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Symposium on 'The challenge of translating nutrition research into public health nutrition'

Session 5: Nutrition communication
The challenge of effective food risk communication

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A chronology of food scares combined with a rapid, unchecked, rise in lifestyle-related diseases such as obesity highlights the need for a focus on effective food risk communication. However, food risk communication is highly complex. Many factors will affect its success, including the demeanour and conduct of the source, its transparency, interaction with the public, acknowledgement of risks and timely disclosure. How the message is developed is also important in terms of language, style and pretesting with target audiences, as is the choice of appropriate channels for reaching target audiences. Finally, there are many personal factors that may affect risk perception such as previous experience, knowledge, attitudes and beliefs, personality, psychological factors and socio-demographic factors, many of which remain unexplored. While there is evidence that campaigns that communicate health risk have been associated with behaviour change in relation to major public health and safety issues in the past, it is unknown at this stage whether targeting risk information based on risk-perception segmentation can increase the effectiveness of the messages.

Risk communication: Risk perception: Audience segmentation

Scientists and regulators have long recognised the need to communicate risk to the public. However, much of the early research in this area was focused on issues such as war, nuclear power, road safety, water safety, chemicals and medicines. Only relatively recently have researchers begun to explore the communication of food risks or have European and national agencies been charged with responsibility for food risk communication. This change in approach followed a plethora of food scares, which began in the late 1980s with the well-publicised occurrence of food poisoning from Salmonella in eggs in the UK and has continued up to the present.

Originally, it was believed that communicating risk would allow individuals to process risk more accurately and thus behave more optimally in relation to their health[1–5]. It was assumed that education was the correct solution to allow the public to interpret risk more 'rationally'. However, psychological and sociological research has since shown that lay individuals may process risk quite differently from food experts[6]. While the food experts use technical quantitative methods of risk measurement to assess risk, consumers use a broader approach for risk assessments. In a recent qualitative study conducted in four European countries it was found that formal or 'scientific' sources of evidence are rarely mentioned in relation to decisions about food risks[7]. Instead, participants rely on more practical approaches, including perception of naturalness, taste, smell and appearance.

Taking into account what has been learned from risk-perception research, there has been a change in the approach taken to risk communication. In the past, the public was perceived as a passive receiver of risk information and considered to often misunderstand or misinterpret risk messages. In contrast, it is now recognised that risk

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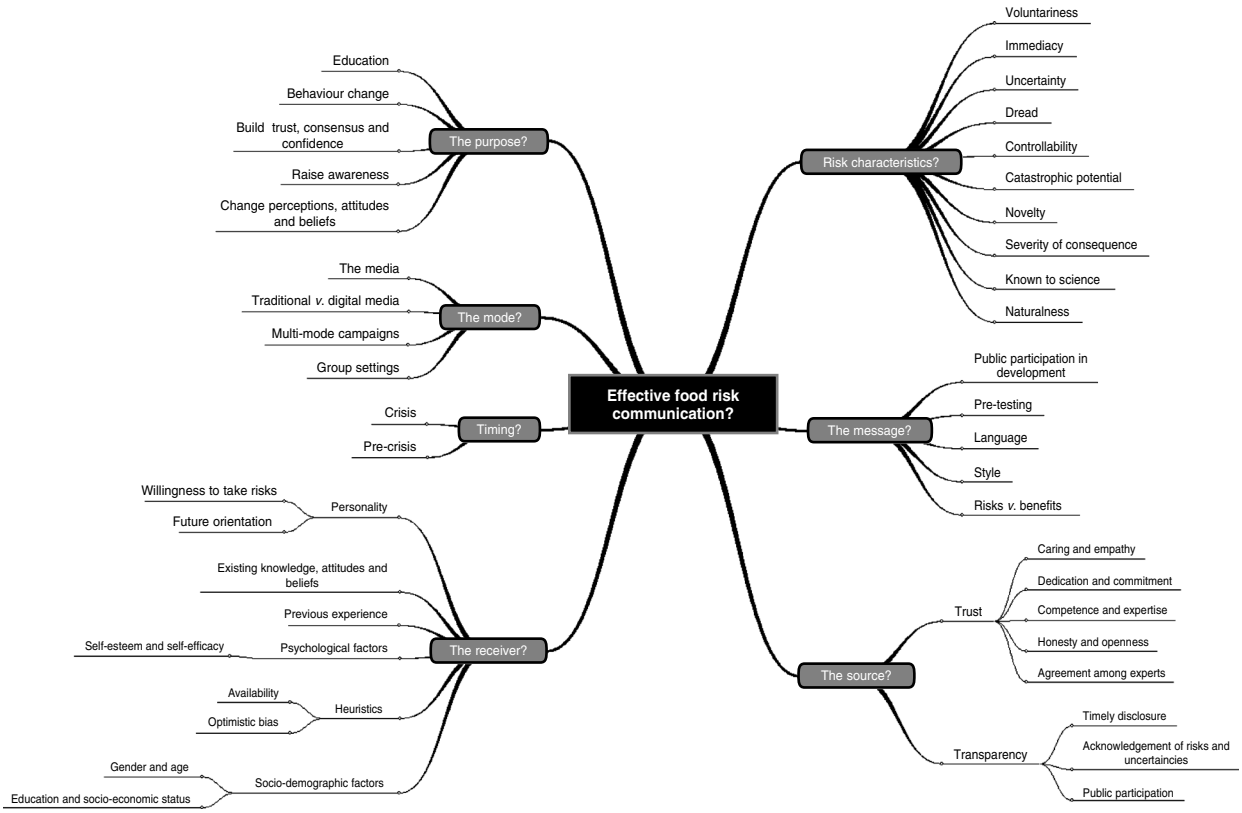

Fig. 1. Factors affecting risk communication.

communication should involve a process of exchange of information among all those concerned with the risk at hand.

While risk communication has advanced greatly in recent years, its complexity means that there is no single set of recommendations to suit all situations. Many publications and reports have produced guides for best practice in risk communication[8–14], which provide useful reading. However, efforts in food risk communication will vary in their purpose, timing (crisis and non-crisis) and the attributes of the hazard involved, all of which will impact greatly on the communications strategy and its potential for success. The effectiveness is further influenced by the source of the information, the message, the mode of delivery and the characteristics of the receiver (see Fig. 1). The present paper will attempt to review and summarise some of these influencing factors.

The changing food environment and the development of food risk communication

The roots of risk communication lie in risk-perception research. The most widely accepted model of risk perception is the psychometric model. It was developed in the late 1970s and uses nine explanatory scales including voluntariness, immediacy, uncertainty, dread, controllability, catastrophic potential, severity of consequence, known to science and novelty[6]. The strongest predictors of risk have included 'dread', i.e. whether individuals can tolerate living with a risk and think about it calmly, and 'novelty', i.e. how precisely the risks were known[6,15]. More recently, 'naturalness' has also been found to explain a substantial amount of variation in risk perception[16].

These factors help to explain why individuals react, or fail to react, to different types of food risks. Recent scares include the discovery of BSE in beef in 1996, dioxins in animal feed in Belgium in 1999, concerns around acrylamide in 2002, *Enterobactum sakasaki* in baby formula in France in 2004, polychlorinated biphenyls in Scottish salmon in 2004, Sudan Red dye in 2005 and bird 'flu in 2006. These risks elicited responses ranging from media frenzy to the collapse of production of whole food chains, restriction of trade, limitation of food technology development and even government collapse in the case of dioxins in animal feed in Belgium. However, given the characteristics of these risks and what is known from the psychometric model the public response was somewhat predictable.

During the period corresponding to the recent food scares the rates of diet-related diseases such as obesity and diabetes have increased dramatically, tripling in Europe over the past two decades[17], with major implications for human health. While scientists and public health nutritionists describe this situation as a pandemic, studies have shown that, for example, neither a high fat intake nor a high energy intake[18] score highly in risk perception and the rise in obesity continues unchecked. Whereas technological and food safety issues appear to elicit a dramatic response, healthy eating advice aimed at improving chronic health does not, because the consequences are not immediately apparent.

The many purposes of risk communication

Given the variety of risks to be addressed, the purpose of food risk communications can vary greatly and includes building trust and consensus, creating awareness, educating, influencing perceptions, attitudes and beliefs, promoting action and changing behaviour. In turn, a variety of strategies will be required to achieve each goal. Pre-crisis communications normally involve proactive strategies to call attention to potential and existing risk issues and provide a platform for discussion and information sharing. They may also aim to illicit behaviour change in relation to a well-known food risk or one with long-term consequences[19]. Communicating during a crisis presents a particularly difficult challenge for risk communicators in maintaining public confidence. Strong emotions, such as fear, anxiety, distrust, anger, outrage, helplessness and frustration[8,20] come to the fore and present serious barriers to effective communication[21,22]. Convincing the recipient to accept some level of risk is no easy task. Useful guidelines have recently been issued by the WHO in the *Sixth Futures Forum on Crisis Communication*, which deal with preparedness, infrastructure, timing, availability, transparency, honesty and media relations[10].

Trust, transparency and uncertainty in risk communication

Increasingly, the risk communications strategies of health and regulatory authorities, often the source of risk communications efforts, have come under intense scrutiny, particular during crises. Disasters such as the BSE crisis in the UK and the dioxin scandal in Belgium have focused attention on the causes of public distrust in these institutions and their risk-management practices[23]. Mistrust in a communicator is a major barrier to effective risk communication[24] and may render the source less credible than other sources such as the mass media[25]. Only when trust has been established can other goals, such as raising awareness and behaviour change, be achieved.

Four important determining factors have been observed in establishing trust and they include: caring and empathy; dedication and commitment; competence and expertise; honesty and openness[26]. On the other hand, trust is decreased by perceived disagreement among experts, lack of coordination among risk-management organisations, failure to incorporate public participation, an unwillingness to acknowledge risks, delay in disclosure of information and irresponsibility or negligence in fulfilling risk-management responsibilities[12,27]. For these reasons, measures such as increased transparency in risk-assessment and -management processes, widespread consultation and stakeholder engagement are now viewed as important aspects of risk communications practice.

The demand for transparency and the focus on the needs of the recipient have had an impact on how messages about food risk are developed and on what is communicated. The need to communicate uncertainty is now an important consideration. In the past, scientific experts have worried that communicating uncertainty would result in public distrust. In fact, the opposite was found to be true; failure to communicate about uncertainty increases public distrust in risk-management strategies[28], while acknowledging uncertainty increases public confidence[29]. Authorities that are not completely transparent or that over-simplify the risk messages could also be accused of lying[30–33].

Effective translation of scientific messages

Equally, the message itself must be clear, easily understood and take into account the concerns of the public. The numerical expressions and small probabilities used by risk assessors can be difficult for non-scientists to understand. However, translating these terms into every-day language is problematic. A meta-analysis has shown that words such as ‘rare’, ‘unlikely’, ‘frequent’ and ‘probable’ mean different things to different individuals[34]. The effectiveness of risk comparisons have also been explored in relation to specific risk; for example, what are the risks now compared with 10 years ago or what are the risks compared with a better-known risk[35]. However, these comparisons do not take into account the complexity of decision making for an individual.

Research on the use of appropriate language and style of the communication is limited in relation to food risks. The effectiveness of using verbal expressions compared with numerical expressions has been examined in relation to Rn gas[36]. Also compared was understanding of messages that were conveyed using a ‘command’ or directive approach *v.* a ‘cajole’ or persuasive approach. It was found that the command approach using verbal expressions increases learning and the numerical expressions result in greater consistency between perceived and objective risk, while the ‘cajole’ verbal version increases the probability of making an appropriate recommendation to a neighbour. Thus, no method was found to be best and the communications format will depend on the aim of the risk communication. It is unknown whether this result is specific to communication about Rn gas or whether it is transferable to food risks. Again, this uncertainty highlights the need for pre-testing messages with key audiences.

Communicating both benefits and risks

The scenario in which a certain behaviour presents both risks and benefits presents an interesting case study. Such a situation has recently been reviewed in relation to oily fish, which provide the benefit of *n*-3 fatty acids, but may also be contaminated with heavy metals[37]. Exposure to the benefit-only message was found to result in an increased intention to eat fish (+21 %), while the risk-only message translates into an 8 % decrease in intention to eat fish[38,39]. Balanced messages that include both risks and benefits do not significantly change intention to consume fish. However, other research has shown that negative information has more impact than positive information[29,38–41] and that consumers value information that has potential negative health effects more than information that conveys positive health effects[42].

Choosing the best medium for communication

In relation to the use of appropriate channels for communication, risk communicators normally rely on their public relations, advertising and media-buying partners for advice on targeting specific audiences. However, these data are rarely captured in the scientific literature. A useful review of elements of successful mass-media campaigns for behaviour change, including use of appropriate channels, has been published[43]. Evaluation studies indicate that individual or small-group settings, such as information exchanges and public workshops, are the most effective venue for communicating trust factors[21,44]. The effectiveness of written (i.e. brochure) *v*. computerised communication has been tested and no significant differences in learning outcome were found[45,46]. Thus, at this stage it is not known whether there is an optimal mode for communicating risk.

The role of the media in risk communication

The media influence on risk perception is also still very much under debate. Media exposure would seem a logical influence of risk perceptions, especially given the vivid language, narratives and imagery often accompanying news stories. For example, the terminology 'mad cow' evoked high emotion. However, it is difficult to measure the social amplification of risks, i.e. why hazards or risk events with minor physical consequences frequently elicit strong public response and result in extremely severe social impacts.

There is widespread perception that media reporting is biased; for example, in a review of UK and Swedish media reporting it was found that reports tend to be negative and use alarmist headlines rather than reassuring ones[47]. However, other reviews have suggested that reporting of food risks is more neutral or moderate[31]. Media reporting of risk may or may not provide the kind of information, e.g. statistics, that would allow an individual to assess their own risk. However, it has been suggested that the media may have an influence on the public's risk perception because the media express themselves in a way that the public can understand[31]. In relation to media coverage of GM foods it has also been shown that changes in the volume and content of risk reporting can alter attitudes[48].

The growing reach and sophistication of digital communication is largely unexplored in relation to food risk communication. Certain subsets of the population now favour the internet, and especially social networking sites, along with mobile phone technology, as their preferred media channels and attempts to communicate with them using conventional media channels may fail. The influence of the internet on the rapid global spread of information on a food risk has recently been reviewed[49] following the publication of a report on the level of contamination in farmed salmon in *Science*[50]. The widespread publicity that followed had immediate negative implications for the farmed salmon industry. It has also been demonstrated from the European Food Safety Authority's monitoring of media reporting of semicarbazide in baby food in 2006 that global coverage is expanded by the internet, with the highest publicity outside the EU noted in the USA[51].

Characteristics of the recipient of risk messages

Finally, understanding the characteristics of an individual that influence how he or she will receive and act on risk information presents perhaps the most complex challenge. Past experience, existing knowledge, attitudes and beliefs, socio-demographic factors, personality factors, psychological variables, self-esteem, perception of vulnerability and affect heuristics such as optimistic bias may all influence how risk messages are accepted and whether an individual is likely to change related risk behaviour. Thus, audience segmentation has become increasingly important when crafting risk messages.

Previous experience, existing knowledge, attitudes and beliefs

If an individual, or someone known to them, has experienced the outcome of a risk (e.g. food poisoning) this factor will clearly intensify its personal relevance[52]. In contrast, the extent to which an individual is knowledgeable about the topic or familiar with it may result in overconfidence or complacency[53]. Existing beliefs and attitudes have also proved to be important predictors of risk perception and to influence acceptance of risk messages; for example, in relation to GM foods previous attitudes has been shown to be the strongest predictor of variance in perceived risk (86–90 %) and benefit (92–95 %)[54]. Also, more extreme or well-crystallised attitudes could influence perceptions of the information source, causing mistrust rather than perceptions of the risk being communicated[54]. In short, if a message is not in line with what an individual already believes it is likely to be dismissed or neglected[53].

Socio-demographic factors

Socio-demographic factors such as age, gender, socio-economic status, religious beliefs and world views also appear to be important in risk perception. It has been shown that men, particularly white men, view risks to be smaller when compared with women[55]. A similar observation has been reported more recently, with women who have children and are full-time home makers rating risks more highly[56,57]. Older individuals also perceive greater risk[57] and are more likely to avoid risk[56]. Results relating to education level are equivocal. Higher education levels have been found to lead to less risk aversion[57], while subjects with a higher education worry more, feel less confident about the effectiveness of measures to prevent themselves from falling ill, feel less able to take such measures and have a lower level of trust in the safety of food products[56]. Socio-economic differences may also be important. Subjects with higher incomes have been shown to have higher risk avoidance[57], while those with lower incomes being less likely to engage in the risk communications process, particularly non-nationals who may have language barriers.

Cultural theory proposes that 'worldviews' such as fatalism, individualism, hierarchicism and egalitarianism

could explain some variation in risk perception, and this approach seems intuitively plausible[58]. Individualists fear factors that might interfere with their individual freedom, egalitarians tend to mistrust experts and authority, hierarchists accept risk as long as decisions about such risks are justified by government or experts, while fatalists are quite indifferent (they try not to know or worry about situations they think they cannot change). However, these factors have subsequently been found not to make a large contribution in risk perception[59].

Personality

As yet, many personality factors have not been assessed in relation to the success of risk communication; for example, an inherent willingness to take risks, feeling of vulnerability or future orientation. Some research has been carried out in relation to self-esteem and self-efficacy. For individuals with high self-esteem the idea that they are engaging in unhealthy behaviour may be more unacceptable than it would be to those with low self-esteem and may evoke a defensive response and rejection of the message. Those individuals with low self-efficacy may fail to act if they feel that they can do little about a health risk[60,61].

Psychological factors

From a psychological perspective, individuals utilise various mental coping strategies to process complex risk information[62–64]. These cognitive processes for making quick assessments are often known as heuristics. Some examples are availability, anchoring and confidence or optimistic bias. 'Availability' means that an individual may have experienced the effects of a risk, or been exposed to images in television for examples, which means that it is easy to imagine. 'Anchoring' refers to an initial known risk perception or estimate; like a first impression, it is hard to move an individual from this point of view. 'Optimistic bias', means that individuals tend to believe they are less likely than others to experience harm[65].

How optimistic bias applies to food has been examined in some recent studies, although not extensively[66–68]. The studies have shown that individuals tend to show self-favouring biases for behavioural risk factors instrumental in the occurrence of health problems; for example, one study has indicated that individuals claim to eat less high-fat foods compared with the average individual[69]. It is suggested that these findings may help explain why nutritional messages fail; they fail because while individuals may accept the general validity of these messages, they may also deem them applicable to other individuals who eat more of the 'risky' food than they do.

Risk communication and behaviour change

Given the variety of factors influencing all aspects of the chain of communication between the messenger and the receiver of the risk information, the question remains 'can risk communication affect behaviour change'. To a greater or lesser extent, this question is posed by every behaviour-change intervention reported in the literature (for an extensive review, see Gerrard *et al.*[70]). Certainly, there is evidence that campaigns that communicate health risk have been associated with behaviour change in relation to major public health and safety issues such as population smoking levels, seatbelt wearing, sexual health behaviour in gay populations following information campaigns about HIV and AIDS and reduction in dietary fat intakes in the USA. What is not known at this stage is whether targeting risk information based on risk-perception segmentation outlined in the present paper can increase the effectiveness of the messages.

Conclusion

The complexities in food risk perception and communication outlined here represent only some of the challenges facing risk researchers today. Understanding these issues is important for public health policy makers and risk communicators as well as for the food industry. If individuals do systematically misperceive food risks and this misperception has both health and economic consequences, then addressing this issue is key. Future research on food risk perception must look to frontier methods of social science to disentangle causal processes linking perception, communication and behaviour. This approach will ensure that future risk communications programmes are both evidence-based and effective.

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