Effect of Information About Animal Welfare on Consumer Willingness to Pay for Yogurt

F. Napolitano,[1] C. Pacelli, A. Girolami, and A. Braghieri
Dipartimento di Scienze delle Produzioni animali, Università degli Studi della Basilicata, Via dell'Ateneo Lucano 10, 85100 Potenza, Italy

ABSTRACT

This study aimed to verify whether consumers confirm their willingness to pay extra costs for higher animal welfare standards in a situation where a potential purchase performed by consumers, such as the Vickrey auction, is used. A 104-member consumer panel was asked to rate its willingness to pay (WTP) for plain and low-fat yogurts in 3 information conditions: tasting without information (blind WTP), information about animal welfare without tasting (expected WTP), tasting with information about animal welfare (actual WTP). Information was provided to the consumers under the form of labels indicating the level of animal cleanliness and freedom of movement (5-point scale, from poor to very good). Consumers were influenced by information about low standards of animal welfare (low cleanliness and low freedom of movement) and moved their willingness to pay in the direction of their expectations. However, the discrepancy between expectancy and actual WTP was not totally assimilated, indicating that WTP was also expressed in relation to other aspects (e.g., the sensory properties of the products). Conversely, the information concerning high standards of animal welfare (high cleanliness and high freedom of movement) was able to affect expectancy but had an effect on actual WTP only when the most acceptable yogurt was offered to the consumers. In the case of discordant information on animal welfare, partly indicating high levels of welfare (freedom of movements) and low levels of welfare (cleanliness), expected WTP was always lower than blind WTP. However, when the least acceptable product was presented, they completely assimilated their actual WTP to the expectations. Conversely, with the most acceptable yogurt, no assimilation occurred and sensory properties prevailed in orienting consumer WTP. Within each product, consumers expressed a higher WTP for products with labels indicating high welfare standards as compared with yogurts with labels reporting intermediate and low welfare standard. These results show that information about animal welfare, if given to the consumers, can be a major determinant of consumer WTP for animal-based food products. However, information about high standards of animal welfare should be paired with products presenting a good eating quality.

Key words: animal welfare, willingness to pay, information, yogurt

INTRODUCTION

Intensive systems allow obtaining animal products at relatively low prices. They represent the main production system in Europe and North America, and are acquiring most of the market in the developing countries. As a consequence, the welfare of farmed animals is markedly and progressively decreasing (Verhoog et al., 2004). In a study done by the European Commission in 2007 consumers were asked to rate the importance of farm animal protection on a scale ranging from 0 to 10. The majority of consumers answered toward the high end of the scale with a score of 7.8. In response to this public endorsement an increasing number of regulations have been issued on the welfare of farm animals in general (European Union, 1998) and for various animal categories (veal calves, European Union, 1991a, 1997; pigs, European Union, 1991b, 2001; laying hens, European Union, 1999), whereas a directive has been recently proposed for broilers (Council of the European Union, 2005). In addition, most of respondents to a recent survey (86%) believed that imported foods from outside the European Union should respect the same conditions of animal welfare as those applied in the European Union (European Commission, 2007). In North America, livestock welfare has traditionally been an area for industry self-regulation. However, Swanson and Mench (2000) noted that a number of opinion polls revealed public interest in the way farm animals are raised. As a possible consequence, various bills have been offered that would affect animal care on the farm, during transport, or at slaughter.

Despite the public drive toward increased farm animal welfare standards, many farmers, practitioners, and academics are concerned about the extra costs linked to increased levels of animal welfare. They claim that such increased costs may lead to a reduced competitiveness of farm animal enterprises. From a strict economic point of view, the values of animal welfare are negative, inducing unmitigated costs to producers and consumers (Tweeten, 1991). The relationship between animal welfare and production costs is complex (Appleby, 2005). For instance, it has been estimated that only 19% of the price paid by consumers reaches farmers (ERS, 2004). In recent years, although retail costs to consumers for animal products have steadily increased, payments to farmers have not increased or have even decreased, indicating that farmers have little control over the margins that can be obtained from the food market (Fraser et al., 2001). According to Appleby (2005) and McInerney (2004), marked improvements in farm animal welfare could be achieved with only minor increments of food prices (less than 1%), whereas Bornett et al. (2003) noted that moving from fully slatted floors to Freedom Food standards for pigs determines a 4% increment in pork production costs.

For consumers from western countries, price is not the only determinant behind animal-food purchases as they are acquiring an increasing interest in farming practices and the related animal welfare standards. Consumers do not seek the cheapest food but the best value for money [i.e., the maximum benefit for what they are prepared to spend (McInerney, 2004)]. Consumers make their food choices using many different aspects. Intrinsic (e.g., color, flavor) and extrinsic cues (e.g., price, origin, stamp of quality, production, and nutritional information) are used to form expectations about product quality attributes. The latter can be classified in 2 categories: those experienced before or during consumption (experience quality attributes: e.g., price and sensory properties) and those not experienced directly, such as healthiness, naturalness, ethical aspects, and so on, which confer benefits to the consumers because they are believed to be true but should be communicated to be perceived because they are credence characteristics that cannot be confirmed before or after purchase. In a recent study conducted on Lebanese consumers, Haddad et al. (2007) noted that sensory properties and fat level accounted for 65.5% of intent to purchase concentrated yogurt (Labneh), whereas information on various aspects (price, processing, nutritional characteristics) contributed only 34.5% of purchase intent. However, the consumption of yogurt, a food already considered to be healthy, can benefit from further messaging and promotion

(Luckow et al., 2005). In fact, a significant effect of the expectations induced by information has been observed on yogurt quality judgment and purchase intent (Schifferstein et al., 1999).

Hedonic measurements are often used to study the global (actual) perception of the product. Previous studies have been conducted on the effect of information about animal welfare on lamb (Napolitano et al., 2007a) and beef liking (Napolitano et al., 2007b). These experiments showed that expectations induced by the information on animal welfare were able to affect the quality perception of meat: the expectations were positively (the liking score of the product tasted without external information was higher than expected) or negatively disconfirmed (the product was worse than expected) according to the information given to the consumers. Thus, the assimilation model was generally applicable (Anderson, 1973; Cardello and Sawyer, 1992) because in both cases the hedonic ratings moved toward the expectations when the information concerning animal welfare was given, as compared with tasting without external information. The information given to consumers should be based on real data concerning production systems where their ethical concerns about animal welfare are really addressed.

Other studies indicated that consumer intent to pay, measured through a questionnaire, was higher for products obtained using animal-friendly raising techniques. In particular, people appeared to be prepared to pay an average 5% extra for pork from outdoor-raised pigs, with one-fifth of consumers declaring to be willing to pay 20% extra (Dransfield et al., 2005). In another study conducted on consumers from the 25 European Union member states, the majority of respondents (57%) stated that they were prepared to pay more for eggs from animal-welfare-friendly production systems: 25% could accept a 5% increase, 21% declared that an increment of 10% would be acceptable, and 11% were prepared to pay extra costs of 25% or more (European Commission, 2005). Similar results were obtained in the United States, where in 1998 44% of respondents expressed the intent to pay 5% more for food from animals raised humanely and 20% said they were prepared to pay up to 10% more (Swanson and Mench, 2000).

However, hedonic and purchase intent measurements may be not representative of the real behavior of consumers. They may declare high preferences and purchase intent for products with high-perceived quality, albeit not buying them under economic constraints (Lange et al., 1999). Therefore, little is known on the effect of the information about animal welfare on the real willingness to pay of consumers. Recent studies demonstrated that auctions are able to place consum-

Table 1. Chemical composition of plain (PY) and low-fat (LFY) yogurts (g/100 g)

Item	PY	LFY
Protein	4.8	4.0
Sugar	4.0	5.1
Lipid	3.5	0.1

ers in real situations where they can show their true preferences. In particular, the Vickrey second price auction is widely used to assess consumer willingness to pay real goods (e.g., Melton et al., 1996), including foods (Lange et al., 2002), and the value consumers give to food safety (e.g., Hayes et al., 1995). According to this specific type of auction consumers are individually asked to submit a sealed bid corresponding to the highest price they would agree to pay for a particular product. The highest bidder (i.e., the winner), by paying the second highest price, has the opportunity to buy a product at a price equal to or, more often, lower than the value he assigns to the product (Vickrey, 1961).

The present study aims to verify whether consumers confirm their willingness to pay extra costs for higher animal welfare standards in a situation where a potential purchase performed by consumers, such as the Vickrey auction, is included.

MATERIALS AND METHODS

Products and Subjects

Two products were used (Table 1): plain yogurt (**PY**) and low-fat yogurt (**LFY**). Subjects were recruited in Potenza (main town in the region of Basilicata, southern Italy). One hundred thirty-five subjects were interviewed and were asked their frequency of consumption at home (1 = never; 2 = less than once a month; 3 = once a month; 4 = once a week; 5 = once a day). The consumer panel consisted of 104 subjects selected on the basis of age (19 to 34 yr) and level of education (at least high school diploma), and using predetermined screening criteria based on consumption frequency of yogurt. The selected consumer panel included subjects that reported to consume yogurt at least once a month. Subjects were mainly students with a mean age of 24 yr, as in previous research (Grunert and Valli, 2001) young subjects with a higher level of education fell within a segment of consumers defined as "concerned about animal welfare". In addition, consumers were asked to fill out a questionnaire to assess their sensitivity to various aspects of animal welfare. The questionnaire consisted of statements that were positive or negative in terms of animal welfare. These statements were presented to the subjects in an alternate order to avoid a carryover effect. Consumers were asked to rate their degree of agreement with statements, such as "Farm animals are sentient beings", "In farming practices, production efficiency is more important than animal welfare", "Farm animals should be raised in natural conditions", "Mutilations (beak trimming, de-horning, etc.) represent a useful tool for increasing production efficiency", etc., on a 7-point scale labeled at the left end with "I do not agree", at the right end with "I do agree" and at the central point with "I neither agree nor disagree", the latter corresponding to the score 4. Scores were attributed following an increasing trend for positive statements (1 to 7), whereas a decreasing trend was used for negative statements (7 to 1). The mean scores of the subjects participating to the study ranged from 5.5 to 6.8, indicating a high sensitivity to animal welfare issues.

Experimental Design and Information Provided to Consumers

The experiment was planned in three tests (Table 2). In the first test the consumers were offered both PY and LFY in a balanced order of presentation. They were asked to taste the product and rate their willingness to pay (**WTP**) receiving no information (no information sheet, no labels) on the products (blind WTP). The WTP and hedonic scores are strongly related (Lange et al., 2002); therefore, in blind conditions, consumers were also asked to rate the 2 products on a 9-point hedonic scale to assess the perceived acceptability of the 2 products (PY and LFY) and evaluate whether sensory properties were able to influence the effect of information on consumer willingness to pay. The scale was labeled at the left end with "extremely unpleasant", at the right end with "extremely pleasant" and at the central point with "neither pleasant nor unpleasant", the latter corresponding to the score 5. In the second test the subjects received the information sheet and the products labeled with the information concerning the welfare conditions of the animals in terms of body cleanliness and locomotion. They were asked to read carefully the information and give their WTP expectation for that product without tasting it (expected WTP). First and second tests were performed in the same day. The day after the third test was performed: the consumers were given both products (PY and LFY) labeled along with the information sheet. Consumers were instructed to read the information sheet and the labels before tasting the sample and express their WTP immediately afterward (actual WTP).

Table 2. Summary of the experimental design for the assessment of consumer willingness to pay (WTP)

Test	Day	Stimulus presentation	Type of evaluation	Type of rating
1	1	Yogurt	Tasting without information	Blind WTP
2	1	Information	Expectation	Expected WTP
3	2	Yogurt + information	Tasting with information	Actual WTP

In tests 2 (expectations produced by information) and 3 (actual WTP generated by information and tasting of the product) consumers were provided with labels (Table 3) and an information sheet explaining their meaning. The information given to the consumers was based on a recent study in which laypeople were asked to watch videos of dairy cattle raised according the most common housing systems in use [i.e., cubicles (**CU**), straw yards (**SY**), and tie stalls (**TS**)] and elicit terms describing how they perceived the observed farming systems to affect cattle welfare (Napolitano et al., 2007c). Two main dimensions of animal welfare were identified by pairing free choice profiling and generalized Procrustes analysis techniques: cleanliness and freedom of movement. The statistical analysis indicated that CU farms received high scores for both cleanliness and freedom of movement, whereas SY farms were high in freedom of movement and low in cleanliness, and TS were low in both freedom of movement and cleanliness. Thus, the following explanation was given to the consumers through the information sheet:

Today you will receive 6 products obtained from 6 different farms. Several aspects can be taken into account to assess animal welfare at farm level. However, only 2 main aspects relevant to animal welfare were assessed in these farms: freedom of movement and body cleanliness. These aspects are solely related to the animals and do not affect food safety, which is guaranteed for all products. The results of the on-farm welfare assessment are reported on the labels under the form of stars, as indicated below:

★★★★★= Very good

★★★★☆ = Good

★★★☆☆ = Sufficient

★★☆☆☆ = Insufficient

★☆☆☆☆ = Poor

Three labels, corresponding to 3 combinations of cleanliness/freedom of movement were used:

Cleanliness ★★★★★, freedom of movement ★★★★☆ (corresponding to farms CU)

Cleanliness ★☆☆☆☆, freedom of movement ★★★★★ (corresponding to farms SY)

Cleanliness ★★☆☆☆, freedom of movement ★☆☆☆☆ (corresponding to farms TS).

Vickrey Auction and Data Acquisition

The second price Vickrey auction (Lange et al., 2002) was used to assess consumer willingness to pay for yogurts according to the level of welfare of the animals used in the production process. Participants attended a short presentation explaining the procedure to be followed for the auction. It was made clear that the submission of bids implied a commitment to buy the product. Participants agreeing to the procedure signed a consent and received €10 in cash. Subsequently, a formal training on the use of the Vickrey second price auction was conducted. It was explained that for each product evaluated the maximum price accepted to pay for one unit of product had to be written on paper, separately by each participant. The participant submitting the highest price (winner) had to buy the product, not at the submitted price, but at the second highest price (i.e., the second highest submitted bid). This procedure allowed one of the participants to buy a product at a price lower than or equal to the price they would normally accept to pay. It was also explained that the study aimed to know the value that the product had for the consumers, not its commercial value, and that the best option for them was the submission of their real reservation price. To ascertain that all participants correctly interpreted the procedure, some practice was conducted using snacks. Subsequently, the 3 tests were conducted: it was explained that yogurts would be evaluated under different information conditions and only one condition, randomly chosen by a consumer, would be used as the actual auction. This procedure was used to avoid that winners would become less motivated in winning more products.

Statistical Analysis

All the variables were tested for normal distribution using the Shapiro-Wilk test (Shapiro and Wilk, 1965). Student's paired *t*-tests were used to evaluate differences between mean offers expressed either for differ-

Table 3. Product labels for each information condition corresponding to 3 housing systems

Housing system	Label[1]
Tie stall	Animal welfare score
	Freedom of movement ★☆☆☆☆
	Cleanliness ★★☆☆☆
Straw yard	Animal welfare score
	Freedom of movement ★★★★★
	Cleanliness ★☆☆☆☆
Cubicle	Animal welfare score
	Freedom of movement ★★★★☆
	Cleanliness ★★★★★

[1]★★★★★ = Very good; ★★★★☆ = Good; ★★☆☆☆ = Insufficient; ★☆☆☆☆ = Poor.

ent combinations "information types (TS, SY, CU)/ product (PY, LFY)", or for the same combination under different information conditions (tasting only, information only, tasting with information).

RESULTS AND DISCUSSION

Comparisons Between Different Information Conditions (Tasting Only, Information Only, Tasting with Information)

Perceived acceptability was higher for PY (5.82 ± 0.19) than LFY (4.79 ± 0.17; $P < 0.001$). In particular, consumers rated the former product above the central point (5 = neither pleasant nor unpleasant) and the latter below it. This result is likely to be due to the different chemical composition of the 2 products (Table 1), which in turn affected their sensory properties: low fat products show reduced creaminess and flavor, which can only partly be replaced by added sugar solids (Rash, 1990).

Results concerning the effect of information on expected and actual WTP are shown in Table 4. For any combinations of information type/product the expected WTP was significantly different from the WTP expressed in blind conditions ($P < 0.01$), thus indicating

the occurrence of disconfirmations. In particular, the consumers found all combinations of yogurts PY and LFW with information TS and SY better than expected (positive disconfirmation), whereas the combinations PY – CU and LFY – CU were considered worse than expected (negative disconfirmation). These results indicate that information about raising conditions and the related animal welfare can have a marked impact on consumer expectancy with high animal welfare standards (CU) associated with higher WTP for food products and low animal welfare standards associated with lower purchase intent. According to Blokhuis et al. (2003) the perception of food quality is determined by the welfare of the animals producing that food along with the overall nature and safety of the end product. However, when the consumers were provided with information partly indicating high levels of welfare (freedom of movements) and low levels of welfare (cleanliness), their expectations were lower as compared with WTP expressed in blind conditions. Therefore, in presence of discordant information, consumers lower their expectations in conformity to the worse condition of welfare. Alternately, it can be hypothesized that consumers deem animal hygienic conditions more relevant than the expression of natural behavior.

When SY was paired with PY and CU was paired with LFY, no assimilation toward the expectations could be detected; expectancy did not affect actual WTP (actual WTP was not significantly different from WTP expressed in blind conditions). Significant differences were observed between actual and blind WTP for the combinations TS/PY ($P < 0.01$), TS/LFY ($P < 0.001$), SY/LFY ($P < 0.01$), and CU/PY ($P < 0.01$), thus indicating that the information about cattle welfare was able to affect the actual WTP of consumers for the corresponding yogurts. In this case, the effect of information can be explained on the basis of the assimilation model, which can be observed when the actual WTP of the product moves in the direction of the expec-

Table 4. Effect of expectation on consumer willingness to pay (WTP) each combination information/product[1]

Ratings[2]	Combinations information/product					
	TS/PY	TS/LFY	SY/PY	SY/LFY	CU/PY	CU/LFY
E − B	−0.29***	−0.16***	−0.22***	−0.09**	0.25***	0.38***
	positive disconfirmation	positive disconfirmation	positive disconfirmation	positive disconfirmation	negative disconfirmation	negative disconfirmation
A − B	−0.11**	−0.09***	−0.05	−0.08**	0.08**	0.04
	assimilation	assimilation	no assimilation	assimilation	assimilation	no assimilation
A − E	0.19**	0.05*	not applicable	0.01	−0.17***	not applicable
	incomplete	incomplete		complete	incomplete	

[1]Information/product: CU = cubicles, SY = straw yards; TS = tie stalls; PY = plain yogurt; LFY = low-fat yogurt.

[2]Ratings: E = expected WTP mean scores; B = blind WTP mean scores (baseline); A = actual WTP mean scores (with information).

*$P < 0.05$; **$P < 0.01$; ***$P < 0.001$.

tations. In particular, the labels giving information of low welfare standards for both parameters (i.e., TS: low score for animal cleanliness, low score for freedom of movements) had a negative impact on the actual WTP of both products (PY and LFY). These results indicate that when the information on animal welfare is consistent, consumer WTP can be markedly reduced. Conversely, when discordant information was given (i.e., SY: low score for animal cleanliness, high score for freedom of movements), the assimilation occurred only in the case of the product LFY. Although a positive disconfirmation occurred for both products, the expectations were able to affect the actual WTP only if the yogurt (LFY) was less acceptable from a sensory point of view, whereas if the sensory properties of the product were satisfactory (PY), the expectations produced by contradictory information did not significantly reduced yogurt actual WTP. When labels indicating high welfare standards for both parameters (i.e., CU: high score for animal cleanliness, high score for freedom of movements) were used, they determined assimilation only for PY. In this information condition, the assimilation was detected only when a more acceptable product (PY) was offered to the consumers, whereas if the yogurt was disliked (LFY), the information was unable to significantly increase product actual WTP.

Both combinations TS/PY and TS/LFY determined incomplete assimilations, as indicated by the fact that in both cases expectancies were significantly lower than actual WTP. Conversely, the incomplete assimilation observed for CU/PY can be attributed to the fact that the expectations were significantly higher than actual WTP. The incomplete assimilations observed for these combinations are likely to be due the important role played by sensory properties in the determination of actual WTP. In fact, when the label TS (low welfare standards) was paired to the more acceptable product (PY), the assimilation was lower ($P < 0.001$) than in the case of TS/LFY pairing, corresponding to the less acceptable yogurt ($P < 0.05$).

Unlike TS/LFY, the combination SY/LFY produced a complete assimilation of consumer WTP toward the expectations. These results are not necessarily in contrast, as in the case of SY/LFY the disconfirmation (difference between expectations and WTP in blind conditions) was much lower than in the case of TS/LFY.

Comparisons Between Different Combinations of Information Type (TS, SY, CU)/Product (PY, LFY)

Table 5 shows blind, expected, and actual consumer WTP. Mean scores of blind WTP were higher for PY than LFY ($P < 0.001$), possibly reflecting the perceived liking of the 2 products. Conversely, expected WTP

scores were higher for CU than SY and TS ($P < 0.001$) and higher for SY than TS ($P < 0.01$). Within each information type PY actual WTP was always higher than LFY actual WTP ($P < 0.001$), as a consequence of the different perceived liking of the 2 products. More importantly, within each product (PY, LFY) consumers expressed a higher actual WTP for CU-labeled yogurts as compared with SY- and TS-labeled products ($P < 0.001$). Conversely, the actual WTP expressed for SY-labeled product tended to be higher than TS ($P < 0.10$) when PY was offered to consumers, whereas no significant differences between SY and TS yogurts were observed when LFY was used.

These results indicate that consumers are aware of the possible negative effects of low animal welfare standards on product quality. Our study also confirms previous reports based on focus groups stating that consumers use animal welfare as an indicator of other product attributes such as food safety, food quality, and food healthiness (Harper and Henson, 2001). According to Harper and Henson (2001) consumers are concerned about animal welfare. However, currently this aspect is not a priority in food choice as a consequence of the lack of information available about the farming practices used for production purposes. The same authors revealed that consumers are willing to receive more information about production methods to make informed choices. In fact, the majority of the respondents to a survey conducted within European Union stated that they were very rarely or never able to identify products obtained using animal-welfare-friendly production systems because no information was provided (European Commission, 2005).

CONCLUSIONS

Results from the present study show that consumers were influenced by information about low standards of animal welfare and moved their WTP in the direction of their expectations. However, the discrepancy between expectancy and actual WTP was not totally assimilated, indicating that WTP was also expressed in relation to other aspects (e.g., the sensory properties of the products). Conversely, the information concerning high standards of animal welfare were able to affect expectancy but had an effect on actual WTP only when the most acceptable yogurt was offered to the consumers, possibly because when consumers received a less acceptable product the effect of sensory properties prevailed on the effect of information. In the case of discordant information on animal welfare, consumer expected WTP was always lower than blind WTP. However, when the least acceptable product was presented, they completely assimilated their actual WTP

Table 5. Mean (±SE) willingness to pay the product in 3 different sessions (blind, expectation, actual) and for each combination information/product[1]

Item	Blind		Expectation		Actual	
	PY	LFY	PY	LFY	PY	LFY
TS	0.56 ± 0.03	0.43 ± 0.02	0.27 ± 0.02	0.27 ± 0.02	0.46 ± 0.02	0.32 ± 0.02
SY	0.56 ± 0.03	0.43 ± 0.02	0.34 ± 0.02	0.34 ± 0.02	0.52 ± 0.02	0.35 ± 0.02
CU	0.56 ± 0.03	0.43 ± 0.02	0.81 ± 0.03	0.81 ± 0.03	0.65 ± 0.02	0.47 ± 0.02

[1]Combination information/product: TS = tie stalls; SY = straw yards; CU = cubicles; PY = plain yogurt; LFY = low-fat yogurt.

to the expectations, possibly because the difference between expected and blind WTP was low, whereas with the most acceptable yogurt no assimilation occurred and sensory properties prevailed in orienting consumer WTP. Within each product, consumers expressed a higher actual WTP for CU- (high welfare standards) labeled yogurts as compared with SY- (intermediate welfare standard) and TS- (low welfare standard) labeled products.

These results show that information about animal welfare, if given to the consumers, can be a major determinant of consumer willingness to pay animal-based food products such as yogurt. Therefore, this information can provide farms a potential tool to differentiate products and increase competitiveness with no interventions on production efficiency, while improving the welfare state of the animals. However, to be effective, information about high standards of animal welfare should be paired with products presenting a good eating quality because, along with information, sensory properties play an important role in affecting consumer willingness to buy yogurt. In addition, it seems that, if information is given in a discordant manner (e.g., high standards for one aspect, low for another one), consumers tend to lower their expectations to the worse conditions with negative effects on their actual willingness to pay.

ACKNOWLEDGMENTS

REFERENCES

Anderson, R. E. 1973. Consumer dissatisfaction: The effect of disconfirmed expectancy on perceived product performance. J. Mark. Res. 10:38–44.

Appleby, M. C. 2005. The relationship between food prices and animal welfare. J. Anim. Sci. 83(E Suppl.):E9–E12.

Blokhuis, H. J., R. B. Jones, R. Geers, M. Miele, and I. Veissier. 2003. Measuring and monitoring animal welfare: Transparency in the food product quality chain. Anim. Welf. 12:445–455.

Bornett, H. L. I., J. H. Guy, and P. J. Cain. 2003. Impact of animal welfare on costs and viability of pig production in the UK. J. Agric. Environ. Ethics 16:163–186.

Cardello, A. V., and F. M. Sawyer. 1992. Effects of disconfirmed consumer expectations on food acceptability. J. Sens. Stud. 7:253–277.

Council of the European Union. 2005. Proposal for a Council Directive: Laying down minimum rules for the protection of chickens kept for meat production. http://ec.europa.eu/food/animal/welfare/farm/proposal_EN.pdf Accessed Sep. 20, 2007.

Dransfield, E., T. M. Ngapo, N. A. Nielsen, L. Bredahl, P. O. Sjödén, M. Magnusson, M. M. Campo, and G. R. Nute. 2005. Consumer choice and suggested price for pork as influenced by its appearance, taste and information concerning country of origin and organic pig production. Meat Sci. 69:61–70.

ERS. 2004. Calculating the food marketing bill. Amber Waves, February. Economic Research Service, Washington, DC.

European Commission. 2005. Attitudes of consumers towards the welfare of farmed animals. Special Eurobarometer 229. Wave 63.2. TNS Opinion and Social http://ec.europa.eu/public_opinion/archives/ebs/ebs_229_en.pdf Accessed Sep. 20, 2007.

European Commission. 2007. Attitudes of EU citizens towards Animal Welfare. Special Eurobarometer 270. Wave 66.1.TNS Opinion and Social. http://ec.europa.eu/public_opinion/archives/ebs/ebs_270_en.pdf Accessed Sep. 20, 2007.

European Union. 1991a. Directive 91/629/EEC. Off. J. L 340:28–32.

European Union. 1991b. Directive 91/630/EEC. Off. J. L 340:33–38.

European Union. 1997. Directive 97/2/EC. Off. J. L 025:24–254.

European Union. 1998. Directive 98/58/EC. Off. J. L 221:23–27.

European Union. 1999. Directive 1999/74/EC. Off. J. L 203:53–57.

European Union. 2001. Directive 2001/93/EC. Off. J. L 316:36–38.

Fraser, D., J. Mench, and S. Millman. 2001. Farm animals and their welfare in 2000. Pages 87–89 in The State of the Animals 2001. Humane Soc. United States, Gaithersburg, MD.

Grunert, K. G., and C. Valli. 2001. Designer-made meat and dairy products: Consumer-led product development. Livest. Prod. Sci. 72:83–98.

Haddad, Y., J. Haddad, A. Olabi, N. Shuayto, T. Haddad, and I. Toufeili. 2007. Mapping determinants of purchase intent of concentrated yogurt (Labneh) by conjoint analysis. Food Qual. Pref. 18:795–802.

Harper, G. C., and S. J. Henson. 2001. The level of consumer concern about animal welfare. The Comparative Report. The University of Reading, UK. EU FAIR CT98-3678.

Hayes, D. J., J. F. Shogren, S. Y. Shin, and J. B. Kliebenstein. 1995. Valuing food safety in experimental auction markets. Am. J. Agric. Econ. 77:40–53.

Lange, C., F. Martin, C. Chabanet, P. Combris, and S. Issanchou. 2002. Impact of the information provided to consumers on their willingness to pay for champagne: Comparison with hedonic scores. Food Qual. Pref. 13:597–608.

Lange, C., F. Rousseau, and S. Issanchou. 1999. Expectation, liking and purchase behaviour under economical constraint. Food Qual. Pref. 10:31–39.

Luckow, T., H. R. Moskowitz, J. Beckley, J. Hirsch, and S. Genchi. 2005. The four segments of yogurt consumers. J. Food Prod. Mark. 11:1–22.

McInerney, J. 2004. Animal welfare, economics and policy. Report prepared for DEFRA. http://statistics.defra.gov.uk/esg/reports/animalwelfare.pdf Accessed Sep. 20, 2007.

Melton, B., W. Huffman, J. Shogren, and J. Fox. 1996. Consumer preferences for fresh food items with multiple quality attributes: Evidence from an experimental auction of pork chops. Am. J. Agric. Econ. 78:916–923.

Napolitano, F., A. Braghieri, M. Caroprese, R. Marino, A. Girolami, and A. Sevi. 2007a. Effect of information about animal welfare, expressed in terms of rearing conditions, on lamb acceptability. Meat Sci. 77:431–436.

Napolitano, F., G. Caporale, A. Carlucci, and E. Monteleone. 2007b. Effect of information about animal welfare and product nutritional properties on acceptability of meat from Podolian cattle. Food Qual. Pref. 18:305–312.

Napolitano, F., G. De Rosa, G. Caporale, A. Carlucci, F. Grasso, and E. Monteleone. 2007c. Bridging consumer perception and on-farm assessment of animal welfare. Anim. Welf. 16:249–253.

Rash, K. 1990. Compositional elements affecting flavour of cultured dairy foods. J. Dairy Sci. 73:3651–3656.

Schifferstein, H. N. J., A. P. W. Kole, and J. Mojet. 1999. Asymmetry in the disconfirmation of expectations for natural yogurt. Appetite 32:307–329.

Shapiro, S. S., and M. B. Wilk. 1965. An analysis of variance test for normality. Biometrika 52:591–610.

Swanson, J. C., and J. A. Mench. 2000. Animal welfare: Consumer viewpoints. http://animalscience.ucdavis.edu/Avian/swanson.pdf Accessed Sep. 20, 2007.

Tweeten, L. 1991. Public policy decisions for farm animal welfare. J. Agric. Environ. Ethics. (Special Suppl. 1) 6:87–104.

Verhoog, H., V. Lund, and H. F. Alroe. 2004. Animal Welfare, Ethics and Organic Farming. Pages 73–94 in Animal Health and Welfare in Organic Agriculture. M. Vaarst, S. Roderick, V. Lund, and W. Lockeretz, ed. CABI Publishing, Wallingford, UK.

Vickrey, W. 1961. Counterspeculation, auctions, and competitive sealed tenders. J. Financ. 16:8–37.