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# Risk Comparisons in a Democratic Society: What People Say They Do and Do Not Want

Branden B. Johnson\*

## Introduction

Informed citizens are central to a workable democratic society. Ignorance among citizens about risk and its correlates, and the dangers this poses for effective hazard management by society, are constant themes in hazard management literature. Although the role of knowledge in risk estimation or evaluation is disputed,<sup>1</sup> a major rationale for the research and practice of risk communication is to enhance citizens' knowledge so that they can be responsible individual hazard managers and voters.

One approach advocated for twenty years seeks wider use of comparisons to "put into context" the risks of a given threat, context most often defined by advocates to convey the message that what people fear causes far fewer deaths than more familiar activities. Very few studies have attempted explicit experimental tests of the effect of risk comparisons, with mixed results.<sup>2</sup> These tests presented non-random samples of the general public with alternate comparison scenarios to experimentally test their effects on risk beliefs. In the spirit of the common risk communication advice to assess one's audience,<sup>3</sup>

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<sup>1</sup> See, e.g., Branden B. Johnson, *Advancing Understanding of Knowledge's Role in Lay Risk Perception*, 4 Risk 189 (1993).

<sup>2</sup> See Emilie Roth et. al., *What Do We Know About Making Risk Comparisons?*, 10 Risk Anal. 375 (1990); Paul Slovic et al., *What Should We Know About Making Risk Comparisons?*, 10 Risk Anal. 389 (1990); William R. Freudenburg & Julie A. Rursch, *The Risks of 'Putting the Numbers in Context': A Cautionary Tale*, 14 Risk Anal. 949 (1994).

<sup>3</sup> See, e.g., M. Granger Morgan & Lester Lave, *Ethical Considerations in Risk Communication Practice and Research*, 10 Risk Anal. 355 (1990); Kerry K. Pflugh et

I thought it useful to supplement such experiments by discussing the topic directly with citizens, the research focus of this paper.

### Background

Risk comparison criticisms vary widely. One approach has been to argue that certain comparisons are more appropriate (less likely to be publicly rejected) than others. For example, comparisons like this year's emissions to last year's, or to a public health standard, have been deemed better than comparisons of highly dissimilar items, e.g., voluntary versus involuntary risks.<sup>4</sup> A tougher criterion is that "comparisons of risk-related situations or alternatives" are only useful if alternatives can actually replace one another, as in a decision to purchase (or have produced) one chemical over another. By contrast, one cannot choose to substitute the risk of being hit by a meteorite for the risk of breathing a chemical.<sup>5</sup> The most challenging criticism is that comparison advocates focus on a single element (communication context and trust, content or format of comparison, communication aim), when all of these elements must be dealt with for the comparison to be "compelling... in changing somebody's... perspective on the risk/decision." Thus, an effective comparison requires more than "a discrete [isolated] communication" of one or few numbers put in a certain way for a given goal, for particular decision alternatives. Understanding, and promoting dialogue on, the varied choices for each of these elements might be needed for comparisons to be worthwhile.<sup>6</sup>

The scant experimental evidence on these hypotheses is mixed, and not very apposite. One experiment<sup>7</sup> tested 14 types of comparisons usable in a hypothetical factory manager's planned speech about the

al., *Establishing Dialogue: Planning for Successful Environmental Management; A Guide to Effective Communication Planning*. N.J. Department of Environmental Protection and Energy, Division of Science and Research (1992).

<sup>4</sup> See Vincent T. Covello, Peter M. Sandman, & Paul Slovic, *Risk Communication, Risk Statistics, and Risk Comparisons: A Manual for Plant Managers*, Washington, D.C.: Chemical Manufacturers Association (1988).

<sup>5</sup> See Sven Ove Hansson, *Incomparable Risks* in Proceedings: New Risk Frontiers, Stockholm, Sweden: Center for Risk Research (Britt-Marie Drottz-Sjöberg, ed. 1997).

<sup>6</sup> Personal interview with John Kadvany (1997).

<sup>7</sup> See Roth et al., *supra* note 2.

risks of emissions from his factory. The citizen preferences among comparisons expected by professional communicators were not the same as those of the upper-middle class respondents, although researchers and critics wondered whether these preferences would have appeared if the scenario used involved a local, controversial situation. Other experiments<sup>8</sup> focused on such topics as how easily the impact of a comparison (e.g., to reduce risk estimates and concern) might be reversed.

Given limited empirical evidence for the value of risk comparisons for democratic deliberation of hazard management, I felt it important to explore with citizens how they might feel about risk comparisons. The preliminary data presented here stems from two focus groups that consists of the beginning of a larger project on the topic, and are intended for illustrative purposes only.

### Research Design

Organizations were invited to receive \$20 for each volunteer recruited for focus groups; two focus groups were conducted with church members in central New Jersey. They comprised of 15 women and seven men, in their mid-30s to early 70s, in such work as speech pathologist, minister, mechanic, housewife (4), teacher (chemistry [2], voice/music [2], 4H), insurance teacher, dietician, software engineer, and librarian. It also included retirees from the food industry, automobile sales, nursing, and school secretary. Two were actively involved with the local recycling program, one with wildlife rehabilitation, and four were members of national environmental groups. I used standard procedures to facilitate the discussions.

The focus group protocol began with warm-up questions on interest in environmental information and felt need for "context." Then members read a quotation from proposed legislation (S. 981 in the last Congress) on risk assessment, that "each agency shall... place the nature and magnitude of a risk to health, safety, or the environment... in relationship to other reasonably comparable risks familiar to and routinely encountered by the general public' as part of making decisions about whether and how to regulate that risk." They were asked to

<sup>8</sup> See Slovic et al., *supra* note 2; see also Freudenburg et al., *supra* note 2.

comment on this proposed policy, including what “routine,” “familiar,” and “reasonably comparable” meant to them. Then a series of more focused examples was offered: a jury considering a hypothetical asbestos case;<sup>9</sup> radon;<sup>10</sup> drinking water;<sup>11</sup> industrial emissions;<sup>12</sup> and an economic development commission asking voters to consider alternate land uses that might bring the town about \$2 million in gross revenue a year (60-home subdivision; shopping mall; high-technology factory; chemical or low-level radioactive waste disposal facility).<sup>13</sup> Each example has been the topic of risk comparison research, or suggested or used by government agencies, but the aim in these case discussions was not to present actual or hypothetical risk comparisons, as in experiments discussed earlier. Rather, the aim was to ask whether and what comparisons would be useful to participants in these situations (including what, if anything, counted as “familiar,” “routine,” etc.). If needed, they would be asked to read a list of things to which the case might be compared, but without any quantitative or qualitative comparisons. Questions on trust in, sources of, and disputes over risk comparisons concluded the protocol.<sup>14</sup>

In practice, I followed the protocol loosely due to its length, and it became clear that the generic questions about risk comparisons were, by and large, far too abstract for these audiences. Initially, they found it difficult to grasp the meaning of comparisons in the environmental context; the case studies eased, but it did not eliminate this confusion for everyone.

<sup>9</sup> As in the scenario used by Slovic et al., *supra* note 2.

<sup>10</sup> A comparison, involving cancers presumably caused by natural radon in indoor air and cancers presumably caused by other environmental problems (e.g., air pollution; hazardous waste sites) in New Jersey, used by the Bureau of Environmental Radiation, NJDEP in some public risk messages.

<sup>11</sup> In 1999 all water utilities in the U.S. will be required to annually report to their customers the quality of their drinking water, the subject of this comparison discussion.

<sup>12</sup> As in the scenario used by Roth et al., *supra* note 3.

<sup>13</sup> A comparison suggested by Dr. Jill Lipoti (personal communication) but not used for a LLRW siting case.

<sup>14</sup> Generic trust in any potential source of risk comparisons was lacking —“some of it simply feels like scare tactics” and “they seem to pick . . . something that makes them sound good...” — although low-resource “altruistic” sources were deemed a bit more trustworthy. A comment that a government comparison involving natural radon was “good” might have implied some trust in a specific instance despite that person’s denial of trust generically.

## Results

*Dissimilar Comparisons.* It has been said that people will reject comparisons of items they deem improperly dissimilar, such as risks of driving to a public meeting versus risks of hypothetical future emissions of the as-yet-unbuilt facility whose permit is the meeting's topic.<sup>15</sup> Although focus group members struggled with the generic concept of comparisons, over half in each group had enough familiarity with it to spontaneously volunteer "bad" comparisons they heard, such as of exposure to a hazard through food ingestion versus death in a car accident, or radon versus automobile risks, or of industrial emissions versus larger exposure to the same carcinogen if pumping gas at a gas station all day ("that didn't make me feel very much better, because I wouldn't want to breathe all the gasoline fumes all day either!").

Comparing voluntary to involuntary risks, a topic raised in both groups without prompting by the facilitator, was rejected vocally and strongly by most members as inappropriate; yet, this rule was not applied consistently. For example, when discussing the asbestos case, one group rejected a comparison to voluntary tobacco smoking; yet, in discussing the federal bill, one person cited tobacco smoking as a good comparison:

... when radon was big they compared it to cigarette smoking, and I thought that was probably a good comparison because radon does have lung effects, too.... To me that would be a helpful situation.

Individual participants offered preferred comparisons, with at least half of other members of respective groups vocally or non-verbally agreeing: comparison of the risks of camping versus playing golf in a lightning storm (preferable to, say, comparing risks of being hit by lightning to those of winning a lottery); comparing the risks of one food (or contaminant or component) to those of another; comparing one energy generation option to another; and comparing utility water quality to bottled water quality. As one person said, "It's got to be 'apples to apples,' closely controlled." This contrasts with an argument (not cited in the focus groups) that "we all routinely compare highly

<sup>15</sup> See Morgan & Lave, *supra* note 3. See also Hansson, *supra* note 5; see Presidential/Congressional Commission on Risk Assessment and Risk Management, *Risk Assessment and Risk Management in Regulatory Decision-Making*, Final Report, Vol. 2, at 43 (Washington, D.C.: Gov't Printing Office, 1997).

dissimilar states,” including health risks or apples-and-oranges, by disaggregating their attributes, rating how they vary across choices and their value, and summing up for a composite evaluation of choices.<sup>16</sup>

*Acceptance of Comparisons for Personal Decisions.* Risk experts have mostly debated risk comparisons’ effects on lay decisions about what government agencies and for-profit firms should do about a given hazard. Citizens’ duties as individual hazard managers have received little attention in the discussion of environmental<sup>17</sup> risk comparisons, although much research has tested messages relevant to personal behavior that reduces risk (e.g., on natural radon).

Focus group members offered spontaneous comments that suggest this has been an oversight. Take, for example, the opinion of a woman who rejected information in her public-citizen role as a juror that seemed valuable for her private-citizen role as a parent:

I don’t agree completely that that data about the hazards of smoking versus asbestos is irrelevant from a legal point of view. For me it would be irrelevant as a juror, because I agree, you know, the students choose to smoke, they don’t choose to be in an environment that includes asbestos.... Now, as a human being, I think that it’s relevant information to have, and helpful information to have, because it helps you to know what to do with an asbestos scare, how to weigh that inside of yourself, how to weigh that if you’re a parent, how concerned you’re going to be about your children. So as a juror it would be irrelevant, but I don’t think it’s completely irrelevant, as a citizen I think it’s relevant.

The majority of members in one focus group felt that comparing the number of cancers estimated to be caused in New Jersey by natural radon to other potential environmental causes of cancer (hazardous waste, air pollution, etc.) was valuable. Asked why they reacted in this way, while rejecting similar comparisons with regard to the asbestos jury case, one participant said:

You can do something about it yourself, rather than having another agency do it or a litigation, you can get the test and then take care of it yourselves. So it’s easier to do.

<sup>16</sup> See Adam M. Finkel, *Toward Less Misleading Comparisons of Uncertain Risks: The Example of Aflatoxin and Alar*, 103 *Env’l Health Perspectives* 376 (1995).

<sup>17</sup> Medical risk communication has long used comparisons (e.g., for patients).

Discussing the legislative proposal, a participant in the other focus group said:<sup>18</sup>

If the initial risk that you're trying to draw these comparisons to is something that I have no control over, comparisons would be interesting, but I would want someone else to fix the problem, regardless. If you're going to compare air pollution to cigarette smoking, interesting, but I have no choice over what I breathe; I do have a choice over whether or not I smoke.

In both meetings, participants cited examples of valuable comparisons: widely-agreed examples included the impacts of various lawn and garden fertilizers and pesticides, and alternate uses of residential properties (e.g., natural yards), and the impacts of recycling various materials.

*Hazard Management Priorities.* Despite the widespread reaction against comparisons involving issues with seemingly no chance for personal decision or control, a couple of people hinted that more general comparisons among environmental issues might be welcome:

If nothing else, that would help establish an order of priorities... If the risks associated with water pollution exceed the risks associated with air pollution by a factor of 10, obviously the first thing we would want to address is water, not whether you're going to be struck by lightning... that's an irrelevant statistic... And we have toxic waste dumps, the problem is what do you do with the stuff. That should be where the money should be, where the attention should be, and you do have to compare against other... reasonably comparable risks. Two things give you cancer. One's going to give it to a lot of people real quick, and one is a real maybe, you want to give up on the maybe and focus on the — (Another participant asked, "So you want to work on the triage theory?") Yeah.

*Reaction to Proposed Legislation.* As noted earlier, proposed federal legislation would in part require comparison of the risk being considered for regulation to "reasonably comparable" risks "familiar to and routinely encountered by the general public." As a potential audience for such comparisons, the third of participants who expressed an opinion were largely dubious about their value, citing distrust of the

<sup>18</sup> A couple of people in each focus group said that having no one to blame for radon, as compared to the asbestos jury case, made it easier to accept and use risk comparison information, but they could not explain why they felt this way.



comparison sources, and a preference for comparisons concerning personal, rather than societal, decisions about risky entities and activities. One person said that “the phrase ‘reasonably comparable risks’ is going to generate a lot of lawsuits.”

### Conclusions

Evaluating any means for democratic participation, much less how to convey hazard information to inform democratic participants, should involve multiple methods and measures. The tentative results reported here from two focus groups require verification. Although I have no reason to believe that members of these church-based groups from two separate communities were atypical in their reactions to the concept of risk comparisons, as with any focus groups that cannot be confirmed by the focus group process itself. I plan follow-up research to confirm or refute these reactions in a larger population, including experiments to see whether the comparative information desired by these focus group members affects their hypothetical decisions and behavioral intentions. However, these obviously tentative focus group results are no more tentative than the sketchy and potentially conflicting results of the few experimental studies done to date (since they include no replications, we cannot say whether their findings conflict). Talking directly to intended citizen audiences about their beliefs and wants produced findings in this case that were neither predicted nor produced by experiments to date; that is both a potential benefit and a reason to seek confirmation.

It has been noted often<sup>19</sup> that much risk communication stresses the aims of the intended communicator, not those of the intended recipient of a message. Most advocates of environmental risk comparisons hope to convince citizens that existing or proposed activities by business or government are acceptable (or, more rarely, unacceptable). This aim was of little interest to the middle-class citizens involved in this study. They appeared to believe that risk comparison information is either unnecessary<sup>20</sup> (because these institutions should

<sup>19</sup> See, e.g., Covello, Sandman & Slovic, *supra* note 4.

<sup>20</sup> At least they say it is unnecessary for them. Whether they truly believe institutional decision-makers do not need this information is less clear, despite cited normative beliefs, since focus group participants were not asked about this explicitly.

act or avoid action on “obvious” moral or other bases, not deliberate upon risk information or try to persuade citizens about the acceptability of risks) or suspect as persuasive propaganda. These findings are neither entirely surprising nor reason to abandon this kind of persuasive communication.<sup>21</sup> But they clarify obstacles that institutional communicators must address for successfully informing and motivating citizens participation in policy formulation or implementation. For example, communicators might need to know more about the “mental models” of hazard management systems that citizens have,<sup>22</sup> and clarify why action without deliberating upon risk information would be worse than swift, but incompletely informed, action.

The self-concept of citizens as hazard managers also deserves more attention from risk communicators.<sup>23</sup> We know little about how much citizens see themselves as people able to make choices that affect environmental quality. (They do seem to make at least some erroneous attributions of cause and responsibility; e.g., in one national survey<sup>24</sup> nearly half of the respondents believed factories were the primary cause of U.S. water pollution, with only 23% identifying runoff as the largest cause.) Citizenship requires more than merely voting in elections or speaking at a public meeting on what one wants others to do; it calls for doing one’s part to protect the public weal. Communications with comparisons that motivate and direct personal action on environmental quality without preaching, and research testing responses to such messages, would seem to be a valuable complement to institution-focused comparisons that these citizens would appreciate.

<sup>21</sup> On ethical issues of persuasion, see Morgan & Lave, *supra* note 3; Katherine E. Rowan, *The Technical and Democratic Approaches to Risk Situations: Their Appeal, Limitations, and Rhetorical Alternative*, 8 *Argumentation* 391 (1994); Branden B. Johnson, *Ethical Issues in Risk Communication: Continuing the Discussion*, *Risk Anal.* (forthcoming 1999).

<sup>22</sup> See Branden B. Johnson, *Trust Judgments in Complex Hazard Management Systems: The Potential Role of Concepts of “The System”*, *Advances in Social Trust Theory and Research* (George Cvetkovich & Ragnar Löfstedt eds. forthcoming 1999).

<sup>23</sup> For a rare study of this topic, see Robert E. O’Connor, Richard J. Bord, & Ann Fisher, *Rating Threat Mitigators: Faith in Experts, Governments, and Individuals Themselves to Create a Safer World*, 18 *Risk Anal.* 547 (1998).

<sup>24</sup> National Environmental Education and Training Foundation, *The National Report Card on Environmental Knowledge, Attitudes and Behaviors; The Sixth Annual Survey of Adult Americans*. (Washington, D.C., Roper Starch Worldwide November 1997).

Finally, citizens' judgments of risk comparisons appear to be complex, within as well as between participants. Examples include asbestos comparisons accepted in a parental role but not a juror role; tobacco-smoking comparisons rejected in the asbestos jury case (with an accused defendant) but accepted in the natural radon case with "no one to blame;" and distrust of comparison sources in general but trust in government's radon cancer comparisons. These exemplify the argument cited earlier<sup>25</sup> that communication context and trust, and the content and format of comparisons, can affect how citizens react to risk comparisons. Beyond testing every intended message, as long urged,<sup>26</sup> communication practitioners and researchers must consider context, trust, content and format in tests of risk comparison messages. Risk communication will have its best chance to support the inherent complexity of informed (by risk comparisons) democratic decision-making if communicators and citizens work together to produce comparisons that are accurate, informative, and used.

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<sup>25</sup> *Supra* note 7.

<sup>26</sup> *Supra* note 4.

