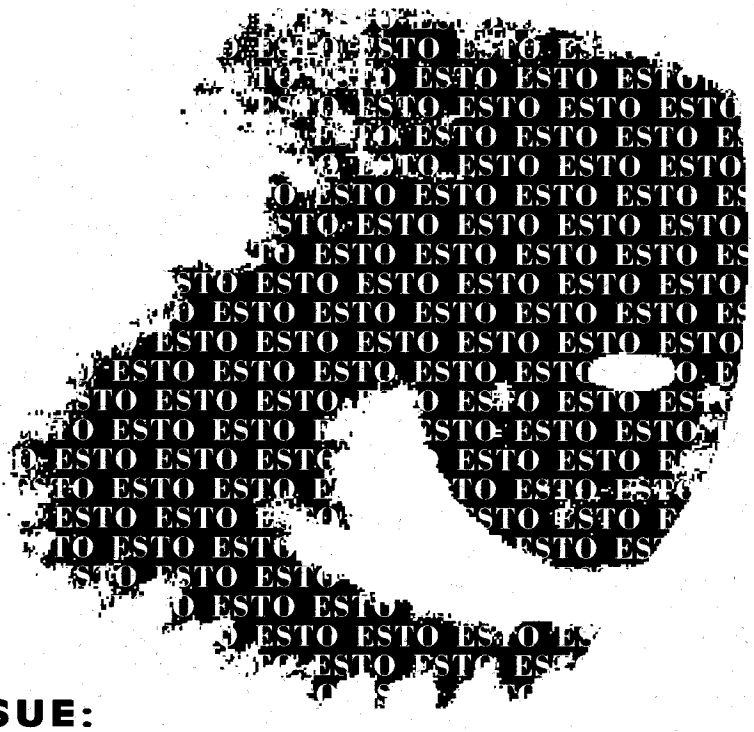
March/2004

82

ISSN: 1025-9384

The IPTS REPORT

EDITED BY THE INSTITUTE FOR PROSPECTIVE TECHNOLOGICAL STUDIES (IPTS)
AND ISSUED IN COOPERATION WITH THE EUROPEAN S&T OBSERVATORY NETWORK



SPECIAL ISSUE: PERSPECTIVES ON CRISIS AND RISK COMMUNICATION

CEE: XV/18

EUROPEAN COMMISSION
DIRECTORATE-GENERAL
Joint Research Centre

ENGLISH VERSION

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PUBLISHED BY THE EUROPEAN COMMISSION
Joint Research Centre
ISSN: 1025-9384
Catalogue Number: LF-AA-04-082-EN-C
DEPOT LEGAL: SE-1937-95

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Special Issue: Perspectives on Crisis and Risk Communication

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...Communication on Health and Risk Issues

...common interests (e.g., 'we are interested in the health and safety

...priorities (short-term and long-term).

...while recognising political/economic interests and hidden agendas.

...assessment and ethical community values.

...an interest in the issue (non-governmental organisations, trade ..., media, etc.).

...with these integral for successful delivery of information.

...with your participants.

...advocacy groups, organisations, the public, etc.

...their concerns, and the potential mechanisms to reach them.

...audience, including cultural variables.

...surveys, polls, baseline, etc.

...focus groups, observational studies, survey/baseline.

...patterns of the audience (e.g. how do they get information)

...to communicate with public(s).

...immediately in crisis.

...recognise emotions, speak clearly and understandably.

...and adapt it, and establish tracking mechanism(s).

...more about fairness, competence, and empathy than data

...disclosure - never lie.

...and benchmarks for your planning and implementation.

...and credible messages.

...mechanisms for the delivery of messages.

...before making major decisions or announcements.

...and place in perspective; avoid comparisons that trivialise.

...level, consistent messenger.

...public/audience communication.

...openness and accessibility.

...news media, radio call-in, free calls, bulletin boards, etc.

...ence are: you cannot do everything.

...to be taken.

...than less information.

...effectiveness.

...emotions.

...language about deaths, injuries, and illnesses.

...simple, non-technical language.

...messages that connect at a personal level.

...that are culturally sensitive and make data come alive.

...perceptions) by offering realistic, compliance-prone actions.

...efforts on intended audiences.

...make the desired decision?

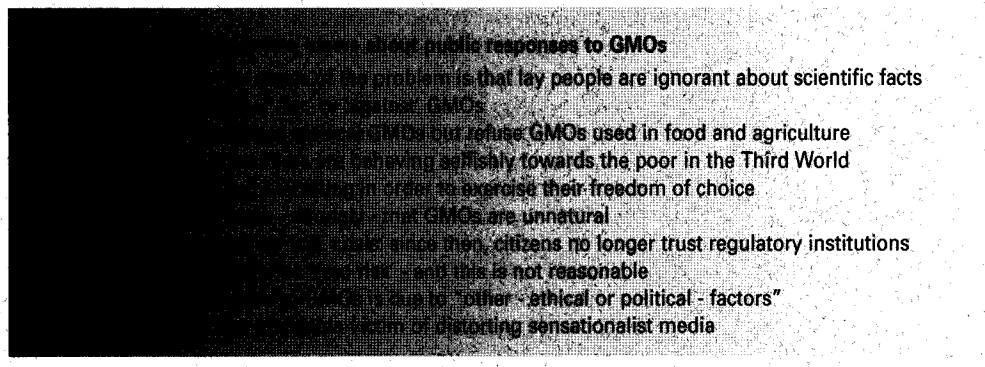
...outcome and impact measures.

...with key participants?

...the next intervention...the next steps?

...effective: Have a plan- Focus on People

Sources: Dr. Scott C. Ratzan, at Global surveillance, Diagnosis and Therapy of human transmissible spongiform Encephalopathies: Report of a WHO Consultation, World Health Organization, ***www.who.int/csr/resources/publications/bse/whoemczdi989.pdf***



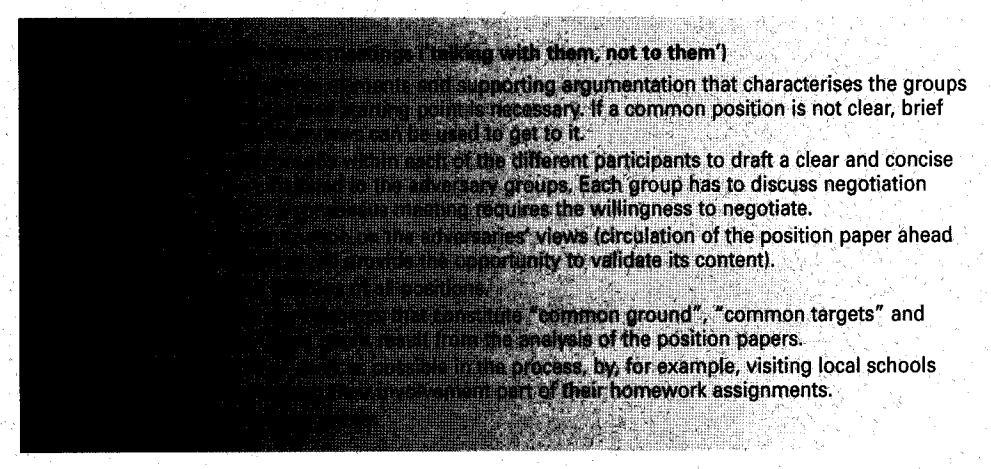
Source: Public Perceptions of Agricultural Biotechnologies in Europe, Final Report of EC Funded Project: FAIR CT98-3844(DG12-SSMI). Prof. Claire Marris et al.
An updated version of this table was presented by Prof. Marris at the Risk Perception conference organized by Directorate General for Health and Consumer Protection[4].

life as capricious and attempts to control it as futile. In any case, however, recent research indicates that people rarely conform consistently to one of the four types exclusively, and their reaction to risk is multidimensional (Bennett, 2001).

In addition, attitudes towards social partners based on incorrect assumptions have to be revisited. The belief that the public cannot conceptualise uncertainty and that providing information about uncertainty would increase mistrust in science and scientific institutions has been challenged (Frewer and Salter, 2002). Similarly, the assumption that Europeans are technophobic is not supported by Eurobarometer studies (Gaskell, 2002). Recent work by C. Marris et al., funded by DG Research, analyses public perceptions of agricultural biotechnology in Europe, and discusses the effect that such myths can have on policy formulation. (Box 2 lists 10 dominant stakeholder views/myths about the public response to GMOs).

Public attitudes to the scientific advice that constitutes the basis for the message being communicated have been changing (see the article by B. Duncan in this issue). The scientific advice processes are reviewed and efforts are made to establish assessment and monitoring criteria for the impact of scientific advice on policy formulation and on the interactions between the different social actors (Frewer and Salter, 2002 and *'The IPTS Report'*, issue 72)[5].

Similarly the effect of these changing attitudes on regulatory processes is not to be ignored (see the article by F. Bouder in this issue).



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consideration the perception of the crises by citizens, the scientific analysis of the crisis factors, the agendas of all the parties involved and the changing nature of, and conflicts between, these elements (Ballantine, 2003).

There is currently a significant gap in our knowledge and understanding of the effectiveness of the various types of media effects during crises (whether political, social, ethnic, economic, environmental, health, etc). United Nations agencies, non-governmental organisations, bilateral aid agencies, national government and community-based organisations have all sought to contribute towards the management, transformation, and/or resolution of crisis using the media. The complexity and size of these issues, however, and the pressure imposed on those attempting to address it (by various interested parties) make the systematic description, assessment and evaluation of the media's role during crisis a methodologically difficult task. There are currently many criticisms, which can be summarised in the following terms:

"The media can: cause intended change; cause unintended change; cause minor change [form or intensity]; facilitate change [intended or not]; reinforce what exists [no change]; prevent change. Any of these changes may occur at the level of the individual, society institution or culture...If one goes back to the premise of media effects ... the main message is that a simple assumption of some effect from mass media is a sound one. However, the direction, degree, durability and predictability of effect are each uncertain and have to be established case by case, with only limited possibilities for generalisation. "(Denis McQuail, McQuail's Mass Communication Theory, 4th edition, 2000, Sage, p.424 & 44).

Our concern in this article is not to go into this methodological and theoretical debate but rather to outline the basic arguments put forward by communications specialists and other scholars and practitioners. The aim is to summarise these arguments as they relate to the role of the media in exacerbating crises and/or consolidating stability and promoting the resolution of crises and pose certain questions for further analysis.

Media Determinants of Positive and Negative Spirals of Communication

Many social scientists and scholars today agree that the existence of crisis and conflict itself is an inevitable part of human interaction. The question is not how to prevent it, but rather how to deal with it in such a way as to produce the most positive and least violent outcomes possible for all the parties concerned. The media plays an important role in negotiating the structural factors, as well as generating the facilitating and triggering factors that lead up to a crisis and conflict. They can thus play a significant role in crisis situations, not only by provoking panic, hatred and even violence, but also in promoting stability, conflict resolution, management and transformation (which are themselves hotly contested and extensively analysed concepts).

Since the media's interpretation of events in a period of crisis has an influence on people's attitudes to the situation, the question revolves around *the conditions* under which so-called 'negative spirals of communication' develop and turn into media-driven panic/crisis situations and whether these can be indeed transformed into media processes which promote and cultivate the path towards political/social stability. In other words, if the media have such an effect on the public, under what circumstances do these spirals of communication develop into crisis generation and under what circumstances do they contribute to stability?

In order to understand the role of the media during a crisis it is important to view it as an expression, and a complex part, of overall socio-

The media's ability to reach large numbers of people and participate in the opinion building process brings with it considerable power to shape the course of crises and conflicts

Crisis and conflict is probably an inevitable part of human interaction. The issue is rather how to deal with it in such a way as to produce the most positive and least violent outcomes

In order to understand the role of the media during a crisis it is necessary to understand the impact of the media as an expression, and a complex part, of overall socio-political conditions rather than isolated events

tion of journalists by the government sources; public relations management by so-called "spin doctors"; manipulation of Preparatory Defence Information (PDI) / abuse of information campaigns for the psychological national defence by the army).

Furthermore, one needs to take into consideration that peer pressure is also experienced by journalists in various forms and creates additional obstacles:

- By reading a number of additional newspapers and following various news broadcasts on a daily basis in order to keep up with the news agenda of their competitors and peers, journalists perceive and translate the accentuated perception of the mainstream crisis/panic opinion expressed in the media during times of crisis as the dominant discourse.
- Since journalists tend to predominantly socialise with other journalists, peer pressure is constant. Consequently, in times of crisis, moderate journalists perceive their opinion as a dissident one and may be reluctant to risk being treated as pariahs by their peers.
- The upper echelons of management in the media tend to socialise with their peers, as well as with the social, political and economic elites of the country and as result tend to form a part of the country's establishment and have an interest in maintaining the status quo. The political and economic elites exert great pressure on the media managerial elite, especially during crises, when they are, or feel that they might, come under threat.

Research suggests that during crises the obstacles alluded to above in the six categories of 'basic social determinants of journalism' (see Figure 1), combined with increased peer pressure contribute to the increased production of media content that in itself contributes to a culture of social panic.

The result of all these factors for the reporting of crises is the simultaneous development of a 'spiral of silence' (Noelle-Neumann, 1973, p108) by moderate journalists who feel their opinions to be marginalised and deviant and a 'spiral of crisis/moral panic speech' by extremist/populist journalists who realise that their opinions have become mainstream, and thus feel the need to exaggerate (see Figure 2).

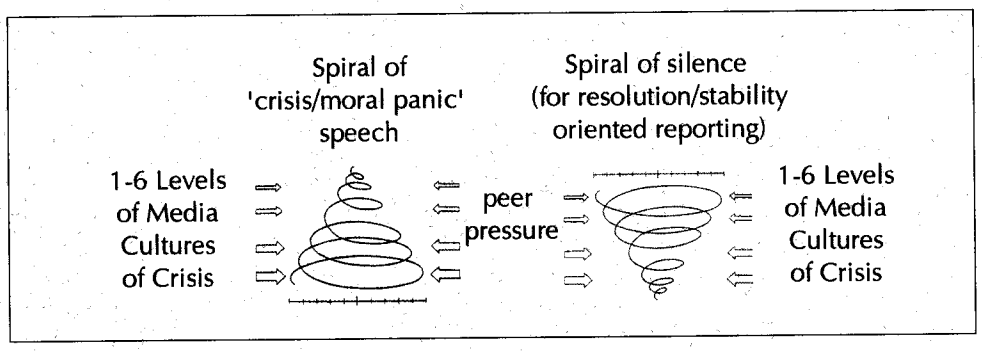
Journalists also work under various forms of peer pressure, such as the perceived need to be reporting the same stories as rival publications

Options open to the media?

Given the foregoing, what can journalists themselves actually do? It appears that two main options are open to journalists, who can (again subject to multi-levelled influences) adopt them in very diverse ways:

- Journalists can choose unquestioningly to report and follow issues ('facts') as dictated and followed by the dominant social group, thereby

Figure 2. Modes of reporting crises



The outcome of peer pressure and social determinants of journalism is to tend to silence moderate journalists while encouraging others to take ever more extreme positions

Second, there is another set of approaches which are gaining popularity in certain media and political circles which suggests that the job of journalists is to report crises and conflicts for a general audience in such a way as to promote stability and peace rather than exacerbate tensions, panic and even violence, or that more proactively, media ought to have a 'pre-determined' stability/peace agenda and be designed for targeted audiences.

The last set of approaches is developing in a variety of directions and has again been criticised as problematic. The idea behind media and stability/peace building is in itself a challenging concept to grasp. The mainstream idea behind 'media and stability/peace building' is that journalists are not supposed to 'take sides' on the crisis/conflict in question, other than the side of 'stability/peace'. The questions then we ought to be asking revolve around:

- Who defines stability and peace?
- How are these concepts understood by the various actors? How many types of 'stability' and 'peace' exist and how do these apply in particular crises areas?
- How do journalists decide upon the type of a targeted audience or the issue to be addressed? Why do they make those decisions and not others?
- How can journalists be held accountable for eventual fallbacks? Who decides that they are being 'constructive' and how is the decision being taken?
- Should media intervention take place in the first place? Under which conditions? What justifies the organisation's presence there? To which extent are they imposing their own value-system while attempting to introduce a media culture of stability and peace?

These questions are increasingly attracting the attention of more media specialists and other personnel directly or indirectly involved in media work. It is important to note here that the media (with its covering of institutions and individuals with diverse and often conflicting interests) vary in their ability, willingness, and determination to affect the positive outcome of a crisis/conflict situation. Although the media influence is not evenly distributed in terms of time, situation, and/or location, it constitutes a great resource with vast potential to verify, moderate, and critically question existing and emerging crisis.

Robert Karl Manoff (1998) summarises the potential media roles in the prevention and management of crisis and conflict as including:

- Channelling communication between parties
- Educating
- Confidence building
- Counteracting misperceptions
- Analysing conflict
- De-objectifying the protagonists for each other
- Identifying the interests underlying the issues
- Providing an emotional outlet
- Encouraging a balance of power
- Framing and defining the conflict
- Face saving and consensus building
- Solution building.

Conclusion

It is worth closing with a note that these media do not operate in a vacuum and their roles in times of crisis clearly do not come only from the journalists but rather involve a set of complex, multi-levelled activities undertaken by a wide variety of actors operating from institutional bases in independent, multilateral and governmental institutions. Thus the 'positive' communication during times of crisis, necessitate the combined efforts of media professionals, diplomats, scientists and experts, and other diverse protagonists. It is through the interaction and even cooperation amongst these actors that both various types and forms of crisis and conflict or stability and peace often result.

Another set of approaches which are raising criticism while gaining popularity in certain circles suggests that the job of journalists is to report crises and conflicts for a general audience in such a way as to promote stability and peace

Science, Risks and Social Representations

Andrea Lorenzet and Federico Neresini, *Università di Padova, Italy*

Issue: In recent years, scientific crises have gained the attention of an expanding audience. At the same time, scientific controversies, most notably those involving biotechnology, have been given considerable media coverage. In the public arena scientific facts lose their supposed certainty and tend to be shaped by the "social representations" social actors use to characterise and assess risks.

Relevance: Understanding how social representations operate to mediate the public's perception of risks is the first step towards re-considering approaches to scientific communication. Failure to take the particular features of debates on scientific controversies into account leads inevitably to misunderstandings between policy-makers, scientists and the lay public whenever crises arise.

Introduction

So-called "social representations" (Moscovici, 1984) are interpretations we all use in everyday life to give a meaning to reality. They originate in our life in society, in the context of groups, in the media and in public debates. Every social representation is conventional and associates a meaning with an image. For example, when we think about cloning, the image of a sheep will come automatically to mind[1]. Moreover, the image of the sheep brings with it a system of relatively fixed meanings that were defined through public debates before our act of interpretation. When we use social representations we put labels onto reality in order to reassure ourselves about the unknown, and to make the new and unconventional seem more commonplace. However, we do so in ways that often do not follow the precepts of rationality and are shaped by socially defined opinions and values.

Social Representations are important because they tell us something about the way we give a meaning to reality and to everyday life. It would therefore be useful to see how they operate in the process of risk assessment in science-related crises.

In recent years scientific crises have gained the attention of a growing audience, and scientific controversies, especially those involving biotechnology, have achieved considerable media coverage. However, the growing presence of scientists in the media seems to run counter to the principles scientists themselves use to validate scientific discoveries. The scientific method envisages the public disclosure of evidence and theories so they can be subjected to testing and/or falsification by peers

"Social representations" are conventional meanings or images people associate with certain facts or situations in order to give them meaning

The views expressed here are the authors' and do not necessarily reflect those of the European Commission.

the promoters gave them, but are necessary to let the "scientific fact" grow and gain in strength, supported by a wider network of "allies" (Latour, 1987). The mass media, along with other actors, are a crucial part of these networks; indeed, they are the place where meanings and interpretations are constantly negotiated.

So, once the audience has been exposed to these issues, the scientific fact becomes open to a lot of interpretations by different social actors (Neresini, 2000). When a scientific fact appears in the public arena these new interpretations are shaped by the mental schemes provided by the working social representations. As mentioned at the start of this article, social representations (Moscovici, 1984) are models that enable us to frame reality with a simple and clear purpose, to give us the cognitive resources to face the unknown. And what can be more unknown than a scientific discovery?

To be active, social representations need to be shared by a group of people. They operate on the basis of consensus, because they give "points of view" on reality that are socially shared. Obviously, very often Social Representations may seem irrational and illogical, but their importance lies in their strong cultural background. To ignore them, as scientists often seem inclined to do, may have a strong negative influence on the whole process of communication of science, because it inevitably leads to misunderstandings and to a decline in the public trust in science and, for policy-makers, in scientific advice.

Risk Assessment and Scientific Advice

The use of social representations in public debates on scientific issues is extremely important because in such a context scientific knowledge loses its "privileges" and its power to explain reality, becoming instead just one point of view among others in that context, especially when we are talking about perceptions of risk. In other words, the public's attitude to risk tends to be influenced, for example, by cultural, moral, political or economic arguments as well as scientific arguments, because social representations do not come from science alone, but from society as a whole. Obviously policy-makers need to be aware of these specific aspects of the debates on scientific issues because the public's perception of risk relates directly to the degree of public trust in institutions.

These issues are part of the wider debate on the nature of risks in (post-)modern societies. The growing awareness that modernity has brought with it not only development and welfare, but also new problems and therefore new risks, has enabled sociologists such as Giddens (1990) to recognize anxiety as a key feature of contemporary societies. In this context, understanding the way society assesses risk becomes a way of understanding the inner nature of society itself. And in our societies risks are assessed in public debates that are mainly channelled through the mass media. In this context communication plays a crucial role, because is through communication that the boundaries between what risks a community is willing to accept and what instead constitutes an unacceptable risk for society as a whole are constantly being negotiated. In the case of scientific communication, citizens are supposed to express their opinions through the mediation of their presumed spokesmen, namely associations, organisations, parties, social movements, and so on. Thus, risk assessment managed through public debate, and not just through scientific advice, becomes the basis on which to achieve genuine democratic participation. This becomes even more important if we bear in mind that science is one of the most powerful institutions in society and that, despite the fact that the applications of technology are so widespread, science tends to leave other institutions and the public out of its processes and decisions (Feyerabend, 1978). However, since science

Scientists who are challenging the dominant paradigm are more likely to turn to the general public for an audience in order to gain support against the establishment

Social representations operate on the basis of a consensus shared by a group of people

Understanding the way society assesses risk becomes a way of understanding the inner nature of society

Keywords
public debates, scientific advice, negotiation, social representations, scientific knowledge

Note

1. The reference here is of course to "Dolly" the sheep, which was the most widely reported case of a cloned mammal.

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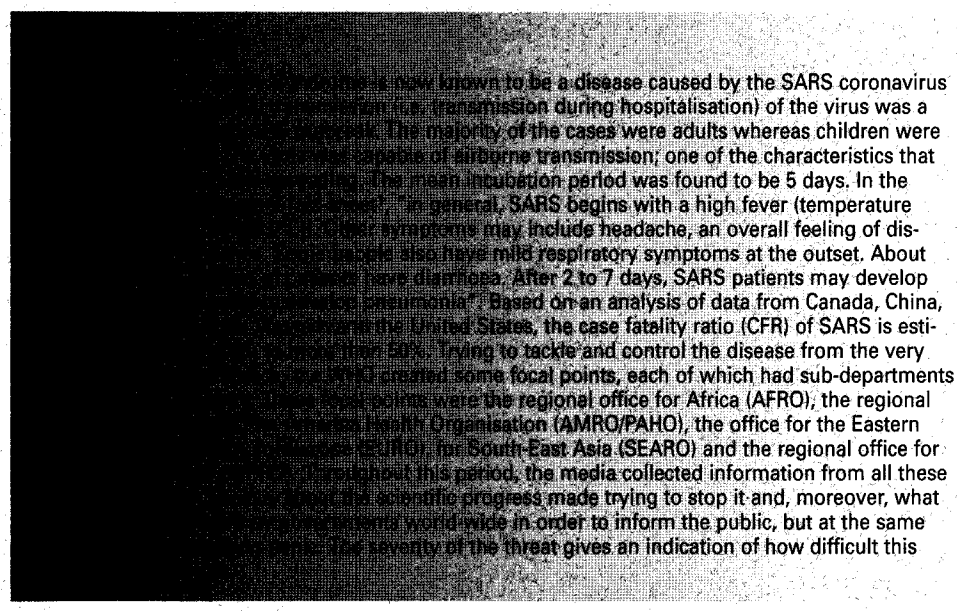

is now known to be a disease caused by the SARS coronavirus ... transmission during hospitalisation) of the virus was a ... The majority of the cases were adults whereas children were ... appears of airborne transmission; one of the characteristics that ... the mean incubation period was found to be 5 days. In the ... In general, SARS begins with a high fever (temperature ... over) symptoms may include headache, an overall feeling of dis... people also have mild respiratory symptoms at the outset. About ... have diarrhoea. After 2 to 7 days, SARS patients may develop ... pneumonia". Based on an analysis of data from Canada, China, ... the United States, the case fatality ratio (CFR) of SARS is esti... over 50%. Trying to tackle and control the disease from the very ... created some focal points, each of which had sub-departments ... points were the regional office for Africa (AFRO), the regional ... Health Organisation (AMRO/PAHO), the office for the Eastern ... (EMRO), for South-East Asia (SEARO) and the regional office for ... Throughout this period, the media collected information from all these ... and scientific progress made trying to stop it and, moreover, what ... around world wide in order to inform the public, but at the same ... the severity of the threat gives an indication of how difficult this

Coulthard, 1996). Secondly, when reporting, direct observation of facts or first-hand evidence is a basic condition sought by newsmakers. The immediacy of descriptions and the closeness of the reporter to the event in a sense guarantee the accurate news reporting. However, in the SARS case it was quite difficult for the reporters to place themselves at the centre of events. This was not only due to the distance but also due to health measures that needed to be taken. So news agencies had to supply information to the reporters. In this case the attribution of the words used was of great importance. Sources are 'accepted' in a hierarchical order. People linked to power relations or institutions are thought to be more reliable and consequently more frequently "quoted" than others, so a lot of what was reported was associated with power structures (Thompson, 1996). The presentation of reported speech entails important strategies used by the media to project a discourse that is reliable, accurate and factual.

In investigating these news reports, it makes intuitive sense to start from the four main elements that form the core of reporting. The original speech event gives us the person being reported and what he or she said, while the reporting event gives us the reporter and the fact that he or she is reporting what someone else said. From these we can identify four intermeshing but relatively independent dimensions of choice for the reporter: The first one is the voice: That is to say, who or what is presented as the source of the statement being reported. The second one is the message, which relates to the function or content of the original statement and the way it is presented. The third is the signal, in other words the way in which the reporter indicates that this is a language report. The final dimension is the attitude of the reporter. The attitude is mainly the evaluation by the present reporter of the message or the speaker[2].

Starting to analyse these dimensions, we begin with the "voice". When presenting an external voice in an article, there seems to be four main groups along a spectrum: Self, specified others, unspecified others and the community. The most commonly used form in news discourse is that of "specified others", where all the characteristics concerning the person speaking are published, and the unspecified others, where the source speaking is more or less like an organisation, an institute or a whole group of people (Makkonen-Craig, 1999). The other two cases appear more rarely because

Reporters see being close to events as a guarantee of accurate news reporting. However, in the case of scientific or health issues they are often forced to rely on less immediate sources

When information from a particular source is given in a news report, there are a variety of ways in which it can be quoted. The manner chosen gives subtle cues as to the reporter's attitude to that information

The third dimension of choice for a reporter, as mentioned before, is the signal. The ways in which the reporter can signal that the reader should interpret a stretch of language as a report, appear to have two aspects. The first is the logical relationship between the signal and the message as realised through the structural dependencies. The second main aspect is the nature and position of the signal itself, which construes how the report fits in with the surrounding text. The reasons for choosing to realise the signal in any particular one of the ways described below are extremely varied. For example, during the SARS case, at least in the Greek press, there was an evident tendency to position the signal at the beginning of the clause because it was important to point out that what follows is said by a prime minister, a well-known doctor or a member of the WHO (e.g. "According to David Heymann, executive director of the Communicable Diseases Cluster (CDS), a worldwide effort is being organised by the WHO to face the threat")[4].

The final main dimension of choice concerns the reporter's attitude to the reported message. The basic choices in this category are common to all expressions of attitude: neutral, positive, negative, etc. For language reports one of the main types of value that are assessed in these terms is the truth or validity of what the original speaker said. The most obvious way in which reporters can show their attitude regarding the reliability of the reported message or the person who said that, is through the choice of the reporting verb. For example the choice of the verb "told" or "said" gives no indication of the reporter's attitude towards the reported message, whereas "pointed out" signals acceptance by the reporter that this point of view is correct (Floyd, 2000). During the SARS crisis, for example, journalists tended to use more the verb 'claim' instead of the verb 'said'. That is because this way they could distance themselves from responsibility for what was being reported. In other cases, politicians' statements were interpreted or reported differently according to the reporter's angle. There are also structures such as clauses starting with "as" which can show the reporter's adherence to the validity of the reported message (e.g. "As he said: There was no security guard at the entrance of the hospital"). Other signals function primarily to indicate scepticism, such as the "or so" type (e.g. "He died of heart attack. Nothing to do with SARS, or so they say"), while others more or less ostentatiously suspend judgement on the validity of the message (e.g. "Dr. Claus was quoted as saying that this virus may have its origin in mice").

The examination of language reports in news discourse along the lines suggested here is an excellent starting point for training in critical reading, especially where it is possible to compare a report with the original statement and/or with other reports of the same statement from different sources (Fairclough, 1995). In all cases, represented or reported speech is a mediated and indirect text. By transferring words said to other people, reporters detach themselves from what is being reported in order either to distance themselves, or to evaluate or to legitimise their own previous discourse. This is a very important strategy used by reporters to pass their own judgement on the action. When selecting and processing what to report, writers reveal their own stance towards what is represented. No speech representation is objective or simply neutral. "Quoting" what people say is a very risky activity and it becomes even worse when it comes to crucial issues such as the SARS case. Statements are transformed through the perspective of a reporting intermediary, who is an agent in a discursive practice. In this way, social identities and roles are created according to the values of the person reporting and the institution this person works for. The press is thoroughly preoccupied with what important people say. The concept of importance, however, is directly linked to power and social structures.

The most obvious way in which reporters can show their attitude regarding the reliability of the reported message or the person who said that, is through the choice of the reporting verb

Examining language reports in news discourse is a good starting point for critical reading, especially where it is possible to compare a report with the original statement or/with other reports of the same statement from different sources

When selecting and processing what to report, writers reveal their own stance towards what is represented. No speech representation is objective or simply neutral

Keywords

media strategies, news discourse, source attribution, language report, information control

Notes

1. Centers for Disease Control (USA), **http://www.cdc.gov/ncidod/sars/factsheet.htm**
2. The news discourse analysis in this report is mainly based upon Geoff Thompson's theory: "Discourse Perspectives on Language Reports".
3. The majority of the examples in the report are taken from the French newspapers: *Le Monde, Liberation,* the English newspapers: *The Times, Guardian and the Greek newspapers: Τα Νέα (Ta Nea), Καθημερινή (Kathimerini).*
4. Example quoted from *Καθημερινή* (Kathimerini), *Τουλάχιστον μάθαμε με ποιον ιό έχουμε να κάνουμε...,* 20/03/2003, p. 7.

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agriculture DG to a DG with consumer protection as its mandate and, since 2003, an independent European Food Safety Authority (EFSA) has been responsible for risk assessment. The EFSA's scientific advisory committees have been appointed following a public call for candidates and a rigorous selection procedure, their meetings are webcast live over the Internet and EFSA has a mandate to communicate to the public, on issues of risk independently of the Commission.

These governance reforms, coupled with initiatives to strengthen the EU's food safety laws, have undoubtedly had an impact. For example, public fears about BSE have been allayed to such an extent that 2003 saw relatively few stories about "mad cow disease" or variant-CJD in the European media. The Commission and the EU were perceived to have responded well to the 2001 outbreak of foot and mouth disease[3]. An outbreak of Avian Influenza hit the Netherlands and some neighbouring regions of Belgium and Germany in 2003 without raising much public alarm.

Nonetheless, risk communication on food safety still remains highly problematic. Despite the governance reforms in place at EU level, despite the adoption in 2003 of new EU Regulations on the labelling and traceability of genetically modified organisms (GMOs), and an assessment by the new independent agency EFSA of its first GMO, the debate about the safety of GM food is as heated as ever. Even with all these reforms in place, and a positive opinion from EFSA on one variety of GM maize[4], many Europeans remain opposed to lifting the EU's moratorium on authorizing GMOs for use in Europe, and this is reflected at the political level. On 8 December 2003, when the most recent request for an authorisation was put to an EU regulatory committee only six out of the 15 EU Member States voted in favour[5]. Also, it still does not take much to trigger "scare stories" in the media about food. The level of interest in scientific reports on acrylamide in fried food in 2002 or semicarbazide in baby food in 2003 are proof of this.

Understanding public perceptions of risk

At the Commission's 4-5 December 2003 conference on risk perception[1] Commissioner Byrne identified five factors influencing risk perception:

- Governance: How good is the relationship between government and public institutions and the broader society? Is the risk management system perceived as transparent? Is it perceived as being effective?
- Science: Is science seen as isolated from society or engaged with it?
- Society: Civil society and non-governmental organisations can play a central role in shaping the public's views on risk.
- Culture: Cultural assumptions and values can colour audiences' perceptions of risk.
- Media: How a story is reported is of crucial importance.

Unfortunately, regarding the last factor, the media seems to like scare stories. Commissioner Byrne cited the example of the 2003 outbreak of Severe Acute Respiratory Syndrome (SARS). At the beginning of the outbreak, when the possibility of a major epidemic could not be excluded, SARS made the headlines worldwide. As soon as the outbreak was contained the media lost interest in SARS.

During the SARS outbreak the World Health Organisation (WHO) and, the European Commission, established themselves as the principle sources of reliable, authoritative information about the disease. They communicated in a calm and transparent manner – for example, the Commission published daily reports of SARS cases Europe-wide on its public health website. When the reporting of new cases, first of all, slowed and then stopped, the media and the public were able to accept that the outbreak was over. Commissioner Byrne con-

The creation of an independent European Food Safety Authority and the strengthening of the EU's food safety laws have undoubtedly had an impact on risk assessment and management

In contrast to the BSE crisis, during the SARS outbreak the authorities were able to maintain public trust and establish themselves as a source of reliable, authoritative information about the disease

were noted of official risk assessments in different countries reaching different conclusions on the basis of the similar evidence. When looking at how the public perceives the risks associated with GM food, there are significant differences both within and between countries. Though some 54% of Europeans are sceptical about GM food – they see risks and no benefits, some 28% seem to be quite relaxed about their introduction[6]. Looking further into citizens' views on GM food a link can be observed between their beliefs, their values and their perception of risk.

Experts talk of risk perception being conditioned by the cultural models humans use to interpret their surroundings[7]. Familiarity with certain risks can lead people to accept, or ignore them, as can cultural assumptions about their benefits or social acceptability. If people feel they can take steps to limit or to avoid a risk they are more likely to accept it. Conversely, risks that are unfamiliar and that run counter to our values seems more threatening. So, in the case of GM food its opponents tend to value "natural" agriculture and be suspicious of the agri-industrial companies promoting GM technology. "Scientific evidence" alone will not address their concerns, as they inherently distrust the people producing the science.

Implications for policy makers

The interactions between values, culture and risk perception are complex and not yet completely understood. The December 2003 conference could not provide a detailed prescription to policy makers on how to deal with them. Nonetheless, some pointers did emerge.

The importance of public debate, and public involvement, was stressed by many of the speakers. Engaging with stakeholders such as non-governmental organisations and consumer groups during the risk assessment and risk management process, of course, helps to build trust. Just as importantly, this engagement can bring into focus issues about values that need to be considered along with the science. As Professor George Gaskell put it: "Science makes many futures possible. But whether these are acceptable or not is a social and ethical, not a scientific issue".

Evidence from studies about public opinion on biotechnology[8] suggests that debate and dialogue will not necessarily change people's views about particular risks. For example, amongst some people surveyed, distrust of GM food increased when they were given more information about the science underlying it. If changing public perceptions of the risks themselves is so difficult, might changing perceptions of the risk management system be easier? In other words, can the public learn to tolerate certain risks if they have confidence in the effectiveness of the regulatory system designed to protect them from those risks? These are subjects that regulators and social scientists could usefully explore.

Conclusion

Risk communication in 21st century Europe will be a difficult task, no matter what we do. Reinforcing the trust of citizens in the risk assessment and risk management processes will clearly make the task easier. Central to this will be good governance – making the process open and being seen to listen to citizens' concerns – and, of course, achieving good results in terms of containing and managing risks. But no matter how good the process, or its results, official risk assessments will always be open to challenge. There will often be scope to dispute the underlying science, and debates about science and risk can easily become linked to debates about society and values.

The public is more aware than ever of differing viewpoints within science, and the limits of scientific knowledge. Citizens and civil society groups

Familiarity with certain risks can lead people to accept, or ignore them, as can cultural assumptions about their benefits or social acceptability

A Prospective Look at Risk Communication in the Nanotechnology Field

Emmanuelle Schuler, *Rice University, Texas*

Issue: Controversies over biotechnology, particularly in the agriculture and food industries, have revealed that public scepticism and resistance can significantly hamper the development of new technologies.

Relevance: As pressure groups have started to publicise the potential dangers of nanomaterials for human health and the environment, scientists, policy-makers and industry have begun to reflect on the actions necessary to assess nanomaterials' impacts on human health and the environment and to set adequate safety guidelines and protocols. Nanotechnology may also have to deal with the kind of scepticism that biotechnology has faced. Communication among stakeholders is very important in this regard.

The current state of the evaluation of nanotechnology

Initial scientific data on the impact of nanomaterials on health have recently been released. Though initial results are preliminary and inconclusive, a joint study by the NASA Johnson Space Center and the University of Texas Medical School suggested that single-walled carbon nanotubes directly injected onto the lung of mice at a dose of 0.5 mg led to the formation of microscopic nodules in lungs after a week (Lam, 2004). These nodules – which can potentially cause more serious lesions – persisted and became more pronounced after three months. Another toxicology research team at DuPont independently conducted similar studies with the difference that carbon nanotubes were placed in the rats' trachea (Warheit, et al., 2004). Results showed that with high doses of carbon nanotubes, fifteen percent died. The cause of death was attributed to suffocation. Nodules were also found in surviving rats but were not persistent beyond a month after instillations. This study suggested that nodules resulted from a reaction to presence of foreign substances – the carbon nanotubes – rather than from a toxic reaction.

These initial studies have received a lot of attention from scientists, industry, non-governmental organisations (NGOs), specialised media, and the mass media. Since then, the topic of toxicology of nanomaterials is on the radar screen of the mass media, both in Europe and USA.[1] The Canadian-based ETC Group (Erosion, Technology and Con-

Initial studies into the health effects of carbon nanotubes have received lot of attention from scientists, industry, non-governmental organisations and all sectors of the media

The views expressed here are the author's and do not necessarily reflect those of the European Commission.

cations. For example, data from the 1999 Eurobarometer survey on biotechnology show that while the vast majority of the European public is opposed to genetically modified food and animal cloning, attitudes to medical (genetic testing and the production of pharmaceuticals) and environmental (bioremediation) applications are positive. One conclusion of this survey was that "... moral concerns attach specifically to particular applications and not necessarily to underlying molecular biology techniques" (Gaskell, et al., 2000). These findings may be a useful barometer for nanotechnology. They suggest that some applications of nanotechnology will likely pose more public concerns than others. Since only very few applications of nanotechnology have so far turned into commercial products and their hazards are not fully appreciated and understood, it is premature to identify which applications of nanotechnology are likely to be accepted by the public, which one are likely to face public resistance.

Public Perceptions

Psychologists Slovic (Slovic, 1987) and Fischhoff (Fischhoff et al., 1979) have shown that risk perceptions are shaped by a range of various psychological factors that explain why some risks trigger higher states of anxiety than others, regardless of the 'objective' risks assessed by scientific methods. Psychological factors that trigger anxiety lead to risk overestimation. Among those factors are whether a risk is perceived as involuntary, whether it is seen as dreadful, and whether authorities seem to lack knowledge and control over risks. These psychological factors explain how the public forms attitudes, thinks, and makes decisions about risks. In addition to individual psychological factors, culture may also play a significant role in public perceptions (Douglas and Wildavsky, 1982). The implication is that risk perceptions may not be uniform across society. In fact, public risk perceptions across Europe may vary from country to country, region to region, or culture to culture. Since no one risk communication strategy will be suitable in all places and at all times, risk communication messages around nanotechnology need to be tailored to targeted groups (Langford et al., 1999).

The role of the media

The media are an important part of risk communication. Daniel Yankelovich showed that the media are more than just a source of information about risk, but help to shape public opinion and how issues are initially framed. The media also play a significant role in amplifying social processes, such as controversies over risk (Kaperson, 1992). Peter Bennett of the UK Department of Health found that the question of blame – that is, identifying the party, whether government or otherwise, upon whom to place blame in a case of an accident such as a chemical spill – is the most important media trigger that turns a potential risk to public health into a major story. Other triggering factors include alleged secrets and attempted cover-ups, conflicts between parties, links to existing high-profile issues or personalities, and the number of people exposed to the risk (Bennet, 1999). For the nanotechnology community, it suggests that policy-makers should not overlook the importance of initial framing around nanotechnology issues and need to find ways to minimise amplification effects. Furthermore, in the case of a nano-technology-related accident, governments should be prudent and open.

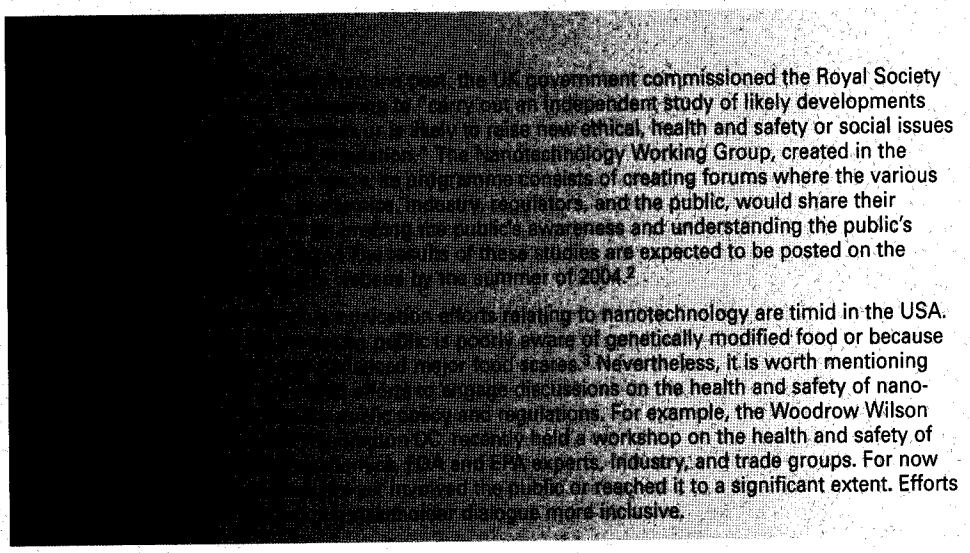
Trust

Trust is the cornerstone of risk communication because it influences public attitudes and behaviours (Renn, et al. 1991). Trust is a broad and multifaceted concept and involves many actors such as governments, scientists, industry, the media, and NGOs, and others. It is generally accepted that in risk communication the source of a message, more

Very few nanotechnology applications have so far been turned in to commercial products, so it is still too early to know which applications are likely to be accepted by the public and which are likely to face more resistance

A range of various psychological factors explain why some risks trigger higher states of anxiety than others, regardless of the 'objective' risks estimated by scientific methods

The media are an important part of risk communication. The media also play a significant role in amplifying social processes, such as controversies over risk



…the UK government commissioned the Royal Society … to carry out an independent study of likely developments … likely to raise new ethical, health and safety or social issues … The Nanotechnology Working Group, created in the … programme consists of creating forums where the various … industry, regulators, and the public, would share their … raising the public's awareness and understanding the public's … of these studies are expected to be posted on the … by the summer of 2004.[2]

… efforts relating to nanotechnology are timid in the USA. … public to become aware of genetically modified food or because … major food scares.[3] Nevertheless, it is worth mentioning … for example discussions on the health and safety of nano- … and regulations. For example, the Woodrow Wilson … recently held a workshop on the health and safety of … FDA and EPA experts, industry, and trade groups. For now … reached the public or reached it to a significant extent. Efforts … dialogue more inclusive.

these factors are interrelated and likely to contribute to shaping the public's opinions and acceptance of nanotechnology. In the light of previous studies on risk perception, it is suggested that the nanotechnology community should engage in an open dialogue with the various stakeholders, including the public, and integrate their viewpoints into decision-making processes. To some extent, it becomes a matter of negotiating risks – to define, for example, an acceptable level of risk among all stakeholders – rather than merely communicating risks.

But this might be easier said than done. Some worry that public consultation and engagement in decision-making processes will do nothing more than give quirky outsiders a public space and voice. As a result it could even further polarise the debate rather than solve issues.

But there can be negative consequences of not engaging in far-reaching public discussion. In fact, if there is one lesson to learn from the past controversies over genetically modified food, it would be this: failure to involve the public in the strategic development of new technologies and to take the public's concerns – whether or not they seem sound to scientists, policy makers or regulators – into consideration leads to distrust of public institutions. Trust is subsequently very difficult to regain. Though public consultation and engagement raise some legitimate concerns, the cost of not including the public in the decision process around nanotechnology may be much higher: it may lower the public trust in scientific and public institutions and trigger public resistance, which in turn may affect the trajectory of nanotechnology development.

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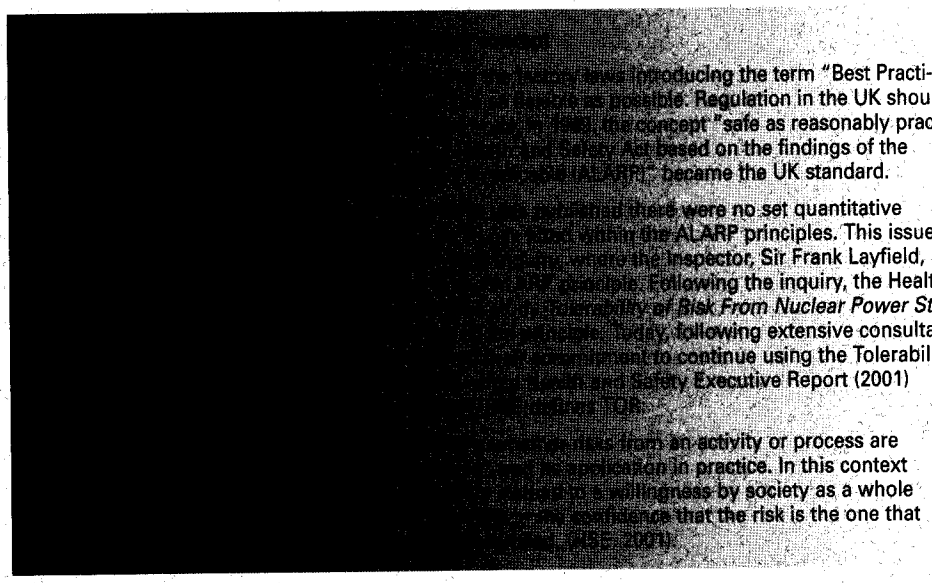
courses of actions whose consequences may include risks. B. Fischhoff tells us that "if people accept a course of action, like deciding to drive somewhere, despite knowing about the risks, then those risks might be termed acceptable, in the context of the other consequences of that action". Fischhoff underlines that those individuals may choose riskier course of action (e.g. deciding to overtake a slow car) and therefore risk should be interpreted as a relative value based on the specific weighing up of the costs and benefits attached to a specific context. Therefore, "a level of risk that is acceptable for one activity might seem horrendously high or wonderfully low in other contexts" (Fischhoff, 1994). Beyond individual risks, the societal dimension of risk is often associated with hazards that are expected to provoke a socio-political response, e.g. risks of events causing a widespread or large-scale detriment or the occurrence of multiple fatalities in a single event. It might be tempting to consider that, from a utilitarian perspective, risks that are societally acceptable are those risks whose benefits exceed costs for the society as a whole. However, this approach is not ethically acceptable in a democratic society, mainly because it does not differentiate between "winners" and "losers". For Fischhoff, the only ethically acceptable solution is to consider that a technology is acceptable if it creates acceptable risk-benefits tradeoffs for each member of society (Fischhoff, 1994). This calls for the definition of socially acceptable frameworks to make decisions about risk acceptance or risk rejection.

What is "TOR"?

The meaning and value of the tolerability-of-risk triangle (see Figure 1) has been presented by the HSE in a way which is accessible to the wider public: " the triangle represents increasing levels of 'risk' for a particular hazardous activity, as we move from the bottom of the triangle towards the top". The triangle can be divided into three broad regions:

- The zone at the top represents an unacceptable region. For practical purposes, a particular risk falling into that region is regarded as unacceptable, whatever the levels of benefit associated with the activity. Any activity or practice giving rise to risks falling in the uppermost region would, as a matter of principle, be ruled out unless the activity or practice can be modified to reduce the degree of risk so that it falls in one of the regions below, or there are exceptional reasons for the activity or practice to be retained.

Although from a utilitarian perspective, risks that are societally acceptable are those risks whose benefits exceed costs for the society as a whole, this is unacceptable in a democratic society because it fails to distinguish between "winners" and "losers"



[redacted] introducing the term "Best Practicable". Regulation in the UK should [redacted] the concept "safe as reasonably practicable" [redacted] Act based on the findings of the [redacted] ALARP" became the UK standard.

[redacted] there were no set quantitative [redacted] within the ALARP principles. This issue [redacted] the Inspector, Sir Frank Layfield, [redacted] Following the inquiry, the Health [redacted] of *Risk From Nuclear Power Sta-* [redacted] today, following extensive consulta- [redacted] to continue using the Tolerability [redacted] and Safety Executive Report (2001) [redacted] TOR.

[redacted] from an activity or process are [redacted] practice. In this context [redacted] willingness by society as a whole [redacted] that the risk is the one that [redacted]

preferences of stakeholders. In other words, it could also be argued that the TOR concept is trying to achieve a conceptual balance between utility (e.g. the need to ensure decisions about risk are established on the basis of sufficiently broad and reliable estimates) and equity (ensuring that all social concerns are taken on board in a proportionate way).

Some attention ought to be paid to the opportunities and issues related to the TOR framework. In particular, the conceptual attractiveness of the TOR framework should be tested against its effectiveness. The TOR framework raises a number of critical questions: is it an applicable concept? What methodology should be followed in order to apply the TOR framework? How could this framework be applied to a range of specific risk areas?

The effective combination of individual and societal risk criteria into a manageable framework has required the HSE to clarify what could be the limits between the broadly acceptable, tolerable and unacceptable regions of the TOR framework. The HSE also reviewed specific methodologies to be followed for including the societal criteria in concrete situations.

The UK approach to safety management "favours risk assessment combined with exposure limits that can be measured and therefore successfully controlled and in use and properly enforced" (Rimington, 1993). The TOR framework therefore calls for a sustained effort to improve quantitative estimates. HSE has proposed general guidelines to frame tolerability measurement (HSE, 2002). The essence of the proposed methodology is that:

- At the stage of risk assessment, the assessment of the risk needs to be based on the best available scientific advice
- Some procedures should be in place to show how risks can be kept as low as reasonably practicable
- Measures to review risks periodically should include the integration of new knowledge and checking on new techniques for reducing or eliminating risks.

The unresolved questions: the wider relevance of the "TOR" concept

It has been noted by academics such as Sheila Jasanoff and David Vogel as well as by regulators, most notably Lord Ashby, that the UK's flexible model of regulation is both unique and highly successful. Indeed, as late as the mid 1980s, comparative regulatory studies indicated that it was able to achieve virtually the same environmental and public health benefits as the US model but at a fraction of the cost. The regulatory world is, however, changing, and this may have consequences for the future of the TOR framework. At the same time, TOR is essentially a UK concept and it may not be easily translatable into other national settings.

A practical limit of the TOR framework in the UK itself is to be found in the fact that the HSE does not have universal competence for all major risks. It has been argued, for example, that the HSE does not regulate most of the ecological harms, marine and aviation risks, as well as risks in patient care (Rimington 1993). This suggests that for all these areas the applicability of TOR would need to be tested. A more serious problem is related to the "fuzziness" of the societal component of the TOR framework. In particular, the formalization of the societal aspects of TOR may be problem in some areas, considering the methodological obstacles to the quantification of societal risk (Cohen 1996, Evans and Verlander 1997).

Finally, although quantitative estimates about the probability of the occurrence of a particular hazard are fairly stable or optimistic (as a result of advances in technology), public perceptions of risk are much more variable. Communication is key in

Keywords

risk, tolerability, safety management

Notes

1. Therefore it is important to underline, although these terms may have been used by some scholars interchangeably, that within the TOR framework tolerability and acceptability are distinct concepts. Unlike acceptability, which is an absolute notion, "Tolerability refers to a willingness to live with risk so as to secure certain benefits and in the confidence that it is being properly controlled. To tolerate a risk means.... Something we need to keep under review and reduce still further if and as we can".

2. Although, more generally, it could be inaccurate to be over-optimistic about quantitative data, as it has been established that estimates of risk probability proposed by experts have a tendency to undermine risks.

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