

Food quality and safety: consumer perception and demand

Klaus G. Grunert

MAPP, Aarhus School of Business, Aarhus, Denmark

Abstract

Research on consumer quality perception is reviewed using the Total Food Quality Model as a structuring device. The relationship between food safety and quality is addressed, and is discussed in the context of research on consumer risk perception. Quality and safety perception is linked to food choice and consumer demand, addressing questions of price perception and the validity of willingness-to-pay measurements. It is concluded that food quality and safety are central issues in today's food economics, though many research questions remain to be addressed.

Keywords: consumer, quality, risk, branding, means–end approach

JEL classification: Q13, Q18, M31, D11

1. Quality and safety in agribusiness

Food quality and safety have been highly topical for the past 10 years—in the public debate, in food policy, in industry, and, last but not least, in research. Several factors have driven this debate. First, a variety of food scares has directed public attention to food safety issues. As a result, safety issues have for some years figured prominently on the political agenda, with the EU white paper on food safety (Commission of the European Communities, 1999) and the foundation of the European Food Safety Agency as visible outcomes. Second, segments of the general public have become interested and often critical with regard to certain ways of producing food—both at the farm level and at the processing level. As a result, we have had discussions on organic production, animal welfare, and the use of genetically modified organisms (GMOs) in food production, to mention only the most prominent debates. Third, and partly related to the previous factor, consumers in developed countries have become more demanding, more critical, and more fragmented in their food choices, leading to situations where quality differentiation of food products, both vertical and horizontal, has become necessary in order to satisfy consumers.

These developments occurred concurrently with an increasing realisation in the food processing industry that competing on price alone is not necessarily the most attractive business strategy. Agribusiness has a long history of being innovative, mostly with the aim of obtaining homogeneous quality

and low production costs. But with increasing global competition on food markets, new competitors have been entering the competitive arena, and old competitors have been catching up on their competencies in efficient production and quality control. In such a situation, more fragmented, heterogeneous and dynamic consumer demand creates opportunities for those producers and value chains that are willing to take the risk to differentiate their products, aim at serving specific target markets, and adapt to local conditions even under the wings of a global marketing approach. As a result, many sectors in agribusiness these days compete not only on efficiency and quality control, but on *adding value*. Adding value is a customer-oriented concept—we only add value to food products to the extent that those consumers at whom the final product is targeted actually perceive these products as better—perceive them as having *more quality*.

The prominence of the concepts of quality and safety in agribusiness is thus driven by all actors in the marketplace. And it is not surprising that research has followed.

2. Research on food quality and safety

There have been three main streams of research on food quality and safety, dealing with *consumer demand for quality and safety*, *provision of quality and safety*, and *consumer perception of quality and safety*. The relationship between the three is illustrated in Figure 1.

The first stream examines to what extent certain quality and/or safety improvements correspond to consumer preferences in the sense that they result in consumer willingness to pay for the added quality or safety features. Willingness to pay for extra qualities can be analysed based on actual consumer demand and resulting prices, for example based on scanner data,

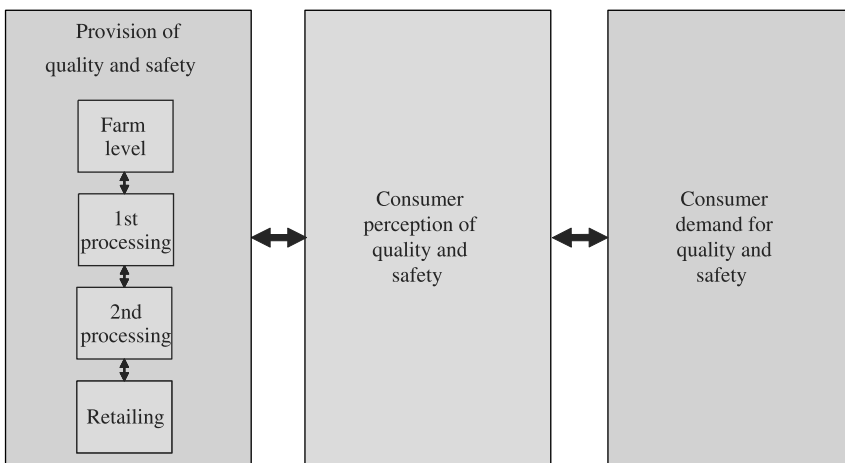


Figure 1. Research on food quality and safety.

leading to shadow prices for certain quality attributes. For products not (yet) on the market, or when actual demand data is not available, consumer willingness to pay can be measured using methods such as contingent valuation or experimental auctions.

Whereas the first stream thus deals with the demand side, the second deals with the corresponding supply side. Providing added safety and/or differentiated quality may require changes in the organisation of agricultural and food production, mainly with regard to governance structures of value chains. Whenever issues of quality and safety cannot be addressed at the final processing level, but have to pervade the whole value chain, relationships among value chain members may have to change. Food safety, for example, is closely linked to the traceability issue and often leads to closer links among value chain members. When quality is already differentiated at the farm level, new forms of contractual arrangements between farmers and processors may be called for. The difficulties of making such arrangements, especially in co-operative organisations, have been discussed widely in the literature.

These two streams of research together constitute the traditional economic approach to dealing with quality and safety issues. More recently, a third stream has been added. It deals with the question of how quality and safety is *perceived* by consumers, and how these perceptions influence consumer decision-making. Consumer preferences are thus not only regarded as being revealed in their demand, but their formation in interaction with the supply of goods becomes a separate area of inquiry. Thus, this stream of research can be seen as *mediating* between supply and demand, as it is the perception of the supply of goods that leads to the demand for these goods, as illustrated in Figure 1.

In this paper, I will concentrate on consumer perception of and demand for quality and safety, i.e. the right-hand part of Figure 1. Issues concerning the provision of quality and safety will be mentioned only briefly at the end of the paper.

3. Consumer perceptions of food quality and safety

3.1. What is quality?

There is an abundance of ways in which the term *quality*, both in food and otherwise, has been defined (see the 1995 special issue of *Food Quality and Preference* for a broad range of proposals). There is general agreement that quality has an *objective* and a *subjective* dimension. Objective quality refers to the physical characteristics built into the product and is typically dealt with by engineers and food technologists. Subjective quality is the quality as perceived by consumers. The relationship between the two is at the core of the economic importance of quality: only when producers can translate consumer wishes into physical product characteristics, and only when

consumers can then infer desired qualities from the way the product has been built, will quality be a competitive parameter for food producers.

In the subjective realm we can, as a gross simplification, distinguish between two schools of thought about quality. The first one, which we can call the *holistic* approach, equates quality with all the desirable properties a product is perceived to have. The second, which we can call the *excellence* approach, suggests that products can have desirable properties that consumers, in their own language, may not view as part of quality. In food, convenience is sometimes named as an example: consumers may say that ‘convenience goods are generally of low quality’, even though they regard convenience as a desirable property of food products (see, e.g. Zeithaml, 1998; Olsen, 2002). In the following, we will use the holistic approach.¹

It follows from the holistic approach that food safety is part of food quality, at least to the extent that consumers believe food safety to be a desirable property. We can usually assume that this is the case, at least up to a point. Safety may, however, be different from other quality aspects in the way in which it affects consumer decisions, a question to which we will return.

3.2. Approaches to analysing consumer perceptions of food quality and the Total Food Quality Model

Research on food quality perception and its impact on consumer food choice has employed a variety of different approaches, most notably the means–end approach, expectancy value approaches, economics of information approaches, and satisfaction/dissatisfaction approaches. The Total Food Quality Model, depicted in Figure 2, was an attempt to provide a common framework for these various approaches (Grunert *et al.*, 1996). It proposes two major dimensions along which we can analyse food quality perception: a *horizontal* and a *vertical* dimension.

The horizontal dimension is a time dimension: it distinguishes quality perception before and after purchase. It takes up the well-known distinction between search, experience and credence qualities and its implications for consumer’s ability to assess quality before purchase, after purchase, or not at all, and the implications this has for the basis on which consumers will infer quality given the information to hand. It also integrates research on consumer satisfaction and dissatisfaction, which rests on the basic assumption that the extent of confirmation or disconfirmation of pre-purchase quality expectations will determine consumer satisfaction and repurchase probabilities (Oliver, 1980).

1 One reviewer rightly remarked that I deviate from the holistic approach again later in the paper when dealing with food safety, and suggested to opt instead for an approach where quality only refers to the sensory characteristics. I have chosen not to follow this advice, because my own research indicates that the term ‘quality’, in the mind of most consumers, is much broader. I therefore retain the holistic view, and with it the problem that safety is a special case, as I will argue later.

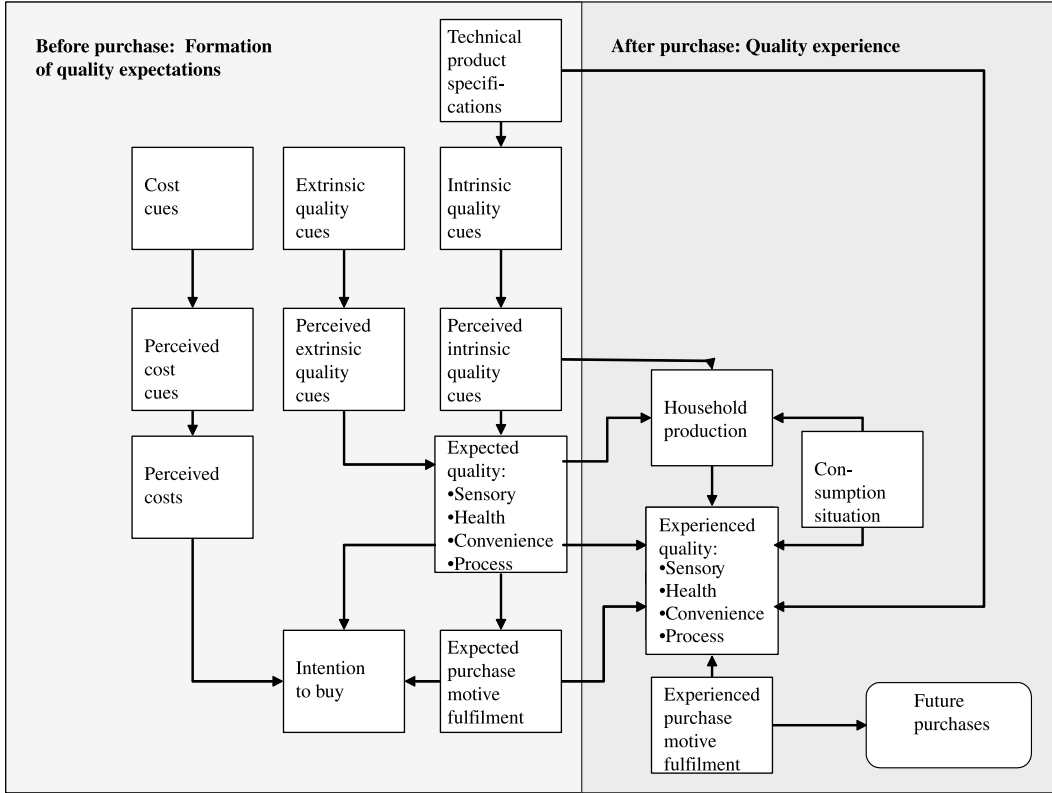


Figure 2. The Total Food Quality Model.

The vertical dimension deals with inference-making. It deals with how consumers infer quality from a variety of signals or cues, and with how consumers find out which properties of a food product are desirable by linking them to basic motivators of human behaviour. It integrates the means–end approach to the analysis of quality and quality perception research based on the concept of quality cues. We discuss it in more detail in the next section.

3.3. The vertical dimension of perceived quality

What motivates consumers to buy one food product rather than another? This issue has been dealt with in the *means–end approach to consumer behaviour* (Reynolds and Olson, 2001), which has been widely used in analysing consumer food choices. The basic assumption of means–end theory is that consumers are not interested in products *per se*, but in what the product is doing for them—in the self-relevant consequences of the product, in the way the product helps them attain their life values (in this way the approach is related to the Lancaster approach to analysing consumer demand). Whether a consumer finds a product attractive is supposed to depend on the extent to which this consumer can link his perception of the product's characteristics to self-relevant consequences and values. Such links are called means–end chains, because they are chains of subjective associations where the product is a means to achieve ends as defined by the consumer.

When asking consumers in an open-ended interview what they regard as food products of good quality, the answers always radiate around four central concepts: taste (and other sensory characteristics), health, convenience, and—for some consumers—process characteristics such as organic production, natural production, animal welfare, GMO-free, etc. (Brunsvold *et al.*, 2002). Placing these concepts in a means–end chain context, food quality, as perceived by consumers, becomes an *intermediate concept*—more abstract than concrete product attributes such as fat percentages, colour and packaging, but more concrete than life values such as being responsible, protecting your family, or having fun and excitement in life. In other words, from the means–end perspective quality is a bridging concept—by forming impressions of the quality of a product, consumers form a judgement on whether the characteristics of the product, as they have been perceived, will help in attaining that consumer's life values.

Means–end researchers have mostly applied a technique called *laddering* to study how consumers mentally link product characteristics to more abstract quality dimensions and from there to life values. Numerous studies employing this method have been reported in the food area (e.g. Grunert and Grunert, 1995; Nielsen *et al.*, 1998; Bredahl, 1999; Jaeger and MacFie, 2000; Valette-Florence *et al.*, 2000; Bech-Larsen, 2001; Grunert *et al.*, 2001; Miles and Frewer, 2001; Fotopoulos *et al.*, 2003; Russell *et al.*, 2004). Results from laddering studies are usually presented in so-called hierarchical value maps, and Figure 3 shows an example from a study on

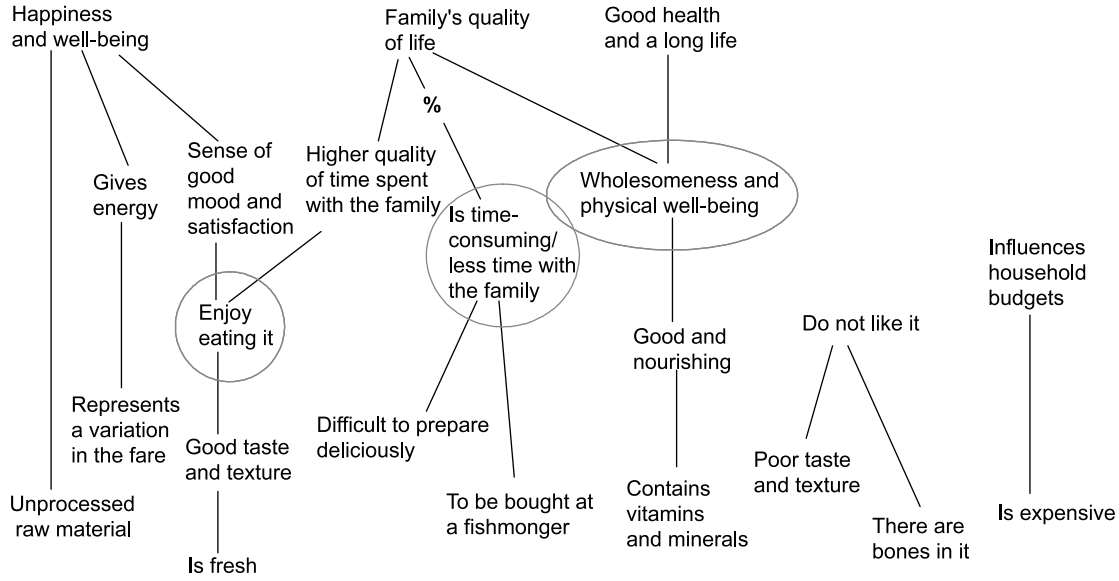


Figure 3. Hierarchical value map for fresh fish (from Nielsen *et al.*, 1997).

consumers' choice or non-choice of fresh fish as the mainstay of an evening meal (from Nielsen *et al.*, 1997). If we look at the middle part of the diagram, we can see that quality perception of fresh fish centres around three major dimensions: enjoyment of eating (mainly related to taste), health aspects (mainly related to the content of vitamins and minerals), and a perceived lack of convenience (because the fish is difficult to prepare and has to be bought at a fishmonger's). At the bottom of the diagram we see the concrete product characteristics from which these quality dimensions are inferred.

The process of inferring quality from characteristics of the product and from other information to hand has been studied from various angles. In economics, the term market *signal* is usually used, whereas studies in marketing and adjacent areas often employ the term quality *cues*. In addition, a distinction between intrinsic and extrinsic cues is usually made: intrinsic cues refer to physical properties of the product, whereas extrinsic cues refer to everything else (Olson and Jacoby, 1972). Common to the approaches is an interest in understanding how consumers form judgements of quality under uncertainty, i.e. in a purchase situation where a product is characterised mostly by experience and credence qualities.

Inference-making in the quality perception process is one of the more mysterious areas of consumer behaviour, and the literature abounds with more or less well documented cases of strange inferences: In the food area, consumers are known to use colour and fat content of meat as an indicator of taste and tenderness, organic production as an indicator of superior taste of vegetables, and animal welfare as an indicator of more healthy products—all inferences that are, from an objective point of view, at least questionable. Our theoretical knowledge in understanding these processes is still quite limited. We have not advanced notably beyond the Sorting Rule Model (Cox, 1967), which said that consumers prefer cues (i) that they believe to be predictive of the quality they want to evaluate, and (ii) that they feel confident in using. When asking consumers which information about a piece of meat they believe to be predictive of taste and tenderness, many consumers believe that information about breed, age of animal, and slaughtering date are predictive of these qualities, but few consumers feel confident in using them, i.e. making the right inferences based on this type of information. Thus, consumers end up making inferences based on cues with which they feel confident, such as colour of meat and visible fat content, even though they may be aware of the fact that these characteristics are not always highly predictive of taste and tenderness. The concept of confidence in inference-making is thus strongly linked to knowledge and expertise of the consumer (Selnes and Troye, 1989). It also has obvious implications for how to deal with information asymmetry: just giving consumers more information will not reduce asymmetry when consumers do not feel confident about using the information.

Among the broad range of applicable extrinsic cues, three have received special attention in the food area as possible quality indicators: brands, cues related to product origin, and quality labels.

The role of brands is amply documented in the marketing, management and economics literature. The classic economic argument is that brands influence purchase to the extent that they reduce risk and communicate the positioning of the product to the consumer (Erdem and Swait, 1998); more psychologically oriented approaches have supplemented this by the notion that brands having such functions will, in the mind of the consumer, have associations that are strong, favourable and unique (Keller, 1993; Krishnan, 1996). Both types of approach imply that brands become powerful cues for consumers to the extent that consumers actually find them predictive of the quality of the product. To the extent that a brand is widely used for quality inference, it accumulates brand equity, i.e. becomes a valuable asset for the manufacturer owning it. A special phenomenon in the food area is the recent rise of retailer brands (also called private labels or own labels) as an alternative to the traditional manufacturer brands (Laaksonen and Reynolds, 1994; Burt, 2000). Retailer brands can, in principle, serve as quality cues to the consumer in the same way as manufacturer brands. However, the comparative lack of a brand history and the historical association of retailer brands with generic products and low-price alternatives results, in many cases, in consumers taking a retail brand as a cue indicating low rather than high quality.

Information on the place or region of origin of the product has a long history in the food area, but interest has increased after the introduction of EU regulations on protected designations of origin (PDO) and protected geographical indications (PGI). In terms of consumer behaviour, such information is a special case of country-of-origin cues, which have been subject to comprehensive research for several decades (Verlegh and Steenkamp, 1999). Research on country-of-origin effects has established that consumers may use origin information as a quality cue (e.g. van der Lans *et al.*, 2001; van Ittersum *et al.*, 2003). Two types of mechanism can be responsible for this (Johansson, 1989). First, consumers may use the cue to link the product to knowledge on the region of origin, which may be relevant for forming a quality evaluation; this may include everything from beliefs about the quality consciousness of Germans, the food addiction of the French, and beliefs about artisanal ways of producing ham in the Parma region. Second, consumers may use this cue during repeat purchases of the product to re-identify a product, the quality of which they found satisfactory—a process that may be especially relevant when the product does not carry a strong brand. It follows from both mechanisms that origin information will have no effect on quality evaluations when consumers have no knowledge about the region of origin, when the quality of the product is not in fact experienced as desirable by the consumer, and/or when we are dealing with trial (as opposed to repeat) purchases.

Quality labels is a fuzzy category that covers many different things. Quality labels can be awarded by manufacturers, groups of manufacturers, retailers, government bodies, and independent organisations, for example, consumer associations. The criteria for awarding the labels can be very strict or almost non-existent. Some labels refer to very specific qualities, such as the labels indicating organic production, whereas others are intended as general quality labels. Some of the better known examples are the French 'label rouge', the German CMA 'Gütesiegel', and the Norwegian 'Godt Norsk'. Although we have no general overview quantifying the overall effect of such labels, it seems likely that many food quality labels probably do not function as quality cues at all, meaning that consumers ignore the information because they do not feel that the labels are predictive of any quality dimensions they are interested in, and that they feel more confident in using other cues (e.g. von Alvensleben and Gertken, 1993). In those cases where quality labels are used, there is ample evidence that consumers misinterpret their meaning or make inferences that go far beyond what the label was intended to communicate (Parkinson, 1975; Beltramini and Stafford, 1993; Verbeke and Viaene, 1999; Juhl *et al.*, 2000).

There is a broad range of other labels that primarily fulfil a public policy function, such as nutritional labels, and that are dealt with by Verbeke (2005b).

The question of cue usage and inference-making is crucial for the functioning of markets dealing with differentiated quality. Products with differentiated qualities need to communicate these qualities to consumers, and consumers need to make inferences that will be predictive of the quality experienced later. Otherwise, consumers will either not buy the quality-differentiated product, or their demand will be limited to trial purchases.

3.4. The horizontal dimension of perceived quality

As noted, the horizontal dimension in Figure 2 refers to how quality perception changes over time. The major (but not only) distinction to be made here is quality perception before and after purchase. Most aspects of food quality are either experience or credence characteristics, and the way quality perception changes over time will differ between these.

Because experience qualities can, by definition, be evaluated with high certainty after the purchase, the expectations about these qualities formed based on cues can be confirmed or contradicted. Confirmation or disconfirmation of expectations is the major determinant of consumer satisfaction and of consumer intent to repurchase the product or not (Oliver, 1997). Especially for new products, which have been bought for the first time and where the formation of expectations at the point of purchase therefore cannot be based on previous own experience, whether or not expectations are confirmed is a crucial point for whether the product will become a success or not.

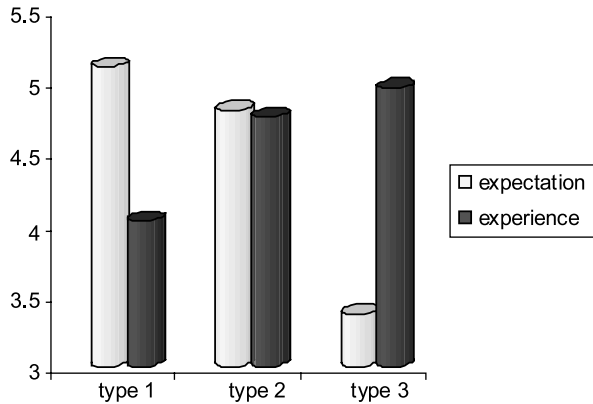


Figure 4. Average evaluation of three types of meat before purchase and after consumption (7-point scale with 1 = not so good, 7 = very good) (from Grunert *et al.*, 2004).

Whether quality expectations will be confirmed depends, obviously, on how good the consumer was in predicting the quality based on the cues at hand. Given the discussion about inference-making above, it may not come as a surprise that consumers are often not especially good at predicting quality, with disconfirmation of expectations and dissatisfaction as a consequence. Figure 4 shows an example of this. Consumers evaluated three types of steak based on their visual appearance, as they would when the meat is displayed in a cool counter. They then received samples of all three types of steak to take home, prepare and eat on consecutive days. The steaks differed in the degree of fattening up of the animals before slaughtering. As the figure shows, the quality experience points in the opposite direction of the expectations: the steak with the highest expectations was actually the least liked after consumption. The discrepancy can be traced back to the way cues were used for inference making: consumers took visible fat as the main cue for evaluating quality, inferring that more visible fat means lower quality. Actually, higher degrees of intramuscular fat lead to more taste and tenderness, which explains the unexpected results (see also Bredahl *et al.*, 1998; Verbeke *et al.*, 2005).

Credence qualities are of increasing importance in food products. Most health-related and process-related qualities belong to this category. For credence qualities, the perception of quality after purchase will still be based on making inferences from cues. These cues can be the same as before purchase, i.e. the quality expectation formed before the purchase still persists, and there will be no confirmation or otherwise. But new cues may become available, and the perceived quality may change. After purchase, the consumer may have been exposed to new information questioning the credibility of the information processed before the purchase. Or the information may be forgotten, thus removing the basis for the previous quality perception. Sometimes, cues emanating during food preparation or consumption process play a role: it has been shown, for example, that

the evaluation of the healthiness of meat rises after the purchase, because the fat that was visible at the point of purchase (and was used as a cue in evaluating healthiness) melts off during preparation.

The distinction of only two phases—before and after purchase—is of course a simplification. Most food products are bought several times, and many are bought continuously over extended periods. Quality perception may change across the whole range of purchases. It is usually assumed, though, that the biggest change occurs in connection with the first purchase, because in the first purchase—the trial purchase—quality expectations are necessarily based on informational cues only, not on own experience, and the first purchase will then lead to the first actual experience with the product, which may lead to fundamental changes in the perception of quality. When purchasing the product for the second and subsequent times—the repeat purchases—previous own experiences will play a role in forming the quality expectations, which therefore will be more accurate. But changes may still occur, for a variety of reasons. Learning may occur with regard to how to handle the product, resulting in better quality experiences. The situation in which the product is consumed may change, which may have an impact on the experienced quality. When consumers are variety-seeking and like stimulation and change, a positive quality perception may wear off over time. For credence qualities, the quality perception can always change when new information about the quality becomes available.

The dimensions that constitute quality in the mind of the consumer, and especially their weights, may change over time as well. Most notably, there may be a tendency that those quality dimensions that are amenable to own experience will, over time, acquire a greater weight. Whereas taste and healthiness, for example, may have equal weight in the pre-purchase phase—where both types of quality perceptions are cue-based—taste may be given a higher weight in the period during and after consumption, because it has now been experienced, whereas healthiness is still abstract and information-based. Over time, there is hence a danger that credence qualities lose out to experience qualities, because the latter are constantly fed by own consumer experience, whereas the former are not. This problem is especially severe for functional foods, where the credence characteristic is the major selling point (Bech-Larsen and Grunert, 2003; Frewer *et al.*, 2003; Verbeke, 2005).

Food products are usually consumed after having undergone some sort of preparation, i.e. they are used in the household production process. The home production process and not the product itself determines the quality perceived during and after consumption and, hence, consumer satisfaction. There is reason to believe that there may be many instances in which the home production process is more important for the overall quality experience than the quality of the product itself. The best piece of meat can be ruined by frying it too long, and a good cook can prepare a delicious meal even from a less attractive piece of meat. We know relatively little on

the relative influence of these factors, and especially about the role of cooking skills.

4. The perception of food safety

Food safety can be defined in a broad or in a more narrow way (Ritson and Mai, 1998). In the narrow sense, food safety can be defined as the opposite of food risk, i.e. as the probability of not contracting a disease as a consequence of consuming a certain food. In the broad sense, food safety can be viewed as also encompassing nutritional qualities of food and more wide-ranging concerns about the properties of unfamiliar foods, such as many European consumers' uneasiness about genetically modified food.

As with food quality, we can distinguish objective from subjective food safety. Objective food safety is a concept based on the assessment of the risk of consuming a certain food by scientists and food experts. Subjective food safety is in the mind of the consumer. It is widely acknowledged that objective and subjective safety (or risk) deviate in many cases. Until recently, such deviations were mostly regarded as a nuisance that has to be tackled by better consumer information and education. More recently—and in the light of the failure of attempts to educate consumers to become amateur food scientists—this attitude has given way to a recognition of the necessity to deal with consumers' perceptions of risk and safety as they are (Frewer *et al.*, 2005).

Is safety just another dimension of quality? Our broad definition of food quality as everything a consumer would find desirable in a food product would suggest yes, as safety certainly is a desirable quality of food. However, qualitative studies of food quality perception suggest that safety is not uppermost in consumers' minds when they are asked to describe their own view of food quality (Brunsø *et al.*, 2002). This may suggest that perceptions of food safety affect consumer food choice in ways that are different from perceptions of the other dimensions of quality we have distinguished above. It seems that safety perceptions play a role predominantly in two ways. First, in situations where major safety problems are perceived—the so-called food scares, such as BSE (Burton and Young, 1996), the dioxin problem in Belgium (Verbeke, 2001), or the Alar controversy in the USA (Herrmann *et al.*, 1997)—risk perceptions can come to dominate all other considerations in food choice and lead consumers to avoid certain categories or brands for some time, until the situation has returned to normal. Safety perceptions in this sense act as a 'sleeping giant' that does not enter quality perceptions under normal circumstances, but can have sweeping effects at times of crisis. Second, consumers apply safety considerations to certain production technologies. Major examples are food irradiation and GMOs. In these cases, consumers perceive the use of certain production techniques as unsafe, and they develop negative attitudes towards the use of these technologies. Such attitudes can be powerful forces in the marketplace, which both industry and regulators take seriously, and they have resulted in the non-use

of irradiation and a considerable delay of the adoption of GMOs on European markets. Consumer attitudes to GMOs in food production have been widely studied (e.g. Bredahl, 2001; Burton *et al.*, 2001; Grunert *et al.*, 2003; Scholderer and Frewer, 2003; Frewer *et al.*, 2004; Hu *et al.*, 2004).

Consumer risk perception in more general terms has been widely studied as well, starting with the well-known work by Slovic and colleagues (Fischhoff *et al.*, 1978; Slovic, 1987), and a number of regularities have been observed (Frewer *et al.*, 2005). Three phenomena that seem to be rather robust will be mentioned here. First, self-imposed risk is more acceptable to consumers than technology-based risk. Thus, although meal preparation at home is, by objective standards, much riskier than meal production in a factory, consumers tend to perceive ready-made meals as more dangerous than meals they have cooked themselves, and the perceived risk is amplified when new and unknown technologies are used. Second, although consumers can usually appreciate the risk associated with their own handling of food in general terms, they believe that the probability of being hit themselves by a problem is lower than the probability of the average consumer being hit by the same problem, a phenomenon also known as 'optimistic bias'. Finally, the importance of the dimensions of dread and familiarity in risk perception has been amply demonstrated, implying that familiar risks are perceived as less severe than unfamiliar ones—a phenomenon relevant to the perception of GMOs and other forms of novel foods.

Food safety is a major topic for public policy. Regulatory responses have been, roughly speaking, in two categories (Caswell and Mojduszka, 1999; Ritson and Mai, 1998). The first refers to the enforcement of common standards for food safety, which has no immediate impact on consumer food choice, but is debatable in terms of economic efficiency when consumer preferences for safety are assumed to be heterogeneous. The second refers to attempts to provide transparency and encourage consumers to form their own judgements on food safety, supported by mechanisms of public participation, consumer education, and consumer information instruments such as labelling. This latter policy, which has been central to the European Commission's white paper on food safety (Commission of the European Communities, 1999), may, however, be based on unrealistic assumptions about consumers' willingness and ability to process information when making daily purchases (Grunert, 2000).

5. Perception of quality and safety and willingness to pay

Perceived quality and safety lead to purchase only when the quality as perceived is high enough for the consumer to be willing to pay the price demanded in the shop. The relationship between perceived quality and price is often referred to as *value for money* (Zeithaml, 1998). Measuring willingness to pay (WTP) for quality and safety attributes has been a major stream of research in agricultural economics. Hedonic pricing methods

(e.g. Baltzer, 2002; Steiner, 2004) or, more recently, mixed multinomial logit approaches (that take into account respondent heterogeneity, e.g. Bonnet and Simioni, 2001) have been used to estimate WTP in cases where market transaction data (usually scanner data) are available. In those cases where market transaction data are either not accessible or non-existent, because we are dealing with hypothetical improvements of quality or safety, contingent valuation (e.g. Boccaletti and Nardella, 2000; Gil *et al.*, 2000; Maruyama and Kikuchi, 2004), experimental auctions (Hoffman *et al.*, 1993; Lusk *et al.*, 2001, 2004; Rozan *et al.*, 2004) and conjoint analysis (e.g. Bech-Larsen and Grunert, 2003; Enneking, 2004; Grunert *et al.*, 2004) have been the most popular methods. WTP estimates that are not based on market data are often made for quality and safety improvements that have not yet been launched on the market. Such WTP estimates are valuable from the perspective of both public policy makers and food manufacturers.

Results from these various approaches often differ a good deal, with WTP as derived from market transactions often being a good deal lower than those derived from hypothetical methods (see, e.g. Shogren *et al.*, 1999) In the eyes of many food practitioners, this not only has discredited non-market based WTP methods, but it has also led to a widespread notion that price is the most important parameter in determining consumer food choice and that interest in quality and safety improvements is often not widespread. However, one should be cautious about such conclusions for two reasons.

First, there is a good deal of research showing that consumers routinely buy lots of products without knowing their prices (e.g. Chernatony and Knox, 1992; Urbany *et al.*, 2000; Vanhuele and Drèze, 2002). This price perception research is usually based on asking consumers the price of a product right after they have placed it in their shopping basket. The percentage of consumers not knowing the price varies widely among studies and also across countries, but has often been found to be very low—for example, in the study by Vanhuele and Drèze (2002) in France, only 10 per cent could recall the price of an item when asked directly at the point of sale, and only 30 per cent could guess it correctly within a 5 per cent margin or error. Price perception is a complex phenomenon. Because, however, markets do function and most consumers can manage their income and expenditures flows, it appears that most consumers *do* form an opinion on whether the qualities of the product outweigh the costs. This opinion may not be based on any price information at all, only on a general assumption that in this product category, prices are usually so low that it does not matter. It may be based on a general assessment of the price level in the store where the product is found, or it may be based on detailed price knowledge of this and a range of competing product varieties. How much consumers are interested in prices, their *price involvement* (Lichtenstein *et al.*, 1993; Urbany *et al.*, 1996), is related to a host of factors, including perceived budget constraints, ‘lowest price’ or ‘value for money’ as basic purchasing motives, or ‘price mavenism’, i.e. a desire to appear as a market expert when talking

to others. In addition, situational factors can affect the tendency to process price information, for example when a purchase is made under heavy time pressure.

Second, habitual purchasing plays a big role in food purchasing. Even though we maintain that consumers by and large make buying decisions based on trade-offs between perceived quality and perceived price, this by no means implies that every food purchase is based on a deliberate, conscious process where the various quality characteristics of a number of products are held up against their prices. As the average consumer buys so many food products continuously, there are obvious limits to the degree of deliberation that is possible, providing incentives for habitual purchasing. In habitual purchases, the actual trade-off between perceived quality and perceived price is replaced by recalling the result of an earlier trade-off and just repeating the decision made there. Also, many food buying decisions may not involve a lot of conscious thought at all, but may be guided by a strong component of automatic, unconscious information processing (Grunert, 1996; Aarts and Dijksterhuis, 2000; Ajzen and Fishbein, 2000; Adaval and Monroe, 2002). As a result of habitual and perhaps even automatic purchasing, new products that are on the shelves may simply not be perceived by consumers, i.e. do not even enter their choice set when shopping. It may take a special marketing effort, such as in-store displays, free samples, etc., to break through the barriers of habitual behaviour and make consumers aware that a new product with an improved quality exists.

The mechanisms of price information processing and habitual purchasing have implications for the interpretation and validity of willingness-to-pay measures. First, market transaction based WTP methods cannot account for the fact that many of the products in the analysis will, for many consumers, not have entered their choice set because of habitual buying. Thus we do not measure WTP for the quality characteristic in general, but only for the quality characteristic given the marketing effort to make the quality-improved product enter consumers' choice set. The estimated WTP may be higher after correcting for factors that are not related to quality but that have an impact on whether the product enters consumers' consideration set. Second, all methods not based on market transactions, no matter whether contingent valuation, experimental auction or conjoint analysis, contain an element of forced exposure, where consumers are made aware of the product they are supposed to bid for. This is a clear deviation from the real-world shopping situation, where consumers have the option of simply ignoring the new product. Moreover, the price information processing to which we encourage consumers in a willingness-to-pay measurement task may differ considerably from what occurs in a real-world setting. This is because price involvement may be inflated in tasks that obviously deal with prices, leading to more conscious deliberation about willingness to pay compared with a real-world shopping situation. In addition, we know from price information processing research about the role of reference prices in forming opinions about what is a good or a bad price (Winer, 1986;

Briesch *et al.*, 1997). However, with new or even hypothetical products, consumers may not have reference prices, and may use a variety of heuristics to establish usable anchor points. These in turn will be widely influenced by context factors both in the shop and in a WTP measurement situation. Only recently have we begun to see studies that try to understand the kind of information processing that consumers engage in when confronted with willingness-to-pay tasks for hypothetical products (e.g. Fischer, 2003).

We should also briefly note that the trade-off between price and quality can function in different ways. Generally, a lower price can compensate for a lower quality, but the degree to which the decision is based on this type of *compensatory* reasoning may vary a lot (Bettman *et al.*, 1998). Consumers may have an acceptable price range for certain goods and make trade-offs only within that range, or they may have indispensable requirements for some products (for example, that eggs have to be free range), where the absence of these requirements cannot be compensated for by a lower price.

6. Providing quality and safety to consumers

In the present paper, I have tried to summarise some of the major issues relating to how consumers perceive quality and safety in food, and how this turns into consumer demand. I have attempted to show the complexities involved, both with regard to how consumers form judgements on the quality and safety of a product, and how these judgements are traded off against price in consumer food choice. Many of these complexities are still poorly understood. Although the marketplace has clearly shown a development towards a food supply that is more differentiated in terms of quality (and perhaps safety), it is also clear that the intricacies of the processes by which consumers make judgements about differentiated products pose a challenge to the functioning of such markets. Consumers want to get the best quality at the lowest prices—but finding out what the best quality is may not always be a straightforward task, and even providing consumers with more information may not solve the problem, as the information may be ignored or misinterpreted. Public policy is often based on the assumption that more information is better, both to improve daily decision-making and in situations of crisis, but the research summarised in this paper implies that more information may not only be without effect, but may in some cases increase confusion and consumer concerns.

However, the complexities and challenges are not only on the demand side. Producers face similar problems: they have to perceive and interpret the signals that come from consumers. Putting differentiated products on the market and waiting for consumer reactions is a costly and not very efficient method of introducing new products, as the high failure rates of new products in the food sector demonstrate. There has therefore been a considerable interest in methods and concepts for consumer-oriented food product development, methods that make it easier for producers to listen to

and understand the voice of the customer (Biemans and Harmsen, 1995; Benner *et al.*, 2003).

Much food product differentiation has traditionally been dealt with at the processing level. However, there has also been a trend towards increasing differentiation already at the farm level. There are various reasons for this. Consumers demand some kinds of product differentiation that by their nature have to be dealt with at the farm level, such as increased animal welfare or organic production. Advances in biotechnology open up new possibilities for differentiation of both animal and plant production. And product differentiation at the processing level involves imitation lags for competitors that are usually short, whereas differentiation that goes back to primary production gives better protection against competitive moves.

When differentiation pervades the food chain, it will often have implications for the governance of the food chain. Differentiation starting at the farm level leads to demands for segregation and traceability, and it requires good communication between the members of the value chain, as intelligence on consumer demands has to travel all the way back to the farm level. This typically requires closer forms of co-operation between value chain members, and especially between farmers and processors, than when the farm level output is judged by price and homogeneity only (Grunert *et al.*, 2005). Finding the right contractual forms for these types of relationship is a research area in its own right (e.g. Mahoney, 1992; Giraud-Heraud *et al.*, 1999; Boger, 2001; Bogetoft and Olesen, 2002) that is beyond the scope of this paper. The development of relationships between farmers and processors adds another dimension to the complexities resulting from increased attention to food quality and safety.

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Corresponding author: Klaus G. Grunert, MAPP—Centre for Research on Customer Relations in the Food Sector, Aarhus School of Business, Haslegaardsvej 10, 8210 Aarhus V, Denmark. E-mail: klg@asb.dk