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Research report

Perceptions of food risk management among key stakeholders: Results from a cross-European study

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Abstract

In designing and implementing appropriate food risk management strategies, it is important to examine how key stakeholders perceive both the practice and effectiveness of food risk management. The objective of this study is to identify similarities and differences in perceptions of, and attitudes to, food risk management practices held by *consumers* and *experts* with an interest in food safety. Focus groups were conducted in five European countries chosen for their (hypothesised) cultural differences in attitudes towards risk: Denmark, Germany, Greece, Slovenia and the UK. Content analysis was carried out on the resulting texts and (sub) categories were identified within the analysis framework to facilitate the capture of emerging themes. Five key themes were identified as common to the perceptions of *both* consumers and experts, although these are not represented in the same way by both groups. These key themes are: (1) efforts made by the responsible authorities to manage food risks; (2) responsibility for prevention and management of food risks; (3) how priorities are established within regulatory systems; (4) scientific progress and its implications for food risk management; and (5) media attention and food safety incidents. Although some similarities emerged between the groups, differences were also identified. For example, experts appeared to be highly negative about media influences, whereas consumers appeared more indifferent about media influences and motives. These different perspectives need to be addressed in order to reduce the perceptual distance between key stakeholders, and in particular, to enhance consumer confidence in the food risk management system. Based on the study findings, recommendations for food risk management policies are outlined.
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Introduction

The risk analysis process consists of three main components: risk assessment, risk management and risk communication (FAO/WHO, 1996). Risk *management* focuses on political and societal aspects of risk analysis, in theory taking into account issues such as risk acceptability and risk mitigation. The primary goal of food risk management is to protect public health by controlling food risks as effectively as possible through the selection and implementation of appropriate measures (FAO/WHO, 1997). In addition to protecting public health through regulation, it is within the remit of risk managers to consider the various legal, political, social and economic issues. Implicitly and explicitly, food risk management practices and their consequences will ultimately impact upon public health, as well as on public confidence in food safety and food security. Indeed, increasing consumer concerns and media attention about food safety have

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contributed to the formation of independent food safety agencies in many countries (Vos and Wendler, 2006).

Although various factors determining consumers' food risk *perception* have been reported in a number of studies over recent decades (e.g. Boholm, 1998; Hansen, Holm, Frewer, & Sandøe, 2003), little attention has been paid to consumers' perceptions and understanding of how food risks are *managed* (Frewer, 2004; Houghton et al., submitted). Moreover, although it is generally believed that experts think about food risks differently from members of the public (Slovic, 1987, 1992), the implications for food risk management practices have not been subject to empirical research. The aim of this study is to understand how food risk management practices are perceived among various relevant stakeholder groups with an interest in food safety (i.e. consumers, food risk assessors, food risk managers and food safety scientists).

This paper begins with a discussion of previous research on consumer and expert views on food risk and food risk management practices. It then describes the research design, which employed focus groups comprising consumers and different types of experts, and is followed by commentary on the analytic approach used. Finally, implications from the results are drawn for optimising future food risk management practices.

Previous research

In designing and implementing appropriate risk analysis (and risk management) strategies, it is important to understand how consumers and experts differ in their risk perceptions (Frewer, 2001; Hansen et al., 2003; Slovic, 1987, 1992). Traditional models of risk analysis have assumed that risk communication follows from risk management, which, in turn, follows from risk assessment. Good risk assessment, risk management, and risk communication practices are needed in order to maintain and increase consumer trust in the safety of food (e.g. Chryssochoidis, Strada, & Krystallis, in press; Frewer, Howard, Hedderley, & Shepherd, 1996). As an integral part of the process of risk analysis, it is important to take the actual concerns of consumers into account when developing both mitigation strategies and risk governance structures. From an economic perspective, society may benefit through reduction of the substantial economic costs associated with the occurrence of a food safety crisis. Potential consequences of such a crisis include the destruction of animals used for food production, product recalls, and the managerial costs associated with tracking the origin of a product and establishing all potential contamination. In addition, when consumers consider consumption of particular food products to be risky, they may (temporarily or permanently) reduce consumption of products in that category, or turn to substitute products (Verbeke, 2001; Verbeke & Van Kenhove, 2002; Verbeke & Viaene, 1999). Ethical concerns as well as economic considerations may also be an important outcome of a

food safety incident (consider, for example, concerns about the destruction of animals associated with Bovine Spongiform Encephalopathy (BSE) crisis).

Slovic and colleagues (see, for example, Slovic, 1987; Slovic, Fischoff, & Lichtenstein, 1982) conducted much of the seminal research on risk perception. By application of the 'psychometric paradigm', it has been found that lay people are not only influenced in their assessment of the risk of potential hazards by technical estimates (which are the basis for formal risk assessments), but also by psychological factors, such as whether they perceive that they are involuntarily exposed to a hazard, or the extent to which they believe a particular hazard is potentially catastrophic and uncontrollable (for example, Fischhoff, Slovic, Lichtenstein, Read, & Combs, 1978). The psychometric approach has been used to study perceptions of food hazards, yielding (generally) similar results to other hazard types (e.g. Fife-Schaw & Rowe, 1996, 2000; Sparks & Shepherd, 1994).

Building on these pioneering studies, which focus on public perceptions of risk, a body of research has examined consumer perceptions of both risk and benefit associated with different food hazards (see, for example, Saba and Messina, 2003; Siegrist and Cvetkovich, 2000). In addition, many studies have focused on consumer views of emerging food technologies such as genetically modified foods (see, for example, Bredahl, 2001; Frewer, Scholderer, & Bredahl, 2003; Grunert et al., 2001; Siegrist, 2000). One conclusion from this research is that *values* represent a central component of consumer decision making (for example, the extent to which an individual perceives that a processing technology has a negative impact on the integrity of nature). Other studies have focused on risks associated with lifestyle, such as inappropriate dietary choices (see, for example, Brug, Lechner, & De Vries, 1995; Dibsdall, Lambert, & Frewer, 2002), and risks associated with micro-organisms (Redmond & Griffith, 2004), pesticides and natural toxins (see, for example, Gordon, 2003; Williams & Hammitt, 2001). The focus of this research has tended towards an examination of the interrelationships between perceptions of risk, benefit, and trust, and how these relate to consumer attitudes towards specific food risks, as well as food risk management practices more generally.

Various studies have found that public perceptions of risks, including food risks, differ from perceptions of 'experts'. Specifically, the public perceives risks associated with various hazards (e.g. toxicological, nuclear) as greater than do experts in these fields (see, for example, Slovic, 1992, but cf. Rowe & Wright, 2001, for a methodological critique). There is also some limited evidence that experts perceives risks in a qualitatively (as opposed to a quantitatively) different manner to non-experts (e.g. Jensen, Lassen, Robinson, & Sandoe, 2005). The reasons for these differences are likely to be various. For example, it may be that experts accept risks as a systemic part of complex systems, such as the food supply chain. Various

external factors, such as environmental pollution, food quality, and unintended negative effects of ingredients (for example, allergic reactions) might contribute to expert perceptions of food risk. Independent of this, there appears to be an underpinning belief that the negative consequences of any hazard can be avoided by effective risk management strategies (Renn, 1998; Wiedemann & Femers, 1993). Experts might also believe in the rationality of arguments, facts and science, arguing that science in itself provides an adequate strategy to control risks. Against this, consumers tend to utilise factors such as (dis)trust in social actors, credibility of risk regulators, and the perceived controllability of risks (both in terms of their own exposure to them, and by regulatory authorities more generally), along with their own abilities and self responsibilities (e.g. De Boer, McCarthy, Brennan, Kelly, & Ritson, 2005). Finally, there is, arguably, a change in the role of experts and scientists as final arbiters of food safety policy within society, given recent changes in the extent to which broader societal values are being incorporated into the risk analysis framework (see, for example, Frewer & Salter, 2003).

Research into public trust and distrust in the risk arena has focused both on trust in information sources, and in regulatory institutions. At the individual level, trust helps people to reduce concerns about risk uncertainty to an acceptable level, and to simplify decisions involving a large amount of information (Savadori et al., 2004). McComas and Trumbo (2001) provide an overview of research that has attempted to develop methods to assess the drivers of trust and distrust in risk information sources. Typically, research in risk communication has theorised that trust and credibility are multi-dimensional. In general terms these dimensions are comprised of items assessing different information source characteristics, such as the extent to which the source is perceived to possess knowledge and expertise, is open and honest with the information it provides to the public, and is primarily concerned about public welfare (see Chryssochoidis et al., in press; also Kasperson, Golding, & Tuler, 1992; Peters, Covello, & McCallum, 1997). Alternative approaches to understanding the drivers of trust and distrust have employed combined qualitative and quantitative methodologies to generate respondent (rather than experimenter) generated credibility constructs (Frewer et al., 1996). In this research, truthfulness, honesty and concern for public welfare were related to trust, but distrust was related to concern about the motives of the information sources in providing information to the public. There is an extensive literature on how best to involve the public in the decision-making about risk management (for example, see Rowe & Frewer, 2005), though the effects of public participation on public trust are presently unclear and there is a need for evaluation of how such exercises are conducted and how they impact on policy development (e.g. Renn, Webler, & Johnson, 1991; Renn, Webler, & Wiedemann, 1995; Rowe & Frewer, 2000).

To summarise, previous research has offered valuable results on how people perceive a variety of food risks, and on how experts and consumers differ in their understandings and perceptions of different hazards. Research has also focused on which factors underpin trust in risk managers, as well as risk information sources. What has not yet been examined is how people perceive the way food risks are managed, and the factors that underpin the societal acceptability or otherwise of different food risk management strategies and mitigation practices. In this paper we attempt to address this issue by looking at how food risk management practices and their effectiveness are perceived by various different stakeholders.

Methods

The objective of this study was to use qualitative methodologies to identify the key factors that influence how people think about food risk management. Given that the research is exploratory in nature, it was decided not to impose a theoretical model or framework on the data acquisition and analysis. The intention was not to test a particular theoretical perspective, but to examine a relatively under-researched area and to begin the process of developing a model of the factors driving consumer confidence in food safety—a process that will be continued in the quantitative phase of this research in the future.

The present study uses focus groups to examine similarities and differences in perceptions about the practice and effectiveness of food risk management across consumer and expert groups. Focus groups generally involve carefully planned discussions with seven to ten people, developed to reveal participants' viewpoints on a topic. The distinctive characteristic of focus groups is the explicit use of the *group interaction* to collect data and insights that might be less accessible without the interaction found in a group. In addition, because of their participant-defined nature, focus groups are explorative and open to themes not anticipated by the researcher (Calder, 1977; Krueger, 1994).

In the summer of 2004, exploratory focus groups were conducted with consumers in Denmark, Germany, Greece and the United Kingdom to gain an understanding of consumer perceptions of the effectiveness of current food risk management practices and to test and refine the methods to be used in the present study. The results of these initial consumer focus groups are reported elsewhere (Houghton, Van Kleef, Rowe, & Frewer, in press). Based on the results of the exploratory study, the design of the main study was improved. Focus groups were held in October and November 2004 in each of five EU countries: Denmark, Germany, Greece, Slovenia and the UK. These countries were selected using Hofstede values (Hofstede 1991), in order to facilitate the identification of countries that are culturally differentiated in terms of uncertainty avoidance and risk-taking aversion. According to Hofstede values, consumers in *Denmark* might be expected to exhibit

low levels of uncertainty avoidance, and have a "risk adverse" cultural identity. Consumers in the *United Kingdom* are associated with low levels of uncertainty avoidance and a "risk-taking" cultural identity. *Greece* is associated with high levels of uncertainty avoidance in conjunction with a "risk-taking" cultural identity; *Slovenian* cultural identities are associated high levels of uncertainty avoidance and with a low power distance, whereas *Germany* is relatively undifferentiated in terms of uncertainty avoidance and cultural identity.

Participants

A total of 46 consumers participated in five focus group discussions. These were conducted in Denmark ($n = 10$), Germany ($n = 10$), Greece ($n = 10$), Slovenia ($n = 7$) and the UK ($n = 9$). Participating consumers were recruited using convenience sampling methods, although efforts were made to recruit diverse groups based on age, educational levels and life cycle stage. Consumers with a background in food safety were excluded from selection.

Table 1 lists the consumer participants' demographic characteristics. These socio-demographic data reflected a social bias, but as the main unit of analysis is the pool of arguments and not individual characteristics, such bias can be tolerated. The mean age of participants ranged from 40 years in Slovenia (range 26–54) to 48 in Germany (range 27–64). Some 54% percent of the participants were male. Participants were generally average to well-educated, with a majority having completed at least a lower level of secondary education or a second stage of basic education.

A total of 62 experts participated in fifteen focus group discussions (it was intended to hold three group discussions in each participating country, although in the end there were two focus groups in Germany, four in Slovenia, and three in the other countries). As WHO distinguishes between the role of risk assessors and risk managers, the groups within each country generally separated food risk assessors and food risk managers into separate focus groups. In addition, a group with food safety scientists was held in each country. The rationale for selecting these categories of expert participants was to ensure a representation of experts from across the food risk analysis process. Although the expert participants came from a wide range of backgrounds, including research institutes, regulatory bodies and the food industry, the distribution of experts

Table 1
Consumer focus group demographics

	Denmark ($n = 10$)	Greece ($n = 10$)	UK ($n = 9$)	Germany ($n = 10$)	Slovenia ($n = 7$)
Age (years)					
Mean (range)	43 (25–64)	44 (22–65)	43 (36–62)	48 (27–64)	40 (26–54)
Gender					
Male	5	4	4	8	4
Female	5	6	5	2	3
Number of persons in household					
1	2	2	1	3	3
2 or more	8	8	8	7	4
Children (younger than 12 years old) in household					
No	7	7	5	8	5
Yes	3	3	4	2	2
Living situation					
City	5	5	2	8	4
Town	4	5	3	2	2
Countryside/rural district	1	0	4	0	1
Highest level of education					
Primary education or first stage of basic education	1	1	0	0	0
Lower level secondary education or second stage of basic education	5	0	1	3	0
Upper secondary education	0	2	4	1	2
Post-secondary, non tertiary education	3	0	2	3	1
Tertiary education (first or second stage)	1	7	2	3	4
Personal situation					
In paid work	6	4	6	6	7
Students/in education	2	3	1	0	0
Unemployed	0	0	1	1	0
retired	1	1	1	2	0
Doing housework	0	2	0	1	0
Other	1	0	0	0	0

Table 2
Participants of expert focus groups

Expert group	Denmark		Germany		Greece		Slovenia		United Kingdom		Total
	Participants	Employment	Participants	Employment	Participants	Employment	Participants	Employment	Participants	Employment	
Food risk assessors	4	Research institute (3), consumer/patient representative association (1)	4	Food industry (2), regulatory body (1), consumer association (1)	5	Food industry (5)	4	Consumer representative body (1), university (1), food industry (2)	5	Regulatory body (2), certification body (1), hygiene training company/HACCP training (2)	22
Food safety scientists	4	University (4)	5	University (3), research institute (2)	5	University (4), research institute (1)	3	Food industry (2), research institute (1)	5	Research institute (4), food industry (1)	22
Food risk manager	3	Regulatory body (2), research institute (1)	No separate focus group	—	7	Ministry (1), inspection organisation (5), consumer association (1)	6[a]	Food industry (5), university (1)	2	Consumer representative body (1), regulatory body (1)	18
Total	11		9		17		13		12		62

[a]Six participants resulting from two focus group sessions (each with three participants).

over these backgrounds is slightly uneven. All expert participants had at least two years' work experience in their particular field. Table 2 provides an overview of the composition of the expert focus groups. Recruitment and data collection for the Slovenian focus groups (both consumer and expert) was carried out by a local commercial market research agency.

Procedures

The focus group discussions were run according to a protocol to facilitate semi-structured data collection. The protocol was similar for both consumer and expert groups, with the exception of one task (see Table 3).

Firstly, participants were asked briefly to introduce themselves to other members of the focus group. A free association task followed to "warm up" participants. They were asked individually to write down all the words or short phrases that came to mind when considering 'How consumers are protected from food risks'. Next, a ranking technique was applied to stimulate group discussion. Participants were asked to prioritise a set of food risks according to how well managed they perceived these to be by the responsible authorities. Participants made their individual rankings based on show cards, which each included descriptions of the different food risks (see Table 3). Participants were then asked to explain their reasons for making these rankings in the group discussion. They were also asked if they felt that any of the risks should be managed differently and, if so, how.

In the next phase of the focus groups, consumer and expert participants were given different tasks (see Table 3 for a detailed overview of the interview protocol). Consumers were asked to evaluate the *trustworthiness* of various actors involved in food safety management. Experts were requested to indicate the degree to which they agree with a set of eight consumer statements regarding *food risk management*. These statements (Table 4) were taken from the exploratory study conducted in summer 2004 (Houghton et al., in press) and were chosen to represent commonly expressed consumer concerns about food risk management. The statements were not specific to a particular country and were presented in such a way that the source was anonymised.

The focus group discussions lasted approximately 2 h. They were moderated by members of the research team and, in the case of Slovenia, by a representative of a market research agency. Following the discussion, each participant completed a background questionnaire and received a small present for their participation. The focus group sessions were audio-taped and transcribed *verbatim*. Danish, German, Greek and Slovenian focus group discussions were translated into English before further analysis was conducted.

Data analysis

Focus group transcripts were analysed using a comparative approach focusing on the differences and similarities

Table 3
Protocols for the conduct of the consumer and expert focus groups

Domain	Probing procedure	Sample question
Both experts and consumers		
Word association task	Participants are requested to write down individually all words or sentences that come to mind when thinking of the following: *how consumers are protected from food risks.*	What does this sentence mean to you? What do you associate with this sentence?
How well are food risks managed?	List of risks[a] is presented on show cards. Participants rank cards individually according to how well they are managed by responsible authorities. Participants are probed for the type of dimensions used for the ranking in a plenary debate.	Which food risk is best managed by the responsible authorities? Which is next best managed? And so on!
Manageability of food risks	Based on the above ranking, participants are asked to indicate the manageability of the list of risks in plenary debate.	Do you think any of these food risks should be managed differently? Which one and how?
Experts		
Response to consumer statements about food risk management perceptions	List of 8 consumer statements[b] is presented on show cards. Participants rank cards individually, according to the degree to which they agree with consumer opinion expressed on show cards. Participants are probed for the type of dimensions used for the ranking in plenary debate.	Which statement do you agree with the most? Which is second?
Consumers		
Trustworthiness of food risk managers	List of actors[c] is presented on show cards. Participants rank cards individually, according to trustworthiness with regard to providing information and handling food safety issues. Participants are probed for the type of dimensions used for the ranking in a plenary debate.	Which group/actor do you trust to handle food safety issues the best/worst?
Both experts and consumers		
Food safety issues not discussed	Spontaneously	Are there any food safety issues that we have not asked about?

[a]Risks included: pesticide residues on food, natural toxins (e.g. poisonous mushrooms), genetically modified food crops (e.g. genetically modified maize), mad cow disease, food allergy, inappropriate dietary choice (e.g. too much sugar, fat or alcohol), and a food poisoning outbreak.

[b]Consumer statements can be found in Table 4.

[c]Actors included (stated in general terms): The European Commission, the food industry, food retailers, a consumer representative organisation, a scientist working for a university, a scientist working for industry, a national ministry responsible for food safety, and farmers.

between the perceptions of food risk management in the consumer and expert groups. To facilitate the comparison between groups, the research team developed an over-arching, exclusive and exhaustive set of codes. Categories of codes were established following an emergent coding procedure (Stemler, 2001), based on preliminary examination of the data by all researchers. Subsequently, initial coding schemes were developed and compared across research teams. Differences were resolved and coding schemes were adjusted. This procedure was repeated until all coders agreed on a coding scheme, containing respectively 95 and 51 codes for the consumer and expert focus groups. The English transcripts were coded with the agreed scheme by a researcher from the country in which the group discussion was held. English transcripts were analysed using Atlas, a software package that facilitates many of the activities involved in textual content analysis.

To make valid inferences from the transcripts, it is important that the coding procedure is reliable in the sense of being consistent. Rater-bias was minimised by employing two coders (one national and one cross-national coder) on all transcripts. The percentage agreement among the two coders was calculated. The two coders discussed differences in coding until agreement was reached. The average percentage agreement between coders ranged from 73% to 91%, which indicates good inter-coder reliability (Lombard, Snyder-Duch, & Bracken, 2002). Interpretive analyses were written for each country by the researcher involved. The goal of the coding scheme and subsequent interpretive national analysis was to explore the range of opinions among groups of stakeholder. In the following section participants' perceptions of food risk management and food safety are outlined in order to describe the key views of food risk management practices that are held in common or diverge by consumers and

Table 4
Consumer statements used in focus groups based on exploratory focus groups

Key theme based on exploratory consumer focus groups	Consumer statements
Who is responsible for good risk management? (personal versus structural responsibility)	*McDonalds! That's personal surely? That is pure self regulation. I know the government is trying to interfere with that.*
The use of personal risk management strategies by consumers	*I take food poisoning as a matter of what we do at our home. Our personal hygiene. If we wash the knives after cutting the chicken.*
How extensively can those involved in food risk management intervene?	*Natural toxins in food, they are just there, you can't avoid them.*
How are decisions regarding risk mitigation taken?	*About genetically modified foods: I think the fact is that we truthfully don't really know about it. There's not been enough information on GM crops. There is not enough information to make our mind up. Even governments admit that, even they are not sure.*
Is the motivation of risk managers primarily consumer protection?	*So, I have ranked mad cow disease as being the best under control. And I have put it there because it has to do with export. It does not have very much to do with whether the rest of us get the mad cow disease.*
The issue can/cannot be solved?	*No matter what the authorities do, we are getting more and more fat people in this country.*
Risk variability among the population	*While talking about obesity: Chris did make the point about schools regulating the sort of things that children eat at lunch times. So I suppose to some degree there is a moderate degree of control there.*
Is research being done/inspections carried out? (uncertainty)	*I believe that it is because there is attention paid to the problem constantly that it only pops up once in a while*

experts. Quotes from participants are included to exemplify the results.

Results

One consistent observation that emerged from the focus group analyses was that experts were more homogeneous and consumers more heterogeneous in their opinions. Experts tended to express the same view independent of their cultural origins, whereas consumers tended to differ in opinion across countries. The discussions revealed that *similar opinions* were often held among the three expert groups (food risk managers, food risk assessors, food safety scientists). Moreover, because of their scientific educational backgrounds and overlapping job responsibilities, many participants referred to themselves as being members of all three categories. As a consequence, the results from the three separate groups of experts are integrated in the analysis. As indicated above, consumers appeared more heterogeneous in their views. However, given the relatively small number of consumer focus groups in this study, this finding must be treated with a degree of caution. More systematic analysis of inter-individual and cross-cultural variation is merited in order to confirm the results reported here—and this will be explored in a future paper following a cross-national survey.

Key themes in the perceptions of experts and consumers regarding food risk management

A number of key themes in perceptions of food risk management are shared by both experts and consumers.

This is of interest because, although consumers and experts may have different risk *perceptions* and risk *attitudes*, driven by different analytical and cognitive approaches, they express similar views regarding what is important in food risk *management*. That both consumers and experts found these themes important does not necessarily mean that they have similar views on why these themes are important—as divergent views between consumer and expert participants existed. In other words, although the five key themes identified here are common to the perceptions and beliefs of both experts and consumers, this does not mean that they are represented in exactly the same way by both groups.

At the most general level, the five dominant themes of perceptions of food risk management relate to: (1) perceived efforts made by responsible authorities to manage food risks; (2) responsibility for preventing the occurrence of, and dealing with, food risks; (3) how priorities are set within regulatory systems; (4) scientific progress and its implications for food risk management; and (5) media attention and food safety incidents. Thus, there is evidence that consumers and experts agree to some degree on the factors (technical and societal) that underpin food risk management effectiveness. There is less agreement within the key themes regarding what constitutes best practice. This finding became clear when expert participants responded to consumer statements from previous consumer focus groups that discussed similar issues. There was no universal agreement or disagreement among the expert body with any of the consumer statements. Indeed the experts often agreed with many of the consumer views on food risk management, while acknowledging that the

particular statements did not always give a full conceptualisation of the issue. The views of consumers and experts in relation to each of these key themes are examined in turn below.

Perceived efforts made by responsible authorities to manage risks

Positive views of food risk management among consumers and experts were linked to the perceived efforts made by the responsible authorities to manage risks. These perceived efforts can be related to the following: systems of control, preventive measures, information and education. Experts are more positive about the efficacy of food risk management practices than consumers: a majority within the expert community thought that risk control systems are well-developed and implemented. Experts did, however, have some concerns about current food risk management practices. These include a perceived lack of resources to apply preventive measures to ensure consumer safety, and a concern that insufficient efforts are made by the authorities to track down food risks, including emerging risks.

Systems of control. Where consumers perceive food risks to be well managed, this is often associated with established systems of control of which people are aware, e.g. the mechanisms for controlling a food poisoning outbreak. In particular, it was perceived that the risks addressed by these systems have received a great deal of attention, that control measures are in place to contain the risks, and that these measures are rigorously enforced.

> Generally, as soon as the outbreak is spotted, the media is used to its fullest extent, it is investigated by the Health and Safety Executive or whoever the responsible officers are and it is traced very well. There always seems to be very prompt action. (Consumer—UK)
> I [gave top rank] to food poisoning because I know from gatherings or from youth hostels and others that as soon as the smallest case occurs they are given a good talking to and they control this quite thoroughly I think. (Consumer—Germany)

Expert participants also discussed systems of control. The majority of experts considered existing systems of control to be both sufficient and efficient for containing food risks. In particular, they considered risks with greater human health impacts (e.g. food poisoning, natural toxins, pesticides, BSE) as relatively well managed.

> […] they have legislated and there are limits and there are bans. So a lot has been done, and it is not necessarily because I think there is a problem with GMOs. (Food safety scientist—Denmark)
> BSE is most controlled, because practically all cows are being tested. And every cow that comes to the market is analyzed again.' (Food risk assessor—Slovenia)

Although experts believed hazards to be well managed in general, they also acknowledged that control systems are not always perfect.

> I think that that is an area [food poisoning] that has been controlled well. We still get people being food poisoned, so I mean it's not, none of these systems is perfect, but it is well done. (Food risk assessor—UK)

As might be expected, a more sophisticated elaboration of control mechanisms was demonstrated by the experts. For instance, experts expressed concerns that optimal consumer protection cannot occur if food control systems do not address all stages of the food chain, arguing that problems mostly arise at the beginning (with farmers) and at the end (with consumers) of the food chain.

> For consumer protection we must assure safety for [the] whole production chain, from [the] beginning to the end. But food safety cannot be assured at the beginning and at the end of [the] food production chain. That means that farmers and consumers are the weakest point, as they don't know enough about food safety in practice. (Food safety scientist—Slovenia)

The positive views expressed by experts were often the result of familiarity with food risks and control measures associated with their professional roles. However, they could be less positive if they were talking about risks outside their particular areas of expertise as is illustrated by the quote below from a UK scientist working with genetically modified food crops. Experts also consistently argued that there are hidden food risks that do not get attention as part of the risk management process, and that there are some risks that are not managed or are extremely difficult to manage.

> I've got pesticide residues down as [not well managed] because I think for me personally I think there are still things there to be done. […] I mean it's probably something […] I know less about […] I think that there is more to worry about there than perhaps with some of the GM issues. (Food safety scientist—UK)
> And again I think inappropriate dietary choice is my last thing [ranked bottom]. I don't think it's managed at all. (Food risk assessor—UK)
> […] it is bloody difficult to regulate what people eat. And if the price […] is cheap enough then people eat what they want despite campaigns and whatnot. (Food risk manager—Denmark)

Preventive measures. A recurring theme for both consumers and experts concerned developing *pro-active* measures to prevent large-scale food crises and scandals, instead of adopting a strategy to deal with a problem after it has occurred. In Germany, consumers expressed the view that the instigation of preventive measures is limited by the inability to predict which food risks are likely to occur.

…the best kind of control would be preventive, and not afterwards when some twenty people have to be wheeled into hospital out of an old-people's home. (Consumer—Germany)

Mad Cow Disease is very high on my list. I'll say that, in Denmark really it was Ritt [the minister responsible for food safety]. She gave it a good knock on the head, any chance she had, and did it… with force. Probably too forceful if you ask some people, probably also considering what you could calculate statistically would be sensible, but I think it was good […] psychologically. (Food safety scientist—Denmark)

Greek expert participants extensively discussed the efforts made to manage a risk, in the context of how fast regulations were enforced in relation to BSE (bovine spongiform encephalopathy or 'mad cow disease').The rapid creation of legislative measures, and implementation of these measures, seems to have resulted in positive evaluations of food risk management.

So, I believe that it is a relatively manageable hazard [mad cow disease], taking into account that we know what causes it and you can control it, and the system was rapidly created and the mechanism worked well. (Food safety scientist—Greece)

Other issues raised by the experts in relation to preventive measures included the level of available financial resources and the question of what is practicable.

[…] we don't have enough money for inspection and control, so it's not done as good as it should be. It is done as good as possible, but we don't make enough of them. (Food risk assessor—Slovenia)

Pesticide residues, again the emphasis there has to be on testing. But, of course, you know, you can only test so much. It's only practicable to do so much. (Food risk assessor—UK)

Information and education. The level of available information and the perceived effort put in to educating consumers was also associated with more positive assessments of food risk management among both expert and consumer participants. In Germany, consumer participants perceived labelling on food products as symbolic of the food industry working for the interest of consumers, and consequently, placed less emphasis on being able to understand *all* aspects of the label. Other participants considered labelling as a precondition of consumer choice in relation to food safety. When consumers have the option of taking a qualified decision (even if they do not take up that option) for example by reading an elaborate label on a product, then food risk management is perceived as being good.

I think there's a lot of information out there now, particularly with peanut allergy and I think they've put a

lot of effort in to trying to advise and educate on food allergies. (Consumer—UK)

Some consumers reported experiencing an information "overload" about food safety: in particular, there were claims that information is often inconsistent, confusing and difficult to understand. This was attributed to expert disagreements and changes in opinion (for example, when initial expert claims that a food is certain to be safe are subsequently revised in the light of uncertainties about risk causality or the extent of risk impact).

There's no… uniformity in all of this It's all like you were saying, you're just getting bombarded from all directions with no real facts and I don't think anybody can give you any facts. (Consumer—UK)

Expert participants had similar opinions in so much as they believed that informing consumers is of crucial importance. They also emphasised the quality of provided information:

My criteria [for ranking hazards as well managed] are: first of all, the degree of informing consumers validly, timely and honestly. (Food risk manager—Greece)

I think it's what format information takes, because there's a lot of information out there, but it's not necessarily always in the form that people want. It might not be accessible; it might not be in the right context. (Food risk manager—UK)

Responsibility

Consumer participants indicated that they held concerns over the management of food risks, particularly under circumstances where they believed they had responsibility and ability to deal with food risks themselves. Experts, however, tended to place greater confidence in the efficacy of control agencies. Within the discussion, a variety of opinions were expressed regarding the extent to which consumers, the regulatory authorities or the food industry had responsibility for food risks and the extent to which they could be held accountable for health problems that arose from food risks. The role of self-responsibility in making proper food choices and dealing with risks was strongly emphasised across all groups, particularly with respect to information and education.

That's my job! It's my job to look after my health. No-one else's. (Consumer—UK)

Do we expect others to inform us? To feed us with information? […] we shouldn't wait for the public authorities to give us everything. (Consumer—Greece)

With regards to food allergy and inappropriate dietary choices, the majority of participants agreed that it is the consumer's *personal responsibility* to prevent these risks from occurring. Personally controllable food risks are perceived as voluntary in terms of individual exposure, because they are avoidable by precautionary behaviour. For example, there was consensus that consumers' life styles and food choices can be blamed for obesity. In

contrast, food poisoning, natural toxins and pesticides were considered to be partly a personal responsibility, and partly the responsibility of others, because of a perceived difficulty of having total personal control over exposure to these risks. In general, the more influence one is believed to have in preventing a food risk occurring, the greater is personal responsibility for health protection:

> Food poisoning—you can influence this, but only to a certain extent. (Consumer—Slovenia)
> I expect that I have to live with pesticides. In the wholefood shop it's probably the same. I can't control it personally, I must believe what's written on [the label]. (Consumer—German)

For consumers, responsibility for self-protection was also regarded as necessary because of *scientific uncertainty*, the *influence of economic interests* over food safety measures within the food chain, and *lack of proper information*. For example, German participants found genetically modified foods difficult to manage, because the consequences are currently unknown to scientists and food risk managers. One UK participant felt that she could only really trust food if she grew it herself and that consumers have to battle against all the "powers that be" in order to protect themselves. In Greece there was a strong emphasis on individual responsibility because it was felt that you cannot rely on the state.

> I don't think anybody can give you any facts. I don't think the scientists can actually come up with, you know, they keep making these breakthroughs and discoveries, but I think that's just life, no-one actually knows one hundred percent. We really just have to take it in to our own hands and do the best we can with what we are sort of given. (Consumer—UK)
> [I ranked according to] what people can manage more easily, what they should pay attention to. Because we all know that there is no proper management or prevention on the part of the responsible authorities. (Consumer—Greece)

The majority of expert participants supported the notion that pesticides residues, genetically modified foods and mad cow disease are the responsibility of regulatory institutions. Although inappropriate dietary choice is seen as the responsibility of the consumer, some experts argued that government and industry have a role to play in helping individuals to make healthy choices.

> I think our body is under government's ownership. If we are ill, fat or we have different illnesses this costs our government a lot of money. This is the reason why government should do something. The government should give consumer information and make advertisements about healthy food... (Food safety scientist—Slovenia)
> Obviously it is a government target [reduced intake of sugar, fat and salt], but... I think it's going to have to be

a reduction by the food manufacturers because they have to accept the reality that a lot of people eat manufactured food. (Food risk assessor—UK)

Experts were more inclined to emphasise the importance of everyone in the food chain taking responsibility and understanding what role they play in food risk management.

> [...] self responsibility is not only a task for consumers, it is a task for all actors in the food markets. (Food risk manager—Germany)
> They [consumers] do have to have education of what their part is, but other people have to understand, everybody in the chain has to understand what is going on and what their parts are. (Food safety scientist—UK)

Food choice was perceived to be a personal issue. That experts and consumers showed broad agreement on this issue was demonstrated in the stage in which experts commented on selected consumer quotes: experts tended to agree with the consumer view that individuals should be free to choose what foods they wish to eat, including fast food. There was some disagreement as to whether the government was attempting to interfere or indeed whether the government should interfere in this particular instance. However, the experts felt that it was important for consumers to be aware of what they are eating.

> I mean the writing is on the wall in the menu isn't it? I don't know whether the government have to do anything. [...] you need to know what's in your food and you make that personal choice. (Food risk assessor—UK)
> [...] I see the problem as information. People are not informed about what kind of food they eat at McDonalds. (Food safety scientist—Slovenia)

A number of experts felt that the government should take more risk management action in the area of nutrition, due to the health problems (and costs) that arise as a consequence of individuals being overweight.

How priorities are set within regulatory systems

Several discussions raised the issue of how priorities were set in food risk management, specifically whether consumer health protection has priority over other interests, such as the economic interests of the food industry. This view was more prevalent among consumers. In other groups (for example in Denmark) issues were raised regarding the efficient spending of money and whether priorities are set based on scientific grounds. An example is BSE, which, according to some participants, was thought to be over-managed as the risk does not affect many consumers, although high levels of resource were allocated to its management. Some participants (both experts and consumers) argued that the primary motivation of politicians was to protect export markets, indicating that food

risk management is predominantly driven by economic interests.

> So if consumers decide after a scandal [...]' we are not going to buy a certain product for half a year',[...] that is what the industry is afraid of. So they produce a great mess but are interested in very safe food. (Consumer—Germany)
>
> Mad cow disease is absolutely under control and it is connected a little bit with imports. In the context of imports this is a problem worldwide. Because of that it is under control. (Food safety scientist—Slovenia)

Other experts agreed with the view that BSE was well controlled, but disagreed with the premise that this was to do with protecting exports. For these experts, the priority of food risk management is the protection of consumer health.

> I don't actually really agree with it, because I suspect the fact is there is a certain element of it having to do with national health, public health at home, rather than just our ability to export beef. (Food safety scientist—UK)

The issue of interests hampering the application of regulations was discussed in both expert and consumer groups. For example, in the Greek consumer group there was a discussion about farmers and the use of pesticides. Some maintained that farmers needed to be more informed about the impact of pesticides, but there was a feeling that commercial pressures were more likely to dictate farmers' decisions. Similarly, in UK expert groups there was also talk about commercial pressures getting in way of application of food hygiene regulations:

> What can education offer, when profit is involved? (Consumer—Greece)
>
> I get the feeling from them [farmers] that they do have some concern, but they are constrained by the laws and regulations and by these other bodies, the food retailers and the food industry. (Consumer—UK)

When stating that he felt that not enough was done to manage GM food crops, one of the UK scientists also indicated that there was probably not a lot that could be done to stop them getting into the food chain, especially if the situation is complicated by the influence of economic or political interests.

> Whereas GMOs, I don't think they are regulated enough. Because we grew a GMO crop, or we did, and GMO foodstuff is getting into the food chain now, from the States anyway in soya and all the rest of it, has been for years and, you know, it's well nigh impossible for them to stop GMO foods getting into the UK food industry. So there's been a bit of blind eye. ... (Food safety scientist—UK)

In discussions about the importance of food safety education of consumers, Greek consumers argued that even if this is operationalised, consumer interests may be of less importance compared to the economic interests of the food industry.

> I don't think that anything is managed effectively. Even if there is information, when there are interests and thoughts about interests and money, none of these [food risks] will be managed. (Consumer—Greece)

Participants in the UK consumer group mentioned that they thought food safety risk management was influenced by a recent increase in litigation culture. According to them, this manifests itself in a tendency for the authorities to over-manage certain risks in a way that is perceived as not helpful or as "going too far". The litigation culture is also seen to contribute to a lack of uniformity in approach to food safety management by different actors involved in food risk management. This leads to increased confusion and frustration for consumers:

> But if you look at food labelling, they seem to slap the label "could be traces of peanut" literally on anything. If you go round the supermarket, if I was to do a weekly shop there, it would be very difficult. [My son] would starve for the week, unless I use totally natural products. But if anything, it's back to the litigation thing, we will just put it on regardless. (Consumer—UK)

Scientific progress and its implications for risk management

Consumers discussed science, scientific progress, and uncertainty. Experts' discussions also focused on these issues, but their comments were more elaborate as a consequence of their specific expertise.

The notion of scientific advances solving some problems while creating others was mentioned by consumers. In addition, progress in science was seen as allowing more problems to be uncovered:

> The whole situation is a vicious circle. In other words, we try to repair the damage we caused earlier and we create a new gap, a new problem and a new hazard. And this is unsettling on the one hand. I cannot be optimistic, since I hear that USA or any other country doesn't sign agreements on reducing this or the other thing. (Consumer—Greece)
>
> What we mustn't forget is that every year [...] science gets better and better and better and every year they can find more things. And that is confusing. Not only is it keeping us alive longer, but that's finding more problems than what we've had before. (Consumer—UK)

Greek consumer participants argued that scientific knowledge and progress can be considered as factors positively influencing the whole risk management system. Similarly, German consumers argued identification of new risks are a normal, but manageable, consequence of scientific progress. Several expert participants argued that uncertainty regarding the various food risks still exists as a consequence of incomplete knowledge of risk assessment, which

has resulted in poor risk management. Scientific uncertainty emerged in discussions related to microbiological risks, food additives, hormones in food, food allergies and genetically modified foods. Different types of 'uncertainty' were identified. For example, there is often a time span between exposure to risks and the associated negative health consequences resulting in future health problems that are unknown today:

> Salmonella can infect us and that is short-term consequence of eating bad food but after a few years it can cause cancer. It's hard to tell. (Food safety scientist—Slovenia)

> For example, I ranked both mad cow disease and genetically modified food products at a relatively lower rank, because it is very difficult to find out exactly what goes on. Possibly, some things have been proven about mad cows, but regarding genetically modified foods we are far from our target. (Food risk assessor—Greece)

Experts furthermore argued that there are still questions to be answered in the area of genetically modified food crops and that not enough information has been made available.

> There's not enough information. The debate is wide open and…it continues to be so. (Food risk assessor—UK)

One Slovenian food safety scientist argued that people are not yet aware of the existing uncertainty regarding the risks of microbes:

> We must know what safety is and what it isn't. But I must say that we don't know yet what happens with microbes when we eat them. We know the ingredients we put in the food, but we don't know how risky they are when you eat them. The problem is when you feel sick and there is no cure. This could be dangerous and not under control…I think people don't realize this. (Food safety scientist—Slovenia)

Variability of risks (as a consequence, for example, of population heterogeneity) was mentioned as not being acknowledged in food risk management. For example, one food risk manager mentioned that genetically modified foods can cause food allergies, but that the effect depends on the consumer and his/her sensitivity to allergens. One food risk assessor identified children as being at high risk for overexposure to additives and chemical substances of food. The difficulties of formulating control measures in the light of risk variability was also highlighted, for example setting standards or limits that allow for differences in susceptibility among individuals or for the increased vulnerability of some social groups (e.g. children, the elderly).

> Nobody tells us that we should not drink water, eat frankfurter sausage, eat salad or rucola on the same day… And when we sum all additives and chemicals together and considering that we have a child that weighs 15 kg and eats all that, then we know that he already exceeded that dose. (Food risk assessor—Slovenia)

> It's really hard to get… where the balance is, [because] you try to make it safer so the odd one or two don't die, but there's a whole continuum (Food safety scientist—UK)

> What's safe in the general population, might not be safe in an old people's home… (Food safety scientist—UK)

Some experts did emphasise the importance of risk messages targeted to specific population groups and the importance of protecting vulnerable groups.

> I think we've got a much better chance if we can get the right message across to the children, then they are going to have that for life. (Food safety scientist—UK)

> I disagree with the statement about children at school […]. But I am influenced by the fact that a population group that is completely unprotected and uninformed is offered food over which it has no control. […] So we should try to protect a group of people who still don't have the ability or the knowledge to choose. (Food risk assessor—Greece)

In Greece, risk-related criteria were discussed with regard to the probability of occurrence, severity of the risk, and the nature of its consequences. In addition, the complexity and 'newness' of food risks was discussed in relation to management:

> I continued my ranking based on the degree of infrastructure and scientific knowledge and I ended up in the complexity of the problem. For example, allergies are an extremely complex problem. (Food risk manager—Greece)

An issue discussed by UK expert participants was whether food risk management has "gone too far" in some areas of consumer protection and, as a consequence, is preventing the development of natural immunity. Similarly, one Slovenian scientist discussed whether children who are exposed to a variety of foods and natural toxins will strengthen their immune systems:

> Natural toxins in the food—if you know them you can avoid them. Sometimes we must eat different things that we don't get too sterile. This is important for kids that they don't get ill too soon. (Food safety scientist—Slovenia)

> I actually do worry…because food is now, processed food is now so biosecure, it's very well managed all the way through. […] But has that affected people's immune systems where, you know, it's like a traditional system isn't it, where you were being protected as well as being infected? (Food safety scientist—UK)

Media attention and food safety incidents

The issue of media attention has both positive and negative associations with food risk management.

Specifically, a belief was expressed by both experts and consumers that whether a food risk is well or poorly managed is related to the amount of media attention it attracts. A positive effect of media attention may be an increased consumer perception that there is institutional attention focused on food safety matters. A negative effect may be the provision of information about what went wrong in terms of food safety management practices. In relation to retailers, consumers argued that these cannot afford bad publicity, and so developed good food risk management practices. Finally, several consumer participants argued that the media itself cannot be blamed for focusing on bad news. They recognised that 'heavy' science stories will not sell newspapers as consumers are not interested in reading these, and that the primary aim of the media is to make money and not to protect consumers.

> […] I thought, well, the thing… handled best is also what has been in the media. (Consumer—Denmark)

> I personally think they [retailers] do try and protect their good name. They do jump on anything they know what's wrong. They are very, very wary of adverse publicity. (Consumer—UK)

In contrast, although both consumers and experts regard the media as being instrumental in communicating about food safety, only experts attribute the media with being solely culpable for producing a food scare or food crisis. Across all the expert groups, media attention to food risks was perceived to have considerable influence on how consumers think about food safety. The media was believed by experts to alarm consumers by focussing on negative rather than positive news events, and by presenting conflicting expert views. Moreover, there was a perception that there is a tendency for food risk issues to become a particular focus of attention for a period of time and then to fade away from the media, with a consequence that consumers think they are no longer pertinent and remain unaware of information provided by the government regarding specific food risks.

> I think it's often things are picked up and will be the focus of a lot of attention at a particular time and then that isn't necessarily followed through either by the government, or the media might lose interest even if the government has put information out… (Food risk manager—UK)

One UK expert discussed the way 'news' is generated in the UK, indicating that other people also have some control over the way the media presents information:

> I think it's quite easy to blame the media. It's not necessarily always the media's fault because they pick up on press releases that are put out by various researchers that are obviously wanting publicity. […] It's often very easy to say "oh the media scare monger" when other people have some control over the way the media

presents that information as well. (Food risk manager—UK)

Consumers' perception of the trustworthiness of food safety managers

Consumers were asked to rank order a list of eight food risk managers in terms of their trustworthiness in handling food safety issues. Participants tended to rank consumer representative organisations and scientists working for universities as the two must trusted actors. Actors that the participants considered less trustworthy included the *European Commission, scientists working for industry, food retailers* and the *food industry*. Although the ranking task was considered to be difficult, it drew a variety of responses, which are discussed below.

Value similarity. Participants perceived food risk managers to be more trustworthy if they come from a similar background to consumers, or are identified as having similar interests or values to those held by consumers (for example the consumer association). For example, one participant from the United Kingdom said '*They [consumer organisations] do have the consumers' interests at heart*'. Economic interests and motives are the primary reasons for distrust, in the sense that actors who have economic interests in food production will be more concerned with profits than with food safety. When they do instigate protective measures it is only because they are required to do so by law and as a result, they will only do the minimum necessary:

> So I think consumer organizations must, other things being equal, almost exclusively be driven by consumers' interests and nothing else. Whereas supermarkets are at the very bottom, it's my impression that they definitely are driven 100% by making the money they need to make. (Consumer—Denmark)

> They [food industry] are not interested in our health or long term perspectives; it's just instant profit making for them. (Consumer—UK)

In some instances, however, different interests can also work to the benefit of consumer protection. Even if it is not the primary concern of different food chain actors, they want to avoid adverse publicity that might damage their reputation (and thus erode profits), or minimise the chances of legal action being taken against them.

> […] it's all about making money, but bad publicity isn't good for profit and therefore I think I've gained a little more trust because they [retailers] have become scared. Particularly when there's been so many gunpoint journalistic features. (Consumer—Denmark)

Participants perceived the European Commission to be less trustworthy as it has to deal with a diverse range of interests and priorities. German participants argued that there is an important food industry lobby active at this international level and, as a result, the European

Commission does not heed consumer interests. In the Danish group, the EU was not trusted to handle food safety well because it cared for consumers' interests *in general*:

First of all, it is a question of how many member countries' interests must be considered, the dissimilar interests of the different countries. In the debate that has been going on, I often see that the commissioners responsible for the different areas, well, they of course want to take care of their home countries, I have seen that many time, we have seen them do that for so many years, so that the EU commission is the least reliable in my opinion since they have way too many things to consider at the same time. (Consumer—Denmark)

It's got so many countries to cover and you think of the diversity of these countries, how can that one body actually know about each country and its food chain, distribution, production and protecting us. So I have no faith in them at all. (Consumer—UK)

The independence of actors was related to this value similarity, in that independent actors were perceived to be able to offer unbiased opinions regarding food safety matters. This was associated with trustworthiness. Actors who were perceived to be less subject to influences from outside agents or institutions or organisations were regarded as more trustworthy.

Knowledge and expertise of actors. Participants' perceptions of *knowledge and expertise* associated with a specific actor determined the perceived trustworthiness of the actor to a large degree. For example, scientists were perceived to be knowledgeable, unbiased and objective. In relation to 'scientists working for industry', however, this argument was frequently overruled by distrust associated with economic interests.

I ranked industry and scientists first, 1because this is where knowledge exists. (Consumer—Greece)

And these are scientists in food industry. If anyone is bad, they are. Because if anything will go wrong or if they use genetically modified things then they will hide that just to sell more. (Consumer—Slovenia)

Idealism/traditions and social relations with actors. In contrast to responses in other countries, Danish and Slovenian participants argued that some farmers are trustworthy because of their *idealism and traditions*. Farmers are considered to be specialists in food and the short distance between them and the consumers makes them more trustworthy:

On the second place are farmers, where I thought of my boy. I buy salad every Saturday from him, carrots and other vegetables. And I am very sure that his vegetables are good, because they are grown on his farm that is not big. I have been buying food from him for many years

now and I know his food is tested. I trust him. (Consumer—Slovenia)

Power and ability to act. Institutional characteristics such as 'power' and 'ability to act' were perceived as another important element of trustworthiness, in the sense that 'knowledge' or 'intentions' can only be displayed if there is a real ability to act.

[Moderator: I find it surprising that you trust ministries.] No, there is a change here. Ministries are supposed to have the power. [Other participant:] Sure, the minister has the power, but we don't know whether he has the will as well. (Consumer—Greece)

I think they [food retailers] haven't got too much influence but just offer the products which are offered to them. (Consumer—Germany)

Some actors can be regarded as trustworthy, but because of the nature of their work they are not regarded as having much influence on food safety.

I've got industry scientists [ranked] sixth. I trust them, but it's the nature of the research they do. They don't really do food safety research, but they try to get more Sunny D in to Sunny Delight. (Consumer—UK)

Discussion

To our knowledge, the results of the research presented here represent the first systematic analysis of differences in perceptions and concerns raised by experts and consumers regarding the practice of food risk management. The focus groups were exploratory and the results must be interpreted with caution. Nonetheless, some important inferences can be drawn.

There appeared to be some agreement between experts and consumers regarding the *de minimis* requirements for positive evaluations of food risk management practices. Effective food risk management is closely related to whether the authorities develop and maintain systems of control, and communicate with consumers about these systems and how they are performing. Taken together, this implies that there is a societal preference for increased resource allocation to identify and contain emerging food risks. Both consumers and experts stressed that there was a need to provide effective communication about food safety to the public. Given the consumer emphasis on information overload already described, it would seem likely that this information should be carefully targeted to consumer information needs. For example, the general feeling within the expert community is that consumers lack essential knowledge about a variety of food-related risk issues. Hence, experts often stressed that consumer education is necessary. However, over-reliance on increased education and information provision may further increase consumer perception of information 'overload', which could be counterproductive.

Both experts and consumers agree that responsibility for good risk management depends on (1) the nature of the risk itself (for example, whether it is natural or technological in origin), and (2) whether consumers are exposed on an involuntary basis or can exercise personal control over exposure. Some food risks were described as being outside the individual's influence or control (e.g. genetically modified foods, pesticide residues, BSE). Others are amenable to individual control by consumers (e.g. inappropriate food choices, food poisoning and food allergy). This finding is consistent with the well-known results of many psychometric studies on consumer risk perceptions (e.g. Fischoff et al., 1978; Slovic, 1987, 1992). Consumer perceptions of control appear to determine the extent to which they rely on institutional risk management. In policy terms, this may indicate that increased empowerment of consumers in health protection will be of increasing importance, implicating a requirement to better understand consumers' individual information needs.

Consumers in particular expressed some ambivalence regarding the issue of scientific and technological progress in the food area. This was because, although progress helps to reduce known food risks, progress may also result in new risks and dangers in food products. Both consumers and experts acknowledged that scientific progress creates new problems by identifying previously unknown risks. Consumers extend this argument to incorporate potential problems associated with the introduction of new food technologies, implying that science is an issue of concern to everyone in society. In addition, variation in response to a risk across populations complicates the potential impact of emerging and existing food risks. Thus, in risk management terms, there is a need to distinguish between systemic risks, shared across populations, and risks that affect only some individuals. In the opinion of both experts and consumers, systemic risks had to be managed by control agencies and regulatory institutions; individual risks had to be managed by individuals, an activity requiring targeted communication. For both kinds of risks the need to communicate information was identified.

Another important issue for consumers is whether food risk managers are primarily motivated by consumer health protection, or whether they are acting to promote their own economic or political interests, or those of other actors in the food chain. This finding mirrors the extensive literature on consumer trust in food safety practices (Frewer et al., 1996; Peters et al., 1997). However, it is also important to note that some consumers perceive specific risks to be over managed (for example, BSE and labelling for some nutritional issues), because of an emerging societal culture of litigation against industry and producers in the event of a food safety problem impacting on consumer health. This seems to imply that more public discussion of the values applied to determining risk acceptability may have a positive impact on consumer confidence related to risk management. There is less recognition of this in the expert community. Experts

also talk about political and economic interests, but on the whole feel that the emphasis in food risk management is on consumer health protection rather than political factors.

Both experts and consumers perceive that the quality of food risk management is influenced by the amount of media attention directed towards a particular food safety issue; insomuch as high levels of media attention can indicate both positive and negative risk management practices. There has been some debate as to whether the media still functions as an 'agenda setter' in the food area. The alternative hypotheses, that the media reflects public discourse about a risk, or that saturation level coverage acts as a heuristic for public concern, also merit consideration (Miller and Reilly, 1995). In general, the media are not highly trusted to provide information on food safety matters by the public compared to some other sources (see for example, Frewer et al., 1996) but are still a primary source of information for many consumers (Verbeke, 2005). There is, however, some evidence that, whilst some consumers actively search institutional sources of information about food safety, others prefer to exploit community networks for food safety information (Kornelis, De Jonge, Frewer, & Dagevos, submitted). Thus the role of the media as the most important and trusted source of food safety information is, in reality, probably overrated by the experts in this analysis.

Several consumer participants indicated that they did not reflect about food safety when purchasing foods. This finding is similar to that from work by Berg et al. (2005), which found that food consumption is largely a matter of routine behaviour or habit. These routines may explain why the safety of foods is taken for granted or is unquestioned by many consumers. If consumers are concerned, they tend to be concerned about the potential personal negative consequences of food risks, and how these could be prevented, either by themselves or other stakeholders and actors in the food chain (Green, Draper, & Dowler, 2003). Furthermore, consumers feel more uncertain and indecisive than experts about what constitutes good practice in food safety management because of the lack of knowledge about what is being done, and the types of values brought to bear on the decision making process by key stakeholders. As a consequence, the food risk management perceptions of consumers are often based on a general feeling or intuition of security or insecurity that is provided by responsible institutions and society more generally.

Experts, in contrast, usually considered food risk management in terms of the effect of hazards on populations, and the role of science in containing the associated riskes. Experts stated repeatedly that food safety requires a greater allocation of resources if consumer protection is to be optimised. In the case of emerging food risks and pro-active prevention, this view was mirrored by consumers. Experts frequently expressed the view that they would like to conduct more research on food risk

assessment, entailing greater institutional resource allocation to this end. They argue that current scientific uncertainties regarding specific risks cause problems during the process of implementing good food risk management. At the same time, experts express the view that the authorities responsible for resource allocation do not acknowledge this need. In some ways, this is not a surprising result, given the current climate that encourages competition for resources between different scientific activities.

An interesting finding emerging from the research is that consumers' perceptions of the trustworthiness of food risk management actors appears to be primarily associated with *value similarity*. Several studies have shown that perceived value similarity is strongly related to attributions of social trust (e.g. Cvetkovich & Löfstedt, 1999; Siegrist, Cvetkovich, & Roth, 2000). In particular, promoting a vested interest, either of the managers themselves, or of other actors in the food chain, will have a negative impact on consumer confidence in risk management. This is consistent with the results of previous research, where it has been demonstrated that perceptions that an institution is actively distorting information to promote a vested interest increases consumer distrust (Chryssochoidis et al., in press; Frewer et al., 1996). For example, Berg et al. (2005) found empirical evidence that consumers' trust in food safety is related to their evaluation of how their national food control authorities perform, as well as to what extent they trust market mechanisms to secure food quality.

It is interesting to note that we could identify differences between consumers and experts in terms of their perceptions of what constitutes good practice in food risk management. However, we could not identify differences in perceptions of different *types* of experts. Whilst experts are not differentiated in terms of perceptions by their interests and job characteristics, consumers are more heterogeneous, and considerable cross-cultural variation has been observed in consumer views across different EU member states. Cross-cultural differences in attitudes were not observed between experts. This would imply that experts are a less heterogeneous group with respect to their views on food safety management practices, and this may imply that there is greater rigidity in the expert community regarding the accommodation of national consumer views regarding optimal risk management practices. This may be a consequence of common educational backgrounds across expert groups, but differing communication practices with consumers across different EU member states.

Implications for risk management

Although the research presented here has indicated that, whilst there are some similarities between consumers and experts regarding what constitutes good practice in food safety management, there are also differences that must be addressed if consumer confidence in risk management is to be developed. Our study may have implications for the development and implementation of new risk management policies. There is a need to integrate societal concerns and values more efficiently into risk assessment and risk management procedures, as well as to optimise risk communication based on this type of knowledge. Failure to do so is one of the causative factors associated with the decline in public confidence in risk assessment and risk management (Frewer, Fischer, Scholderer, & Verbeke, 2005). Proactive communication with relevant end-users, including consumers, about emerging food safety problems, may increase confidence in risk management practices. Proactive communication strategies might also usefully focus on providing information about what is being done to mitigate emerging risks. Consumers also favour greater resource allocation directed towards increasing scientific activities relating to food safety. Indeed, such an activity appears to be a precondition to favourable perceptions of food risk management. Nevertheless, consumers appear to have doubts as to whether food risks can be managed by the authorities alone. For example, inappropriate food choice and corresponding health problems such as obesity are seen as difficult to manage, as the authorities cannot control the healthy or unhealthy food choices of consumers.

In summary, results from our study provide a useful first glance at the range of important societal concerns that need to be accounted for in food risk management. It has to be stressed that focus groups based on small and not representative samples cannot be used as the only empirical evidence to support conclusions (Morgan, 1997). Therefore, results from this study were used to inform the development of a quantitative survey instrument to model the key determinants of consumer confidence in food risk management, which will be reported in a future article.

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