

The public and effective risk communication

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Abstract

Public perceptions of risk have often been dismissed on the basis of “irrationality”, and have tended to be excluded from policy processes by risk assessors and managers. People’s responses to different risks are determined by psychological factors. The technical risk estimates traditionally provided by experts do not influence people’s behaviours and responses in the same way as their risk perceptions. Some concerns are very specific to particular hazard. It is also important to communicate the difference between probability and variability associated with risk estimates. Risk communication must take account of the actual concerns of the public (for example, potential for negative environmental impact, unintended human health effects, or vulnerable groups within the population). When the public want information about a risk, they prefer a clear message regarding risks and associated uncertainties, including the nature and extent of disagreements between different experts. Furthermore, societal priorities for risk mitigation activities may not align with those identified by expert groups. Dismissing the former as irrelevant may result increased distrust in the motives of regulators and industry, with consequences for public confidence in regulatory activities linked to public protection. Awareness and understanding of public concerns must be the basis of an effective risk management strategy. © 2004 Elsevier Ireland Ltd. All rights reserved.

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1. Introduction

Technical risk estimates alone do not form the basis for the development of a coherent and utilitarian risk management policy that is also acceptable to consumers. Research conducted by Slovic and his co-workers (for example, see Slovic, 1987, 1993, 2000) has consistently demonstrated that factors such as whether a risk is perceived to be involuntary, potentially catastrophic, or uncontrolled are more important determinants of public response than technical risk information alone. Risk communication and risk

management must also take account of societal concerns and values. Risk perceptions also have a direct impact on how citizens respond to risk management activities, and those individuals and institutions to which responsibility for consumer protection accrues.

It is public concerns and attitudes (and of course behaviours which result from these concerns and attitudes) that have direct consequences for human health, food safety and security, economic expansion and international regulation. Public concerns influence consumer behaviour, citizen support of environmental pressure groups, and political preferences of voters during elections. For these reasons, developing an effective risk communication strategy as an integral part of risk management must be a pri-

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ority for risk managers, regulators and industrialists alike.

1.1. The goal of risk communication: from risk education to risk consultation

In the 1970s, communication efforts focused on changing public views on risk, with emphasis on communication directed towards technology acceptance. More recently, risk communication issues have focused on restoring public trust in risk management, with due emphasis on more extensive public consultation and participation in risk management and other science and technology issues (Rowe et al., 2004).

Initial attempts to communicate risk was apparently conducted in order to align public views with those held by experts regarding the acceptability or otherwise of a particular hazard. This process has been described by Hilgartner (1990) as the “deficit model”, which assumed that the public are in some way deficient in their understanding of risk, and indeed other areas of science. In other words, communicators adopted the perspective that the public was ignorant of the scientific “truth” about risk and probability. For this reason, the goal of risk communication to “rectify the knowledge gap” between the originators of scientific information and those receiving the information. The resulting public enlightenment regarding risk issues would resolve all problems of technology acceptance (Hilgartner, 1990). Despite these efforts, the lay public remained deeply sceptical of the motives of scientists, regulators and industrialists. Woolgar (1996) has discussed the ways in which science and the social world are often viewed as independent of each other, one result being the discounting of social factors as having any reality determining the development of strategic risk management policies. It is arguable that this separation produced the decline in public confidence in risk management practices that became the focus of regulatory concern in the 1980s and 1990s, as it reinforced the impression that societal values were being discounted by risk managers when risk mitigation strategies were being developed. Thus the question which was asked centred less on why the public did not think like experts, and centred more on the causes of public distrust in regulatory institutions and risk management practices. Attempts were made to increase public trust through increased transparency in

risk management practices, and increased public consultation and participation in risk management policy. Both of these developments had direct implications for risk communication practices.

Increased transparency associated with the risk analysis process resulted in both uncertainties and variabilities associated with different hazards became the subject of public scrutiny. Best practice in risk communication therefore entailed developing ways to communicate these to the public. The issue of risk variability is also of interest, as increasing knowledge (for example that resulting from the human genome project) means that “at risk” sub-populations can more easily be identified. This implies that the development of targeted risk communication to at risk groups is fast becoming a priority, although it may entail individualising information to align with the information needs of “at risk” individuals. These and other emerging risk communication issues will be discussed in subsequent sections.

Otway (1987) has observed that effective risk management involves structuring decision-making processes in such a way that they can accommodate social concerns and provide institutional forms in which these social concerns can be discussed. At the time of writing, institutional structures overseeing governance of science and technology are being restructured—for example, the creation of new institutions with responsibility for risk management and consumer protection, such as the European Food Safety Authority (Frewer and Salter, 2002). In particular, there has been a cultural shift away from top-down communication practices to more consultative, transparent and inclusive decision-making processes. The practice of risk communication is thus re-orientating towards a citizen focus. It is no longer assumed that the public will passively react to risk information without active involvement is the risk management process (Rowe and Frewer, 2000; Wynne, 2001).

2. The practice of risk communication

2.1. What information is relevant to risk communication?

What is salient in risk communication, and what information is believed and responded to, is likely to be

dependent on the social environment surrounding the risk communication. This is likely to be particularly true for potential hazards where the knowledge base surrounding the potential hazard, and responsibility for consumer protection, is perceived to be at the level of society rather than under the control of individual members of the general public (Frewer et al., 1994).

One way to ensure that information is made salient to members of the public is to address peoples actual concerns, as well as the risk information that the source wishes to communicate to the message receiver. These concerns vary between different types of hazard, even within a narrow hazard domain, such as food risk. In the case of microbiological risk, for example, consumer concerns appear to be primarily linked to health. There is also evidence that people perceive that the media has amplified the risks of food poisoning, and that vulnerable groups were more likely to suffer severe consequences of food-borne illness (Miles and Frewer, 2001). In contrast, public concerns about BSE focus on animal welfare issues. In the case genetic modification, ethical concerns and the potential for unintended effects on human health and the environment are dominant (Miles and Frewer, 2001).

2.2. *Trust in food chain actors*

Trust is likely to be particularly important under circumstances where people feel that they have very little personal control over their personal exposure to potential hazards (for example, in the case of pesticide residues or endocrine disruptors being present in the environment). This is likely to occur when there is a public perception that consumers or the environment are being put at risk to protect the vested interests of different actors in the food chain. This has been demonstrated to be the case with genetically modified foods. Siegrist (1999) reports that the extent to which an individual trusts or distrusts in institutions with responsibility for regulating gene technology influences their acceptance of the technology and its products. Increased trust in institutions and industry decreases perceived risk and increases perceived benefit associated with the technology itself. This effect is likely to apply to other technological hazards as well.

Institutions and organisations must consider how best to develop and maintain public confidence in risk management practices. While public trust is, of course,

contingent on institutional transparency, other factors, such as institutional reactivity to public concerns and the extent to which institutional actors involve the public in the risk management decision-making process itself, are also important.

Jensen and Sandoe (2002) have observed that the decline in public confidence in food safety matters continues, despite the creation of new food safety institutions such as the European Food Safety Authority. In part, they argue, this is because communications about food safety issues that are based on scientific risk assessments do not reassure the public. One conclusion may be that all actors in the food chain need to take due account of consumer concerns, and that an integrated response to these concerns needs to be implemented throughout the food chain.

2.3. *Trust and risk communication*

There is some evidence that, if a distrusted source provides information that appears to promote its own vested interest, the information will influence people's attitudes in the opposite direction to that being promoted in the first place. This effect is most likely to occur under circumstances where the attitudes held by a person were not well-formed or articulated before receiving the information. In other words, the receiver of the information will become more opposed to the messages promoted by the information source than they were before receiving the information (Frewer et al., 2003a). More extreme or well-crystallized attitudes may influence perceptions of the information source rather than the object of communication. For example, an individual may perceive that the information is biased towards promoting the interests of the source providing the information. If the individual receiving the information already holds very negative attitude towards the communication issue contained in the information, the result is reduced trust in the information source. The individual also becomes more cynical regarding the competence of the source regarding its ability to communicate about the risk issue in question. For example, consider a member of the public who is opposed to the use of pesticides. If this person then receives information promoting the benefits of pesticide use, ignoring potential risks to human health or the environment, the person then perceives that both the honesty and competence of the infor-

mation source is compromised. Likewise, those with more favourable attitudes towards a particular potential hazard may be more inclined to trust reassurances about its safety compared to those individuals who initially hold negative attitudes. Evidence for this relationship is found in public attitudes to nuclear power (Dunlap et al., 1993) but it is likely that the results could be extrapolated to other potential hazards (for example, pesticides and other chemicals).

2.4. *Communication of uncertainty and variability*

There has been less research conducted into the question of how to effectively communicate about uncertainty and variability associated with risk estimates. Such communication should usefully take account of distinctions between different types of uncertainty, for example, the distinction between outcome uncertainty (“what might actually happen and with what probability”) and assessment uncertainty (“to what extent are the results of the analysis likely to change with additional information”) (Brown and Ulvill, 1987).

Increasing societal and political pressure has been directed towards maximising transparency in risk management practices, in part because of reduced public confidence in these same practices. As a result, the uncertainties associated with technical risk assessments, upon which risk management decisions are founded, will increasingly be subject to public and stakeholder scrutiny (Frewer et al., 2002). It is therefore important to communicate this uncertainty in an explicit and understandable way that is focused on the information needs of target audiences.

Historically, there has been little emphasis on the communication of certainty by risk communication professionals. In part, this was the result of the presupposition within expert and policy communities that the public is unable to conceptualise the scientific uncertainties associated with technical risk estimates. Indeed, it was assumed that providing lay people with this information would have very negative effects on public risk perceptions and related attitudes (Wynne, 1992), and that expert groups have tended to assume that lay people cannot conceptualise uncertainty in risk assessment or risk management (Frewer and Salter, 2002). However, there is evidence that elite groups in the scientific and policy community have underes-

timated the ability of non-experts to understand uncertainty. One result is that risk communication has failed to discuss uncertainty where this exists, increasing public distrust in the motives of regulators and scientific advisors.

In the past scientific experts and policy makers thought that providing the public with information about uncertainty would increase distrust in science and scientific institutions. A second effect of providing this information would be panic and confusion regarding the extent and impact of a particular hazard on human health, the economy and the environment. In fact, the converse appears to be true. The failure of institutional actors to communicate about uncertainty increases public distrust in institutional activities designed to manage risk (Frewer et al., 2002).

Johnson and Slovic (1995, 1998) tested the influence of various uncertainty conditions, reasons for uncertainty, and risk magnitudes, on lay understanding of technical risk estimates. Only 20% of their respondents had difficulties with uncertainty per se, and were unable to indicate if a reported risk figure was a point estimate or an interval estimate. Respondents who were able to distinguish between absolute risk and interval estimates reported that discussion of uncertainty appeared to signal more honesty, but lower competence ratings, associated with the institutions responsible for risk assessment. Graphical presentation of uncertainty produced higher comprehensibility ratings, but lower trustworthiness ratings. The absolute magnitude of a risk estimate influenced respondents' confidence in its accuracy. It was found that low estimates were deemed more “preliminary”, whether uncertainty was mentioned or not.

There is, however, additional evidence that acknowledgement of uncertainty will increase public confidence in regulatory processes (Frewer, 1999). For example, Kuhn (2000) has investigated the effects of communicating environmental risk uncertainty with respondents with both high and low levels of concern about the environment. Environmental attitudes proved to be accurate predictors of environmental risk perceptions if uncertainties associated with assessment were not mentioned. Communicating uncertainty information increased the environmental risk perceptions for people who were initially unconcerned about environmental risk, but decreased risk perceptions for those expressing high initial levels of

environmental concern. Thus communication about uncertainty appeared to increase the credibility of the communicator, which in turn reduced perceived risk, for those individuals initially cynical about the motives of the communicator.

Of course, members of the lay public may react to different kinds of risk uncertainty in different ways—certainly lay people distinguish between these different kinds of uncertainty (Frewer et al., 2003b). Lay people distinguished between lack of knowledge (for example, lack of scientific information regarding a specific risk, or conflicting scientific information or opinion), and uncertainty about the potential impact or extent of a particular hazard. They also that further research may be needed in order to reduce the uncertainty. The research also indicated that the public perceived that regulatory institutions were withholding uncertainty information from the public. The public was more accepting of uncertainty resulting from inadequacies in scientific process in comparison to uncertainty associated with the failure of institutions to reduce scientific uncertainty through conducting appropriate empirical investigation.

Effective communication might usefully focus on providing information about different kinds of uncertainty to interested stakeholders and the public, possibly using multiple methods (for example, graphics versus verbal descriptions). For example, assessment uncertainty is an important factor in deciding how to act, i.e. whether to reduce risk (through risk mitigation action) or reduce uncertainty (through focused research activity). However, risk managers and the public must be informed about the assessment uncertainty before acceptable risk management activities can be identified. As other factors also influence risk management decisions (for example, the severity and immediacy of the potential risk, the cost and side effects of mitigation options, and the cost and time required for research), these should also be communicated. Effective communication is required if the public are to respond in an informed way to public consultation about risk management. Some specific communication issues arise when considering communication between risk assessors and risk managers (Thompson and Bloom, 2000). The American Industrial Health Council has listed key issues of interest and relevance to risk managers (reported in Bier, 2001). As well as being understandable, the applicability of the

risk assessment for policy should be stated, and the information should be balanced (particularly when contentious issues are considered). The basis for the choice of critical assumptions should be described along with discussion and resolution of science issues, and conclusions should be relevant to the policy framework associated with risk management activities. In addition, the difference between risk probability and risk variability should be explicitly addressed in the risk communication. This, of course, is as likely to apply to communication directed at the public as to communication directed towards risk managers.

Under conditions of *risk variability*, the risk varies across a population but the distribution is well known. Understanding variability may also have implications for the allocation of resources to risk mitigation activities, and this must be communicated to both risk managers and the general public and key stakeholders (Morgan and Henrion, 1990). Thompson (2002) notes that because uncertainty differs significantly from variability, there are therefore differences in communication needs between the two cases. Uncertainty arises from lack of perfect knowledge, and may implicate communication about weaknesses in risk characterisation models. In contrast the focus of communication about risk variability is that different individuals within a population are certainly going to experience different levels of risk. This is again important information for both risk managers and the general public, although in the case of the latter it is important to develop a targeted communication strategy that maximises information delivery to at risk individuals.

At present, however, there is insufficient knowledge about how to develop best practice in risk communication of this type. More research is needed in order to identify information about variability and uncertainty be obtained and communicated to the public (or indeed “at risk” subgroups of the public). It is also important to include information about wider social values into this communication process (for example, if the public is concerned about the potential environmental impact of pesticides or other chemicals, this must be addressed in the communication. In other words, simply communicating about the impact on human health would be unacceptable to the public).

Risk communication (to decision-makers, stakeholders and the general public) should also focus about the sources of uncertainty as well as the magni-

tude of uncertainty associated with a particular hazard (National Research Council, 1994). In order to effectively manage risk, it is also important to provide information to interested stakeholders (including the general public) about emerging hazards, which may also be associated with high levels of uncertainty. Risk managers will also need information about the probable public response to emerging hazards. For this reason, it is important to understand how citizens and consumers are likely to react to future and emerging potential hazards as well as those to which they are already exposed.

3. Conclusions

In order to communicate effectively about risk, is important to investigate dynamic changes in both the extent and nature of public perceptions associated with specific hazards. This understanding can be used as the basis for the development of best practice in communicating about risks. Greater understanding of individual differences in perceptions and information needs between different members of the public, and key stakeholders, will facilitate information delivery. However, communication is a two-way process, and institutions need to learn how to internalise public views and societal values into the process of risk analysis. As risk analysis becomes more transparent, both the uncertainties inherent in the process, the variability is risk impact, and the points at which societal and political values start to influence decision making become open to public scrutiny. Thus it is important to address these issues in the process of risk communication, and dialogue with key stakeholders and the public more generally. This is likely to be particularly important in the area of toxicology, where there is a high level of public concern, but also uncertainties associated with risk estimates and assessment methodologies, and variability in hazard effect and impact.

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