irrational. Social scientist Deborah Tannen has described similar failures to communicate in her book, *You Just Don't Understand* (4), in which she details the often-differing premises on which men and women base their actions and responses. Neither view is inherently wrong or irrational; they are simply different. She also notes the value of being able to speak from both perspectives. Ten of the outrage factors that most often arise in environmental health are listed below.

Factors that decrease risk

Voluntary
Control
Fair
Ordinary
Not dreaded
Natural

Certain
Familiar
Morally acceptable
Trustworthy source

Factors that increase risk

Imposed
Lack of control
Unfair
Memorable
Dreaded
Technological,
artificial

Uncertain
Unfamiliar
Morally unacceptable
Untrustworthy source

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These factors influence events in different ways.

- Voluntary/imposed. People need and value choice. When we choose to take a risk, we do not get upset. Think about skiers, football players, motorcyclists who shun helmets, and smokers; voluntarily taking a risk is, for some of us, part of the fun. If, on the other hand, choice is taken away, we may get angry.
- Control/lack of control. We all feel better when we are in control, especially in a risky situation. Most of us prefer to be the driver of a car than a passenger, especially if we have concerns about the other person's driving skills.
- Fair/unfair. Are the risks and benefits of the hazard equally distributed? Who is getting the benefits from the hazard, and who is bearing the risk? (This factor is key to the concerns of the environmental justice movement.)
- Ordinary/memorable. Nuclear radiation hazards, for example, are associated with the very memorable atomic bomb.
- Not dreaded/dreaded. Some health problems are more dreaded than others. Cancer and birth defects, for example, are more dreaded than other disabling and even fatal conditions such as emphysema.
- Natural/technological or artificial (created by people). Public health officials have been largely unsuccessful in raising concern about radon, whereas identical exposures from uranium mine tailings have caused major community protests.
- Certainty/uncertainty. Uncertainty about who is at risk—is your child the “one in a million” who will get cancer from the proposed waste incinerator?—and disagreement among experts about the level of hazard illustrate ways in which uncertainty increases risk.
- Familiar/unfamiliar. A cartoonist captured this outrage factor in a cartoon (5). In this cartoon, a man answers a knock at the door of his house to find a person on the step in a protective “moonsuit.” The visitor is saying, “I’m from the Hazardous Wastes Agency, and I have something to tell you about your lawn.” Many hazardous materials agencies that plan to take samples near residences now bring moonsuits into schools and neighborhoods for people to see beforehand, so that they do not become frightened and gain a heightened sense of risk when they later see the sampling being done.

- Morally acceptable/unacceptable. We have come a long way from the days when wastes were acceptably tossed wholesale into our streets and waterways. Today, pollution is almost a dirty word; a spokesperson who talked of “acceptable levels of contamination” would last about as long on a public podium as a police chief who spoke of “acceptable levels of crime.”

- Trustworthy/untrustworthy. I have saved a most important outrage factor for last: it is the trustworthiness of the information source. People and organizations perceived as benefiting from a hazard, or as having not told the truth about it, are not readily trusted. During the controversy several years ago over the pesticide Alar, the manufacturer and the apple growers associations had low credibility with the public when they characterized the risk. Unfortunately, government agencies too, are often not a trusted information source.

Let us step back a moment and look quickly at these outrage factors with an environmental health controversy in mind to see how they influence risk. Early in 1994 in the semirural, semisuburban town of Corona, California, the U. S. Department of Agriculture and the California Department of Food and Agriculture began sending three helicopters to fly over town at night in tandem every few weeks for 6 months. The pilots released tiny bits of malathion-containing insect bait through the entire area in an effort to kill the Mediterranean fruit flies that were suspected to be there. Many residents had horses and other livestock kept out in the open and there were a small number of farmers in the area. The agencies told local officials and residents of the decision a few days before the pesticide application was to begin and warned them that there were no alternatives. The agencies said the application was needed to prevent infestation of commercial fruit and vegetables, which they believed would cause Japan to embargo California produce.

With this situation in mind, we can review the list of outrage factors and predict the nature and strength of the Corona residents' response. At a public meeting called by the agencies to explain their decision, an overflow crowd of hundreds of angry residents were vociferous in their opposition and scarcely allowed agency representatives to speak. The city council unanimously opposed the malathion application and filed suit, unsuccessfully, in an

effort to stop it. This public reaction is hardly surprising since the pesticide application was not voluntary; residents were not offered control over exposure to families, pets, and livestock; benefits accrued to agribusiness, and risks, if any, accrued to the town's residents; the agencies were viewed as having only the interests of agribusiness in mind, and so as untrustworthy; and so on.

We can see that outrage factors can be used well by scientists and policymakers to foresee public concern and to take this concern into account in describing and addressing hazards. Imagine the credibility Secretary O'Leary would have had if she had said that the Department of Energy assured the public that the radiation experiments were all safe and proper and were no cause of concern, and that for reasons of national security she was unable to release additional information. There would have been a furor, a great division in the country between those who supported that view and those who did not. There would have been cries of cover-up, reports from everywhere that alleged illnesses from the experiments, indignation over the seeming preference for testing Blacks and children, a crippling diversion of resources and lowered morale inside the agencies in response to the allegations, etc. In short, had she defended the experiments, prevented access to information, and taken no action, the outrage level would have risen enormously.

Instead of raising public outrage, however, Secretary O'Leary took it into account; she stepped to the side of the public, acknowledged and even “owned” the outrage, and took assertive action. In announcing the tests, she said, “We were shrouded and clouded in an atmosphere of secrecy. And I would take it a step further: I would call it repression....[I was] appalled and shocked [to learn of the tests] and it just gave me an ache in my gut and my heart” (6). She announced an effort to review 32 million documents for declassification and a thorough investigation of the experiments. Taking a most unusual stance for a Cabinet member, she placed herself in potential conflict with the Department of Justice when she later said that the government should compensate victims of the tests. She noted that her department had a history of fighting claims filed by people who lived downwind of nuclear weapons tests in the 1950s and 1960s, and said, “It doesn't occur to me that, that is the posture I want to be in....[We must ask,] What does it take to make these people

whole?" (7). She established a toll-free hotline to answer people's questions and to take any information they might offer.

Secretary O'Leary thus tapped into the productive energy inherent in the outrage and helped use it as a cooperative force for investigation and change, while turning a potential trust disaster into an increase in

trust for her agency. She provides a good example of how scientists and policy makers can break down the barriers between the two risk equations; scientists can learn about and take to heart the full range of risk factors—not just hazard factors, but outrage factors as well. This approach allows scientists to bridge the risk perception gap

between themselves and the public and gives reporters the opportunity to report on something closer to concord than conflict. Such an approach can only aid scientists and the media in furthering fruitful dialogue on environmental health hazards and on setting appropriate research priorities.

REFERENCES

1. Consumer's Research Magazine. 76(10):31–33 (1993).
2. Sandman PM. *Explaining Environmental Risk*. Washington:U.S. Environmental Protection Agency, 1986.
3. Sandman PM. Risk communication: facing public outrage. *EPA J* 13(9):21 (1987).
4. Tannen D. *You Just Don't Understand*. New York: Ballantine, 1990.
5. Harris S. [Cartoon]. *Current Controversy* 4(3):4 (1985).
6. Schneider K. *New York Times*, 8 December 1993;A20.
7. Schneider K. *New York Times*, 29 December 1993;A1.