

## **Citizen experts in environmental risk**

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**Abstract.** In the last two decades, public administrators have increasingly faced groups of people with opposing views about the risks of exposure to environmental contaminants. Because of a series of intriguing studies on risk perception, the situation is frequently seen, by scholars and administrators alike, as a conflict between experts and citizens, and risk communication guidelines are based on this interpretation. But the citizen-expert dichotomy appears fallacious when it is examined in light of the ways citizens actually participate in environmental policy making. The dichotomy overlooks the fact that citizens express their perception of risk largely through organized citizen groups, and that these groups employ and have access to many experts. This essay uses a mainstream environmental group and a number of grassroots environmental groups to illustrate the point. It concludes that the more important conflict is between experts who find environmental pollution safe and those who find it hazardous.

### **Introduction**

In the last two decades, public administrators have increasingly faced groups of people with opposing views about the dangers of exposure to environmental pollution. In the 1970s at Love Canal, at Three Mile Island, and at Woburn – to name prominent cases – some people argued that public health was seriously endangered and that immediate action should be taken to prevent further exposure; other people argued that the exposures in question were not hazardous and that no protective action was necessary (Levine, 1982; Walsh, 1991; Brown and Mikkelsen, 1990). Today in the 1990s we hear the same kind of debate. For example, some people say that the nuclear waste repository at Yucca Mountain in Nevada would pose a serious public health hazard; others insist it would be safe (Erickson, 1994). Some people believe that synthetic chemicals have caused large numbers of diseases; others say they have not (Proctor, 1995).

These situations are frequently seen, by administrators and scholars alike, as conflicts between experts and lay people – experts taking the position that exposures to environmental pollutants are safe, lay people insisting the exposures are dangerous (Wildavsky, 1995; Whelan, 1993). The idea that these are controversies between experts and lay people has its firmest empirical foundation in the work of a group of researchers led by Paul Slovic who, since the late 1970s, have been studying ‘risk perception.’ In dozens of published papers Slovic and his colleagues have shown that experts and lay people make different estimates of mortality rates and employ different kinds of rationality in making those estimates. (For overviews see Slovic, 1987; Royal Society, 1992).

In the initial demonstration that experts and lay people construe risk differently, Slovic, Fischhoff, and Lichtenstein asked three groups of ordinary people to estimate death rates from various modern technologies. They then compared these estimates with the estimates by a group of 'experts' – people with 'professional involvement in risk assessment.' Finding that for nuclear power, pesticides, and some other technologies, lay people estimated death rates as far higher than they actually are, while experts made more accurate estimates, the researchers set out to understand lay people's reasoning. They hypothesized that lay people think of hazards not according to expected fatalities, but according to the *characteristics* of the hazard. So they administered a new questionnaire which listed possible characteristics. They found that the hazards ordinary folk think are very risky are 'unknown' (unobservable, unfamiliar, with delayed effects and so on) and 'dread' (uncontrollable, not easily reduced, inequitably distributed, etc). In contrast, the hazards people think are not very risky are familiar and controllable (Slovic et al., 1979; 1980; 1981).

The researchers concluded that lay people aren't ignorant of what is 'really' risky. Rather, compared to experts, they employ a broader and richer kind of rationality. Instead of considering technological hazards from a reductionist, technical perspective, they take into consideration qualitative issues like fairness and equity. They are concerned with costs and benefits. They think about community cohesion and about future generations and about their personal lives. In sum, they bring their beliefs and values into play (Slovic, 1987; Schwing and Albers, 1980; Covello, 1983; Perrow, 1984; Fischhoff, 1985; Environmental Protection Agency, 1987; Johnson and Covello, 1987; Krinsky and Golding, 1992).

From a policy perspective, whether and why people perceive something as risky is important because people, as citizens, think their views should affect administrative decisions and environmental laws. Citizens demand that local governments pay attention to their opinions about the citing of hazardous waste incinerators, the dangers of living near abandoned toxic waste dumps, and how nuclear waste should be regulated. And governments do listen to citizens' views on these issues. But if experts, to whom governments also listen, disagree with citizens about what is harmful, how much and in what ways should citizens' perceptions of risk influence decision makers?

The risk literature offers two kinds of answers, both under the rubric of 'risk communication.' To some scholars, while citizens' efforts to affect government should be respected, administrators should try to bring the citizens' ideas about risk closer to the experts'. Thus, while agency personnel need to pay close attention to citizens, the attention is primarily in order to understand why they hold the ideas they do, to gain their trust, and to help agency representatives explain scientific and technical information to them effectively (Environmental Protection Agency, 1990: p. 24; Fessenden-Raden, Fitchen, and Heath, 1987; Michaud, 1991). As Flynn, Slovic, and Mertz put it after describing the public's profound skepticism about the nuclear waste repository in Nevada, 'Countering such attitudes and opinions will require extraordinary honesty, patience, and skill in communicating the appropriate information to the public' (1993:

p. 501). This perspective reflects the prudent notion that environmental policies should be based on sound science, but it appears to care more about reducing citizen protest than reducing environmental pollutants. In K.S. Shrader-Frechette's words, such scholars 'ask how to mitigate the impact of risk *perceptions* (which they assume to be erroneous), rather than how to mitigate the impact of *risk* itself' (1991: p. 78, emphasis in original).

A second answer says that citizens have something to *add* to administrative decision making. In this view, citizen perceptions of risk, although stemming from a kind of rationality distinct from the experts', are equally as legitimate. Risk communication, then, should be a two-way process where agency personnel bring in technical data and citizens bring in social values (Slovic, Fischhoff and Lichtenstein, 1982; Otway, 1987; Krinsky and Plough, 1988; Leiss, 1996; Fischhoff, 1995). In Peter Sandman's words, '[T]echnical professionals are the experts on what's hazardous and what isn't ... citizens are the experts on what's outrageous and what isn't' (Sandman, 1991: p. 40).

Several government institutions base guidelines for risk communicators on the two-way communication idea. Among them are the U.S. Department of Health and Human Services' Agency for Toxic Substances Disease Registry (ATSDR), New Jersey's Department of Environmental Protection and Energy, the U.S. Environmental Protection Agency, and the (semi-governmental) National Research Council. Explaining the citizens' role in communication, ATSDR tells risk communicators, 'People often care more about trust, credibility, competence, fairness, and empathy than about statistics and details' (U.S. Department of Health and Human Services, 1994; p. 4). Other agencies assign citizens a similar role. The EPA says that 'lay people are the experts on what frightens them and what would reassure them' (Sandman, 1986: p. 21). The New Jersey agency says that 'people's values and feelings are a legitimate aspect of environmental health issues and ... may convey valuable information' (Chess, Hance, and Sandman, 1991: p. 19). And the NRC says, '[T]echnical experts and public officials ... need to learn more about nonexperts' interests, values, and concerns' (National Research Council, 1989: p. 21).

Certainly this all sounds like good advice. Two-way risk communication where citizens have a genuine role is more democratic than one-way communication where agency people lecture citizens. But none of these guidelines makes clear what agency personnel are supposed to do once they have listened. They would appear to have three unsatisfactory choices. They can hear citizens' explain why they think the exposure in question is dangerous, but support environmental policies consistent with the experts' view that it is not – a choice which replicates one-way communication and abrogates the claim that citizens' risk perceptions are legitimate and valuable. They can accept citizens' reasoning about what is dangerous and protect them from environmental exposures even when the experts say that the exposure are harmless – a choice implying that environmental decisions should be based on what people believe instead of on what scientists know. Or they can work out some compromise policy that doesn't protect people as much as people want to be protected but

doesn't entirely negate scientific knowledge either – a choice likely to satisfy no one.

These dismal alternatives, however, may be less an inevitable dilemma than an artifact of the smallness of the stage on which the risk communication literature presents the situation. Most of it calls up the same kind of event: local *ad hoc* neighborhood groups organized to fight against a waste treatment facility or polluting industry. But people's attempts to influence environmental policies occur in many more arenas than this. To remember what they are, it is useful to look at the scholarly writings on citizen participation. An inquiry based on this literature suggests different understandings of risk communication, and questions the validity of the concept at the center of the risk perception literature: the citizen-expert dichotomy.

The logic of the citizen-expert dichotomy has already been weakened by scholars who focus on the concept of expertise. Taking the constructionist position that scientific research inevitably reflects the society in which scientists work, these scholars argue that facts and values are inherently linked. They show that science can neither form nor test theories without appealing to extra-scientific assumptions. Thus pure, objective knowledge is impossible (Kuhn, 1970; Mulkay, 1979; Latour and Woolgar, 1986; Gieryn, 1995; Harding, 1986; Longino, 1990).

Some scholars apply constructionism to risk perception. They say it is naive to assume that experts know what is actually hazardous while citizens only have perceptions about those hazards, for experts have no choice but to combine empirical observations and value judgements (Fischhoff, 1989; Shrader-Frechette, 1991; Otway, 1992; Wynne, 1992). Paul Slovic himself has joined these scholars. In a recent essay he wrote that experts' assessment of risk 'is inherently subjective and represents a blending of science and judgement with important psychological, social, cultural, and political factors' (Slovic, 1997: p. 23). But illustrations of the value-laden nature of science frequently take risk perception scholars on a circular route. Working in a context where the citizen-expert dichotomy is the central concept, the lesson they usually draw is that experts perceive risk through their values, and citizens perceive it through theirs (Kraus et al., 1992; Slovic et al., 1995). It is a short trip from there back to the dismal choices I outlined above, for experts and citizens still occupy separate categories.

In this paper I try to avoid these choices by concentrating on the citizen side of the presumed expert-citizen dichotomy. I argue that, just as much of the risk perception literature oversimplifies the concept of expert by assuming that experts only deal in facts, so it oversimplifies the concept of citizen by assuming that citizens only deal in values. The literature makes this mistake about citizens, I contend, by ignoring the organized groups through which citizens influence environmental decisions and from which citizens get many of their ideas about risk. It thus confuses 'citizen' with 'individual,' and fails to ask about the expertise used by the organizations that actually represent citizens to policy makers. To illustrate my argument I examine the means by which the Natural Resources Defense Council came to its position on the health risks of

exposure to pesticides, and the means by which community-level organizations usually come to their decisions on the risks of exposure to industrial waste. I conclude that in controversies over exposure to environmental pollution, we are not seeing a conflict between citizens and experts but between two groups of experts.

### **Citizen participation**

The literature on citizen participation identifies three avenues available to people who hope to influence the government: through the electoral process, through the policy making process, and through the agenda-setting process. In the *electoral process*, citizens participate by voting and its attendant activities, such as working for candidates or sending them money (Conway, 1985; Rosenstone and Hansen, 1993). In the *policy making process* citizens participate in more varied ways: 1) by lobbying elected officials or executive agency personnel via writing letters, talking face-to-face with politicians and their staff, providing technical information, testifying at hearings, signing petitions, and taking part in rallies or demonstrations (Verba, 1993; Berry, 1977; Piven and Cloward, 1977; Kweit and Kweit, 1981); 2) by filing lawsuits (Wenner, 1990; Schlozman and Tierney, 1986: pp. 154–160); and 3) by serving on administrative agency-initiated citizen panels, commissions, and boards, or by attending or testifying at agency-sponsored public hearings and meetings (Aron, 1979; Morone, 1989; Creighton, 1981; Ethridge, 1987). In the *agenda setting process*, citizens participate in more subtle ways. They try to affect what the public construes as a political problem and thus what the government is called upon to address. This sort of citizen participation employs a wide variety of means, including skillful use of the media, to reframe and thus draw new attention to old issues or to transform accepted conditions into contested ones (Cobb and Elder, 1972; Edelman, 1976; Snow et al., 1986; Snow and Benford, 1992; Stone, 1989; Tarrow, 1994; Tesh, 1993).

In the context of environmental risk, the most important point about these three ways to affect government is that citizens can participate effectively as individuals only in the electoral process, and then only as voters and as financial contributors to election campaigns. In other aspects of the electoral process, and in the policy making and agenda setting processes, citizens have to organize into groups to have much influence. The strange thing about the risk literature is that it misses this point. Despite its recognition that people are socially-embedded perceivers of risk, and despite its concern with the best way administrators can respond to organized citizens, the literature takes the individual citizen, not the groups that citizens belong to, as the unit of analysis. This formulation means that risk scholars ignore the activities and the composition of the organizations through which most activist citizens acquire information about environmental hazards. They thus misconstrue the actual relation between citizens and experts.

I am not suggesting that risk perception research has completely neglected organized groups. The initial studies in the field surveyed members of the League of Women Voters and members of a business and professional organization. But there is no indication in the many publications risk perception researchers have generated from these studies that they see these ‘members’ as anything but proxies for the public at large. In fact, some scholars criticize their data for purporting to depict the views of the average citizen but being unrepresentative of the public. Some critics have done new studies in order to form a more accurate picture of the average person’s beliefs. (See, for example, Gould et al., 1988). Certainly it is interesting to know how the typical American perceives risk. But since, as I have noted, the main reason we care what people think about risk is that people, *as citizens*, have a legitimate role in affecting government decisions, studies of individuals are not enough. We also need inquiries where the unit of analysis is the organizations through which citizens participate in making those decisions. I will start by elaborating briefly on the list of participatory avenues available to citizens.

Little needs to be said about the electoral process. Obviously, electoral campaigns are group activities, and unaffiliated individuals haven’t much of a role outside that structure. The group-nature of the policy making process, however, is not so obvious, so here we have to look at the research. Although many individuals do become angry or worried (or heartened) by political events and, all on their own, write letters or make phone calls encouraging government officials to act, most constituent messages received in government offices are stimulated by organized groups (Rosenstone and Hanson, 1933: p. 228; Cigler and Loomis, 1995: pp. 394–398; Schlozman and Tierney, 1986: pp. 184–197). Moreover, especially on the federal level, it is seldom individual, unaffiliated citizens who testify at hearings or public meetings, talk face-to-face with elected representatives and their aides or with agency personnel, and provide technical information to legislators or to bureaucrats. More often it is the paid staff, the consultants, or high-visibility volunteers (movie stars, for example) representing the organized groups who actually do the work. In these cases, citizens not only participate as members of groups instead of as individuals, other people carry out the participation for them.<sup>2</sup> The group-nature of citizen participation is also illustrated when citizens sign petitions and attend rallies, demonstrations, and other crowd events – all activities requiring organized groups. And participation by litigation, although lawsuits with policy implications sometimes carry the name of a single individual, is usually done through formally organized groups (Wenner, 1990).

The group-nature of citizenship is less clearly illustrated in the case of boards, commissions, and public meetings. Sometimes citizen members specifically represent existing grassroots groups, sometimes they represent community-based organizations, and sometimes they represent the public at large (Morone, 1984; Brownlea, 1987; deLeon, 1992). There are apparently no data showing which kinds of representation are most common. Similarly, it is hard to know what percent of public meetings and hearings are attended mainly by unaffiliated

members of the general public and what percent are attended primarily by people specifically supporting an organized group. Without more data, we can only conclude that on boards and at public meetings, citizens are sometimes formally unaffiliated and sometimes formally representative of organized groups.

The concept of unaffiliated citizen, however, fails to recognize the fact that organized groups affect citizens' ideas. In other words, it ignores the third way that people can influence government: the process of agenda setting. Although occasionally individual citizens can influence what the public, and the government, construes as a political problem – consider the attention Michael Harrington brought to poverty in *The Other America*, and the effect of Ralph Nader's *Unsafe at Any Speed* – for the most part, agenda-setting is a collective activity.

Work by members of feminist organizations has been a major factor in the transformation in public opinion about women's role in society (Costain and Majstorovic, 1994; Berry, 1989). The activities of civil rights groups fostered new cultural ideals about racial equality (Eyerman and Jamison, 1991; McAdam, 1996). A crusade by environmental organizations got Americans to think that destruction of the Amazon rainforest constitutes a public problem (Keck, 1995; Conklin and Graham, 1995). In all these campaigns, members of organized groups redefined an accepted condition or situation as a political problem and worked to get the public to embrace the new definition. Once they were successful, the newly-defined problem became a legitimate arena for government policy making.

It's no mystery why the public participates in policy making and agenda setting mainly through organized groups. For policy making, the complexity of modern government makes it difficult for lone amateurs to learn what is going on, to know whom to contact, and to know where to get useful information (Truman, 1951; Kingdon, 1984: pp. 68–71; Rosenstone and Hansen, 1993). The high level of scientific and technical knowledge necessary to study the available data and to discuss the rules and regulations they suggest, keep the unaffiliated average citizen from even understanding many of the issues (Barke, 1986; DeSario and Langton 1987). In the case of agenda setting the cost in time and money of campaigns that seek to construct new social problems puts these avenues well out of the reach of most private citizens (Snow et al., 1986; Snow and Benford, 1992). Perhaps most importantly, citizens seldom enter politics on an empty state. Businesses are already there. Although their main energies go into the production of goods or services, large successful businesses also employ lobbyists and run information campaigns in the expectation of getting some control over the policies that affect them. To have comparable influence, citizens must also organize sizable and powerful groups (Reich, 1991; Zald and McCarthy, 1979; Walsh, Warland, and Smith, 1993).

If, then, we care what citizens think about risk because they try to – and are sometimes able to – influence government decisions, and if citizens do that influencing primarily through groups, the question in environmental risk per-

ception is not about the reasoning individual citizens use to decide that a technology or situation or substance is hazardous. Instead the question is about the reasoning organized groups use.

### **Influencing the federal government**

The Natural Resources Defense Council (NRDC) is one of the dozen or so 'mainstream' environmental organizations that citizens join if they want to influence national environmental policy.<sup>3</sup> Through the NRDC staff they can lobby members of Congress, pressure bureaucrats at the EPA, testify at Congressional hearings, sue violators of environmental laws and regulations, and spread information to the general public about environmental hazards.<sup>4</sup>

In early 1989 NRDC caused a whirlwind of media stories, consumer fear, and industry fury by announcing that preschool children are at high risk for cancers and neurological disorders because they ingest high levels of pesticides along with their fruits and vegetables. The announcement was dramatized by an emotional story on CBS's '60 Minutes' which focussed attention on a single registered pesticide, a growth hormone called Alar.<sup>5</sup> Alar was licensed for use on apples, so residues showed up in apple juice, apple sauce, and of course on the raw fruit itself – all common foods in children's diets. The public responded to the '60 Minutes' segment and to the print media coverage of the NRDC report by refusing to buy apples and apple products. Public pressure was so great that several cities (including Los Angeles and New York) took apples out of school cafeterias, supermarkets put up 'No Alar' signs, and Congress considered legislation that would ban Alar. After three months the EPA issued a preliminary determination to cancel the use of Alar on all foods. Six months after that the company producing Alar voluntarily withdrew its registration (Jasanoff, 1990; Rosenberg, 1996; Rodgers, 1996; Marshall, 1991; Zeise et al., 1991).

The whole affair generated an intense attack by a number of scientists. Joseph Rosen at Rutgers University accused NRDC of using dubious toxicological data, misrepresenting Alar's breakdown product as a genotoxin, incorrectly estimating apple consumption, and relying only on worst-case scenarios (Rosen, 1990). In Congressional testimony Frank Young from the FDA insisted that 'there is not a significant risk at this time facing the American people in the consumption of apples.'<sup>6</sup> John Moore from the EPA said, 'The public is being led [by the NRDC report] to believe that ... their children are at very high cancer risk due to Alar residues in apples and apple products. This is simply not true...'<sup>7</sup> Scientists at the National Food Processors Association faulted the NRDC report for every one of its claims. Their spokesperson charged, 'The basic conclusions of the NRDC report rest on stringing together a series of improbable "worst case" assumptions and/or speculations... .In all of these areas, NRDC has either gotten its facts wrong or has made methodological errors.'<sup>8</sup> And a less economically-interested body of scientists, a committee made up of



representatives from the World Health Organization and the Food and Agriculture Organization, reviewed the scientific data and announced that Alar is not a carcinogen even at fairly high levels of exposure (Marshall, 1991).

As these excerpts from the controversy show, it is possible to make the Alar case look like one where citizens, acting through or inspired by an interest group, press Congress and the bureaucracy to make new policies, while experts criticize the science underlying the citizens' position. But the controversy cannot accurately be characterized as a split between experts and citizens. In the first place, the NRDC study used only data from U.S. government scientists. In the second place, it was done by just the sort of people Slovic and his colleagues designated as experts. In the third place, a number of people outside of NRDC who were also 'experts' publicly endorsed the NRDC position.

NRDC's announcement about the danger of pesticide exposure to children followed the completion of a two-year study and the publication of its findings in a report called *Intolerable Risk: Pesticides in Our Children's Food* (Natural Resources Defense Council, 1989). The report is a fairly dense technical treatise, 136 pages long, with twenty-two tables, ten figures, three appendixes, and 220 endnotes. It starts by describing two sets of data, both acquired from the EPA. One lists the consumption rates for the twenty-seven food items most frequently eaten by preschoolers. These data show that children, compared to adults, eat more food relative to body weight, and that their consumption patterns have changed significantly in recent years. The other data set lists the residue levels of twenty-three pesticides known to have health effects, and commonly detected in the twenty-seven food items. Combining these two data sets, *Intolerable Risk* calculates the amount of hazardous pesticides preschoolers are exposed to in their food. The next step is to assess the health outcome from this exposure. The report employs the results of animal bioassays, considers in its calculation the long latency period between exposure and cancer, and develops a methodology which shows that between 5,500 and 6,200 'of the current population of American preschoolers may eventually get cancer solely as a result of their exposure before six years of age to eight pesticides or metabolites commonly found in fruits and vegetables' (p. 2).

As for the people who did the study, they were, like the 'experts' Slovic and his colleagues interviewed, people with 'professional involvement in risk assessment.' In the risk perception studies these included a geographer, an economist, a lawyer, a biologist, a biochemist, a government regulator, and an environmental policy analyst (Slovic et al., 1979: p. 18). For NRDC they included a public health professional, a computer programmer, a physicist, an economist, a general scientist, and four lawyers.

The principal authors listed in *Intolerable Risk* are Bradford Sewell and Robin Whyatt, both then NRDC staff members. Whyatt had a master's degree in public health at the time of the report, and fifteen years of experience with toxic substances, first as executive director of Scenic Hudson and then at NRDC. Sewell had an undergraduate degree in human biology, two years of experience working on an earlier NRDC toxics project, and skill in computer

programming.<sup>9</sup> Whyatt and Sewell were aided by Glen Gilchrist, a consultant to the project, who developed the basic computer modelling system for exposure assessment.

The person responsible for performing the critical carcinogenic risk assessments was another consultant, William Nicholson from the Department of Environmental Medicine at Mt Sinai School of Medicine. Nicholson, whose PhD is in physics, began developing risk assessment models in 1980. Before the pesticide project at NRDC he had written criteria documents on asbestos both for the EPA and the Swedish government. He had developed a risk assessment model for asbestos for OSHA which the agency continues to use, and he had done extensive reviews of PCB cancer risk for a government agency in Ontario.

The over-all editor of the report was Lawrie Mott, who holds a master's degree in general science from Yale and had had nine years of experience in pesticides at NRDC. She also served as a member of the EPA Administrator's Pesticide Advisory Committee and had sat on the California Department of Health's Cancer Policy Review Committee. Four NRDC lawyers worked on the report: Janet Hathaway, Jane Bloom, Jacqueline Warren, and Albert Meyerhoff. They have all served as official members of various EPA advisory committees on the regulation of toxic substances.<sup>10</sup>

During the time they were working on the report, the authors consulted with other 'professionals in risk assessment.' Some of whom, like John Wargo at Yale and Richard Wiles at the Center for Resource Economics, were 'shadow advisors' unacknowledged in the final report. The most visible outside specialists were the nine official peer reviewers: four MDs, four PhDs, and one EdD.<sup>11</sup>

There are several indications that the final product met the approval of 'experts' unconnected to NRDC, also. In Congressional hearings both Deborah Prothrow-Stith, commissioner of the Massachusetts Department of Health, and Richard Jackson, chairman of the Committee on Environmental Hazards of the American Academy of Pediatrics repeated NRDC's concern for the health of children exposed to pesticides in food, and urged EPA to adopt stronger regulations (U.S. Senate, 1989). Later, a team of researchers from the California Department of Health Services argued that NRDC could reasonably have made an even stronger case that exposure to Alar puts children at risk for cancer (Zeise et al., 1991). And four years after *Intolerable Risk*, the National Research Council (1993) published a study corroborating NRDC's major conclusions. It shows that age-related differences in susceptibility to pesticides exist, that children's diets differ significantly from adults' thereby exposing them to greater amounts of pesticides, and that these early exposure are potentially harmful.

One might respond to all of this – the statement that *Intolerable Risk* used only data provided by federal agencies, the assertion that those responsible for the report fit the category of experts, the citing of corroborating experts – by asking whether the NRDC report is reliable. Did NRDC do 'good science?' But this would be the wrong question, for excellence is not the point here. The point is rather that NRDC, one of the citizens' organizations through which

ordinary people work to influence environmental policy, did not perceive the risk of pesticides using a special form of reasoning. NRDC investigators did deliberately choose one set of data on food intake rather than another, and they did decide to use one toxicologic study rather than another – decisions which angered their opponents (Rosen, 1990). But NRDC was doing science. The organization didn't conclude that Alar is hazardous because Alar is 'unknown' and 'dread.' It didn't publish an ethical treatise calling Alar risky because exposure is involuntary, hidden, and uncontrollable. It didn't bring up values like fairness and equity. Instead, NRDC used the same kind of reductionist, scientific rationality that Slovic and his colleagues labeled 'expert,' and, finding that between 5,500 and 6,200 current pre-schoolers may eventually get cancer from dietary exposure to pesticides, deduced that exposure is hazardous. It then pressed for government action.

This story suggests that from the perspective of federal policy makers, the citizens *are* experts. Individual citizens rarely express their opinions on the hazards of environmental toxins directly to the government. Combining with like-minded folk, they form organizations and hire professionals to do it for them. And as the NRDC case shows, they sometimes also hire scientists to develop the knowledge on which those opinions are based. Even when citizens' groups like NRDC don't actually do research, that is, even when they take positions based on literature reviews (which is more frequently the case) they depend on experts. Thus, most of the time when policy makers hear from citizens – that is, when members of citizen groups lobby policy makers, file lawsuits against them, or pressure them via advisory panels and public hearings – the citizens are representing scientists. This is not to deny that the average person evaluates risk differently from a professional in risk assessment. It is to call attention to the difference between the average person – the one reflected in risk perception questionnaires, and the citizen – the one trying to influence government through the mediation of a group. And it is to suggest that the risk communication scholars have it wrong: when governments hear opposing judgments about the dangers of a technology, the two sides represent not lay people and experts but two groups of experts.

### **Influencing state and local government**

But one might argue that the Natural Resources Defense Council is not the kind of citizens' group that counts in a discussion of risk perception and risk communication. While conceding that citizens who join mainstream groups in order to influence national environmental policy use scientific reasoning, one might point out that risk communicators usually meet with quite different citizens, those organized into neighborhood environmental groups. Neighborhood groups are concerned with local and state policies and rarely have scientists on staff – indeed by definition they seldom have staffs at all. It is the people in these groups, one might argue, whose reasoning about hazards

differs from experts' and who depend on subjective values more than objective science.

This objection to the focus on NRDC, however, ignores the agenda-setting aspects of citizen participation. It assumes that mainstream groups have no influence on grassroots groups, or on members of the general public not (yet) formed into any such group. But the assumption is erroneous. From a policy-making perspective, what NRDC did in the Alar case was get one registered pesticide off the market. From an agenda-setting perspective, it underscored and re-broadcast a message that environmentalists had been promoting since *Silent Spring*: scientific studies show that synthetic chemicals can be harmful to the environment and the public's health. One reason the NRDC study on pesticides is important is that in some small way it is responsible for public beliefs about environmental risk. Unfortunately, the risk perception researchers failed to notice this. Instead of starting from the assumption that people think a technology is risky because they have heard experts say so. The researchers started from the assumption that people think a technology is risky because the technology 'has' certain characteristics. The researchers never asked their respondents about the source of their views on risk, and they never asked themselves who or what assigns characteristics to a technology.

But the NRDC message is not simply that synthetic chemicals are dangerous. It is also that *scientists* think so. The NRDC message thus locates environmental protest in the realm of provable hypotheses, of cause-and-effect research, of objective knowledge. This didn't have to be. As the risk perception studies suggest, environmental activism could avoid emphasizing science. Opposition to pollution can be situated in a moral realm, justified on the basis that exposure violates social values like personal control, fairness, community cohesion, and public information. However, NRDC and other mainstream groups use primarily scientific reasoning when they talk and write about risk, especially when the topic is disease. So when grassroots groups began forming in the 1970s to protest pollution there was an already-existing, widely-used framework within which they could position their complaints.

At least five pieces of evidence indicate that grassroots groups have employed that framework. The first piece of evidence comes from organizing manuals directed at community-level environmental organizations. The authors of these manuals share a basic premise: scientists know what is hazardous and citizens need that knowledge too. They list the government agencies from which citizens can get toxicological, epidemiological, and regulatory information. They direct readers to peer-reviewed scientific journals, suggest they attend professional meetings, and in some cases advise them to contact scientists directly. They explain how to use the Freedom of Information Act and the Community Right to Know provisions of the Superfund law in order to get data from polluting industries. They show how to find and use computer databases. They tell about private organizations that publish toxics information. (Freudenberg, 1984b, Cohen and O'Connor, 1990; Gibbs, 1995; Feldman, 1996).

A second piece of evidence is the existence of two movement publications

that pass scientific findings on to environmental activists. The best-known in grassroots circles is *RACHEL's Environment and Health Weekly*, an independent publication available both electronically and by mail. Started in 1983, it consists of a five- or six-page essay on a current issue in environmental science, heavily referencing the academic literature. The other is the *Environmental Health Monthly*, a newsletter put out by the Center for Health, Environment, and Justice (formerly the Citizens Clearinghouse for Hazardous Waste). Begun in 1988, it reprints in each issue one or more articles in their entirety from the peer reviewed scientific literature, along with a commentary. Both publications concentrate on new research indicating that environmental pollution endangers human health.

A third piece of evidence is Nicholas Freudenberg's survey of 242 grassroots environmental groups. 'More than half the respondents,' he writes, 'reported that they attended conferences or meetings with scientific experts, read government reports, met with activists from other local or national environmental groups, read newspaper articles in order to educate themselves.' Notably, the respondents held information from scientists in higher esteem than that from their fellow environmental activists: 'Contact with scientific experts was rated to be the most valuable source of information (41 per cent of the groups), followed by reviews of government records or reports (33 per cent) and conversations with other environmental activists (29 per cent)' (Freudenberg, 1984a: p. 445).

A fourth piece of evidence comes from case studies of grassroots environmental organizations. At Love Canal, when the New York State Department of Health maintained that only a few people were at risk from the leaking landfill, the citizens' group turned to a cancer researcher at Rosewell Park Memorial Institute. She helped them gather the health data that eventually justified their relocation (Levine, 1982). In Alesia, Oregon, when the Forest Service denied that pesticide spray endangered human health, the local residents got help and advice 'from scientists all over the United States' (Van Strum, 1983: p. 95). At Woburn, Massachusetts, where the drinking water was contaminated with chemical solvents and many children had leukemia, residents formed an alliance with faculty at the Harvard School of Public Health to collect information to dispute the finding that no link existed between the water and the leukemias (Brown and Mikkelsen, 1990). In Michigan during the protest over contaminated cattle feed, citizens drew on the expertise of a local veterinarian, a private testing laboratory, the National Animal Disease Laboratory, and a USDA research laboratory to counter the Farm Bureau Services' denial that a public problem existed (Reich, 1991). After the accident at Three Mile Island, a physics professor from U.C. Berkeley helped nearby residents challenge the DOE's contention that no one had been harmed (Walsh, 1987). At Yellow Creek, Kentucky, a physician and a psychologist helped people fighting against water pollution do a community health survey that linked the pollution with disease rates (Cuoto, 1986). In Ann Arbor, Michigan, a group got help from a chemist, an industrial engineer, a hydrologist, and a former member of a

National Academy of Sciences committee to challenge the Department of Environmental Quality's decision that it was safe to discharge contaminated water into a local stream.<sup>12</sup> In Flint, Michigan, residents protesting the state's decision to allow siting of a hazardous waste incinerator in their neighborhood were helped by a toxicologist at the University of Michigan School of Public Health.<sup>13</sup>

A fifth piece of evidence comes from a study specifically testing the idea that citizens reason differently from experts. Jeanne Jabonoski analyzed what she calls the 'knowledge' used by the citizen members of a Scientific Advisory Board overseeing a lead mediation project in Toronto. She argues that the citizens, who represented an experienced neighborhood group, used technical knowledge (knowledge about legal and regulatory, scientific and engineering issues), procedural knowledge (knowledge which facilitated the board's decision-making process), and observational knowledge (knowledge of local conditions and history) (Jabanoski, 1997).

These pieces of evidence that grassroots groups often use scientific reasoning to understand pollution should not be taken to mean that they all use it rigorously. Anyone who has spoken with more than a few grassroots activists, or been one, or attended public meetings where members of community groups testify, has heard some activists who sound well informed about toxicology and epidemiology, and others who seem to have a weak grasp on even basic scientific concepts. The pieces of evidence should also not be taken to mean that grassroots groups limit themselves to scientific reasoning. On the contrary, individuals who join those groups are usually drawn to activism in the first place by just the sort of passion that the risk perception scholars study. The groups thus often employ emotional appeals and value commitments to mobilize others, as well as to pressure policy makers. Most importantly, the evidence should not be taken to mean that by using science, grassroots groups level the playing field. Industries producing pollution have many more resources to generate and disseminate scientific information than do communities exposed to the pollution. Nevertheless, the available record suggests that 1) when local activists seek advice from other activists on how to win, they are told to arm themselves with science, and 2) they frequently take this advice.

The available record is, of course, both incomplete and mixed. Some members of grassroots groups brush off the very idea that scientific expertise is necessary to understand the health hazards of pollution (Tesh and Williams, 1996). But it is a mistake to think that citizens in grassroots groups who see environmental pollution as risky typically use a form of reasoning substantially different from that used by professionals. More accurately, it is professionals who tell them what is risky. On one level these professionals are the men and women who write or publicly support reports like *Intolerable Risk*. On another level these professionals are the men and women who work with grassroots groups to generate and find scientific data linking pollution with health problems. If members of a grassroots group take positions about environmental risk that differ from the EPA's or the state health department's, they are probably

not using different forms of reasoning. More likely, they are consulting different scientists.

### **Conclusion**

I have been arguing that the risk perception literature misunderstands the conflict over the dangers of environmental pollution because it ignores the citizens' organizations through which people learn about risk and through which they express their knowledge to governments. An examination of those organizations suggests that the risk literature's distinction between lay people and experts is falacious. Instead of finding two groups of people, one thinking about risk in terms of social values, the other thinking about it in terms of scientific facts, the examination discovers a single group of people, thinking in terms of facts. The discovery should not be a surprise. In our culture, science is the most prestigious form of knowledge. When powerful political actors have already defined the issue as scientific, and already used scientific reasoning to claim that nuclear power, hazardous waste incinerators, or pesticide exposure is safe, members of environmentalist citizens' groups have to be scientific too.

This state of affairs raises questions about the political intentions of the risk communication guidelines. The ATSDR's guidelines say that people who oppose hazardous waste sites care more about things like trust than about statistics. The EPA's guidelines teach that citizens are experts only on what is horrifying. The state of New Jersey and the National Research Council tell public officials that their most important task is to consider people's interests, feelings, and values. In light of the stories I've told in this essay, such guidelines look like attempts to disenfranchise citizens. Citizens' groups work hard to locate and generate technical information and to communicate that information to governments. The advice to risk communicators, however, ignores these efforts. Glued to the concept that lay people and experts perceive risk differently, the guidelines assume that citizens are heedless of data, and then define whatever information citizens bring to the table as mere values. Thus the problem becomes how to deal with citizens and their emotional ways of reasoning. Risk communicators are urged to be sincere and tolerant with citizens, but the guidelines assign agency people the role of wise parent, and citizens the role of high-strung child. The scenario justifies limiting citizen participation. Beyond this, however, the advice to risk communicators masks a critical public policy problem. When citizens' organizations call attention to published studies countering the data on which administrators rely, or submit to government agencies new information generated by their own consultants, the dilemma for agencies is not how to combine two distinct kinds of reasoning. The dilemma is what to do when experts disagree.

## Notes

1. The author wishes to thank Janet Hathaway, Lawrie Mott, William Nicholson, Carol Rose, John Wargo, Robin Whyatt, and the anonymous reviewers of an earlier draft of this essay.
2. Many citizen groups do have periodic 'lobby days' when hundreds of members gather in Washington or the state capitol and swoop down on administrative and legislative offices. Such events deviate from the rule that lobbying is done by staff, but they do exemplify the axiom that most citizens participate in policy making via organized groups. At the local level the generalization about staff doing the work is not true because grassroots community groups, almost by definition, have no paid staffs. Thus the members do the lobbying themselves, but here again, it is groups, not individuals, who lobby.
3. The mainstream organizations include besides NRDC, the Environmental Defense Fund, the Sierra Club, the National Wildlife Federation, the National Audubon Society, the World Wildlife Fund, the Wilderness Society, Friends of the Earth, the Izaak Walton League, and the Nature Conservancy.
4. For details see NRDC's quarterly publication, *The Amicus Journal*.
5. Alar was registered as a pesticide, but its purpose was not to deter pests. Instead it extended the period of time fruits and vegetables remained on the branch, decreased dropping during harvesting, and improved storage life (Rosenberg, 1996).
6. Dr. Frank E. Young, Administrator, U.S. Food and Drug Administration in oral Congressional testimony (U.S. Senate, 1989: p. 23).
7. Dr. John A. Moore, Acting Deputy Administrator, U.S. Environmental Protection Agency, in written Congressional testimony (U.S. Senate, 1989: p. 29).
8. Charles J. Carey, President of the National Food Processors Association in written Congressional testimony (U.S. Senate, 1989: p. 91).
9. It's worth noting that Whyatt later left NRDC to get a doctorate at the Columbia University School of Public Health, and Sewell now has both an MPH and a JD from Columbia University.
10. Information on the authors' credentials comes from telephone interviews during December 1994 with Robin Whyatt, Lawrie Mott, Janet Hathaway, John Wargo, and William Nicholson.
11. The peer review committee consisted of Henry Falk, MD, American Academy of Pediatrics; John Gussow, EdD, Columbia University; Steven Markowitz, MD, Mount Sinai School of Medicine; Jack Mayer, MD, Columbia University; Herbert Needleman, MD, University of Pittsburgh; Ian Nisbit, PhD, Nisbit and Co; Frederica Perera, PhD, Columbia University; Marvin Schneiderman, PhD, National Academy of Sciences; Bailus Walker, PhD, SUNY at Albany.
12. Information included in packet presented to the Michigan Department of Environmental Quality by Scio Residents for Safe Water at a public hearing in Ann Arbor, January 13, 1997.
13. Personal communication from the professor in question: Jerome O. Nriagu, Department of Environmental and Industrial Health, University of Michigan School of Public Health.

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