

RISK: Health, Safety & Environment (1990-2002)

Volume 10
Number 3 *Risk Communication in a Democratic
Society*

Article 5

June 1999

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Promoting Informed Decision-Making: The Role of Message Structure

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One of the continuing difficulties of risk communication has been that lay audiences and stakeholders typically do not have the depth of understanding about the complex risk situations necessary for informed participation in decision-making processes. The dominant risk communication approach to resolve this dilemma has been to build expert credibility with lay audiences and to transfer the decision-making to risk experts. However, that approach has been rather problematic, especially on the heels of diminishing credibility of industry and government regulatory agencies. Nonetheless, the Jeffersonian model of democracy would suggest that providing information to stakeholders and enabling them to make informed judgments remains the viable democratic alternative.¹

Considerable literature in risk communication studies in the past few years provide arguments for, and an increasing number focus on, whether or not risk communication could be more effective if lay audiences or stakeholders participate more or get more involved in the risk decision-making process. A number of studies propose rationales supporting the bases for broad participation of various citizens.²

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¹ See Paul L. Ford, *The Writings of Thomas Jefferson* (1899).

² See, e.g., Daniel J. Fiorino, *Citizen Participation and Environmental Risk: A Survey of Institutional Mechanisms*, 15 *Sci., Tech., & Human Values* 226 (1990); Orwin Renn et al., *Fairness and Competence in Citizen Participation* (1995); and Paul Stern & Harvey Fineberg, *Understanding Risk: Informing Decisions in a Democratic Society* (1996).

Other studies suggest general mechanisms or structures that could facilitate a more interactive, stakeholder-centered risk communication process. Those ideas, however, are not new. Habermas, for example, proposed a theory of communicative competence arguing strongly for the benefits of citizen participation in discourses about issues that would have significant impact on people's lives.³ Such theories and claims about the beneficial effects of citizen involvement are important in focusing attention on the multiple dimensions of risk communication.

What is evidently needed are increased efforts to explore concrete and specific procedures or approaches addressing how citizens can acquire the information needed to deal effectively with scientific uncertainty, as well as the nuances and complexities of risk situations.

A number of risk communication studies already address such questions. Stern and Fineberg, for example, describe a lengthy risk communication process in which the criterion for one stage is "developing accurate, balanced and informative synthesis" of the risk assessment.⁴ The evaluation procedure suggested is to "ask representatives of the parties how well they understand the bases for the decision, and whether they perceive any bias in information coming from the responsible organization." While that approach appears logical and likely useful, it does not address the more fundamental questions about the structure of the risk assessment message. Renn, et al. suggest that it is unreasonable to expect participants in public discourse to be fully competent in all aspects of the subject.⁵ Arguing that public participation should provide people with a chance to learn new knowledge and skills, the authors acknowledge that the major problem relates to achieving a level of competence among participants required to make good decisions. While public participation is key to risk communication, better understanding of scientific and technical risk information makes citizens more competent to make decisions on risk issues. It is clear, however, that information alone is not critical to the success of the participation process. We know, for example, that information is seldom a sufficient condition for attitude or behavior

³ See Jurgen Habermas, *Toward a Theory of Communicative Competence*, 13 *Inquiry* 360 (1970).

⁴ Stern & Fineberg, *supra* note 2.

⁵ Renn et al., *supra* note 2.

change. It is also just as likely that the participation process alone is not enough to change attitudes or behaviors, or to move stakeholders and others to a satisfactory decision. What is likely is that both information and process are necessary conditions for effective decision-making by citizens, experts, and policy-makers.

Findings in communication research indicate that the presentation of information may have significant effects on audiences. For example, the manner by which information is provided, the structure of arguments, the persuasive nature of the message, the sources used, and other variables all influence how readers respond.⁶

Information formatting and presentation have been posited to significantly influence an audience's understanding of information, their perceptions of information (that is, whether the information is credible, relevant, and interesting), their disposition to think about information, and their decision to seek additional, supporting, or contradictory opinions or facts. Thus, in order to make the public participation process more effective in moving citizens to levels of technical and scientific competence, it is imperative that continuing improvements and experiments focus on how to deliver scientific and technical information to the public that could, at the same time, engage them to understand and think about such information. The assumption is that when risk information is conveyed in a manner that stimulates "critical thinking" among audiences, then it also increases the chance for audiences to participate productively in discourses about complex risk issues. In short, messages that spur audience activity are needed, thus causing audiences to scrutinize, reason, and search for information, rather than merely act as receivers of input from an information source.

A number of message structures have been investigated. The first, and perhaps most studied, is the persuasive message. Research on persuasion messages emerged from psychology, communication, advertising, and speech more than 50 years ago with classical studies, such as those by Hovland, Lumsdaine, and Sheffield.⁷ G.R. Miller noted that persuasion may be the single most studied process, problem,

⁶ See, e.g., Michael Burgoon, *Communication Messages and Persuasive Effects*, *Message Effects in Communication* (James Bradec ed., 1989); and Michael Burgoon & Erwin P. Berntinghaus, *Persuasive Message Strategies*, *Persuasion: New Directions in Theory and Research* (Michael Roloff & Gerald Miller eds., 1980).

⁷ See Carl Hovland et al., *Experiments in Mass Communication* (1949).

or issue relating to human communication.⁸ A considerable body of literature examines the influence of persuasive messages on audiences, and the structure of those persuasive messages.⁹ Risk communication efforts that rely on persuasive messages have been largely unsuccessful. Of the possible reasons for lack of success, only a few, such as source credibility, have been studied.¹⁰ Mostly, risk communication theory has moved considerably beyond the use of simple persuasive messages to broader participation strategies with more complex assumptions about the nature of communication.¹¹

A second message structure which has been studied is the common mass media news form of the balanced story where the purpose relates to achieving an unbiased presentation of the information.¹² As documented by a number of scholars, these stories do not intend to provide a problem solving orientation and journalists view them as informational, but not necessarily educational.¹³ Still, some recent evidence suggests that balanced information about specific risks inserted with surveys can sometimes promote more deliberative opinions about the issues.¹⁴

⁸ See Gerald R. Miller, *Persuasion*, Handbook of Communication Science (Charles Burger & Steven Chafee eds., 1987).

⁹ See, e.g., Carl Hovland et al., *The Order of Presentation in Persuasion* (1957); Carl Hovland et al., *supra* note 7; Jennings Bryant & Dolf Zillman, *Media Effects: Advances in Theory and Research* (1994); and Karen Schriver, *Dynamics in Document Design* (1997).

¹⁰ See Jack L. Whitehead, *Factors of Source Credibility*, 54 Q. Jour. of Speech 59 (1968); and David B. McCallum et al., *Communicating About Environmental Risks: How the Public Uses and Perceives Information Sources*, 18 Health Ed. Q. 349 (1991).

¹¹ For an alternate view, see Ortwin Renn, *The Role of Risk Communication and Public Dialogue for Improving Risk Management* 3 Risk Dec. and Pol. 5 (1998), in which the author argues that the purpose of risk communication is to persuade receivers to change or modify attitudes or behaviors in addition to enabling understanding and promoting a two-way communication process.

¹² For an excellent discussion of these issues see Sharon Dunwoody & Hans Peter Peters, *Mass Media Coverage of Technological and Environmental Risks: A Survey of Research in the United States and Germany*, 1 Pub. Understanding. Sci. 199 (1992).

¹³ See, e.g., Sharon Friedman et al., *Scientists and Journalists: Reporting Science as News* (1986).

¹⁴ See Katherine McComas & Cliff Scherer, *Providing Balanced Risk Information in Surveys Used as Citizen Participation Mechanisms*, 12 Soc'y & Nat. Resources 107 (1999).

In addition to persuasive and balanced messages, two other message structures may be useful for helping audiences deal with complex information. The first is the dialectical structure which seeks to promote “critical thinking” on the part of the reader. This “critical thinking” approach suggests that involved citizens need to become discriminating consumers and critical processors of risk information if they want to fully participate in decision-making about complex risk issues. Juanillo, for example, points out that the concept of critical thinking suggests the existence of practical judgments and non-passive individual acts of scrutinizing, reasoning, abstracting, and elaborative processing of information.¹⁵ In turn, Juanillo and Scherer propose a dialectical structure of risk communication that encourages active processing and questioning among message recipients.¹⁶ That dialectical structure for risk information has been little studied, but it offers strong theoretical reasons for possible success in moving audiences to more informed decision-making in risk situations.¹⁷

A final message device which has been recently explored deal with narrative or story-telling. Shanahan and McComas found that the use of stories to convey meaning has been supported in some studies, although none of the studies had used a controlled experimental design.¹⁸ In addition, studies examining narrative have generally examined the influence of narrative on attitudes toward a particular issue, rather than how narratives engage individuals in the message. Our interest pertains to how narratives may help move individuals toward an informed risk judgment by engaging them in a story of others involved in a dialectical process of problem solving.

The techniques each of those two approaches use may be complementary. Dialectical messages focus on improving critical thinking, but because of their length, may be less engaging to the

¹⁵ See Napoleon Juanillo, *Recasting Risk and Scientific Disclosure: Dialectical Message Designs on Food Safety Issues* (1994) (Ph.D. Dissertation, Cornell University) (on file with Cornell University Library).

¹⁶ See Napoleon Juanillo & Clifford Scherer, *Attaining a State of Informed Judgements: Toward a Dialectical Discourse in Risk, Communication Yearbook 18* (B. Burleson ed., 1995).

¹⁷ See Clifford Scherer & Napoleon Juanillo, *Rationale for Risk Communication, Proceedings National Risk Communication Conference* (1990).

¹⁸ See James Shanahan & Katherine McComas, *Nature Stories: Depictions of the Environment and Their Effects* (1999).

audience than are shorter persuasive messages. Narrative stories allow the writer to personalize the information by describing people engaged in the decision-making process. Such a device may increase interest in the message and, ultimately, increase the effectiveness of accompanying information, such as a balanced or dialectical message. In the second study we describe herein, we combined dialectical messages with a narrative panel, thus adding a story describing people dealing with issues related to the risk described in the dialectical message.

This process-based communication stimulates thinking and discussion, but does not direct an outcome such as agreement with the message. In addition, it assumes that the result of the communication effort deals with informed decision-making, as contrasted to outcome based communication which focuses on achieving a specific outcome, usually agreement or compliance with the message. The process-based communication does not focus on a specific pre-determined outcome, but concentrates on creating mechanisms and opportunities for citizen participation and involvement. Process-based communication concentrates on democratic decision-making in which citizens develop or achieve a higher level of understanding of the issues, exhibit more critical thinking about the issue, have a more balanced, information-based opinion, seek additional information and recognize the complexity of the issue and alternative solutions. Additionally, the process-based approach makes no assumptions about the nature of the final decision and whether or not it agrees with a pre-determined conclusion.

Methods

This paper discusses two exploratory experimental studies on message devices utilizing dialectical formats. The first study compared three types of risk messages: (1) Persuasive; (2) Balanced; and (3) Dialectical. The second study examines differences between: (1) Balanced; (2) Dialectical; and (3) Dialectical with Narrative stories. Both studies used a Greco-Latin Square experimental design with three different message types for each of three different topics. Table 1 details the subject content, message design, overlap, and uniqueness of each study.

Messages in the first study were about pesticide residues, bovine growth hormone (BGH), and food irradiation. The second compared messages on pesticide residues, compost facility siting, and Lyme disease.¹⁹ While both examined a range of independent and dependent variables, we focus on relationships between types of messages and two dependent variables: critical thinking; and concern about the specific risk described in each message. The research question for both studies relates to the extent to which different message types stimulate critical thinking in the respondents and at the same time does not greatly increase respondent concern about the risk.

The following describes the operationalization of the four types of messages tested in these two studies:

1) In study 1, persuasive messages presented a “synthesis” of conclusions by risk assessment experts and political decision-makers. The goal of these messages revolved around channeling the decision-making of the lay audience towards that advocated by the sender. Some messages were pro and others con. For example, some respondents received a persuasive message arguing that pesticides were a health threat, while others received a message arguing that pesticides were not a health threat.

2) In both studies 1 and 2, balanced messages (typical of media coverage) presented multiple perspectives and opinions but stopped short of advocating a particular position and did not present the full range of information needed for informed decision-making. Every effort was taken to make messages reflect typical “mass media” stories.

3) For study 1 and study 2, dialectical messages presented arguments using a series of questions and answers to enable the reader to probe through possibilities, and weigh contradictory facts and opinions with a view to their resolution. While the messages included information identical to the balanced messages, they also had questioning probes to guide the reader through the process of evaluating and questioning the presented information. Those messages were as much as one page longer than the balanced messages.

4) For study 2, we added a narrative to the dialectical messages. The narrative pertained to a story about individuals faced with the risk discussed in the dialectical portion of the message. The narrative

¹⁹ For details regarding the first study, see Juanillo, *supra* note 15.

examined alternative choices, but did not resolve the issue. Those messages were as much as one page longer than the dialectical messages.

For study 1, the first dependent variable, critical thinking, was composed of nine questionnaire items on attitudinal factors, and cognitive and perceptual processing of information relating to the uncertainty of science and the complexity of risk issues (Cronbach's $\alpha = 0.83$). For example, questions asked if respondents felt they had alternative ways of looking at the issue and the extent to which the information helped them think about the issue. The second study also used critical thinking as the dependent variable, but used a three item measurement (Cronbach's $\alpha = .778$).

Table 1
Message Type and Subjects Used in Studies

<i>Subject</i>	<i>Persuasive</i>	<i>Balanced</i>	<i>Dialectical</i>	<i>Dialectical Plus Narrative</i>
BGH	Study 1	Study 1	Study 1	Not Tested
Food Irradiation	Study 1	Study 1	Study 1	Not Tested
Pesticide Residues	Study 1	Study 1	Study 1	Not Tested
		Study 2	Study 2	Study 2
Compost Facilities	Not Tested	Study 2	Study 2	Study 2
Lyme Disease	Not Tested	Study 2	Study 2	Study 2

We recruited respondents from households in a three-county area from mailing lists of individuals known to be interested in a wide range of issues including health, food and nutrition, family issues, and children. 108 individuals participated in study 1, and 74 participated in study 2. Respondents read three different messages, each pertaining to a different risk-related topic and each using a different message type.

A total of 18 versions of the questionnaire were used to control for factors such as respondent fatigue, message type, subject and message order. All messages were pretested, randomly assigned to subjects and reviewed by experts for accuracy.

Findings

Table 2 presents mean scores for critical thinking for each of the two studies by message type. For study 1, the dialectical messages proved superior in stimulating critical thinking, with persuasive

messages being the least effective. For study 2, a similar pattern emerged with dialectical messages stimulating more critical thinking than were balanced in study 1, but dialectical messages with a narrative proved superior to dialectical messages alone. Subject content was not significant for either study, but message type was significant at $p < .0001$.

Our concern in study 1 focused on whether or not the dialectical messages were considerably longer than either the persuasive or the balanced messages, with dialectical plus narrative messages significantly longer than all others in study 2. Some studies suggest that audiences today have short attention spans, so we expected to find that the persuasive messages would be the most preferred and that the longer messages, while perhaps more successful in promoting critical thinking, would be least preferred. Surprisingly, we found no differences in preference when respondents were asked if the message contained too much, too little, or just the right amount of information. There were no significant differences between persuasive, balanced, dialectical, and dialectical with narrative. It should be noted, however, that the audience recruited for both studies had a somewhat higher education, were more oriented to information seeking, and were more community-oriented, than would be expected with a randomly selected audience. It should also be noted that the audience recruited for these studies closely match the profile of participants in community decision-making groups.

Table 2
Critical Thinking Mean Scores By Message Type

<i>Message Type</i>	<i>Study 1*</i>	<i>Study 2**</i>
Persuasive	1.28	Not Tested
Balanced	1.54	3.11
Dialectical	1.75	3.24
Dialectical Plus Narrative	Not Tested	3.52

* All differences significant at $p < .0001$

** All differences significant at $p < .0001$

While the messages using the dialectical framework appeared to be successful in increasing respondent critical thinking, a second question relates to whether respondent concern about the related risks increased as a result of the messages. We expected dialectical messages to increase respondent concern about the hazards discussed because they presented a more holistic, rational, and critical view of information both supporting and opposing the position that a particular hazard was a health risk. We found no overall significant differences in exposure to message type and overall concern. Dialectical messages did not increase overall concern more than persuasive or balanced messages.

Summary and Conclusions

The primary research question addressed in this work focuses on how the risk characterization message can best be structured for lay audiences participating with experts in a risk-decision process. The two preliminary studies reviewed in this paper seem to support the idea that if the goal of public participation deals with full and informed decision-making, and that if critical thinking about the issue is an important and necessary ingredient in the decision-making process, then message structure may be a key factor in bringing about better participation in the decision-making process. Preliminary evidence suggests that dialectical messages are successful in increasing respondent critical thinking about risk issues, while not significantly increasing respondent level of concern compared with other message types.

Although it is clear from these two exploratory studies that a number of issues are yet unresolved and unstudied, the evidence suggests that at least with motivated audiences, dialectical risk messages may be useful in preparing lay audiences to productively participate in risk decision-making processes. Further research is needed which replicates the two studies reported in this paper. Studies need to examine a range of audiences and how they react to these more complex message structures. To what extent are dialectical and dialectical-narrative message structures effective with audiences with less interest and experience in dealing with complex information? Will the more complex structures result in increased perception of risk because the audience perceives that the risks are less clear and more

unknown? Could video messages using the dialectical structure be more effective with a wider range of audiences? These and other questions need to be studied using more immediate and threatening risks (e.g. ground water contamination or chemical spills).

While a number of authors argue that the major purpose of risk communication pertains to persuading the audience to adopt a particular viewpoint, it is our contention that persuasive messages have not proven effective in the past.²⁰ Persuasive messages may prove to be a simplistic means of conveying risk information given an increasing number of stakeholders who challenge the risk assessment and risk management information provided by experts. The growing access to diverse information sources, as well as the ability on the part of many stakeholders to search for information to suit their needs and concerns, call for a more thorough presentation of risk information.

While the dialectical perspective would argue for presentation of risk assessments consistent with an enlightened participation process (multiple perspectives, free flow of information, and easy access to multiple communication channels and resources) this lofty goal presents immediate and multiple difficulties. Dialectical messages by their very nature are longer, more complex, and require greater reader participation because conclusions are not given to the reader as they are in typical persuasive messages. Theoretically, the dialectical approach presents the strongest link to a true democratic process. It seems inconsistent to utilize a public stakeholder participation process only to limit access to information because of the type of messages/information provided. If we want to strengthen the participation process, we must develop better methods for the presentation of complex risk assessment information to lay audiences. The dialectical message seems ideal. Preliminary evidence suggests, however, that respondents may be willing to spend the extra time reading longer risk messages, especially if audiences already seem interested in the issues.

Daniel Yankelovich persuasively argues that democracy today is not working and that public participation models appear weak because we have not succeeded in removing the boundary between the elite decision makers, scientists, policy specialists, and the public stakeholders.²¹ Yankelovich argues that the results of public

²⁰ See Renn, *supra* note 11.

participation must be a public judgment. Public judgement being a thoughtful, considered judgment, based on an understanding of the costs, benefits, risks, and consequences of alternative solutions and a willingness to stand behind the consequences of that decision. That goal of public participation is clearly parallel with the goal of dialectical messages designed to help individuals and groups move through deliberation toward a considered, thoughtful judgment.

Aristotle believed that multiple persuasive messages enable citizens to discover what is good for society at a particular time and place.²² Public deliberation occurs when advocates and opponents for the various ideas or proposals attempt to persuade people. In the typical implementation, not all perspectives are represented by competent arguments, and inferior proposals may be misrepresented but presented in a highly persuasive way.²³ Dialectical messages, we argue, appear to equip audiences with the tools necessary to critically evaluate complex, sometime conflicting, information about risk. Dialectical messages, may simply be a different implementation of Aristotle's principle of multiple and conflicting persuasive messages, with the added dimension of the inclusion of tools to help evaluate the conflicting arguments.



²¹ Daniel Yankelovich, *Coming to Public Judgment: Making Democracy Work in a Complex World* (1991).

²² See *The Basic Works of Aristotle* (Richard P. McKeon ed., 1941).

²³ See Dominic Infante et al., *Building Communication Theory* (2d ed. 1993).