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Extrinsic attributes of red meat as indicators of quality in Europe: an application for market segmentation

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Abstract

Consumers give increasing importance to the extrinsic quality attributes of meat in response to rising concerns on safety, health, convenience, ethical factors, etc. The role that attributes such as animal feeding assurance, environmentally friendly production, respect for the animal welfare, etc. play in the consumer quality evaluation process has not been studied enough. The objectives of this article were: to evaluate the importance of several extrinsic quality attributes of red meat to consumers in five European regions; to analyse the relationships between the attitude towards these attributes, available cues and factors or motivations that are important to consumers when buying meat; and to identify groups or segments of consumers according to the importance of extrinsic quality attributes. The most important extrinsic attributes found were animal feeding and origin. Environmentally friendly production and animal welfare considerations were also important. Animal feed assurance was an indicator of safety and nutritious/ healthy meat but origin was not. For some groups of consumers, respect for the environment and animal welfare were also related to healthy/safe meat. The range of attitudes consumers hold towards extrinsic attributes could constitute an opportunity to develop consumer-led meat products and further market segmentation.

Keywords: Red meat; Extrinsic attributes; Credence quality; Purchasing motives; Consumer segments

1. Introduction

1.1. Consumer evaluation of meat quality

The concept of food quality is not unique and depends on who is making the definition (Becker, 2000; Verbeke & Viaene, 1999; Wandel & Bugge, 1996). Issanchou (1996) points out that food quality is not an inherent characteristic of food, but rather linked with the concept of acceptability. Consumers' quality judgements of food depend on the perceptions, needs and goals they have (Steenkamp, 1990). Within this user-oriented framework, known as the "perceived quality approach", the concept of quality is essentially defined by the consumer and, therefore, is not easy to measure (Grunert, Larsen, Madsen, & Baadsgard, 1996).

Several approaches have been used to study the perception process of food quality by consumers. Within the widely accepted "multi-attribute approach", quality is a multi-dimensional phenomenon, described by a set of characteristics (attributes) that are subjectively perceived by the consumers (Grunert, 1997).

For some authors though, product characteristics and attributes are not synonymous. According to Becker (2000), features of the product that are used as technical indicators for quality and are in principle measurable by analytical methods are *product characteristics*. The features of the product that meet consumers needs are *product attributes*. The objective product characteristics are not the centre of interest, rather the subjectively perceived product attributes. The difference between these concepts resides on the perceived quality paradigm. This research supports this distinction and, therefore, the term 'attribute' will be used referring to the perception consumers derive from the correspondent product characteristic. Relative to this subject,

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Steenkamp and Van Trijp (1996) presented a conceptual model—the 'quality guidance approach'—that related consumers' quality judgements to the physical characteristics of meat in order to improve product quality from a consumer's perspective.

For the consumer to be able to evaluate quality, he or she needs to have information on the quality characteristics of the product. This information reaches the consumer in the form of *quality cues,* which are defined by Steenkamp (1997) as informational stimuli that, according to the consumer, say something about the product; i.e. they are used to evaluate the performance of the product with respect to the consumer demands. Cues can be *intrinsic* and *extrinsic* (Olson & Jacoby, 1972). Intrinsic cues relate to physical aspects of the product (e.g. colour, shape, appearance, etc.) whereas extrinsic cues relate to the product but are not physically part of it (brand, quality stamp, origin, store, packaging, production information, etc.).

These cues are categorised and integrated by the consumer (Steenkamp, 1990) to infer the quality attributes of meat. According to the author, they can be *experience quality attributes*, those ascertained on the basis of actual experience-consumption- of the product (e.g. taste, tenderness, leanness, etc.), and *credence quality attributes*, those that cannot be ascertained even after normal use of the product, or as Becker (2000) states, attributes that are of concern to the consumer but for which are no accessible cues in the process of buying and consuming (e.g. hormones, BSE, animal feeding guarantee, environmentally friendly produced, respect for the animal welfare, etc.). Some authors (Becker, 2000; Grunert, 1997) also differentiate *search* or *expected quality attributes*; those that are available at the time of purchasing and are used to infer experience quality.

Under this multi-attribute approach, search, experience and credence quality are integrated by the consumer into an overall perceived quality.

Nonetheless, food quality is not only a subjective, multi-dimensional concept, but also a very dynamic one. Consumers are becoming more demanding about product quality (Dalen, 1996; Steenkamp, 1990) and the perception of food quality, in particular meat, is changing rapidly (Grunert & Valli, 2001; Issanchou, 1996; Mannion, Cowan, & Gannon, 2000). Consumers give increasing importance to credence quality attributes in response to rising concerns on safety, health, convenience, locality, ethical factors, etc. (Anwander & Badertscher, 2001; Corcoran et al., 2001; Harrington, 1994; Issanchou, 1996; Latvala & Kola, 2001; Wandel & Bugge, 1996). These credence attributes mainly focus on the quality of the production process (extrinsic characteristics of meat) and not on the product itself (Becker, 1999) and often there are not relevant cues available.

1.2. The supply of quality by the industry

As Henson (2000) points out, there are two interrelated processes when producing a quality product: the quality characteristics offered by the industry and the quality evaluation that consumers make depend, not only on the product, but also on the production process.

Quality is regarded as an essential element of the competitive strategy of a company (Wolff, 1986) and is one of the main factors that determines its success (Steenkamp, 1990). Therefore, the aim of the meat supplier is to understand consumers' tangible and intangible demands with respect to meat quality and then to translate these into intrinsic (product) or extrinsic (process) characteristics that satisfy these demands.

The red meat industry, and in particular the beef industry, is experiencing a long-running crisis, accentuated by recent sanitary scandals (Latouche, Rainelli, & Vermersch, 1998). Lack of consumer-oriented communication from the industry has often been given as one of the main problems of the meat sector (Henson & Northen, 2000; Issanchou, 1996; Northen, 2000).

Delivering the quality attributes demanded by the consumer, together with impartial and reliable information (cues), are key actions that will enable many meat industries to stay in business or to expand (Corcoran, Bernués, & Baines, 2000). Within this context, new product development is a major success factor in competitive meat markets (Grunert & Valli, 2001), where the product is still mostly unbranded. Consumer-led product development should incorporate the emerging credence quality attributes that are important for an increasing number of consumers. Logically, the relative importance of these attributes will differ between consumers with different social, cultural, economic, etc. characteristics (Verbeke & Viaene, 1999).

1.3. A model of quality supply, perception and demand

The consumer decision process is affected by three types of factors (Steenkamp, 1997): the properties or characteristics of the food (supplied by the industry); factors related to the person engaged in food consumption and environmental factors.

Fig. 1 represents a conceptual model of *supply, perception* and *demand of food quality* that gathers several aspects of models built by Steenkamp (1990, 1997), Grunert (1997) and Becker (2000), where the main stages of the consumer' quality perception process are represented, as outlined in Section 1.1. The basic structure of the model fits with the three stages in the process of quality evaluation proposed by Steenkamp (1990): cue acquisition and categorisation; quality attribute belief formation; and integration of quality attribute beliefs into overall quality evaluation. The relationships between product characteristics (technical specifications),

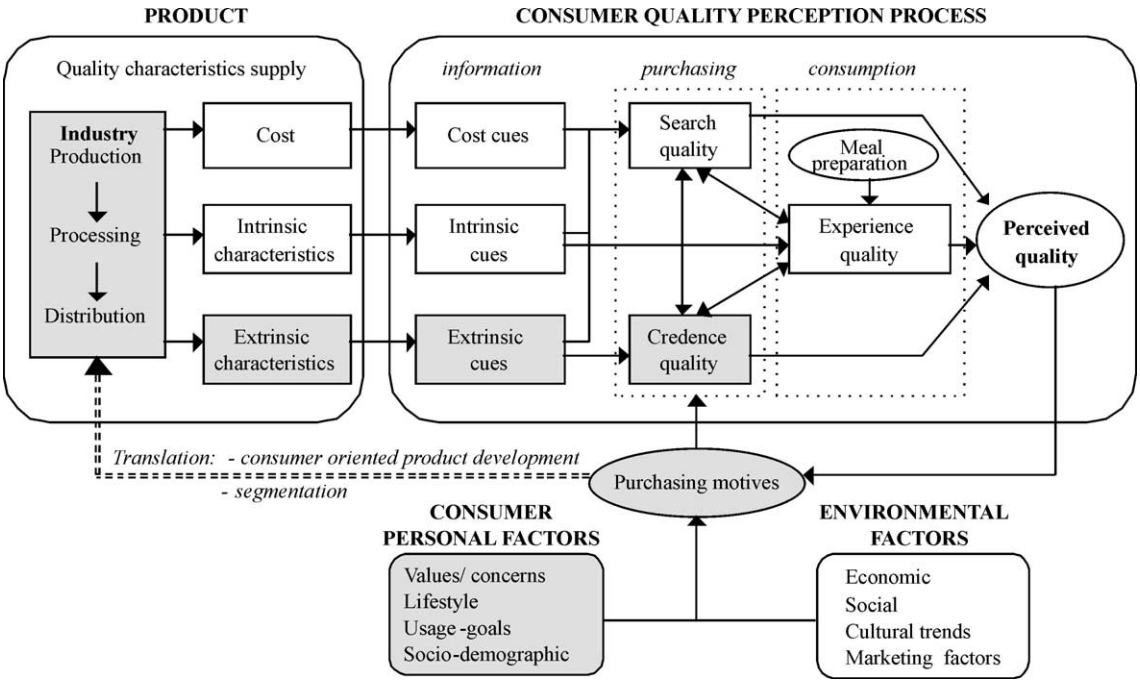

Fig. 1. Supply, perception and demand of food quality. Note: the grey areas are main areas of interest in this paper.

informational cues (cost cues, intrinsic, extrinsic) and attributes (quality judgments) are made explicit. As outlined by Grunert (1997), purchasing and consumption stages are separated and expected quality is differentiated from experience and credence quality. Meal preparation is also recognised as a very important factor for experience quality. Similar to Becker's (2000) model, the supply of quality by the industry is specifically represented, emphasizing the different stages of the chain and the implications for the intrinsic, extrinsic and cost characteristics of the product. Finally, the overall perceived quality, together with the dynamic and increasingly diverse personal and environmental factors, determine the purchasing motives, that are linked with credence and expected quality.

From this process the industry can work to translate purchase motivations (that integrate previous quality experience, values and concerns of the consumer, usage goals, etc. and also influences from the socio-economic environment) into consumer-led commercial strategies such as development of new products/ attributes, further segmentation of the markets, etc.

The paper focuses on the grey areas in Fig. 1. Although the empirical research of this study focuses only on the extrinsic attributes of red meat (perception of extrinsic features of the product) and their relationships with credence quality and motivations of consumers, it concurs with the means-end theory, where products are seen as a means through which consumers obtain certain valued 'ends' (Audenaert & Steenkamp, 1997), i.e. consumers do not demand products for their own sake, but because of the consequences that the consumption of these products will give to them (Grunert & Valli, 2001). These consequences are linked to basic life values. The sequence 'attributes-consequences-values' is interpreted in this study as 'extrinsic attributes-purchasing motives-consumer concerns/ lifestyles' as depicted in Fig. 1.

The objectives of this paper are: firstly to evaluate the importance of several extrinsic quality attributes of red meat (beef and lamb) to consumers in five European regions; secondly to analyse the relationships between attribute beliefs, importance of informational cues available and factors or motivations that are important to consumers when buying meat; and finally to identify groups or segments of consumers according to the importance that extrinsic quality attributes have for them.

2. Methodology

2.1. Sampling

Information from a sample proportionally stratified by geographical area, place of residence (town size) and type of outlet was collected in five European regions located in England, Italy, France, Scotland and Spain.[1]

The survey was carried out between October 1999 and January 2000. Respondents were selected through judgmental sampling. Data were obtained from personal

[1] The areas of study and animal species considered were determined by the SMEs participating in the research project funded by the European Commission (see Acknowledgements).

Table 1
Number and percentage of observations in the sample per region

Country	Area of study	Beef	Lamb	Total
England	Cotswold (South-west of England)	–	448	448 (19.58%)
France	Languedoc-Roussillon (South-east of France)	–	308	308 (13.46%)
Italy	Italy	505	–	505 (22.07%)
Scotland	Scotland	500	–	500 (21.85%)
Spain	Aragón and Lérida (North-east of Spain)	227	300	527 (23.03%)
Total		1232 (53.85%)	1056 (46.15%)	2288 (100%)

interviews at the place of purchase with people responsible for the meat purchases in the household. The number of interviews and the animal species considered in each study area can be seen in Table 1.

2.2. Questionnaire and variables

Exploratory research was carried out in all regions studied using qualitative focus group investigation (Corcoran et al., 2001) and expert meetings with meat industry representatives[2]. The results of this exploratory phase served as the main source of input to the quantitative questionnaire.

Respondents were asked to report on the importance of seven characteristics (extrinsic attributes) to achieve quality in beef/lamb: origin of meat/region of production; environmentally friendly production; animal welfare concerns; animal feeding; animal breed; processing and packaging; and storage. The majority of these, especially the ones referring to the production processes, are credence quality attributes. Data were collected using a scale of three categories: 'not important', 'important' and 'very important' (Table 2).

Respondents were also asked about (Table 3):

- the importance of a number of purchasing motives (factors that were important when deciding the type of meat they bought): considerations involving family and children; nutrition and health; safety; ease of purchase; ease of cooking; knowledge of preparation; tradition; price; satisfaction obtained from meat; and meal occasion;
- the importance of different sources of information (cues) to assess quality of meat in the shop: retailer/ supplier; direct assessment (colour, fat, etc.); label/ brand; and price.

Socio-economic characteristics were also gathered to profile the groups of consumers: age; sex; socio-economic status; place of residence (rural vs. urban); family size and presence of children in the family (Table 3).

Table 2
Focal variables used in the principal components analysis

Focal variables: extrinsic attributes[a]	
Origin/region of production	Animal breed
Environmentally friendly	Processing/packaging
Animal welfare	Storage
Animal feeding	

[a] Classes were: 'not-important'; 'important'; 'very important'

[2] Representatives of SMEs involved in the project.

2.3. Data analysis

Statistical analysis was carried out separately for the beef and lamb consumer samples.

Firstly, frequency analysis by region was performed on the focal variables to assess the relative importance for consumers of extrinsic quality attributes of beef and lamb. Multivariate statistical methods were needed to analyse and understand the large data matrix, here a

Table 3
Variables and classes used in the Chi-square analysis

Purchasing motives[a]	
Family and children	Knowledge of preparation
Nutrition and health	Tradition
Safety	Price
Ease of purchase	Satisfaction obtained
Ease of cooking	Meal occasion
Sources of information on quality: cues[a]	
Retailer/ supplier	Label/ brand
Direct assessment (colour, fat, etc.)	Price
Socio-economic variables	
Age	Population: rural/ urban
18–35 years old	< 5000
36–65 years old	5000–50,000
> 65 years old	> 50,000
Sex	Family size
male	1–2 members
female	3–4 members
	> 4 members
Socio-economic status	Presence of children
low	yes
medium	no
high	

[a] Classes were: 'not-important'; 'important'; 'very important'

combination of quality characteristics of meat, to present the results in an understandable way (Næs, Baardseth, Helgesen, & Isaksson, 1996). Relationships between quality attributes were investigated using Principal Component Analysis (PCA) with Varimax rotation. To avoid response bias, mean-center values were obtained for each individual by assigning scores to each category as follows: 'not important' = 1, 'important' = 2, 'very important' = 3. Then, the mean score across the seven attributes was calculated and subtracted from the individual's importance score on each attribute.

Factors explaining heterogeneity in the consumer samples were obtained in this way. A non-hierarchical Cluster Analysis was carried out to classify consumers, using the co-ordinates of the observations to the main factors obtained from the PCA. The number of clusters was obtained on the basis of the R^2 obtained and of a strong increment produced in the Cubic Criterion of Clustering and PseudoF values (SAS, 1994). Finally, a Chi-square analysis was carried out crossing the groups of consumers with purchasing motives, sources of information on quality and socio-economic variables to see if there were significant differences between groups.

3. Results

3.1. Importance of extrinsic attributes for beef and lamb consumers

For both the beef and lamb consumer samples, the extrinsic attributes of meat that were most appreciated were animal feeding (83.2 and 82.6% of respondents rated this attribute as 'important' or 'very important', for beef and lamb, respectively) and origin of meat (85.7 and 79.9%; Fig. 2). Environmentally friendly production and animal welfare were also relatively important (72.0 and 75.9% of beef and lamb respondents respectively considered environmentally friendly production as 'important' or 'very important'; these figures were 78.8 and 76.7% in relation to animal welfare). Storage was also considered an important extrinsic attribute, whereas processing/packaging and especially animal breed were considered less important.

However, there were differences between regions that should be mentioned. Italian beef consumers showed a similar pattern to the average, but at a higher level; especially important were the processing/packaging and storage. Scotland also showed a similar pattern, but conversely to a lesser degree; only origin had a relevance analogous to other regions. For the Spanish beef sample, animal feeding was clearly more important than origin. The rest of attributes were similar to the average, except animal breed that had the lowest importance.

Like the Scottish, English consumers associated the lowest degree of importance to most attributes, the most important ones being animal welfare and origin. In France, animal feeding was considered 'very important' by 69.5% of respondents and environmentally friendly, origin and animal welfare were also relevant. A similar pattern could be observed in Spanish lamb consumers, although in this case storage was more important than environmentally friendly and animal welfare.

3.2. Factors that explain differences among consumers

The contribution of the variables to the main factors obtained in the PCAs of the beef and lamb consumers samples and the variance explained are shown in Table 4.

The first three factors were chosen because they explained a high proportion of original variance and had an eigenvalue higher than one. They were very similar for the beef and lamb samples and globally explained 77.9 and 80.8% of variance respectively.

In Fig. 3, the extrinsic attributes are represented in the three-dimensional space defined by these factors or axes. Animal welfare and environmentally friendly were located close to each other, along the positive segment of X axis. Origin/region of production and animal feeding were located in the positive segment of the Z and Y axes, respectively. Animal breed was located close to the origin. Processing/ packaging and storage were located in the negative area defined by the three axes.

Therefore, the factors can be defined as follows:

- Factor 1. Ethical factor: environmentally friendly production and animal welfare concerns (opposed to processing/packaging and storage).
- Factor 2. Origin factor: origin/region of production concerns (opposed to processing/packaging and storage).
- Factor 3. Animal feeding factor: animal feeding concerns.

3.3. Consumer types

Four groups of consumers were obtained for both the beef and lamb samples from the Cluster Analysis. The purchase motives, sources of information on quality and socio-economic characteristics that explained relevant differences between groups (Chi^2 analysis) are shown in Tables 5 and 6.

3.3.1. Beef consumer types

The largest group of beef consumers (Group 3; 43.1% of the sample) was characterised by a comparatively high appreciation of all extrinsic attributes of beef, except for origin/region of production that were significantly less important. Conversely, a high appreciation of the origin of beef, in combination with different

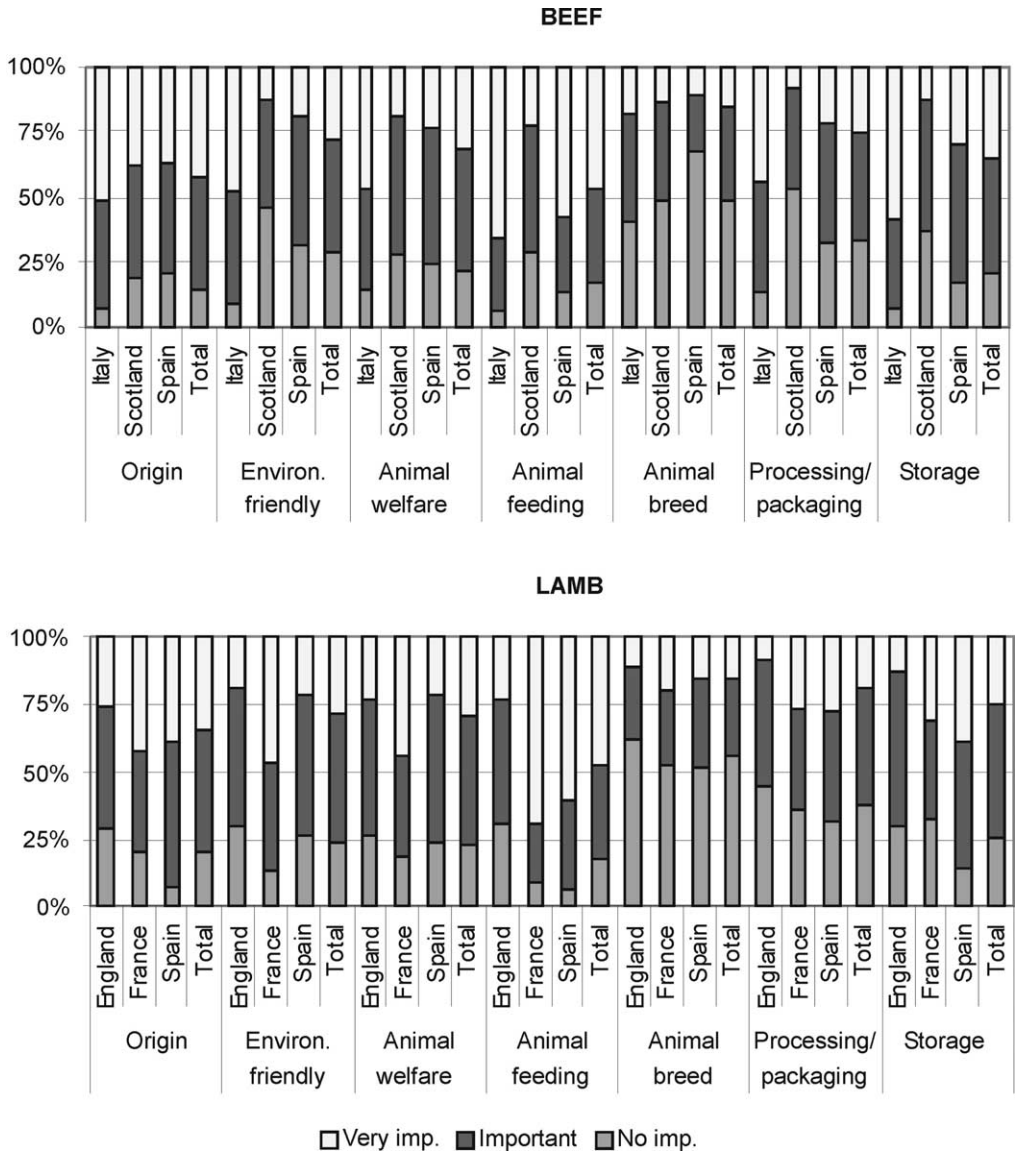

Fig. 2. Importance of extrinsic attributes for beef and lamb consumers per region.

Table 4
Contribution of the main variables to the first three factors obtained in the PCAs for beef and lamb

	Beef			Lamb		
	Factor 1	Factor 2	Factor 3	Factor 1	Factor 2	Factor 3
Origin/region of production	−0.214	0.918	−0.177	−0.159	0.930	−0.135
Environmentally friendly	0.702	0.025	−0.307	0.798	0.081	−0.096
Animal welfare	0.749	−0.125	0.135	0.774	−0.232	0.059
Animal feeding	−0.049	−0.059	0.940	−0.067	−0.091	0.965
Animal breed	−0.208	0.068	−0.047	−0.177	−0.040	−0.099
Processing/ packaging	−0.565	−0.663	−0.372	−0.553	−0.584	−0.481
Storage	−0.586	−0.220	−0.062	−0.616	−0.300	−0.250
% of variance	30.0	25.1	22.7	33.3	25.3	22.2

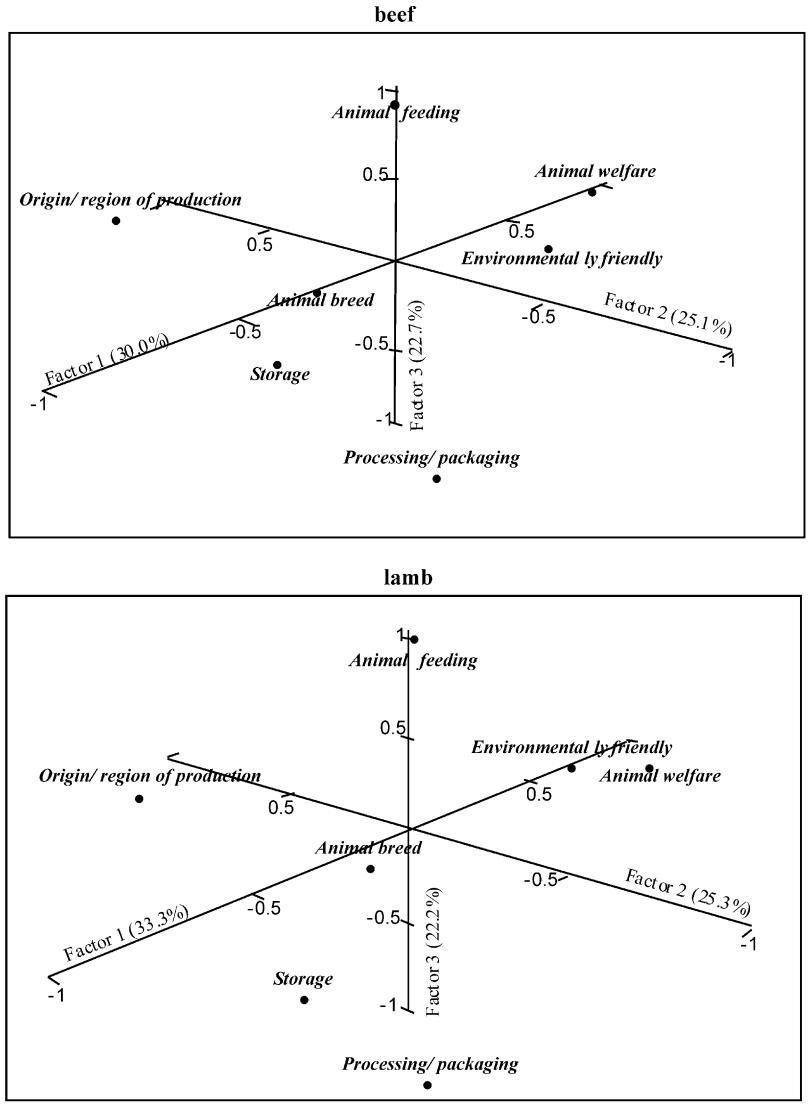

Fig. 3. Location of the variables (extrinsic attributes) in the three-dimensional space defined by the three main factors of the PCAs. Note: for the correct interpretation of the graphs it is important to focus on the direction of variables from the origin, the distance between variables do not have meaning.

attributes, characterised the other Groups, that were similar in size. For Group 1, the feeding regime of the animals was also very relevant. For Group 2, processing and packaging in combination with the storage of meat were important factors. For Group 4, respect for the environment and welfare of animals were also highly rated (Table 5).

Some consumer purchasing motives were significantly different between groups. Nutrition, health and safety aspects of beef were comparatively more important for consumers of Group 3 and less important for consumers of Groups 1 and 2. The knowledge of preparation of beef was a more important motive for purchasing for consumers of Group 2 and less important for consumers of Group 4.

In relation to the sources of information about quality, there was a significant difference in Group 1, for which the label/brand had lower importance, and Group 3, for which label/brand was more important.

Some socio-economic characteristics of the Groups were also different, the most important one being nationality (P-value = 0.001). Age and place of residence also contributed to differentiate the segments of beef consumers.

3.3.2. Lamb consumer types

The four groups obtained from the lamb sample were quite different from the beef groups (Table 6). The largest group of lamb consumers (Group 1; 47.1% of the sample) was characterised the high importance of origin/region of production of lamb, the rest of attributes being secondary. In the rest of the Groups, origin/region of production had far less significance. Consumer of Group 2 (10.8% of lamb sample) paid special attention to the attributes directly related to the system of production, such as feeding regime, environmentally friendly production and animal welfare concerns. Processing and packaging of lamb and storage were com-

Table 5
Main characteristics of the groups obtained in the cluster analysis for the beef sample

Extrinsic attributes[a]	Group 1 ($n=204$)	Group 2 ($n=222$)	Group 3 ($n=531$)	Group 4 ($n=275$)
Origin/region of production	0.78	0.74	0.48	0.77
Environmentally friendly	0.23	0.34	0.57	0.71
Animal welfare	0.42	0.24	0.67	0.67
Animal feeding	0.85	0.35	0.73	0.58
Animal breed	0.27	0.29	0.39	0.30
Processing/packaging	0.26	0.57	0.64	0.17
Storage	0.48	0.58	0.67	0.44
Purchasing motives[b]				
Nutrition/ health ($P=0.040$)	−	−	+	±
Safety ($P=0.076$)	−	−	+	±
Knowledge of preparation ($P=0.003$)	±	+	±	−
Cues				
Label/brand ($P=0.004$)	−	±	+	±
Socio-economic characteristics				
Region/country ($P=0.001$)	More in N-E Spain, few in Italy	More in Scotland, few in N-E Spain	More in Italy, few in Scotland	More in Scotland, few in N-E Spain
Age ($P=0.010$)	Middle age people, few young people	−	Younger people	Older people
Place of residence ($P=0.086$)	More in rural areas	More in big cities	More in big cities	More in medium size cities

[a] Average indicators of the group calculated as: 0 = not important; 0.5 = important; 1 = very important.
[b] Higher importance than average = '+'; less importance than average = '−'; average importance = '±' P = Chi^2 probability to reject the Null Hypothesis. Only variables with significative differences ($P<0.1$) appear in the table.

paratively irrelevant. Group 3 also gave importance to the environment and animal welfare, in combination with an intermediate importance to processing/ packaging and storage. In this Group, origin and animal feeding regime ranked of low importance. Finally, in combination with animal feeding, Group 4 showed the highest interest in processing/packaging and storage of lamb, whereas origin, environmental and welfare concerns had the lowest importance for all groups.

Several purchase motives were significantly different between the segments obtained: family and children concerns, safety implications, ease of purchase and cooking, satisfaction obtained when eating lamb and meal occasion. Group 1 seemed to be less concerned about all these factors except for the satisfaction of eating lamb. Group 3 rated safety implications, satisfaction of consuming lamb and meal occasion as less important also. Conversely, Groups 2 and 4 showed a higher than average interest for all purchasing motives (except for satisfaction obtained by Group 4, which was intermediate).

There were also differences in relation to the importance of direct assessment and label/brand as sources of information about quality of lamb. Direct assessment of quality (colour, fat, etc.) was more relevant for consumers of Groups 2 and 4, and less relevant for consumers of Group 3. Label/brand was more important for consumers of Group 2 and less for consumers of Group 4.

In line with the beef sample, nationality, age and place of residence were significantly different (P-value = 0.001) between lamb consumer groups, together with the size of the family and the presence of children in the family (Table 6).

4. Discussion and conclusions

4.1. Importance of extrinsic attributes for evaluation of quality

Information on the extrinsic characteristics of meat constitutes the main cue to inform the consumer on credence quality concerns, such as safety, health, ethical considerations, etc. (Becker, 2000; Northen, 2000). In this study, animal feeding was the most important extrinsic attribute for both beef and lamb consumers. Cowan (1998), Henson and Northen (2000) and Glitsch (2000) found that animal feed was considered amongst the most important cues to predict credence quality, more specifically safety of beef, in six European countries. In

Table 6
Main characteristics of the groups obtained in the cluster analysis for the lamb sample

Extrinsic attributes[a]	Group 1 ($n=497$)	Group 2 ($n=216$)	Group 3 ($n=114$)	Group 4 ($n=229$)
Origin/region of production	0.70	0.54	0.30	0.46
Environmentally friendly	0.51	0.73	0.69	0.26
Animal welfare	0.45	0.78	0.73	0.36
Animal feeding	0.50	0.94	0.39	0.81
Animal breed	0.30	0.22	0.29	0.33
Processing/ packaging	0.38	0.16	0.56	0.61
Storage	0.50	0.35	0.52	0.63
Purchasing motives[b]				
Family/children ($P=0.008$)	−	+	±	+
Safety ($P=0.001$)	−	+	±	+
Ease of purchase/convenience ($P=0.003$)	−	+	±	+
Easy of cooking ($P=0.011$)	−	+	±	+
Satisfaction obtained ($P=0.001$)	±	+	−	±
Occasion ($P=0.001$)	−	+	−	+
Cues				
Direct assessment ($P=0.001$)	±	+	−	+
Label/ brand ($P=0.011$)	±	+	±	−
Socio-economic characteristics				
Region/country ($P=0.001$)	More in S-W England, few in S-E France	More in S-E France, few in S-W England and N-E Spain	More in S-W England, very few in N-E Spain	More in N-E Spain, few in S-W England
Age ($P=0.001$)	Middle age and older people	Middle age people	Younger people	Younger people
Place of residence ($P=0.001$)	More in medium size cities	More in big cities	More in medium size or big cities	More in rural areas
Family size ($P=0.074$)	1–2 member families	−	1–2 member families	Bigger families
Presence of children ($P=0.042$)	More in families with no children	−	−	More in families with children

[a] Average indicators of the group calculated as: 0 = not important; 0.5 = important; 1 = very important.
[b] Higher importance than average = '+'; less importance than average = '−'; average importance = '±' P = Chi^2 probability to reject the Null Hypothesis. Only variables with significative differences ($P<0.1$) appear in the table.

the present study, the information was collected before the BSE crisis spread across many countries in Europe (e.g. France, Italy and Spain); therefore, it might be anticipated that animal feeding, identified as an indicator of safety as discussed in the next section, would be considered an even more important extrinsic quality attribute of beef.

Origin was also a very important attribute of meat, especially beef. Origin of meat has also been pointed out as an indicator of meat safety (Becker, 1999; Cowan, 1998; Latouche et al., 1998). In the study of Henson and Northen (2000) and Glitsch (2000), the origin of meat was a helpful factor in assessing safety of beef, especially in Ireland, Germany and Sweden, but was less relevant in Italy, Spain and the UK. In this study the relationship between origin and safety of red meat could not be established; this is elaborated on in the next section. Here, the high regard for this attribute seemed to be linked to the value of 'locality', or the 'consumer sense of belonging', as expressed by De Cicco, Van der Lans, and Loseby (2001).

The increasingly important ethical concerns consumers hold in relation to the impact of intensive rearing methods on the environment and the animal welfare (Harrington, 1994; Steenkamp, 1997) were also reflected in the results of the survey, especially in the regions located in Italy and France. However, as Wandel and Bugge (1996) point out, the expressed concerns of consumers in relation to environmental and animal welfare issues do not mean that behaviour has changed accordingly. Here, the link between attitudes and behaviour seems to be very tenuous. Little research is still available on this subject and, as Issanchou (1996) states, there is a need to integrate extrinsic attributes of meat in consumer experiments.

Storage of meat was also very important attribute for consumers, especially in Italy and Spain. This extrinsic characteristic is related to the freshness and hygiene of meat and, therefore, is a major cue for expected and experience quality. Freshness was found to be one of the main criteria for evaluating choice of food products (AGB/Europanel, 1992, as reflected in Steenkamp, 1997).

Packaging and processing of meat (pre-prepared) are less important to consumers, except for the Italian sample. This attribute can be identified with convenience values. The fact that consumers are used to buy unbranded and, frequently, unpackaged meat, in contrast to other food products, can partially explain this phenomenon. Nevertheless, this situation is changing rapidly and adequate packaging and further processing of meat could have increasing importance for convenience-orientated consumers in the future. Meat producers consider animal breed as one of the most important factors in obtaining a quality meat product and the meat industry uses animal breed and animal type as grading indicators of quality. Nevertheless, most consumers surveyed do not share this view. This attribute is not perceived by consumers because they do not recognize it or do not have access to the information, Bello and Calvo (1998). This phenomenon illustrates how the concept of quality is understood differently by the different actors along the meat chain and by the consumer (Wandel & Bugge, 1996), leading to failure to transfer information effectively between them (Corcoran et al., 2001).

Overall, there are great differences in the appreciation of extrinsic attributes of red meat between European regions, as shown in Fig. 2. This result confirms the importance of cultural differences in studying quality perceptions in meat, as other studies have established before (Cowan, 1998; Glitsch, 2000; Grunert, 1997; Henson & Northen, 2000; Petrovichi, Ritson, & Ness, 2001).

4.2. Relationships between extrinsic attributes, sources of information on quality, purchasing motives and socio-demographics

The empirical results showed many similarities between beef and lamb consumer samples and some general trends could therefore be observed.

Consumers that showed a higher interest in the safety and nutritional/health aspects of meat also attached a higher importance to most extrinsic attributes, especially those referring to the system of production, but not to the origin of meat. For consumers who considered origin as a comparatively important attribute of meat, safety and nutritional/health concerns were lower or equal to the average. Thus, it could be inferred that origin was not a good indicator of safe and healthy/nutritious beef and lamb.

Consumers evaluated attributes referring the environment and animal welfare, which are associated with consumers' ethical values, in a unidirectional way. These two attributes, together with the system of animal feeding, were linked to greater concerns about safety, nutrition and health.

Processing and packaging of meat were especially relevant for 'convenience-driven' consumers who attached importance to knowledge of preparation (low cooking skills) and ease of purchasing and cooking.

Beef labels or brands were a more important source of information about quality for consumers concerned about safety and nutrition/health. This fact confirms the role that extrinsic cues can play in credence (safety, ethical concerns, etc.) quality evaluation of beef. If the label verifies the credence quality, then it becomes a search quality attribute in the shop, as indicated by Becker (2000). Nevertheless, the credibility of the information source is one of the main factors determining the perception of credence quality attributes (Grunert, 2001) and therefore, credible and reliable attributes and labels are needed (Northen, 2000).

For lamb consumers, 'own assessment' of intrinsic cues at time of purchase was an important source of information for those with a range of concerns, including safety. Lamb label/brand was also an important source of information for lamb consumers who attached importance to attributes of the production process, which normally do not have relevant informational cues available.

Some general socio-demographic trends can be pointed out from Tables 5 and 6. Young consumers tended to attach more importance to the way food is produced in terms of respect for the environment (also found by Wandel & Bugge, 1996), welfare of animals and processing and packaging of food. In general, their purchases were also more influenced by several factors such as safety and nutritional/health implications and, in the case of beef attached greater importance to the label or brand as a source of information. Older consumers showed an opposite trend.

In contrast to consumers in rural areas, those living in cities were more concerned about the environment and animal welfare and paid more attention to the label or brand to get information about the quality of meat.

Finally, the importance given to the price of meat, either as a motive to purchase or as indicator of quality, and socio-economic status, did not differ significantly between beef and lamb consumer groups (P-value > 0.1). This phenomenon suggests that economic variables are becoming less suitable indicators in describing segments of consumers, whereas nationality, cultural level, age, place of residence, lifestyle, etc. are increasingly important (Dagevos & van Gaasbeek, 2001; Issanchou, 1996; Wandel & Bugge, 1996).

4.3. Implications for the meat industry

From the results, it is clear that the importance that consumers attach to different attributes of red meat varies widely, as do purchase motivations that depend on values, concerns, lifestyles, socio-demographic features, etc. This constitutes a big opportunity for consumer-led product development and further segmentation of markets (Bredahl & Grunert, 1997),

especially in highly undifferentiated products such as beef and lamb (Grunert & Valli, 2001).

In the PCAs, the factor that explained the highest proportion of heterogeneity in the beef and lamb consumer samples referred to the 'ethical concerns' consumers had about animal welfare and the environment. The second most important factor referred to origin of meat and the third to animal feeding assurance. The segmentation of consumers with preference criteria for extrinsic quality attributes constitutes a relevant market strategy for the meat industry because these attributes can be modified without altering the physical product (Oude Ophuis & Van Trijp, 1995). Therefore, the promotion of meat products that deliver relevant extrinsic attributes of animal feeding, environmentally friendly production and animal welfare considerations, attributes which have been identified as credence quality indicators for safety, nutrition and health concerns, could constitute appropriate commercial strategies to restore consumer confidence. Nevertheless, it is advisable to note that when ethical concerns are involved, consumers might be apt to give socially desirable answers and therefore overestimate the importance of such factors in their decision process.

As already stated, extrinsic attributes can be perceived by the consumer through appropriate cues that help them evaluate credence and experience quality. However, there is a significant difference amongst the extrinsic attributes considered in this study in relation to the information available for quality evaluation. For 'origin' or 'region of production', 'processing/packaging' and 'storage' there is often information available and consumers can use these cues to evaluate search and experience quality and also credence quality. Other attributes such as 'animal feeding', 'environmentally friendly' production and respect for 'animal welfare' rarely have cues available, and therefore consumers are not able to use them for quality evaluation.

Lack of consumer-oriented information is one of the main reasons for consumer mistrust of the red meat industry and, in this context, communication of meat products that deliver new extrinsic attributes could give a commercial advantage over competitors. The three attributes mentioned above were the main credence indicators for consumers concerned with safety, nutrition and health, but who also allocated greater importance to the label and brand of meat as a source of information. Hence, the signalling of cues that inform on attributes of the production system requires appropriate product labelling and branding strategies (Caswell & Mojduszka, 1996; van Trijp, Steenkamp, & Candel, 1997). It also requires that quality assurance systems that are in place are credible and effective (Dalen, 1996; Northen, 2000; Wall, Weersink, & Swanton, 2001).

Greater co-operation/integration within the meat chain is also necessary in this context to allow for a common definition and maintenance of quality standards along the chain and new product development. This should also allow marketing and branding strategies to be more cost-effective and successful in reaching the consumer.

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