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# Perceptions of Rural Consumers on the Aspects of Meat Quality and Health Implications Associated With Meat Consumption

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**Abstract:** This study was conducted to determine the perceptions of rural low-income consumers on meat quality and health issues associated with meat consumption. A total of 466 consumers in the Eastern Cape (EC) Province (South Africa (SA)) were randomly sampled, and principal component analyses (PCA) were used to analyse the data. With regard to purchasing decisions, correlation analysis was performed to establish the relationships between actual scores and mean scores so as to determine purchase motives and decisions. The major purchase point mentioned by all consumers was the supermarket (65%), and the reasons were that this purchase point was the most hygienic and the meat was fresh (35%). The estimated relationship showed a significant association between products consumed at home and the source of income of consumers. With regard to consumption patterns and health issues, most consumers were aware of nutritional balance issues (64%), and most were aware of the health risks associated with meat consumption (59%). It was concluded that consumer perceptions on the meat quality aspects associated with health and consumption patterns are affected by disposable income and cultural background.

**Keywords:** meat quality; consumption patterns; consumers; purchase decision

## 1. Introduction

Meat is an important component in the daily diet of a large proportion of society and is regarded as a valuable food from a nutritional perspective [1]. Meat provides important nutritional elements including protein, fats, vitamins, and minerals that efficiently aid in the normal functioning of body systems of consumers. The South African Food Based Dietary Guidelines recommend the inclusion of meat or meat products in meals daily [2]. Currently, per capita meat consumption in South Africa is approximately 58.7 kg capita/year [3]. Although the benefits of meat consumptions are significant, a diet rich in meat can also have a potential negative effect on human health due to the high content of cholesterol and saturated fatty acids that may be contained in meat [4]. For red meats, such as beef and pork, studies have associated a reduction in their consumption as a reflex response associated with individual perceptions of health risks [5,6]. The cholesterol and saturated fat contents of red meats have been pointed out as specific health factors influencing consumer choices [7–9]. Consequently, a shift in preferences towards the consumption of poultry products has been evident over the years due to the associated health benefits of poultry products [9,10].

Meat consumption patterns are unpredictable due to constant changes in consumer behaviour towards meat and other food products [11]. For consumers to willingly purchase and consume a particular meat product, their perceptions of it must be positive [12]. Therefore, understanding consumer behaviour becomes vitally important, as the way consumers' expectations are met decisively influences their purchasing decisions [13,14]. The behaviour of consumers towards food, especially meat, is characterized by changing preferences [15]. This is because food choice is a phenomenon resulting from the interaction between a varieties of factors [16]. Thus, consumers consider several characteristics in order to determine the acceptance of food products, sensory characteristics, nutritional value, convenience, and its impact on their health [17,18]. If consumers have a negative perception of any meat product, their purchasing behaviour will be affected negatively [12]. Besides the price of the product, factors such as appearance, convenience, and perceived quality as well as safety [19,20], social, individual, economic, and cultural aspects influence decisions made in the market place [11]. Hence, consumers are leaning towards food products that benefit their well-being. Consumers are now demanding food products that are safe and are of good quality at a reasonable price [20].

Around the globe, the diets of relatively more urbanized populations are characterized by a higher content of meat, poultry, and other animal products than the less diversified diets of rural communities [21]. Nevertheless, due to the close association between the rural and urban populations in developing countries, and through filtering of information, rural consumers are becoming increasingly aware of the quality, health, and safety aspects of meat and meat products they purchase. It is therefore important for the meat industry to have knowledge on what quality cues rural consumers use when purchasing meat and how they can use this information to remain competitive. The objective of the study was to determine the perceptions of rural consumers on meat quality aspects, and health and wellness issues, associated with meat consumption and consumption patterns.

## 2. Materials and Methods

### 2.1. Study Site

The study was conducted from Amathole and Chris Hani Districts situated in the Eastern Cape Province of South Africa. Under the two districts, different municipalities were chosen and a total of seven villages were visited. Under the Amathole district, Amahlathi Municipality (Mxhalanga location); Nkonkobe Municipality (Gqumashe, Ntselamanzi, Khayamnandi, Mavuso), and Buffalo City municipality (Tyhusha) were selected. For Chris Hani, the local municipality named Lukhanji (Hukuwa) was selected and used for the study.

### 2.2. Selection of Respondents

A random sampling strategy that eliminated consumer background was used in the study to meet the objectives of the study. A total of 466 (Table 1) consumers were randomly selected from different households for the study. The consumers were interviewed in their homes. Before the interviews were conducted, the enumerator first explained the purpose of the visit, and when the consumer agreed to be interviewed, and the consent form was signed by the consumer, the interview continued.

**Table 1.** Number of respondents and gender distribution.

Village	Number of Respondents	Gender Distribution	
		Females	Males
Mxhalanga	70	19	51
Tyhusha	104	35	69
Hukuwa	48	17	31
Gqumashe	37	12	25
Khayamnandi	57	17	40

Table 1. Cont.

Village	Number of Respondents	Gender Distribution	
		Females	Males
Mavuso	75	25	50
Ntselamanzi	75	38	37
Grand Total	466	163	303

### 2.3. Survey Instrument

The study design was based on the theory of plan behaviour outlined by Fishbein and Ajzen [22], and a review of literature related to meat quality and consumption patterns. The survey instrument was developed through collaborations with nutritionists, meat scientist, and meat producers. The instrument was also pretested with the targeted population.

### 2.4. Data Collection

A structured questionnaire was used to interview the consumers. Trained enumerators administered the questionnaires. The questionnaire was translated into the vernacular (Xhosa) language for ease of administration by the enumerators since the study was carried out in villages where the understanding of the English language was poor. Data collected included demographic information such as gender and age, employment status, source of income, monthly income, and religion. The consumers also answered questions pertaining to meat purchasing decisions, preferred meat products, meat products most consumed at home, their ability to tell the quality of meat by visual assessment, consumption patterns, and health issues.

### 2.5. Visual Cues and Purchase Decisions

With regard to visual cues and purchasing decisions, the questionnaire focused on the following: preferred place of purchase, preferred meat products, meat products most consumed, visual assessment of quality (meat colour, fatness, freshness, and price), consumption patterns, and health issues. Evaluation of visual appearance (meat colour, fatness, freshness) was measured on descriptive scales (e.g., meat colour: “Is colour of meat an important indicator of quality?”; “totally unimportant 1–2–3–4–5 very important”). These meat quality cues were derived from and used in earlier studies on meat quality [23–25].

#### 2.5.1. Meat Quality Aspects

Both the descriptive and evaluative scales were used to evaluate consumer perception of the intrinsic quality cues. Evaluations of expected quality, namely, smell, taste, juiciness (after cooking), freshness (at point of sale), tenderness (after cooking), leanness, healthiness, and nutrition, were performed with a 5-point scale. The perceptions of all the intrinsic cues were measured on descriptive scales (e.g., meat colour: “Is colour of meat an important indicator of quality?”; “strongly disagree 1–2–3–4–5 strongly agree”).

Extrinsic quality cues were selected based on previous research and based on the established marketing environment [26,27]. The respondents were asked to rate the following extrinsic quality cues: price, carcass class, place of slaughter, and label, also on a 5 point Likert-type scales (e.g., label: “Is information on the packaging/label an indicator of quality?”; “strongly disagree 1–2–3–4–5 strongly agree”). These intrinsic and extrinsic meat quality cues were derived from and used in earlier studies on meat quality [23–25].

### 2.5.2. Consumption Pattern and Health Issues

This part included questions regarding the consumption patterns of consumers. The consumption patterns comprise the frequency of consuming meat (per day and per week), the quantity of meat consumed per meal (estimated using number of pieces consumed), the perception of meat as a component of a healthy diet, the preferred method used to cook (fried, boiled, stew) and general knowledge of health-related issues on the consumption of meat (type of meat) was also part of the interview.

### 2.6. Statistical Analyses

Data on demographics of respondents were summarized as frequencies (PROC FREQ, [28]), and statistical differences were analysed using the chi-square statistical test ( $\chi^2$ ). Associations were tested between respondent age, employment status, income, and all other factors and attributes. Principal component analyses (PCA) with varimax rotation were conducted in order to identify the underlying structure of the items used for measuring evaluations of the perceived intrinsic and extrinsic factors affecting meat quality explained in Sections 2.5.1 and 2.5.2. For intrinsic factors, based on the PCA of the items measuring expected eating quality a two-factor solution was chosen, where both factors had eigenvalues  $n < 1$ . The first factor, expected quality, covered eight items: taste, smell, juiciness, healthiness, nutrition, tenderness, freshness and leanness, while the second factor, visual appearance covered two items: colour and fatness. For the evaluation of extrinsic factors, a single factor solution was also chosen. The factor covered four items: price, carcass class, place of slaughter, and label. The relationship between evaluation of visual appearance and expected quality was estimated by means of structural equation modelling that enables the estimation of a casual model, based on factors from PCA analysis described above. For the equation modelling, the CALIS procedure (PROC CALIS, [28]) was used. The root mean square error of approximation (RMSEA) was used as the primary fit measure.

## 3. Results

### 3.1. Characteristics of Interviewees

Table 2 shows the socio-economic and demographic characteristics of rural consumers interviewed for their perception on meat quality. The results showed that both male (35%) and female (65%) rural dwellers practicing either Christianity or traditional religion participated in this study. Christianity was, however, found to be a dominant religious practice taking almost 75% of the respondents that were involved in the current study. The marital status of most of the respondents was single (56%), aged between 21 and 30 years. As typical of rural settings, most of the respondents were unemployed (54%) but just pensioners (47%) that basically depend on a monthly stipend in the range of 1100–2500 (R 1100–2500) as social grants from the government. Although 11% were middle-income earners, earning between 2600 and 5000 (R 2600–5000) monthly, the result showed that less than 1% of the respondents earn more than 10,000 rands as their monthly income.

**Table 2.** Socio-economic and demographic characteristic of consumers interviewed on their perceptions of meat quality.

Variable	Category	Frequency (%)
Gender	Female	65.02
	Male	34.98
Marital Status	Married	27.90
	Single	55.79
	Divorced	3.22
	Widowed	13.09

Table 2. Cont.

Variable	Category	Frequency (%)
Age	≤20	6.44
	21–30	24.68
	31–40	21.24
	41–50	11.37
	51–60	14.38
	≥60	21.89
Employment	Employed	22.10
	Unemployed	53.86
	Dependent	24.04
Source of income	Salary/Wage	26.61
	Pension	47.00
	Grant	17.60
	Self employed	8.79
Monthly income	≤R 1000	27.25
	R 1100–R 2500	57.30
	R 2600–R 5000	10.52
	R 5100–R 10,000	4.08
	≥R 10,100	0.85
Religion	Christianity	74.47
	Traditional	25.53

### 3.2. Meat Quality Aspects and Purchasing Decisions of Consumers

The majority of purchase points reported in the current study for all consumers were supermarkets (65%) (Figure 1), and the reason given was that, at this purchase point, the meat will be more fresh (35%). The majority of consumers preferred to consume mutton (44%) (Figure 2) because it was preferred by most members of the family. The mostly consumed meat was chicken (Figure 3), and the reason given was that it is affordable (38%). A significant relationship was observed between income and meat product purchased ( $n = 177$ , 40%,  $\chi^2 = 14.136$ ,  $p = 0.001$ ). This means that disposable income plays a major role in the purchase decision of consumers. When purchasing, the consumers said they mainly considered colour, freshness, and prices (35%) as the most critical.

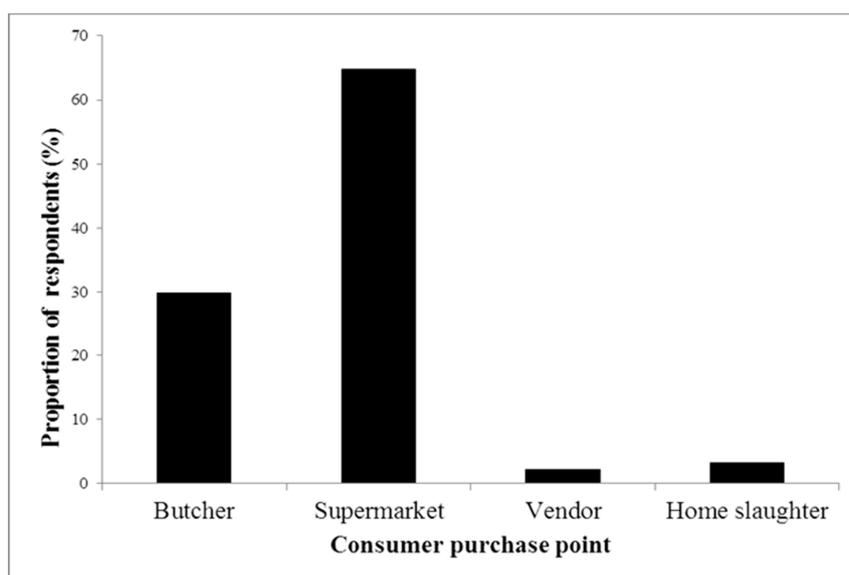


Figure 1. Meat purchase points by consumers from rural areas.

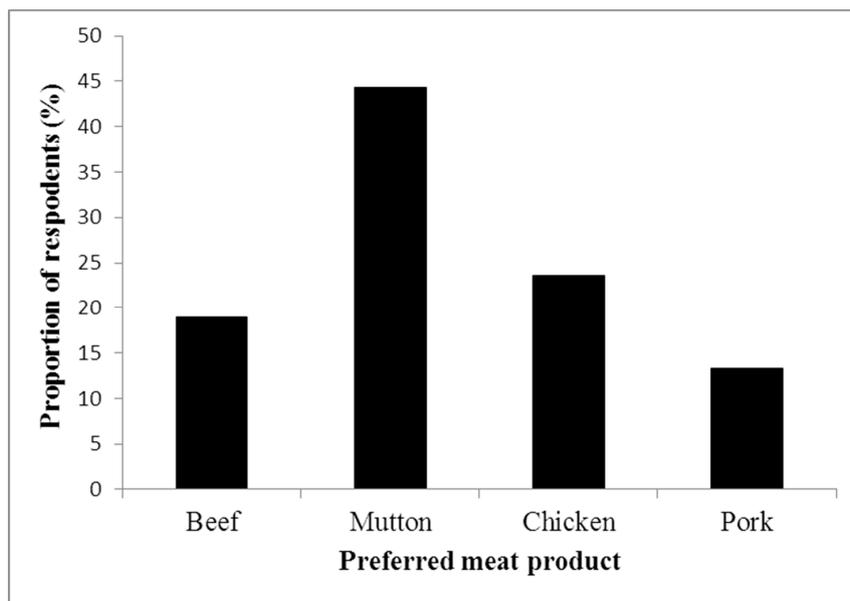


Figure 2. Proportion of meat types preferred by consumers from rural areas.

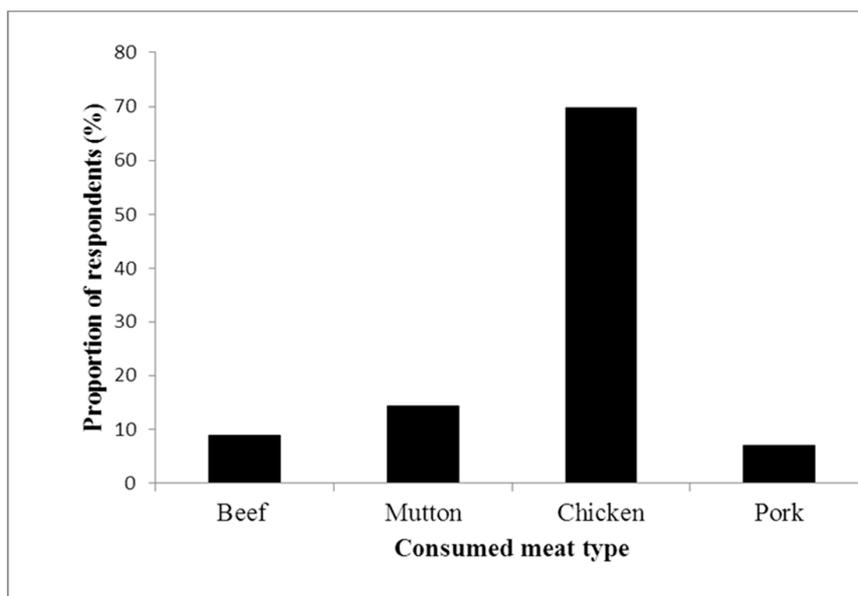


Figure 3. Proportion of meat type consumed by rural consumers at home.

### 3.3. Consumers' Perception of Intrinsic and Extrinsic Quality Cues

Results of PCA for perceived visual appearance and expected quality aspects are shown in Table 3. All quality aspects were loaded on one common factor, whereas all purchase motives were loaded on a second common factor. In visual quality factors, meat colour loaded well and was weakly positively related to favourable evaluation of expected visual quality of meat. In the purchasing decision component, taste and freshness were negatively linked to purchasing decision of the consumers. Higher prices were found to be negatively associated with quality expectation. The quality of meat was found to be associated with colour, tenderness, juiciness, and leanness combined in a one-dimensional quality concept.

**Table 3.** Identification of latent constructs from principal components analyses (PCAs) <sup>a</sup> of quality aspects and purchasing decisions of consumers.

Item	Consumer	
	Factor 1	Factor 2
<i>Intrinsic cues</i>		
Fat marbling	0.19	0.40
Freshness	0.33	0.03
Healthiness	0.08	0.18
Juiciness	0.06	0.40
Leanness	0.35	0.46
Meat colour	0.02	0.33
Nutrition	0.10	0.37
Smell	0.06	0.20
Taste	0.22	0.15
Tenderness	0.08	0.25
Variance explained (%)	0.50	0.69
<i>Extrinsic cues</i>		
Carcass class	0.15	
Package label	0.19	
Place of slaughter	0.31	
Price	0.02	
Variance explained (%)	60	56

<sup>a</sup> Varimax-rotated solutions.

The measurements from the CALIS procedure are shown in Table 4. The model had the satisfactory fit measures: (RMSEA = 0.001, GFI = 0.89,  $\chi^2 = 2.91$ ), and the analysis supported the elicited dimensional structure. The estimation showed significant, strong, and positive relationships between the visual quality items and perceived meat quality. Weak and negative relationships were observed between the place of slaughter and the perceived source quality. With regard to the price effects, carcass class was moderately negatively related to perceived favourable price.

**Table 4.** Structural equation coefficients for evaluation of visual cues and expected quality of meat.

Latent Variables	Indicators	Consumers	
		Coefficient	t-Value
Visual quality	Colour	0.325	0.832
	Fat marbling	0.251	8.333
Expected quality	Juiciness	0.403	6.231
	Nutrition	0.321	0.912
	Healthiness	0.665	1.236
	Smell	0.479	5.326
	Taste	0.002	3.256
	Tenderness	0.595	6.015
	Freshness	0.601	4.308
	Leanness	0.402	5.678
Perceived source effect	Place of slaughter	−0.213	−0.832
	Packaging	0.012	3.259
	Carcass class	0.689	5.006
	Price	0.615	0.532

Fitness measures:  $\chi^2 = 2.91$ ,  $df = 2$ ;  $p = 0.001$ , RMSEA = 0.001; GFI = 0.89, RMR = 0.079.

### 3.4. Consumption Patterns and Consumer Health Issues

With regard to consumption patterns and health issues, most consumers were aware of nutritional balance issues (64%). A high proportion of consumers (61%) consumed meat once a day and at least twice per week (41%). Results show that most consumers consume two pieces (52%) of meat per meal and that boiled (40%) meat was the most preferred method of preparing or cooking meat. Consumers in this study were aware of the health risks associated with meat consumption (59%). Although the consumers were not aware of how much meat will keep them healthy (53%), some of them (29%) adopted a risk reduction strategy of consuming less meat or less red meat based on the impression by most of them (88%) that meat is a rich protein component in their diet.

## 4. Discussion

This survey indicated that the majority of consumers buy their meat in supermarkets. This was also observed in other studies [15,29], where consumers choose supermarkets as the main purchase point of meat. Consumers prefer supermarkets because they assume that the meat will be fresher and cheaper. The study reveals that the consumers generally preferred mutton over other types of meat, although chicken was the most consumed type of meat. In this study, mutton consumption was lower due to the price of mutton relative to other types of meat, such as chicken. This agrees with the study by Rani et al. [30], who observed that consumers preferred mutton meat although consumers were not buying because of its high price. This contradicts observations in developed countries, where health issues [31], branding, and expected quality of meat are considered critical by consumers [32,33].

In other studies [15], chicken was found as the most consumed meat by consumers in Germany. According to Verbeke [9,10], poultry meat has become associated with products beneficial to health. Secondly, it could be the price factor that affects purchasing decisions. Poultry meat is known to be cheaper compared to other meat products [34]. In this study, price was viewed as the main factor affecting a purchasing decision due to the fact that the respondents were from a rural and poor background and that most purchases are determined by the amount of cash available [19]. The quality of the product is secondary, as observed by Ballantine et al. [35].

The observed results show that the quality of meat was associated with colour, tenderness, juiciness, and leanness. The fact that colour was regarded by the consumers as the most important quality when purchasing is because it is the first attribute that consumers use when selecting meat [12]. Meat colour is the most important factor affecting consumers' acceptance. It is important in meat marketing since it is the first attribute that consumers use to predict freshness and wholesomeness [12]. Consumers still demand beef to be of a bright cherry-red colour [36], lamb a brick red colour, and pork and chicken a pink colour [12]; however, the colour of fresh meat is not well correlated with eating. These findings are similar to those of Becker et al. [15] and Jocumsen [37], who also found that consumers use freshness as the most important attribute at the point of purchase.

In this study, fat marbling was observed to be positively related with perceived visual quality, whereas Bredahl [27] indicated that fat marbling was related to quality aspects such as tenderness and taste. Verbeke et al. [38] state that one requires good knowledge and good background to appreciate marbling. Kauffman and Marsh [39] defined marbling as the visible fat present in the interfascicular space of a muscle and it affects flavour, juiciness, and tenderness of meat and hence increases its palatability [40]. The fact that respondents showed a lack of knowledge in interpreting the importance of marbling in meat quality could have been a result of their rural background, and this was also observed in a study by Vimiso et al. [19].

Visual quality cues were positively associated with expected meat quality measured by juiciness, freshness, tenderness, and leanness. In most instances, in supermarkets, consumers have been observed to use visual cues to assume expected meat quality [33]. Their interpretations may be misleading, as the consumers often experience a low degree of correspondence between expected and experienced quality. It is therefore necessary to provide more information to the consumers on the various aspects of quality of the meat they are inclined to purchase through labels.

Concerning the extrinsic cues, direct links were observed between the source indicators and expected quality items. Price was regarded as the second factor for predicting meat quality in the shop attribute. Price is probably the best known extrinsic quality indicator. It becomes more important when information about other attributes is lacking and there is a risk. In particular, the price cue is used when evaluating unbranded products [27]. When comparing two similar products, the higher-priced alternative is usually expected to be of better quality [41,42]. Other studies [43] observed that price appears as a significant cue when consumers do not have adequate information about the intrinsic quality cue or when it is the only presented cue. The observed significant positive association between visual quality cues and expected meat quality suggest that, with rural consumers, colour and fat content, together with price, were the most frequently considered characteristics in assuming quality, as observed in other studies [18].

With regard to consumption patterns and health issues, most consumers were aware of nutritional balance issues and health risk issues associated with meat consumption. The meat consumption of the consumers at present is low, and this corresponds with their low income because the majority of them depend on pension money. Meat was proven to be an everyday dietary choice for most of the consumers even in rural areas. The consumers preferred their meat to be boiled, as this method, as compared with other methods of cooking such as frying, will not add more fat. This fact was expected since most of the consumers are elderly people, and most of them had indicated that they preferred this method due to health reasons, while others had been advised by their doctors. High fat intake is correlated with different diseases, including cancer [44]. The study also revealed that the consumers were not sure on how much meat they should consume to keep them healthy. However, they think that consuming less meat (small portion of meat) or small amounts of red meat reduces health risks. For certain meats such as beef and pork, studies have associated a reduction in their consumption as a reflection of individual perception of health [5,6]. However, the reports on the health risk of meat consumption are controversial. The risk might not be a function of meat per se, but reflects high fat intake and/or the generation of carcinogens through cooking and processing [45].

## 5. Conclusions

In general, meat was perceived as a healthy component of the diet. Consumers also consider the same characteristics that are considered by those of developed countries, for example, European countries. However, the expected difference among consumers of different groups are on preparations and cooking methods of the food. Consumer perception of meat quality aspects, health issues, and consumption patterns is affected by their income. Colour and fat marbling were perceived as the most important intrinsic cues of meat quality. Price was perceived as the most important extrinsic cue. Therefore, a broader view needs to be taken when investigating rural consumer meat evaluation ratings in different market segments by including variables that influence purchase decisions, such as consumer perceptions of colour and intramuscular fat content at the moment of purchase, and tenderness and flavour, which contribute to the sensory quality of the meat. Consumers from rural areas are aware of nutritionally balanced food. The question remains whether consumers have a correct impression of the health consequences, and of the factors that determine whether meat is healthy or not.

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**Conflicts of Interest:** The authors declare no conflict of interest.

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