

ORGANIC PORK: CONSUMER QUALITY PERCEPTIONS

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PREFACE

The research reported here was jointly supported by the European Commission through contract number QLK5-CT-2000-00162, “Sustainability in the production of pork with improved nutritional and eating quality using strategic feeding in out-door production” (SUSPORKQUAL; co-ordinated by Anders Karlsson, Danish Institute of Agricultural Sciences) and the Danish Directorate for Food, Fisheries and Agribusiness (Direktoratet for Fødevareerhverv) through grant number 93s-2486-Å02-00169, “Organic pork: consumer quality perceptions” (INFOORG; co-ordinated by Lone Bredahl, Aarhus School of Business).

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EXECUTIVE SUMMARY

Previous research on consumers' quality perception indicates that consumers expect substantially higher eating quality in pork that was produced in organic and free-range systems. At the same time sensory studies and comparisons of objective quality show the performance of organic and free-range pork to rarely beat that of conventional pork, meaning that meat from outdoor production systems may not be perfectly able to fulfil consumer expectations. The interesting point here is that consumers' expectations may in fact be so strong that they may override differences in experienced quality.

An experiment was conducted with 185 consumers to separate these effects and estimate their relative size. Each participant tasted eight pork chop samples. These samples varied on two factors: actual meat type, and label information. The factors were completely crossed in a factorial design. The actual meat types were (a) conventional and (b) organic pork, both from pigs of a Duroc crossbreed. Under the conventional system, pigs had been reared indoors and fed conventional concentrate *ad lib*. Under the organic system, pigs had been reared indoors with access to an outdoor area at an organic farm, and fed organic concentrate and red clover silage *ad lib*. The four label information conditions were (a) organic pork, (b) free-range pork, (c) conventional pork, and (d) no information. Samples were prepared at a sensory lab following a standardised protocol. Serial positions of samples were counterbalanced across subjects. Before tasting each sample, consumers rated expected quality. After tasting each sample, consumers rated experienced quality on four dimensions (including taste, tenderness, juiciness, and overall acceptability) as well as willingness to pay.

Highly significant differences were found between label information conditions, following the same pattern on all dependent variables: samples labelled organic or free-range received consistently higher ratings than samples labelled conventional or unlabelled ones, irrespective of actual meat type. Significant but substantially smaller differences were found between actual meat types regarding experienced taste, experienced juiciness, overall acceptability, and willingness to pay, with organic pork receiving consistently lower ratings than conventional pork, irrespective of label information. There were no differences between actual meat types regarding expected quality or experienced tenderness. No significant interactions were found either, indicating that the effects of actual meat type and label information were additive on all dimensions. Comparisons of effect sizes indicated that the effects of label information were on average 9 to 10 times higher than the effects of actual meat type.

The results suggest that the experienced quality of organic pork is very much a matter of expectations. Interpreted in terms of assimilation and contrast theory, consumers appear to be able to detect the somewhat lower objective eating quality of organic pork, but the difference between the high expectations and moderate experiences of the quality of the organic pork seems to fall into their latitudes of acceptance. Consequently, consumers assimilate their experiences upwards until they align with their expectations. It is concluded that when differences between expected and experienced quality of organic pork are not too large, consumers' high quality expectations will function as anchors and raise the level of experienced quality until it aligns with expectations.

INTRODUCTION

Denmark is the country with the highest per-capita consumption of pork in the world (in 2003, roughly 60 kg per head per year) as well as its biggest exporter. Of the approximately 23 million pigs produced for slaughter each year, over 80% are exported. The intensity of the production has sparked consumer concern (Bredahl & Andersson, 1998; Bredahl & Poulsen, 2002; Ngapo, Dransfield, Martin, Magnusson, Bredahl & Nute, 2004) and caused criticism from environmental authorities. In December 2003, European Environmental Agency director Jaqueline McGlade told press agency Ritzau that “the intensity of pork production in Denmark is not sustainable in terms of the environment and pollution. Denmark will soon have to discuss whether the entire ecological system can cope with the high level of pig production such as it has today” (Ritzau, 4 December 2003).

Under the Fifth Framework Programme, the European Commission has funded a large cross-national research project on “Sustainability in the production of pork with improved nutritional and eating quality using strategic feeding in outdoor production” (SUSPORKQUAL). From 2001 to 2004, an interdisciplinary network of researchers has investigated the possibilities of sustainable outdoor production systems, including a wide range of aspects such as compensatory growth in pigs, animal welfare and health aspects, residue levels in pork, eating quality, nutritional value, consumer demands, and marketing possibilities.

Besides process consideration such as animal health, one of the main challenges in the project was to improve the objective quality of pork from organic and outdoor production systems. Lindahl (2003) reports initial results suggesting that the meat produced under such systems may come close or even become superior to pork from pigs raised under conventional systems in terms of eating quality parameters such as colour, nutritional parameters such as fatty acid composition and iron content, and sensory traits such as juiciness, tenderness, and meaty taste. Other parameters, including tenderness and fat content, still pose a challenge. The aim of the research presented here was to investigate how the quality of pork produced under organic outdoor systems is evaluated by consumers.

Theoretical framework

The perceived quality of food products comprises sensory, health, convenience and process dimensions (Brunsø, Fjord, & Grunert, 2002; Grunert, Bredahl & Brunsø, 2004). Usually, these quality dimensions cannot be evaluated at the point of purchase, for some because their perception is contingent upon handling and ingesting the product in the home (this goes for the sensory and most convenience dimensions), for others because they are pure credence dimensions that cannot be perceived by consumers even upon consumption (this goes for most health, safety and process dimensions). Because of this, consumers' quality perception process falls in two stages.

In a first step, expectations of product quality are formed based on evaluations of available cues regarded by the consumers as reliable indicators of the quality of the

product. These quality cues can be intrinsic or extrinsic (Olson, 1976, 1978; Olson & Jacoby, 1972). Intrinsic quality cues are part of the physical product such as colour or fat content (Bredahl, Grunert & Fertin, 1998; Bryhni, Byrne, Rødbotten, Claudi-Magnussen, Agerhem, Johansson, et al., 2002; Hurling & Shepherd, 2003; Issanchou, 1996; Ngapo, Martin & Dransfield, in press). Extrinsic quality cues are everything else that is related to the product or its production process, such as price, packaging, consumption environment, or the information contained on labels – for example, a logo that certifies that the product is organic (Cardello, 1995; Meiselman, Johnson, Reeve & Crouch, 2000; Tuorila, Cardello & Leshner, 1994; Verbeke & Viane, 1999).

In a second step, the quality of the product is experienced when the product is ingested (Bredahl et al., 1998; O’Mahoney, Cowan & Keane, 1992. Assimilation and contrast theory assumes that consumers’ expectations operate as fuzzy anchors in their judgments of experienced quality (Sherif & Hovland, 1961). If the discrepancy between expectation and experience is small, it will fall into consumers’ latitudes of acceptance: incoming sensations are assimilated towards prior expectations. If the discrepancy between expectation and experience is high, it will fall into consumers’ latitudes of rejection: incoming sensations are contrasted away from prior expectations (Cardello, 1994; Olson & Dover, 1976

Grunert, Larsen, Madsen, and Baadsgaard (1996) have suggested a Total Food Quality Model that comprises these relations. The model is shown in Figure 1.

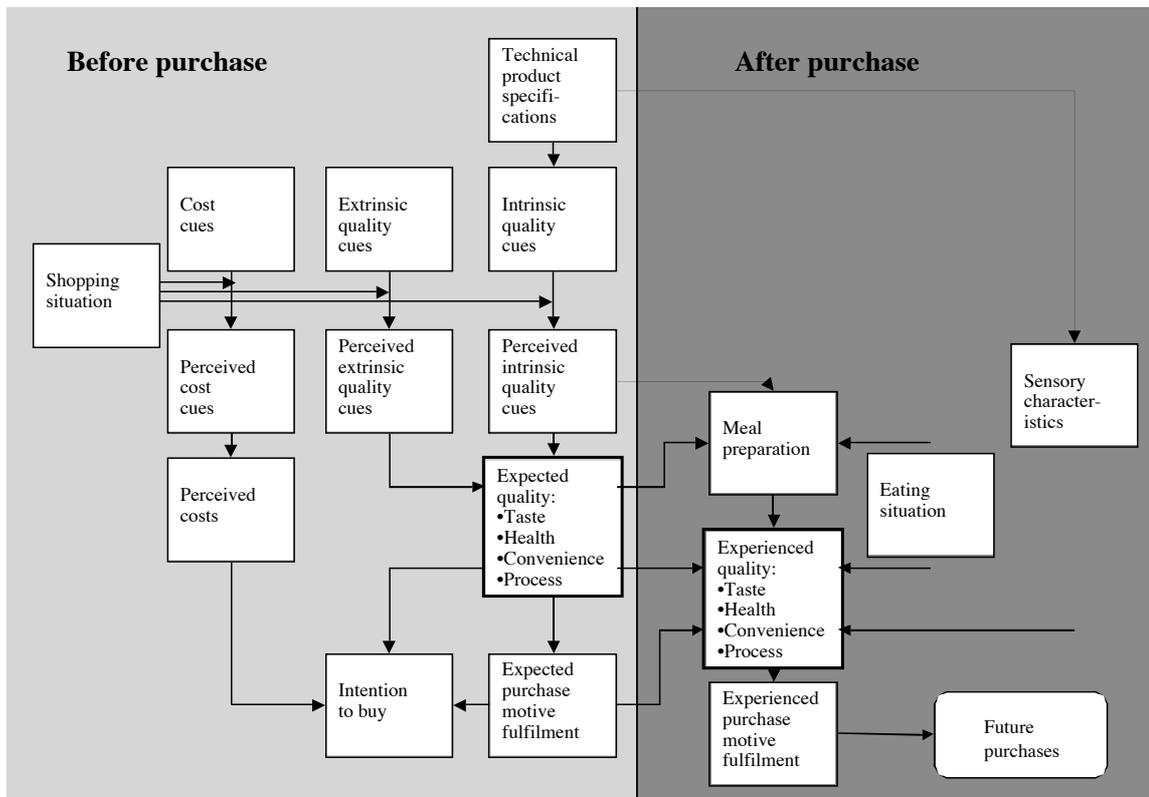


Figure 1. The Total Food Quality Model (adapted from Grunert, Larsen, Madsen, and Baadsgaard, 1996).

Building on previous research in the area, the model also shows on a general level how expected quality interacts with perceived costs to determine the purchase decision, how expected quality interacts with meal preparation and the objective (sensory) quality of the product to determine experienced quality, and, finally, how experienced quality affects future purchase decisions.

In the following, previous research will be reviewed that has investigated the different stages of the quality perception process in the context of pork from pigs raised in different production systems. Since qualitative research indicates that Danish consumers do not have a clear concept of the distinction between organic, free-range and indoor with outdoor-access systems in pig production (Bredahl & Poulsen, 2002), consumer studies focusing on any of the three systems will be included.

Previous research

Bredahl and Poulsen (2002) report results from a focus group study with Danish pork consumers. In this study, consumers defined high quality pork in terms of good taste, tenderness, juiciness, freshness, leanness and healthiness. Above all, pork of good quality had to taste good. In addition, it should be tender and juicy, fresh, lean and healthy. The participants generally found it difficult to evaluate the quality of meat at the point of purchase, particularly pre-packaged meat. The colour of the meat and the share of fat were important quality cues. Generally the participants looked for meat with little fat. To some, the colour of the fat and the colour of the meat were used as indicators of the freshness of the meat. Pieces of meat that were cut in unequal sizes or meat that was poorly trimmed were considered to be of low quality.

In addition, the results obtained by Bredahl and Poulsen (2002) revealed a clear perceptual link between the quality of pork and the applied production method, in which extensive outdoor production was generally perceived to result in higher quality than intensive indoor production. The factors which consumers perceived to influence quality included the transportation of the pigs, how the pigs were kept at the farm, what the pigs were fed, the use of growth enhancers, treatment of the live pigs at the slaughterhouse, the general welfare of the pigs, the use of medicine, the breed of pigs, the level of veterinary control, and the cooling of the meat. Despite the predilection for 'welfare' pork, meat from extensive production systems was rarely bought. Although it was generally regarded as desirable, the focus group participants generally rejected the meat because they perceived it to be either too expensive or too difficult to obtain.

Another qualitative study by Bech-Larsen and Grunert (1998) gives insight into the attributes, desired consequences and life values that consumers associate with the concept of organic pork. In this study, Danish consumers were interviewed individually, using the laddering method. Consumers were asked to imagine that they had to choose between ordinary and organic pork. After that, consumers were asked to explain both the difference between the two types of meat and why the product attributes mentioned were important to them. The hierarchical value map obtained from a content analysis of the responses is shown in Figure 2.

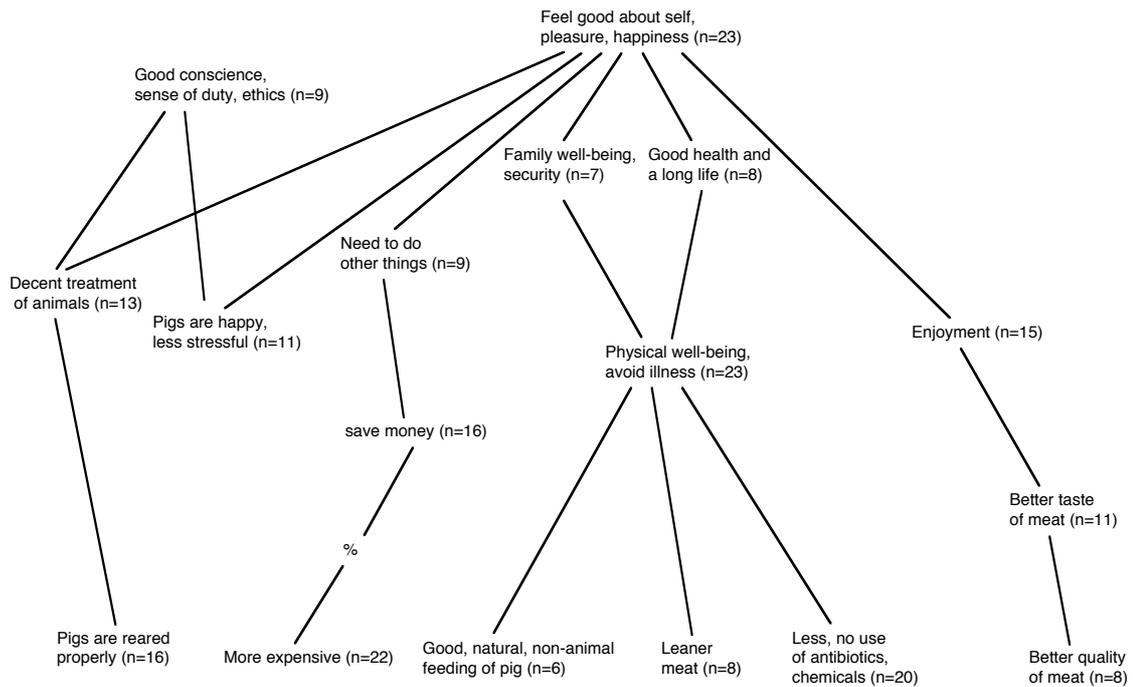


Figure 2. Associations of Danish consumers with perceived attributes of organic pork (adapted from Bech-Larsen & Grunert, 1998).

Results show that Danish consumers believe that good rearing conditions, natural feeding of the pig, no use of antibiotics, leaner meat and generally higher quality are important attributes of organic pork, and that they associate these attributes with physical well-being, good health and a long life. Again we find that the health aspect is an important quality to consumers, and that naturalness is closely related to health. There seem to be at least four different realms of considerations when choosing or not choosing organic pork: animal welfare, expectations regarding health and higher hedonic quality of organic pork, but also budget constraints. Budget constraints, more than availability, seem to be the most important barrier to increased purchase and consumption of organic pork.

Taken together, results from these qualitative studies suggest that consumers make a whole range of positive inferences from the label “organic”, and these refer not only to concern for the environment and health, but also to animal welfare and even better taste. Secondly, the positive inferences may not necessarily lead to purchase when consumers do not believe that the trade-off between price and quality is sufficiently favourable.

Scholderer (2003) reports results of a representative survey among Danish pork consumers. Consumers were asked to state their quality expectations for pork from pigs raised in different production systems. The production systems included extensive outdoor production as well as conventional, intensive indoor production. Quality expectations were measured on twelve different dimensions, including expected leanness, freshness, healthiness, tenderness, nutritional quality, juiciness, domestic origin, taste, absence of hormone and drug residues, nearby production, animal welfare, and price.

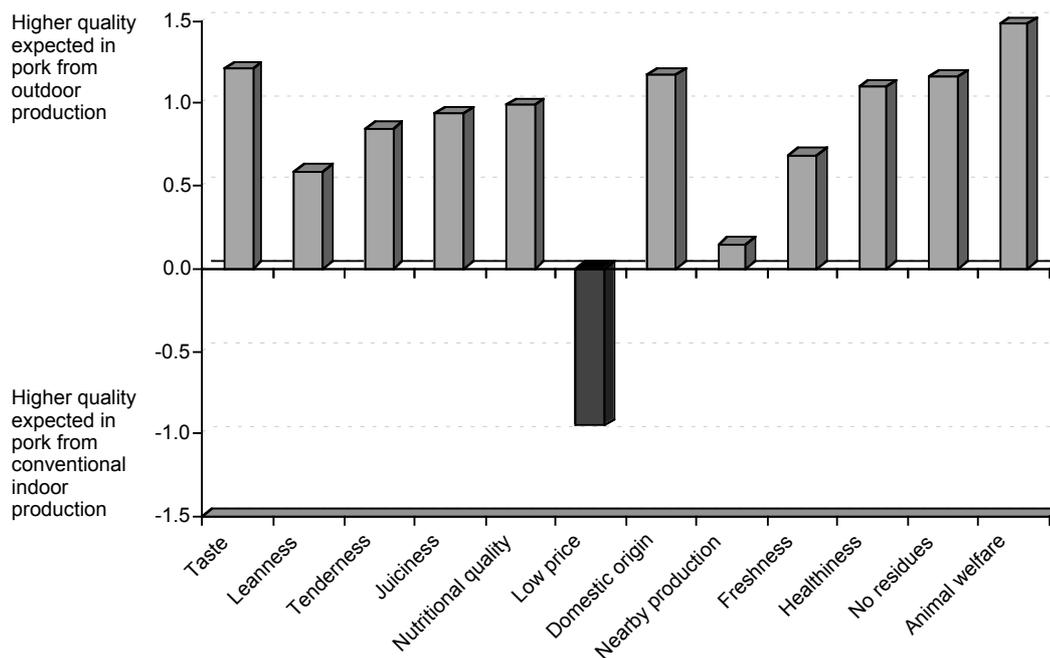


Figure 3. Consumer perceptions of quality advantages of pork from outdoor production systems as compared to pork from conventional indoor production systems (adapted from Scholderer, 2003).

When consumers' quality expectations were compared for pork produced under the two different systems, a "halo" effect was found. Consumers expected substantially higher quality in pork from outdoor production on *all* dimensions apart from price.

Such "halo" effects in quality expectation may become a serious problem. When consumers associate organic and outdoor production not only with health and animal welfare, but also with good taste, leanness, tenderness, and juiciness, this means that a process-related attribute like organic or free-range is no longer just a credence characteristic (Philipsen & Andersen, 1998), but partly becomes an experience characteristic, where expectations can be confirmed or disconfirmed after the purchase. When consumers have (perhaps unrealistic) expectations about better taste of organic products, the disconfirmation of such expectations may reduce the likelihood that the product will be re-purchased if perceptual contrast effects occur and therefore constitutes another potential barrier for the demand for organic pork.

In a choice experiment where respondents had to choose between conventional and organic pork, those choosing the organic variety expected the organic pork to be of better quality across all quality dimensions, including taste and tenderness (Grunert & Andersen, 2000). The quality experienced after preparing and eating the organic pork, however, fell generally short of the expectations. When consumers learn that the taste of organic products does not live up to expectations, they may be led to perceive that in some cases there may be a trade-off between taste and process.

Oude Ophuis (1994) reports an experiment where the effects of non-sensory factors on sensory evaluation of pork from pigs raised in free-range systems was investigated. A sample of 170 Dutch consumers participated in experimental tasting sessions. Two between-subjects factors, prior experience with free-range pork and labelling, and one within-person factor, actual meat type, were experimentally varied. Prior experience was found to have significant effects on the evaluation of the sensory attributes savoury, dry and pleasant. Although no significant main effects were found for the labelling factor, a number of interactions of labelling and prior experience with actual meat type were significant. Labelling and prior experience with the product appeared to influence sensory evaluation of free-range pork favourably for a number of attributes. At least for the group of consumers that had prior experience with free-range pork, a strong assimilation effect of prior expectations on sensory evaluations was concluded.

Aims of the study

The research reviewed above indicates that consumers expect substantially higher eating quality in pork that was produced in organic and free-range systems. On the production side, recent innovations in rearing and feeding strategies have led to organic pork of substantially improved quality. Initial results reported by Lindahl (2003) suggest that the difference between pork from pigs reared and fed under these improved organic systems may at least come close in objective quality to pork produced under conventional systems.

Assimilation and contrast theory (Sherif & Hovland, 1961) assumes that people's expectations operate as anchors relative to which an incoming stimulus is evaluated. Even though consumers' expectations of the quality of organic pork may be unrealistically high, the difference between expected and experienced quality may still be small enough to fall into consumers' latitudes of acceptance. Should this be the case, we would expect that consumers' quality experience will be assimilated towards their quality expectations, independent of small variations in objective quality of the meat. Below, an experiment is reported that tested this hypothesis.

METHOD

Participants

A total of $N = 240$ consumers from the Roskilde area were recruited in September 2003 for participation in consumer tests. Initial contact was made over the telephone, using the random digit dialling method for sampling¹. Upon contact, participants were screened according to two criteria: all participants had to be regular consumers of pork, and all had to have the main or shared responsibility for food shopping and cooking in their households. Of the 240 participants initially recruited, 55 failed to show up at the sensory testing facility on the agreed date, resulting in a total effective sample size of $N = 185$ (response quota: 71.2%). The mean age of the participants was 43.6 years (SD = 12.0), 60.5% were female. Demographic characteristics are presented in Table 1.

Procedure

All tasting sessions were conducted at the sensory testing facilities of the Danish Meat Research Institute in Roskilde in October 2003. Altogether, each participant tasted eight pork chop samples. The preparation of the samples followed the same standardised protocol under all conditions. The whole loins (*M. longissimus dorsi*) were trimmed to a maximum 2 mm fat layer and cut into chops of 19 mm thickness. Each chop was then fried to an internal temperature of 65°C (7-9 minutes in total). All chops were salted, but no pepper or additional seasoning was used during preparation or offered to the participants.

The pork chop samples varied on two factors: actual meat type, and label information. The factors were completely crossed within-subjects in a factorial design: each participant tasted each meat type under each label information condition, resulting in altogether eight samples per participant. The actual meat types were (a) conventional and (b) organic pork, both from pigs of a Duroc crossbreed (Duroc boar and Landrace x Yorkshire sow).

Under the conventional system, pigs had been reared indoors at the Danish Institute of Agricultural Sciences, Research Centre in Foulum (Tjele, Denmark) and had been fed conventional concentrate *ad lib*. Under the organic system, pigs had been reared indoors with access to an outdoor area at an organic farm, and fed organic concentrate and red clover silage *ad lib*. All pigs had been slaughtered at the Research Centre in Foulum. Means and standard deviations of live weight at slaughter and contents of water, intramuscular fat and protein in the loin under the two rearing conditions are shown in Table 2.

¹ Recruitment of participants had been subcontracted to TNS Gallup A/S, Masnedøgade 22-26, DK-2100 Copenhagen Ø, Denmark.

Table 1. Demographic characteristics of participants (total $N = 185$).

		Frequency	
		Count	Percent
Age	18-25 years	14	7.7
	26-35 years	41	22.5
	36-45 years	35	19.2
	46-55 years	60	33.0
	65-65 years	33	18.1
Gender	Female	112	60.5
	Male	73	39.5
Cohabitation	Single	46	24.9
	Living with partner	138	74.6
Number of persons In household	1	29	15.8
	2	75	40.8
	3	41	22.3
	4	30	16.3
	5+	9	4.8
Number of children (under 16) in household	0	104	61.2
	1	41	24.1
	2	119	11.2
	3	4	2.4
	4+	2	1.2
Gross annual household Income (DKK)	Below 200,000	11	5.9
	200,000-299,999	29	15.7
	300,000-399,999	27	14.6
	400,000-499,999	20	10.8
	500,000-599,999	38	20.5
	600,000 and above	57	30.8
Education	Up to 8 years of schooling	12	6.5
	9 or 10 years of schooling	67	36.2
	12 years of schooling	44	23.8
	Higher education	60	32.4
Occupation	Unskilled labour	9	4.9
	Skilled labour	38	20.5
	White-collar	84	45.4
	Self-employed	9	4.9
	Helping in family business	4	2.2
	Unemployed	7	3.8
	Retired	14	7.6
	In education	14	7.6
Region of residence	Rural	35	18.9
	Urban	143	77.3

Table 2. Characteristics of actual meat types: means and standard deviations (SDs) of live weight at slaughter and contents of water, intramuscular fat and protein in the loin under the two rearing conditions.

	Rearing condition			
	Conventional		Organic	
	Mean	(SD)	Mean	(SD)
Live weight at slaughter (kg)	102.4	(2.5)	102.7	(5.4)
Water (g/100g)	74.5	(0.6)	74.9	(0.6)
Intramuscular fat (g/100g)	2.0	(0.4)	1.8	(0.5)
Protein (g/100g)	23.1	(0.9)	23.0	(0.4)

The four label information conditions were (a) organic pork, (b) free-range pork, (c) conventional pork, and (d) no information. The samples were labelled by means of small banners attached to the plates on which the samples were served. The serial positions of the samples were counterbalanced across participants. Before tasting each sample, participants rated expected quality. After tasting each sample, participants rated experienced quality on four dimensions (including taste, tenderness, juiciness, and overall acceptability) as well as willingness to pay.

After having tasted and rated all pork chop samples, participants were asked to complete a short questionnaire about shopping and consumption habits, general quality orientations, and demographics. The sessions ended with a detailed debriefing. All participants were issued with a disclaimer informing them that the meat samples they had tasted had not in fact been the ones as which they had been labelled. All participants received monetary compensation.

Measures

Upon presentation, but before tasting each sample, expected quality was measured by asking respondents, “Please look at meat sample number X. Without having tasted it, what is your overall impression of the meat”, to be answered on a seven-point scale ranging from “not good at all” to “very good”.

Experienced quality was measured immediately after tasting each sample, separately on four dimensions. Taste was measured by asking respondents “How do you think the meat tasted”, to be answered on a seven-point scale ranging from “not good at all” to “very good”. Tenderness was measured by “How tender was the meat”, answered on a seven-point scale ranging from “not tender at all” to “very tender”. Juiciness was measured by “How juicy was the meat”, answered on a seven-point scale ranging from “not juicy at all” to “very juicy”. Overall acceptability was measured by “After having tasted the meat, what is your overall impression of the meat”, answered on a seven-point scale ranging from “not good at all” to “very good”.

Table 3. Means and standard deviations (SDs) of expected quality, experienced quality, and willingness-to-pay ratings under all experimental conditions (valid $N = 185$).

	Actual meat type			
	Conventional pork		Organic pork	
	Mean	(SD)	Mean	(SD)
Expected quality				
Label info: none	5.08	(1.20)	5.02	(1.13)
Label info: conventional	5.12	(1.13)	4.93	(1.13)
Label info: free range	5.46	(1.05)	5.36	(1.02)
Label info: organic	5.33	(1.14)	5.30	(1.00)
Experienced quality: taste				
Label info: none	5.15	(1.30)	4.89	(1.34)
Label info: conventional	4.98	(1.26)	4.85	(1.27)
Label info: free range	5.63	(1.16)	5.58	(1.17)
Label info: organic	5.65	(1.07)	5.50	(1.23)
Experienced quality: juiciness				
Label info: none	5.24	(1.34)	5.12	(1.46)
Label info: conventional	4.96	(1.38)	4.69	(1.39)
Label info: free range	5.43	(1.29)	5.22	(1.34)
Label info: organic	5.43	(1.21)	5.11	(1.41)
Experienced quality: tenderness				
Label info: none	5.10	(1.33)	4.89	(1.49)
Label info: conventional	4.89	(1.40)	4.88	(1.35)
Label info: free range	5.38	(1.25)	5.33	(1.34)
Label info: organic	5.34	(1.30)	5.11	(1.51)
Experienced quality: overall acceptability				
Label info: none	5.24	(1.24)	4.87	(1.38)
Label info: conventional	4.94	(1.34)	4.81	(1.24)
Label info: free range	5.47	(1.19)	5.46	(1.22)
Label info: organic	5.45	(1.14)	5.36	(1.27)
Willingness to pay (DKK per kg)				
Label info: none	88.71	(25.09)	84.13	(23.85)
Label info: conventional	86.28	(22.43)	81.89	(21.21)
Label info: free range	95.88	(23.57)	95.15	(23.26)
Label info: organic	98.04	(24.95)	94.84	(24.54)

Note. Expected quality and experienced quality ratings (on the four dimensions taste, tenderness, juiciness, and overall acceptability) were scaled to a minimum of 1 and a maximum of 7. Willingness-to-pay responses were collected with an open-ended question format.

Willingness to pay was measured after experienced quality had been measured for each sample. Respondents were asked, “What is the most you would be prepared to pay for 1kg of these pork chops? The average price for 1kg pork chops in a Danish supermarket is DKK100”. Means and standard deviations for all measures under each condition are shown in Table 3.

Design and analysis

The design was a completely crossed 2×4 within-subjects design, including the factors actual meat type (conventional pork, organic pork) and label information (no information, conventional pork, free-range pork, organic pork). The dependent variables were expected quality, experienced quality (measured on the four dimensions taste, tenderness, juiciness, and overall acceptability), and willingness to pay. Data were analysed by means of repeated-measures analysis of variance (ANOVA) using the GLM procedure in SPSS 11.0.

RESULTS

Expected Quality

To check whether the experimental manipulations had been successful, a repeated measures ANOVA was conducted with actual meat type and label information as within subjects-factors, and expected quality as the dependent variable. This is a useful test of the internal validity of the experiment: before tasting the pork chop samples, participants should not have had any cues on which to base their quality expectations apart from the label information. As expected, the information on the label had a highly significant impact on participants' expected quality ratings ($F[3,182] = 13.42, p < .001$, effect size $\eta^2 = .18$), whilst actual meat quality had no such effect, and neither had the interaction of both factors.

The marginal means of the ratings that participants gave under the four label conditions (averaged over actual meat types) are shown in Figure 4. As expected, participants expected substantially higher quality from pork that was labelled "free range" or "organic" than they did from pork that was unlabelled or labelled "conventional". Interestingly, participants did not expect differences between free-range and organic pork (as indicated by pairwise comparisons with Bonferroni adjustment). Likewise, they appeared to equate unlabelled with conventional pork.

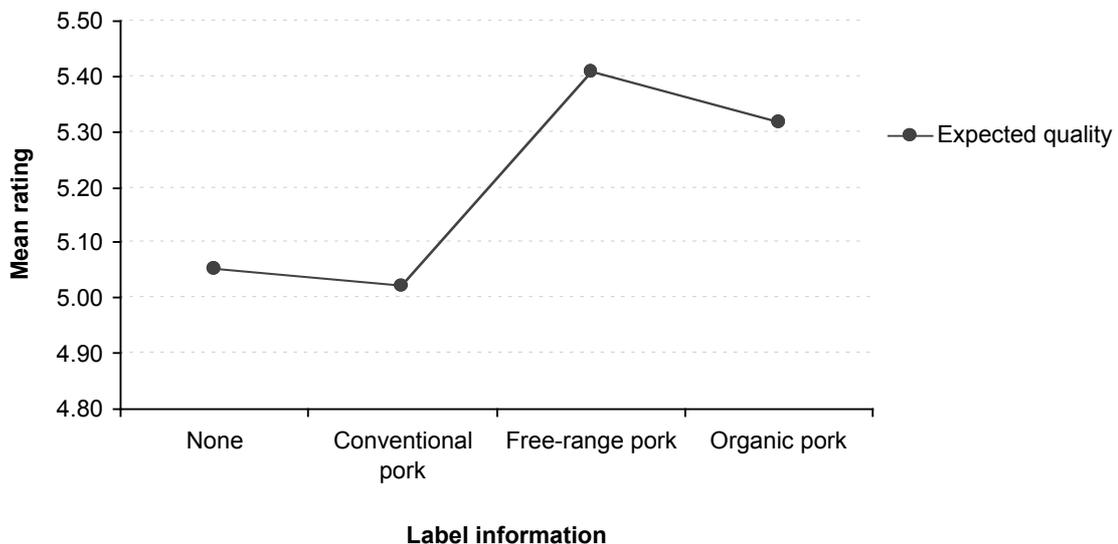


Figure 4. Marginal means of expected quality under different information conditions, independent of actual meat type (measured before each sample was tasted).

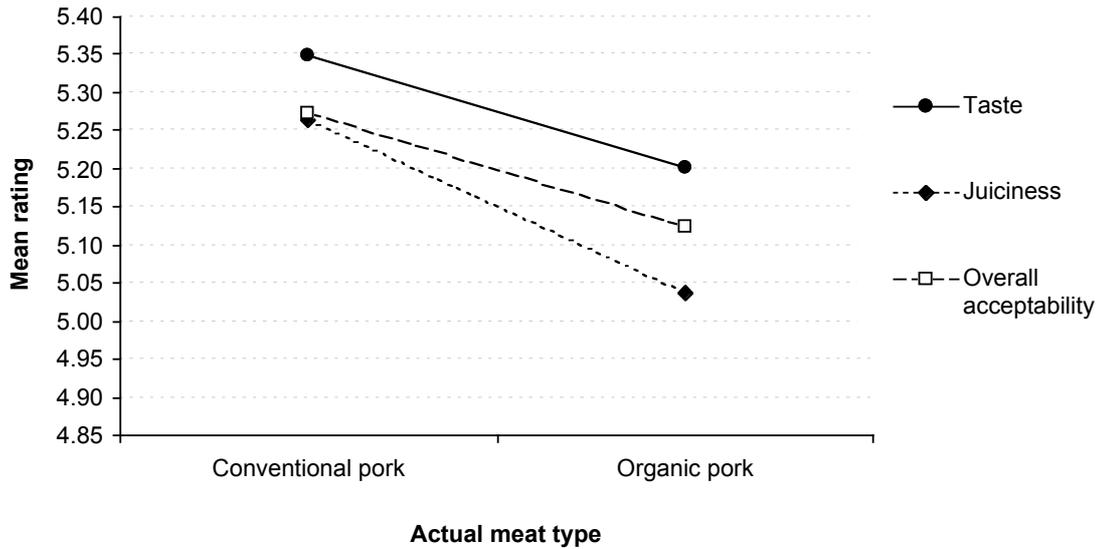


Figure 5. Marginal means of experienced quality (on three dimensions) of different actual meat types, independent of information condition (measured after each sample had been tasted).

Experienced Quality

Separate repeated-measures ANOVAS were conducted over the four experienced-quality dimensions, taste, tenderness, juiciness, and overall acceptability. Actual meat type had small but significant effects on taste ($F[1,184] = 5.85, p < .05, \eta^2 = .03$), juiciness ($F[1,184] = 10.03, p < .01, \eta^2 = .05$), and overall acceptability ($F[1,184] = 5.85, p < .05, \eta^2 = .03$), but not on tenderness. Marginal means of the quality ratings participants gave for conventional and organic pork are shown in Figure 5. The pattern appears to be stable across the three dimensions: the experienced quality of organic pork is consistently lower than that of conventional pork.

Label information, on the other hand, had highly significant main effects on all four dimensions of experienced quality: taste ($F[3,182] = 24.16, p < .001, \eta^2 = .36$), tenderness ($F[3,182] = 11.54, p < .001, \eta^2 = .16$), juiciness ($F[3,182] = 13.68, p < .001, \eta^2 = .18$), and overall acceptability ($F[3,182] = 19.56, p < .001, \eta^2 = .24$). The marginal means are shown in Figure 6. The pattern is the same that was already observed above. Independent of the actual meat that participants tasted, they experienced substantially higher quality in pork that was labelled “free range” or “organic” than in pork that was unlabelled or labelled “conventional”. Quality ratings for free-range and organic pork did not differ significantly from each other (as indicated by pairwise comparisons with Bonferroni adjustment). Unlabelled and conventional pork did not differ significantly from each other either.

No interactions between actual meat type and label information were found for any of the four experienced quality dimensions, indicating that the two factors were additive.

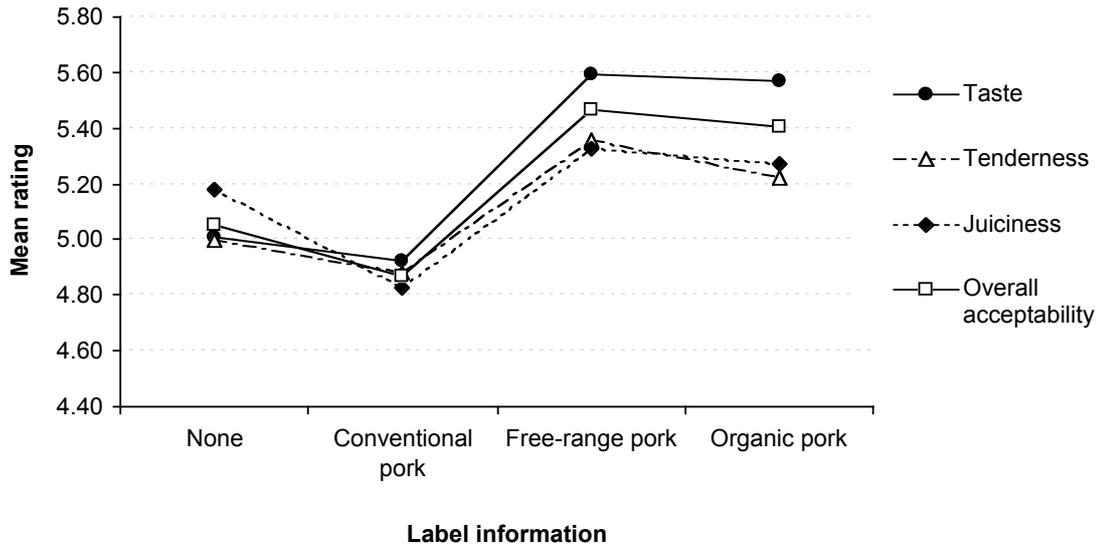


Figure 6. Marginal means of experienced quality (on four dimensions) under different information conditions, independent of actual meat type (measured after each sample had been tasted).

Willingness to pay

Finally, participants' willingness to pay for the pork chops they had sampled was analysed, using the same repeated-measures design. Mirroring the effects obtained for experienced quality, actual meat type had a small but significant main effect ($F[1,184] = 7.38, p < .01, \eta^2 = .04$). As shown in Figure 7, the marginal means of participants' stated willingness to pay were lower for organic pork than for conventional pork.

Label information had a highly significant and substantially larger effect ($F[3,182] = 30.11, p < .001, \eta^2 = .35$). Marginal means are shown in Figure 8. Independent of the actual meat that participants had tasted, they were willing to pay more for pork that was labelled "free range" or "organic" than for pork that was unlabelled or labelled "conventional". Pairwise comparisons indicated that willingness to pay did not differ significantly between free-range and organic pork, and neither did it between unlabelled and conventional.

The interaction was not significant, indicating that the effects of actual meat type and label information affected willingness to pay additively.

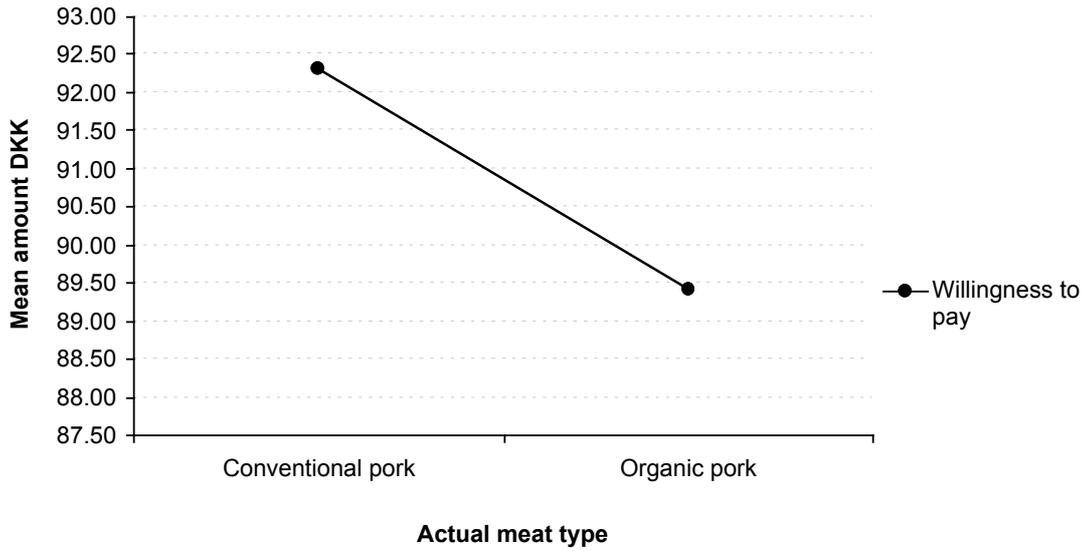


Figure 7. Marginal means of consumer willingness to pay for different actual meat types, independent of information condition (measured after each sample had been tasted).

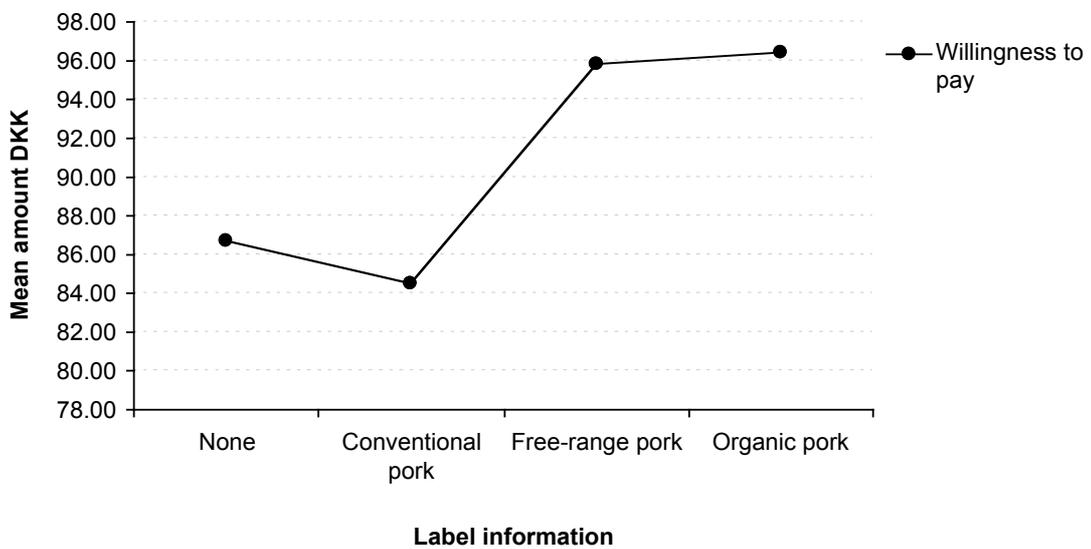


Figure 8. Marginal means of consumer willingness to pay under different information conditions, independent of actual meat type (measured after each sample had been tasted).

DISCUSSION AND CONCLUSIONS

Sustainable pig production systems face the challenge that consumers expect benefits from them that go beyond process parameters such as improved animal health and welfare. Qualitative and quantitative research has indicated that, in addition to such process benefits, consumers have high expectations about the eating quality of pork that was produced in organic and free-range systems. Although these expectations may be unrealistically high, recent innovations in rearing and feeding strategies have led to organic pork of substantially improved quality that may at least come close in eating quality to pork produced under conventional systems.

The research reported here has investigated what happens when consumers' expectations are confronted with actual product experience. The research question was formulated in terms of assimilation and contrast theory (Sherif & Hovland, 1961): even though consumers' expectations of the quality of organic pork may be unrealistically high, the difference between expected and experienced quality may still be small enough to fall into consumers' latitudes of acceptance. Should this be the case, it was expected that consumers would assimilate their quality experience towards the anchor set by their prior expectations, and that this effect should be observable independent of small variations in the objective quality of the sampled meat.

An experiment was conducted to test this hypothesis. Consumers evaluated a number of pork chop samples that varied on two factors: the actual type of the meat (conventional versus organic pork), and the type as which it was labelled (organic, free-range conventional, and no information). Label information and actual meat types had been completely crossed in a factorial design, allowing separation of the effects of consumer expectations from the effects of objective meat quality. The results showed a consistent pattern:

- Pork chops labelled "free-range" or "organic" were consistently perceived to have higher eating quality than pork chops labelled "conventional" or unlabelled ones, independent of the actual meat type consumers had tasted.
- When label information effects were adjusted for, the organic pork chops used in this particular study were consistently perceived to have slightly lower eating quality than the conventional pork.
- The effects of label information were substantially higher than the effects of actual meat type (averaged over quality dimensions, the effect size η^2 of the labelling factor was approximately nine times higher than the effects size of the actual meat factor).

Hence, it can be concluded that the hypothesised assimilation effect did in fact occur. If differences between quality expectations and quality experiences are small enough, quality expectations will function as anchors and raise the level of experienced quality until it aligns with expectations.

However, there is a caveat to this conclusion. Although consumers' stated willingness to pay for pork chops that were labelled "organic" or "free-range" was significantly higher than for pork chops labelled "conventional" or unlabelled ones, the absolute premium they were prepared to pay was relatively small. Averaged over actual meat types, respondents stated that they would be prepared to pay a premium of approximately DKK10/kg (equivalent to a 12% premium) for pork chops labelled "organic" or "free-range".

Unfortunately, consumers' true willingness to pay is probably still overestimated by this figure. Research on response bias in willingness to pay surveys has found that respondents are likely to give "symbolic" answers to willingness-to-pay questions when the attitudes towards an issue have value-expressive character (Blamey, 1998). Hence, a discounting factor should be applied to the "raw" willingness responses. The exact size of such a factor is unknown. Although the response format chosen here is known to yield a relatively small amount of bias as compared to other response formats (see Brown, Champ, Bishop & McCollum, 1996), the estimates should still be treated with caution.

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