

## CONSUMER PERCEPTIONS OF FOOD SAFETY

**Lynn Frewer, Janneke de Jonge and Ellen van Kleef**

*Wageningen University, The Netherlands*

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### Summary

Understanding consumer responses to various food safety issues is of crucial importance if effective food safety policy and risk communication are to be developed and implemented. This chapter presents an overview of research into consumer perceptions of food safety, and the role of consumer risk psychology in determining risk-related behaviors and best practice in risk communication. Many empirical investigations of consumer perceptions about the safety of food have focused on perceived risk associated with food, food-related hazards, and food technologies. In addition, consumer trust in different actors and institutions responsible for guaranteeing food safety, as well as trust in the information provided by different information sources that communicate about food-related risks, is considered to be important for consumer confidence in the safety of food, as well as consumer evaluation of the efficacy of food risk management practices. In particular, as food chains become global, there is a need to understand cross-cultural differences in consumer risk perceptions and trust in food, and how these influence consumer behaviors. It has become increasingly evident that consumers are making decisions about the acceptability of specific foods and production technologies based on a complex interaction of perceptions of risk and benefit associated with specific food choices. Theoretical advances in the area of social psychology are relevant to the development of effective risk-benefit communication strategies that address communication of risk under conditions of uncertainty, as well as communication specifically targeted at vulnerable groups within the population. Research is urgently needed to further our understanding of the fundamental

mechanisms which determine individual responses to existing and emerging food issues, particularly under circumstances where habit, emotion, and information processing heuristics may have an effect on consumer decision-making. Risk communication and intervention activities aimed at health promotion should be developed that take these issues explicitly into account.

## 1. Introduction

Existing and emerging food risks have been recognized by international organizations, as well as many governments worldwide, as a major problem both in modern (intensive) and in low-input food production systems. Many of these organizations are also responsible for communicating food risks and other safety matters to interested stakeholders, including consumers. Substantial effort and resources have been invested in global, national and regional initiatives (e.g., research, regulation) to improve food safety standards. The series of food safety crises since the 1990's, including Bovine Spongiform Encephalopathy (BSE), dioxin contamination in different food chains, the debate about the effects of acrylamide, and the identification of emerging pathogens such as *E. coli* O157 have evoked broad public concern about the safety of the food and feed chain. One consequence has been the decline in consumer confidence in regulatory activities associated with consumer protection in the agri-food sector.

Consumer 'rankings' of the severity of different risks appear to differ from those provided by individuals with 'technical' skills and knowledge about a specific hazard domain, including that of food risk. For example, experts often wonder why consumers accept relatively high risks from unhealthy food choices, while at the same time they do not tolerate risks that experts may find relatively low, such as contracting Creutzfeldt Jakob Disease (vCJD) from eating beef that has been produced in a country where BSE occurred. Considering that public evaluations of risk and acceptability differ from expert risk judgments, consumer reactions to food-related hazards or new food technologies can not be predicted by relying on technical risk assessments made by experts. Therefore, understanding consumer responses to various food safety issues is of crucial importance if effective food safety policy and risk communication is to be developed and implemented. That is, the behavior of consumers in relation to food safety issues can only be properly predicted if there is systematic understanding of the way in which consumers perceive risks, and benefits, associated with different food safety issues.

As a result of the increasing globalization of the food supply, food safety problems are spreading rapidly beyond single locations to create global problems, and it is at this level that the issues of existing emerging food risks must be discussed. At the present time, an emerging risk which has potential for negative effects is Avian Influenza which, whilst not technically a food risk, may have severe consequences on the efficiency of food production, animal welfare, human health, as well as consumption of poultry and poultry products. In 2006, a Special Eurobarometer study was carried out to examine consumer opinions regarding Avian Influenza. Although the majority of European citizens were not very worried about the health risks posed through the consumption of poultry, eggs and egg-based products, approximately 1 respondent in 5 declared that he/she has reduced her consumption of poultry meat, and 1 out of 8

respondents reported that they had reduced their consumption of eggs and egg-based products. This demonstrates that consumers appear to be risk adverse in terms of their consumption behavior even under conditions where they appear relatively unconcerned about the potential impact of a particular potential hazard.

In the light of cross-national food safety issues, there is an urgent need to understand cross-cultural differences and similarities in risk perception, and how these influence consumer behaviors. In addition, there is a need to develop insights into best practice in risk management and communication targeted *across* and *within* cultures.

Many empirical investigations of consumer perceptions about the safety of food have focused on perceived risk associated with food, food-related hazards, and food technologies. In early studies focused on understanding lay peoples' risk perception, different dimensions of risk were identified. In particular, it was found that factors that are not included in technical risk estimates may influence peoples' perception of risk, such as the extent to which a risk is perceived to be *unnatural*, *dreaded*, or to which an individual perceives exposure to be *involuntary*. These psychological dimensions are excellent predictors of people's responses to potential risks associated with hazards across different hazard domains, including that of food hazards.

Another concept that has been extensively studied in relation to consumer perceptions of food safety, and food risk management in general, is the concept of trust. Consumer trust in different actors and institutions responsible for guaranteeing and controlling food safety, as well as trust in the information provided by different information sources that communicate about food safety or food-related risks, is considered to be important for consumer confidence in the safety of food, as well as consumer evaluation of the efficacy of food risk management practices.

Consumer perceptions of risk and their trust in regulators, and risk information, have been identified as important underlying determinants of consumer acceptance of new food technologies, as well as factors that influence consumer behavior in the context of food safety incidents. That is, the impact of consumer risk perceptions on product consumption and choice, such as brand choice, retail choice, and preferences for distinct product types (e.g., organic products) has attracted considerable attention. For example, research into consumer perceptions of meat indicated that consumers' self-reported meat consumption was related to their perceptions regarding the potential presence of hormones or harmful substances in meat products, and the safety of meat.

In addition to studies focusing on consumer perceptions of food-related hazards in relation to food safety incidents and new food technologies, research in the food area has focused on lifestyle hazards such as inappropriate dietary choices, or microbiological risk associated with food contamination.

Increasingly, individual differences in consumer responses to food hazards, and communication about the associated risks, have been taken into account. For example, risk perceptions, food safety related behaviors, consumer responses to food safety scares, and consumer use of information are dependent on consistent personality characteristics as well as other background variables.

The aims of this chapter are:

- to provide an overview of research into consumer perceptions of food safety, and
- to provide an overview of the role of consumer risk psychology in determining risk-related behaviors and best practice in risk communication

## 2. Consumer Perceptions of Risk

By means of psychometric scaling methods, researchers in the late 1970s initiated research which identified those factors which drive consumers' responses to a variety of hazards associated with lifestyle choices and technological innovation. Slovic and colleagues conducted the influential research that revealed that the public judge risks on different and more criteria than the two classical factors of risk, i.e. level of probability and degree of possible harm. From this research, it was found that the main drivers of public perceptions of risk are the degree to which a hazard is unknown, and the degree of dread experienced by the individual evaluating a particular hazard. The application of the 'psychometric paradigm' to increase understanding of the factors that determine risk perception, inspired many researchers to carry out more detailed research into specific risk issues, such as food-related hazards.

Although the psychometric approach has been utilized to study risk perceptions in a number of countries, the results and implications have been criticized on the basis that the results have not been cross-culturally validated in less developed countries. Other researchers have put forward the criticism that *aggregated* data were the unit of analysis, which did not allow investigation of individual differences. Thus the model neglects potentially important individual differences in risk perception, particularly when considering how to effectively communicate about different hazards, which may also be prone to population level variability in terms of their impact on consumer health and wellbeing. However, many studies have shown that risk perceptions vary between individuals. In order to investigate the dimensionality of public risk perceptions taking into account potential individual differences, research has investigated individual perceptions of hazards across the risk dimensions distinguished by Fischhoff and colleagues in the 1970s. The same two dimensions underlying public risk perceptions (i.e., unknown risk and dread risk) were obtained as in psychometric studies that used aggregated data. However, it was found that the *extent* to which hazards were perceived to be unknown and dreaded was dependent upon individual perceptions.

With respect to individuals' perception of risk, a relevant psychological phenomenon is that of *optimistic bias* or *unreal optimism*. Optimistic bias refers to an individual's judgment that negative events are less likely to happen to the person making the judgment in comparison to the risks experienced by an average member of society. This is because people personally believe that they are at low personal risk from the hazard and 'bad things happen to other people'. Optimistic bias has been observed for a range of food related hazards, but tends to be more pronounced for that which can be

described as ‘lifestyle’ related as opposed to ‘technological’ in origin. For example, in the case of saturated fat consumption, people justify their lower than average personal risk ratings by attributing higher perceived personal control over risk exposure to the hazard, together with increased perceived personal knowledge about the effects of saturated fat consumption on health. As a consequence, it may be difficult to motivate consumers to reduce their fat intake since they perceive that information is directed towards more vulnerable and less knowledgeable members of society.

### 3. Risk and Benefit

#### 3.1. Risk and Benefit Associated with New Food Technologies

Many studies have been conducted on consumer attitudes to emerging food technologies, such as genetically modified foods, food irradiation, or highly technological food processing practices. In the area of food technology, it seems likely that consumer responses are contingent on perceptions of both risk and benefit associated with specific applications. The higher the perceived risk associated with a particular technology or hazard, the less favorable were found to be consumers’ attitudes. For example, research has focused on the trade-offs consumers make between perceived risks and benefits regarding genetic modification applied to mitigating allergies. The attitude of allergic and non-allergic respondents towards applications of genetic modification for allergy prevention was examined for one food application (apple) and two non-food applications (birch, grass). Allergic patients perceived greater ‘benefits’ associated with the birch application compared to non-patients, and the perceived benefits of genetic modification for allergy prevention increased with an increasing impact of allergic complaints on quality of life. However, no differences were found between patients and non-patients for the food application, possibly because the severity of apple allergy is rather low. Thus it appears that the *personal relevance* of a particular benefit associated with a technology application will influence whether a particular consumer perceives the application of a technology to be acceptable.

Research into consumer attitudes to emerging food technologies has further demonstrated that consumer attitudes towards these technologies, and the products of these technologies, do not only include evaluations of the potential personal benefits and health effects, but also take account of moral concerns and beliefs such as *ethical and moral* considerations, and *values* such as *concern about the integrity of nature* played a part in societal and consumer acceptance. The public perception that institutions and industries were pushing the introduction of genetically modified foods in order to protect their own vested interests rather than to support societal benefits did little to alleviate societal concerns. In the future, emerging technologies applied to food production (e.g., nanotechnology), or convergence between different technologies in the agri-food sector (e.g., information and communication technologies, biotechnologies, cognitive sciences and nanotechnologies), may give rise to other public concerns under conditions of increased complexities and uncertainties regarding both risks and benefits associated with food production processes and food products produced by such processes. In response to public concerns, institutions may adopt a precautionary

approach in terms of regulation. An example is that taken by the European Commission to restrict the use of GM crops under conditions of uncertainty about negative environmental consequences, and restrictions in imports of food products that are produced using genetic modification.

### **3.2. The Negative Correlation Between Perceived Risk and Benefit**

There is some evidence that perceived risk and benefit associated with different activities or technologies are negatively correlated. That is, high levels of perceived risk are related to low levels of perceived benefit, and *vice versa*. However, it has been argued that in the *real world*, high levels of risk are only acceptable when they are offset by high perceived levels of benefit. Several theories have been developed and tested to explain the negative relationship between perceived risk and benefit. It has been hypothesized that consumer perceptions of risk and benefit are dependent upon consumer trust in institutions and the industry. For example, when trust in scientists, authorities, and industry was controlled in the analysis, the inverse relationship between perceived risk and perceived benefit associated with different hazards decreased. Although it has been proposed that perceived risk is reduced when the public trust expert knowledge, regulators and risk managers in being able to control risks, other studies indicated that other dimensions of trust, such as care for public welfare of different actors, might overrule perceived competence in influencing risk perceptions and attitudes. In addition, research has indicated that prior attitudes toward hazards or technologies might influence whom the public trusts. For example, if people have a strongly held attitude about a potentially hazardous activity, such as genetic modification of food products, they are more likely to trust a source that provides a message congruent to their attitude, and to distrust a source that provides a dissonant message). This means that trust does not necessarily influence risk perceptions and acceptance of technologies, but that overall attitudes might also steer more specific perceptions of risk and trust. Closely related to this, other researchers have suggested that affective responses to a hazard, or emotion generated by a particular hazard topic, guides perceptions of risk and benefit. Affective responses to an event or object can serve as a mental shortcut when making assessments of risk and benefit. The use of affect in cognitive information processing might be more efficient in terms of mental resource allocation, and easier to use, in comparison to analytic reasoning about benefits and risks, and might particularly be helpful when mental resources are limited. It has been empirically demonstrated that affect comes prior to, and influences, judgments of risk and benefit. The results of the study indicated that, when the opportunity for analytic deliberation was limited, and people had to rely on quick affective judgments, the inverse relationship between risk and benefit perceptions increased. So, under conditions of time pressure, 'low risk, high benefit' evaluations of activities and technologies were more frequently made, in comparison to conditions where time constraints did not apply. In addition, it was found that when people were provided with information about *either* the degree of risk or benefit, subsequent evaluations of both risk and benefit were influenced. That is, information indicating high benefit increased subsequent judgments of benefit, but also reduced perceptions of risk associated with the activity or technology under consideration. The results showed that risks and

benefits are not evaluated independently from each other, and that people make affectively congruent judgments of risk and benefit. The tendency for overall affect to serve as a cue for making judgments has also been called the *affect heuristic*. In addition, others proposed a similar concept, namely the *risk-as-feelings* hypothesis, which postulates that feelings, such as worry, fear, dread, or anxiety influence responses to risky situations. It has also been argued that perceived risk and benefit might be inversely correlated, because people have a need for consistency in beliefs, and as such tend to avoid cognitive dissonance, or conflict between different beliefs held simultaneously. That is, it is cognitively difficult for consumers to perceive high risks and high benefits associated with the *same* hazard simultaneously. Finally, the inverse relationship between risk and benefit judgments might be explained by people producing 'net riskiness' and 'net benefit' judgments, because they do not evaluate risks and benefits independently from each other. This means that when net risk is high, net benefit is low, and *vice versa*.

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### **Biographical Sketches**

**Lynn Frewer** was born in London in 1960. She has a BSc in psychology from the University of Bristol, UK (1981), an MSc in Ergonomics from University College London, UK (1982) and a PhD in applied psychopharmacology from the University of Leeds, UK (1987).

After completing her doctoral studies she obtained a lectureship at the University of Port Moresby in Papua New Guinea. Subsequently she held research posts at the institute of Psychiatry in London and the Institute of food research in Norwich, where she headed the Consumer Science Group. She is currently Professor of Food Safety and Consumer Behaviour at the University of Wageningen in the Netherlands. She has published over 90 referred journal articles and three books in the area of food safety and consumer behaviour, as well as science and society issues associated with risk analysis in the agrifood sector.

Professor Frewer is a chartered member of the British Psychological Society.

**Janneke de Jonge** was born in Boxmeer (The Netherlands) in 1978. She obtained a Master of Science degree in business economics with a specialization in marketing research in 2002 from Tilburg University, The Netherlands.

In 2003, she started her PhD research examining consumer confidence in the safety of food within the

Marketing and Consumer Behaviour group of Wageningen University. She defended her dissertation called 'A monitor for consumer confidence in the safety of food' in 2008. Since 2007, she has been involved in the EU-funded research projects Safefoods and Sigma Chain. In August 2008 she was appointed as an assistant professor at the Marketing and Consumer Behaviour group of Wageningen University.

Dr. de Jonge is a member of the Society of Risk Analysis (SRA) and the Dutch Association of Social Psychological Researchers.

**Ellen van Kleef** was born in 1972 in Echteld (The Netherlands). Ellen van Kleef obtained a Master of Science degree in Human Nutrition in 1997 at Wageningen University, the Netherlands. After working for a short period of time at Unilever Research Vlaardingen (1998), she began her doctoral dissertation research at Wageningen University in 1999. She defended her dissertation called 'Consumer research in the early stages of new product development. Issues and applications in the food domain' in 2006. From 2004 till 2008, she was a postdoctoral researcher at the EU-funded research project SAFE FOODS (Promoting food safety through a new integrated risk analysis approach for foods). Currently, she is an assistant professor in the Marketing and Consumer Behaviour Group of Wageningen University. Her research interests are food risk perception and consumer behaviour, and experimental consumer research for both food policy and new product development purposes.