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uma aproximação pela pontuação de melhor-pior*

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Os atributos mais relevantes na decisão de compra de carne bovina: uma aproximação pela Pontuação Melhor-Pior

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Resumo: O objetivo deste estudo foi o de avaliar os atributos mais importantes na decisão de compra da carne bovina na cidade de Dracena – SP, Brasil. Foram realizadas entrevistas cara-a-cara utilizando questionário estruturado, no qual foi realizado um Experimento de Escolha Discreta Melhor-Pior do caso 1. As respostas foram analisadas pela Pontuação Melhor-Pior. A heterogeneidade das preferências foi avaliada através de análise fatorial. Verificou-se que a aparência da carne bovina é o atributo mais importante na decisão de compra dos consumidores e ele é seguido pelo frescor, embalagem/data de validade, cheiro e textura da carne. Observou-se a existência de grupos de consumidores com diferentes preferências pelos 5 fatores que agrupam os atributos avaliados. Por exemplo, homens atribuem maior importância aos atributos da dimensão saudável (carne orgânica e quantidade de gordura na carne) enquanto que as mulheres dão mais importância aos atributos da dimensão data de validade/embalagem.

Palavras chave: Preferência dos consumidores, percepção de qualidade, comércio de carne bovina, Dracena

Abstract: *The aim of this paper was to evaluate the most important attributes on beef purchase decision in the city of Dracena, State of Sao Paulo, Brazil. It was carried out face-to-face interviews using a structured questionnaire, in which was performed a Best-Worst Discrete Choice Experiment of case 1. The answers were analysed by Best-Worst Score. The preference heterogeneity was assessed through factorial analysis. It was found that the appearance of beef is the most important attribute on consumers' purchase decision and it is followed by its freshness, packaging/expiry date, smell and texture. It was observed the existence of groups of consumers with different preferences by factors that group the evaluated attributes. For example, men attach more importance to the attributes (organic and fat amount) of the healthy dimension while women give more importance to the attributes from expiry data/packaging dimension.*

Key words: consumer preference, quality perception, beef trade, Dracena.

Resumen: *El objetivo de este estudio fue evaluar los atributos más importantes en la decisión de compra de carne vacuna en la ciudad de Dracena – SP, Brasil. Fueron llevadas a cabo encuestas cara a cara utilizando un cuestionario estructurado, en lo cual se hizo un Experimento de Elección Discreta de Mejor-Peor, del caso 1. Las respuestas fueron analizadas utilizando la puntuación de mejor-peor. La heterogeneidad de las preferencias se evaluó mediante análisis factorial. Se descubrió que la apariencia de la carne vacuna es el atributo más importante en la decisión de compra de los consumidores y le sigue el frescor, la fecha de envasado/caducidad, el olor y la textura de la carne. Se observó la existencia de grupos de consumidores con diferentes preferencias para los 5 factores que agrupan los atributos evaluados. Por ejemplo, los hombres otorgan mayor importancia a los atributos de la dimensión saludable (carne orgánica y la cantidad de grasa en la carne), mientras que las mujeres otorgan más importancia a los atributos de la fecha de caducidad/dimensión del envase.*

Palabras clave: Preferencia de los consumidores, percepción de calidad, comercio de carne vacuna, Dracena.

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INTRODUCTION

Agriculture is fundamental to any country. Its role ranges from providing affordable food as well as generating jobs and income. Brazil has natural conditions that provide competitive advantages to the beef production. Brazil is the second largest beef producer in the world (FOOD AND AGRICULTURAL ORGANIZATION - FAO, 2014). In 2016, the herd of 219 million head. Animals intended exclusively for meat production are 74.43% of the total. These cattle produced 9.14 million tonnes equivalent housing. Of the total production, 80.03% was destined to national market (ASSOCIAÇÃO BRASILEIRA DAS INDÚSTRIAS EXPORTADORAS DE CARNES - ABIEC, 2018).

In 2016, the Gross Internal Product (GDP) of livestock was R\$ 125.57 billion and it represented 31% of the GDP of agribusiness (ABIEC, 2018). The beef supply chain traded US\$ 138.36 billion at national market in 2016. In this chain, input sector traded US\$ 33.68 billion, farmers operated US\$ 26.65 billion; slaughterhouses summed US\$ 33.91 billion, while the value was US\$ 43.86 billion at retail (ABIEC, 2018).

The Brazilian meat market increased in the last decades. In 1990, consumption *per capita* of meat was 49.4kg, in the next decade it was 79.0 kg (+59.9%) and 97.6 kg (+23.5%) in 2013 (FAO, 2014). In part, this increase in consumption is due to the *per capita* income improvement. The income grew up 15% between 1990 and 2000 and 139% between 2000 and 2013.

Income impact differently on the meat market. Carvalho and Bacchi (2007) estimated the income elasticity of expenditure (ϵ_{RP}) per capita of meat to the Brazilian market. According to him, the improving in income increases mainly in consumption of high-quality beef ($\epsilon_{RP} = 0.538$) and then in low quality beef ($\epsilon_{RP} = 0.084$). With more income people search for better quality meats.

Economic factors are important to understand consumption. Nevertheless, purchase decisions involve many other aspects. Knowledge about which attributes stronger rule on consumer purchase decisions is extremely important for medium and long-term supply strategies elaboration (BERTASSO, 2000). This information enables the identification of priorities, allocation of resources and improvement of productive capacity, with reduction of economic activities' costs of the productive chain.

Therefore, the aim of this study was to evaluate the most important beef attributes on consumer purchase decision in Dracena, Sao Paulo State. Dracena is a municipality located in the west of Sao Paulo state, Brazil. It is the largest municipality in "Nova Alta Paulista" region, with 46.324 people in 2017 and the Gross Domestic Product *per capita* was US\$ 7.023,55 in 2015 (INSTITUTO BRASILEIRO DE GEOGRAFIA E ESTATÍSTICA - IBGE, 2018). Its origins came from coffee growing, but this culture has been replaced by livestock since 1970 and from 2000 onwards by sugar cane. Livestock, although occupying the largest productive area, has also lost space for sugar cane. These changes have impacted all regional economy (LELIS; HESPANHOL, 2013). In this sense, the College of Agricultural and Technological Sciences has endeavoured to develop alternatives that makes agriculture and traditional economic activities viable, as is the case of livestock.

2 LITERATURE REVIEW

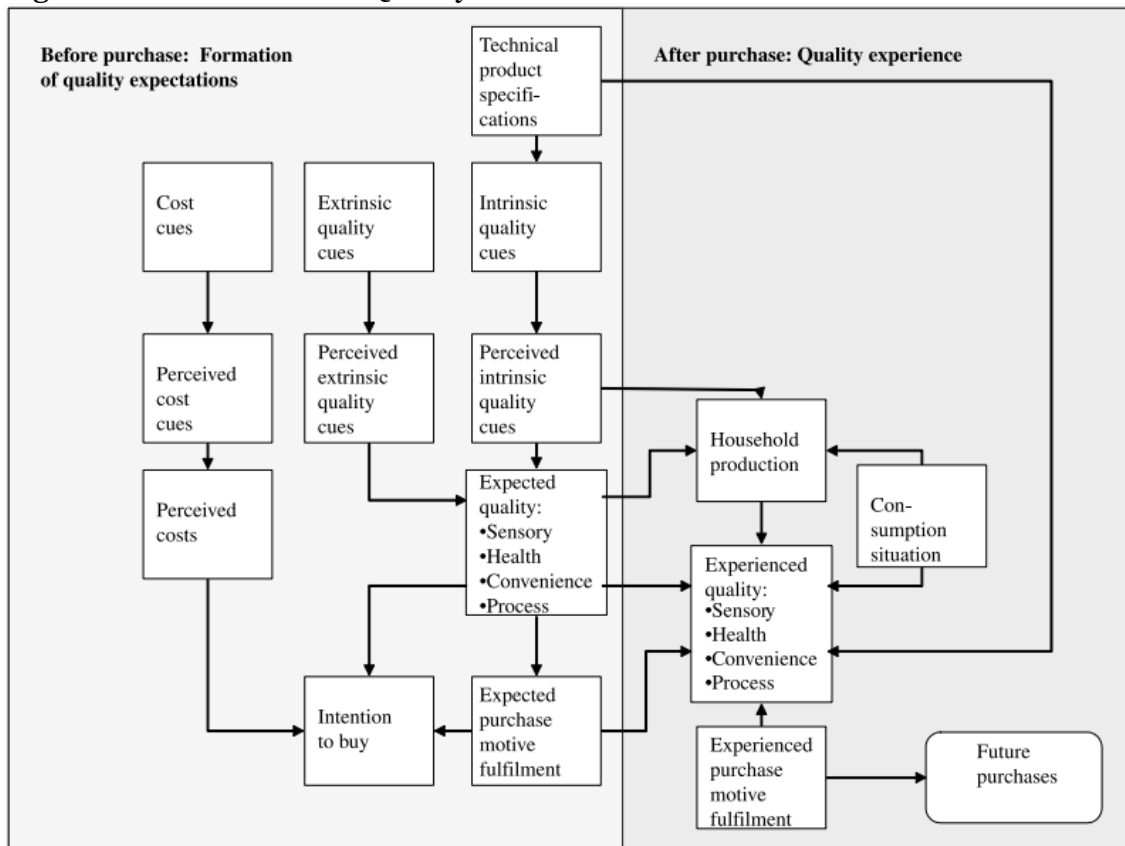
This research was carried out based on Lancaster's theory (LANCASTER, 1966), which has a multidimensional approach. This approach makes it possible to relate the economic theory with consumer behavior theory. According to Lancaster's theory, consumer does not evaluate the product utility by the product itself, but by its characteristics or attributes set, which satisfy consumers' needs and desires. On the other hand, Lancaster model doesn't consider that consumer is only able to have perceptions about product quality. This doesn't invalidate his theory, but it does require an extension to include perception in the studied model (WIERENGA, 1984), which was included in item 2.1 of the work.

2.1 THE FOOD PURCHASE PROCESS

Although consumers are becoming more informed and demanding when purchasing a product, they are not able to evaluate all product quality at purchase time. In imperfect information conditions, consumers only perceive the product quality.

The perception of quality and purchase decision process have been studied under several approaches, but in the case of food, the most exhaustive focus has been attributed to the Total Food Quality Model (GRUNERT; BRED AHL; BRUNSO, 2004), represented by figure 1. This model integrates a number of theories to food quality, such as Means-End Chain model (GUTMAN, 1982), Fisbein-Aizen's Theory of Attitude (1975), Economic Information (NELSON, 1974), Theory Reasoned Action, Theory of Planned Behaviour, Theory of Expectation of Quality and Perceived Quality (OLIVER, 1993).

Figure 1 - The Total Food Quality Model



Source: Grunert (2005)

The perception of quality is built based on imperfect information. The Total Food Quality Model considers consumer behaviour in two moments: before and after purchase. Before purchase, consumer is able to detect some quality characteristics. After purchase, the major part of quality features can be evaluated by consumer. Thus, the quality expectancy is based on a limited number of quality indicators, time constraints and the limited ability of people to process the information of quality. According to Steenkamp (1989), quality indicators are available information to consumer and verifiable prior to the purchase decision. The intrinsic quality indicators related to the product physical property, such as: colour and amount of fat. Extrinsic quality indicators are associated with the product, but they are not an integral part of the physical product and can be modified without altering the product itself. The extrinsic quality indicators would be the product's origin, brand and price.

The total food Quality Model also allows classifying the quality indicators in search, experience and belief characteristics. Table 1 shows some examples of these characteristics and relate them to intrinsic and extrinsic quality indicators. It is important to focus on providing the most meaningful information on quality indicators of experience and belief. Consumer, focused on food production chains, would strive to maximize these indicators to extrinsic quality indicators.

Table 1 - Classification of the quality indicators

	Intrinsic indicators	Extrinsic indicators
Search characteristics	• Colour, texture, fat amount, smell	• Labels, nutritional information, product origin, brand and price.
Experience characteristics	• Taste, freshness, softness	
Belief characteristics	• Healthy, productive characteristics	nutritional and process

Source: Grunert, Bredahl and Brunso (2004)

In the purchase situation, buyers compare the expectation of food quality to the purchase motivation and monetary costs. From the economic point of view, the comparisons of costs and benefits is the evaluation of the exchange. The exchange situation determines the purchase intention. After purchase, consumers gain quality experience through the preparation and use of food. The quality experience is influenced by several factors of the product itself, such as its taste, but also by way in which food is prepared; situational factors such as the time of day, type of food and consumer mood and previous experience. The relationship between quality expectation and experienced quality (before and after purchase) is taken as factors that determine consumer satisfaction with the quality of food and, consequently, with the likelihood of repurchase.

2.2 THE INDICATORS OF MEAT QUALITY

Consumers use quality indicators in shaping their perceptions about beef quality. Grunert (1997) observed that consumers generally estimate meat quality through various quality indicators such as colour, aroma, meat cut, hygiene at sale place, packaging, price, weight, veins and apparent bones, freezing or cooling, marbling, visible fat, fat content and colour and consistency of fat. If time is a limiting factor to the purchase process, two factors dominate the formation of the quality expectation: fat perception and market place. People chose a given market place because they have confidence to a specific butcher.

In Brazil, we still have few studies about the perception of indicators of meat quality, particularly regarding to belief and experience characteristics. Meat products have been bought mainly in supermarket butchers or packaged beef without labels of quality. However, there is an increasing interest in using recognized brands as well as quality labels.

3 METHODOLOGY

Some steps were taken to perform the study. The first was the literature review on the subject, followed by a Focus Group with consumers from the city of Dracena. The main objective of these two steps was to pre-understand the beef purchase decision process. From this understanding, a list of beef attributes was elaborated. The third step was to elaborate a questionnaire with a Best-Worst Discrete Choice Experiment (BWDCE) of case 1. This questionnaire was used in a survey with the consumers from Dracena. The BWDCE was carried out to measure the beef attributes importance on purchase decision.

3.1 BEST WORST CHOICE EXPERIMENT

In 1990, the Best-Worst Discrete Choice Experiment (BWDCE) was proposed by professor Louviere and Woodworth as an extension of Thurstone's Random Utility Theory (RUT). In the BWDCE of case 1 individuals are invited to choose the most and the least important object (in this case the object is an attribute) in each choice set (LOUVIERE *et al.*, 2013). Figure 2 illustrates the first choice set (version 1) of the BWDCE adopted in this study. Each object is a beef attribute. The BWDCE was employed in the study because it overcomes some problems presented by other measurement and rating methodologies.

Rating methods employ scales and Likert scale is the most usual. Respondents have difficulty to use scale categories (e.g. "important", "very important") and just delimit the endpoints. In addition, people could have different perception about the distance between categories and results could be inconsistent with their actual preferences.

Figure 2 - First choice set (version 1) of this study

Choice situation 1		
(-)	Characteristic	(+)
	Beef texture	
	Commercial beef brand	
	Selling point reputation	
	Beef smell	

Source: Own author

Another limitation of scale use is that people value each attribute independently and there is not a trade-off among attributes. Often responses do not provide adequate discriminations among attributes in order to list their priorities. Thus, it is impossible to draw recommendations. All these limitations are overcoming by BWCE because respondents are forced to compare alternatives (attributes) and do choices (COHEN, 2003).

Indirect measures provided by Discrete Choice Experiments provide richer insights into trade-offs and, as they have a natural link with real choices, they should be more external valid than direct measures, such as Likert scale (LOUVIERE; ISLAM, 2006). An additional advantage of BWDCE over a traditional "most-preferred" choice questions is the extra information about individuals' preference. It provides greater amount of information per individual per choice set with less cognitive demanding on respondents (LOUVIERE *et al.*, 2009).

3.2 SURVEY AND DATA

As explained previously, the selection of beef attributes was backed by specialized literature, which was complemented with a Focus Group. The focus group was performed in 2016 in the College of Agricultural and Technological Science of Sao Paulo State University. The group had 8 people with similar education and ages vary between 30 and 50 years old. At the end, it was selected 12 attributes related to the beef purchase process (Table 2).

Table 2 - Selected attributes

Attributes	Attributes
1) Beef texture	7) Beef freshness
2) Commercial beef brand	8) Beef appearance
3) Selling point reputation	9) Organic product
4) Beef smell	10) Packaging/expiry date
5) Traceability of beef	11) Inspected beef
6) Country of origin labelling	12) Fat content

Source: own author

The experimental design was elaborated following the recommendations of Orme (2005) and Chrzan and Patterson (2006). Each attribute was repeated 3 times through choice sets and each choice set included 4 attributes or alternatives (figure 1). This kind of experimental design does not demand hard effort for the respondents. Thus, the answers quality could be guaranteed.

The software “Sawtooth MaxDiff Designer” was employed to do simulations with different combinations of the attributes to obtain an experimental design with the best statistical properties. According to Orme (2006) this program, by default and in order, considers the following properties: one-way frequency, two-way frequencies, positional frequencies and connectivity. As a result of one thousand simulations, the final outcome was a design with no lack of connectivity and was a one-way frequency balanced and with a positional frequency mean of 1.5 and standard deviation of 0.5. Besides the BWCE, there were questions related to beef consumption habits and socio-economic data in the questionnaire.

The data was collected in July 2017 in public places of the city of Dracena, Sao Paulo State, Brazil. In total, information from 166 consumers was collected by face-to-face interviews, in public places. Consumers were randomly invited to be interviewed. Sampling error was calculated in 7.6%, with 95% of confidence. It was taking into account Trespalacios, Vázquez and Bello (2005) to make this estimation.

4 RESULTS AND DISCUSSION

In order to simplify to readers, the results were organized as follows: sample profile, average preference and heterogeneity on preferences. The last two subsections are dedicated to describe consumer preferences, while the next one presents the sample profile and compares it with the Dracena population profile.

4.1) SAMPLE PROFILE

The interviewed consumers’ socio-demographic data are shown in table 3. The survey only evaluated the opinions of people over the age of 18. A total of 166 consumers were interviewed. The sample has a greater participation of women. In total, 59% of interviewed consumers are women, while this number is around 51% in the population. This sample characteristic is desired because normally women make the purchase decision of food for their family.

The sample also represents the preference of consumers with high school and college in greater proportion. In Dracena, 34% of population frequented the

elementary education. In the sample, just 7% of consumers belong to this group. Young people opinions are more present in this study. In the sample, 29% were less than 24 years old and people aged 25 to 44 accounted for almost half of interviewees (49%). These age classes represent 43% and 23%, respectively, in the population.

In order to facilitate people's participation in the survey, consumers were not asked about their family income, but about their social class. The results of social classes could be extrapolated income range per month, in minimal wages (MW), by equivalence list adopted by IBGE¹, described for Marketing Direto (2017).

Table 3 - Consumers' socio-demographic characteristic

Socio-demographic characteristic	Sample ¹		Population ²	
	Number	%	Number	%
<i>Gender</i>				
Male	68	41%	17,609	49%
Female	98	59%	18,198	51%
<i>Age range</i>				
From 18 to 24 years old	48	29%	6,615	18%
From 25 to 44 years old	81	49%	13,444	38%
From 45 to 64 years old	29	17%	10,560	30%
More than 64 years old	8	5%	5,146	14%
<i>Study level</i>				
Elemental study	12	7%	7,156	34%
High school	100	60%	9,188	43%
College	54	33%	4,934	23%
<i>Social class/income</i>				
Class A and B /More than 5 MW/month	41	25%	2,504	7%
Class C/From 3 to 5 MW/month	80	48%	2,773	10%
Class D and E/Less than 3 MW/month	45	27%	22,957	83%
Total	166	100%	42,048	100%

Source: (1) own author, (2) IBGE (2018).

4.2) AVERAGE PREFERENCE

The intrinsic attributes stand out on beef purchase decisions. The beef's appearance is the most important attribute on beef purchase decision. As each attribute was presented 3 times to each consumer and 166 consumers participated in the research, the maximum number of indications that an attribute could receive was 498. Appearance was indicated 293 times as the most important attribute (column B in the table 4) and 17 times as the least important attribute (column W). In 188 choice situations it didn't receive any statement. The difference between the number times that it was stated as the most important and the number of times it was stated as the least important is 276 (column BW). Dividing this number (BW) by the number of

¹ In 2017, the minimal wage (MW) was R\$ 937.00 (US\$ 284.73) per month. Social classes A and B earn more than 5 MW/month, while social class C earns between 3 and 5 MW and social classes D and E have an income below 3 MW.

consumers (166), it is obtained the Best-Worst Score (column BWS). The BWS of beef appearance is 1.64.

It was calculated relation between the number of times that the attribute was selected as the most important and the number of times that was stated as the least important (B/W). This relation is 17.2 for beef appearance. It means that for each statement as the least important attribute, it was selected 17.2 times as the most important attribute on beef purchase decision. When the relation B/W is one, it indicates that these attributes were selected as the most important attribute as often as the least important attribute. Selling point reputation and inspection's B/W value is 1.0. Statistical inference also shows that both attributes have the same importance to consumers.

Table 4 - The relative importance of attributes considered on beef purchase decision, estimated by Best Worst Score (BWS)

Rank	Attribute	B	W	BW	BWS	B/W
1 ^o	Appearance	293	17	276	1.64 _a	17.2
2 ^o	Freshness	263	21	242	1.44 _{a,b}	12.5
3 ^o	Packaging /expiry date	247	33	214	1.27 _b	7.5
4 ^o	Smell	183	36	147	0.88 _c	5.1
5 ^o	Texture	150	75	75	0.45 _c	2.0
6 ^o	Inspection	106	106	0	0.00 _d	1.0
7 ^o	Selling point reputation	81	81	0	0.00 _d	1.0
8 ^o	Fat content	90	164	-74	-0.44 _e	0.5
9 ^o	Organic	33	190	-157	-0.93 _e	0.2
10 ^o	Traceability	22	223	-201	-1.20 _e	0.1
11 ^o	Commercial brand	15	266	-251	-1.49 _f	0.1
12 ^o	Country of origin labelling	11	282	-271	-1.61 _f	0.0

Source: Own author

Each attribute BW was calculated for each consumer and attribute BW distribution were analysed for all attribute by Kolmogorov – Smirnov and Shapiro-Wilk test. It was found that all attributes BW are not normal distributed. Thus, attributes' BW were compared with Mann-Whitney test. Results are shown in the column BWS by the overwritten letters. Letter “a” states that beef appearance is as important as beef freshness and, in the same way, letter “b” indicates that freshness has the same importance to consumers than Packaging /expiry date.

Since fat content BWS become negatives. It happens because attributes received more indications as the least important than the most important attribute on beef purchase decision. The country of origin labelling is the least important attribute. Nevertheless, statistical inference shows that country of origin labelling is as relevant as commercial brand on beef purchase decision (letter “d”).

These results can be compared to those of previous studies. In Porto Alegre (Brazil), appearance, price and the type of meat cut have the greatest importance to consumers at purchase time (GIACOMAZZI, 2016). In Campo Grande (Brazil), the most and the second most important attributes are hygienic conditions and good smell and appearance is the third most important beef attribute to consumers (DIAS *et al.*, 2015).

Appearance is a quality indicator available at shopping place and it include color, fat content, marbling and drop loss. Consumers relate red-purple color to beef freshness. Color is used as an indicator of sensory quality, although eating satisfaction

not always is related to color. In order to improve beef shelf life, it is relevant to improve color stability (FONT-I-FURNOLS; GUERRERO, 2014). According to Suman *et al.* (2014), the best way to control the beef initial color and color stability is the system approach. It involves genetics, production factors, pre- and post-harvest issues combined with packaging and storage temperature. For example, vitamin E mitigates adverse effects of several feed stuffs on beef color or yet color-stabilizing effects of antioxidants are packaging specific.

In many countries, fresh meat freshness is an important attribute. Verbeke and Viaene (1999) observed that freshness is top five important attributes for fresh meat in Belgium. In Germany, Ireland, Spain, Sweden and UK it is the most important attribute and in Italy it is the second most important attribute for consumers (GLITSCH, 2000). It is advisable to communicate freshness to consumers. Communication of freshness could be done by a time – or temperature – sensitive freshness indicator applied to individual beef packages. According to Fortin, Goodwin and Thomsen (2009), indicators of freshness have been adopted by some food retail (Monoprix, Wagon-Lits, Ooshop, Milco, Barakat, Citychef and Marriott's food service) in different countries.

Texture is a multi-parameter sensory attribute and acceptability of juiciness and tenderness are more studied. These two parameters have positive influence on consumer preference for meat. Thus, they are highly correlated to overall expected quality, intention to purchase and willingness to pay (FONT-I-FURNOLS; GUERRERO, 2014).

It is possible to improve the beef's tenderness (texture) by optimizing *in vivo* strategies, such as the animal feeding and genetics, and post mortem factors, such as carcass refrigeration after slaughter, hot carcass hanging, ageing time and cooking procedure (NGAPO *et al.*, 2013).

In Brazil, the most beef production uses extensive pasture (it takes 164.7 million ha), where feeding is exclusively with grass. In 2016, it was slaughtered 36.9 million cattle and 87.51% of them were produced exclusively in pastures (ABIEC, 2018). According to Resconi *et al.* (2010), meat of cattle with finishing diet on concentrate diet, only, had less intensity of odor, flavor and tenderness than diet with grass. Hence, feedlot is advisable to increase tenderness. Nevertheless, its costs are higher. Ziliotto *et al.* (2010) evaluated the costs for fattening animals in pasture for 100 days and feedlot for 75 days, in Rio Grande do Sul State. They found that it is cheaper to fattening cattle in pasture (US\$ 279.49/head) than in feedlot (US\$ 301.62/head). Up today farmers do not receive subsidies for softer beef. This policy could be an alternative to compensate the differences between pasture and feedlot costs.

In some countries, such as USA, consumers prefer grass fed beef. They worry regarding their health, environment, animal welfare and local agriculture production (GILLESPIE *et al.*, 2016). Although being appreciated in other markets, it is likely that grass-fed beef would not be market competitive in Dracena. Organic meat is not a priority for interviewed consumers. The organic production ranks ninth in the priority list among 12 studied attributes.

Consumers considered selling point reputation and inspection as intermediate importance attribute. Both attributes are related to risk perception, but mostly for beef inspection, it was expected to be more important to consumers. It because in March 2017 the Federal Police of Brazil enforced the Operation Weak Flesh, which investigated some of the largest processing companies. These companies were accused of trading spoiled products with falsified expiration date and bad appearance and smell meat were altered with unauthorized chemicals. The operation denounced public agents, from the Federal Inspection System (SIF), for receiving kickbacks to loosen up

the vigilance. The case was widely publicized by the national and international press. A possible explanation for the observed result was the work carried out by the Brazilian Ministry of Agriculture (MAPA) to restore consumer confidence. The messages of this public body were based on the risk absence to consume meat and the meat industry reputation, which is prepared to attempt the most demanding world markets.

Consumers do not regard the country of origin as an essential characteristic of meat quality. Country of origin labelling results diverge from those observed by Realini *et al.* (2013). They found that beef origin is more important than feeding or price and they noted that consumers from Spain, France and United Kingdom prefer domestic beef instead imported. In European countries, the local products' market is traditional and expressive. In 1919, the French Agricultural policy established the Designation of Origin (DO) and, in 1992, the European Union introduced the labels Protected Designation of Origin (PDO) and Protected Geographical Indication (PGI) (SPARF, 2010). Nowadays there are 1,590 European food denominations (EUROPEAN COMMISSION - EC, 2018). In Brazil, the first Designation of Origin and Geographical Indications was in 1999 and 2002, respectively. Up to now, there are 32 Geographical Indications and 7 Designations of Origin from Brazil. The greatest part of the Brazilian designations (85.4%) were founded since 2010 (INSTITUTO NACIONAL DE PROPRIEDADE INDUSTRIAL - INPI, 2018). Another explanation is the existence of foreign beef in the Brazilian meat market. According to the FAO (2014), in 2013, Brazil imported of 0.1% of its total beef consumption while Spain imported 8.9%, France 7.9% and UK 4.3%.

Barcellos *et al.* (2012) verified that Brazilian people, especially from Porto Alegre (in the south of the country), consider product's origin as the second most important attribute among 6 attributes. The culture of consuming products associated to the territory is stronger than south of Brazil. In this part of the country, there are 38% of all designations, including the unique designation of beef. Sao Paulo state has only 5% all designation. It is why country of origin labelling is not important to consumers on their purchase decision.

4.3) Heterogeneity on preferences

In order to study the preference heterogeneity, a principal component was performed. A principal component analysis was carried out with a varimax rotation in order to determine which attributes might be related. Five factors with an eigenvalue greater than 1 explain 61.4% of variance the first three explain 41.9% of variance (table 5).

The five factors can be interpreted as representing core attributes, and they are as follows: (1) No inspection, (2) Organic production, (3) Commercial brand, (4) Selling point reputation and (5) packaging/expire data.

Factor 1: no inspection dimension opposes inspection (-0.763) and traceability (-0.620), but with a "good taste" (texture and freshness).

Factor 2: healthy dimension values organic production (0.794), but opposes fat content (-0.637).

Factor 3: brand dimension opposes commercial brand (0.658) and country of origin (0.588), with appearance (-0.578).

Factor 4: selling point dimension opposes selling point reputation (0.814) and traceability (0.428), with smell (-0.698).

Factor 5: expiry date dimension values only packaging/expiry date (0,916).

Positioning maps were used to present the differences among socioeconomic characteristics: gender, age range, study level, social class/income. The positioning

analysis of the different socioeconomics levels was performed on the basis of their weights on the various factors. Figure 3 shows the consumers' preferences regarding factor 1 or no inspection dimension and factor 2 or healthy dimension and Figure 4 presents the consumers' preferences in relation to factor 4 or selling point dimension and factor 5 or expiry data dimension.

Table 5 - Factor loadings of beef purchase attributes.

Attributes	Factor number				
	1	2	3	4	5
Texture	0.661				
Commercial brand			0.658		
Selling point reputation				0.814	
Smell				-0.698	
Traceability	-0.620			0.428	
Country of origin labelling			0.588		
Freshness	0.527				
Appearance			-0.578		
Organic		0.794			
Packaging /expiry date					0.916
Inspection	-0.763				
Fat content		-0.637			

Note: Only values above 0.400 are presented.

Source: Own author

As observed by Mennecke *et al.* (2006), although there exists some discrepancy in the ranking of beef attributes between male and female, their general responses are analogous.

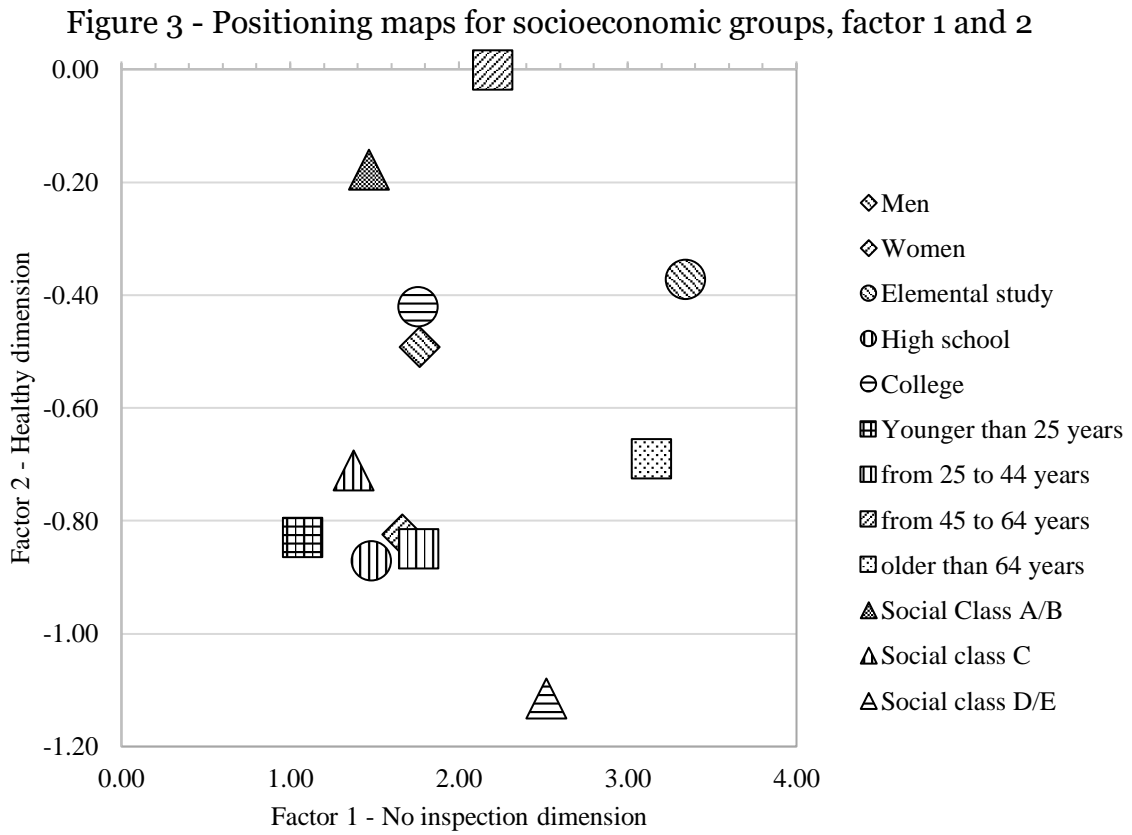
In Dracena, men give more importance to the healthy dimension while women consider more the expiry data dimension. This result is divergent of Illichmann and Abdulai (2013). They observed that German women give more importance to organic beef once they are willing to pay (WTP) 0.30 euros per kilo for 100% organic farm-grown feed while men are WTP 0.20 euros per kilo.

No inspection dimension is more important to those consumers with elementary study and the expiry data dimensions is less important to them. The healthy dimension is less important to consumers with high school.

Consumer's age is related to his evaluation of beef attributes (Figure 3 and 4). This relation is positive with attribute's importance of factor 1 - no inspection dimension, i.e., younger consumers give more importance to attributes related to this dimension.

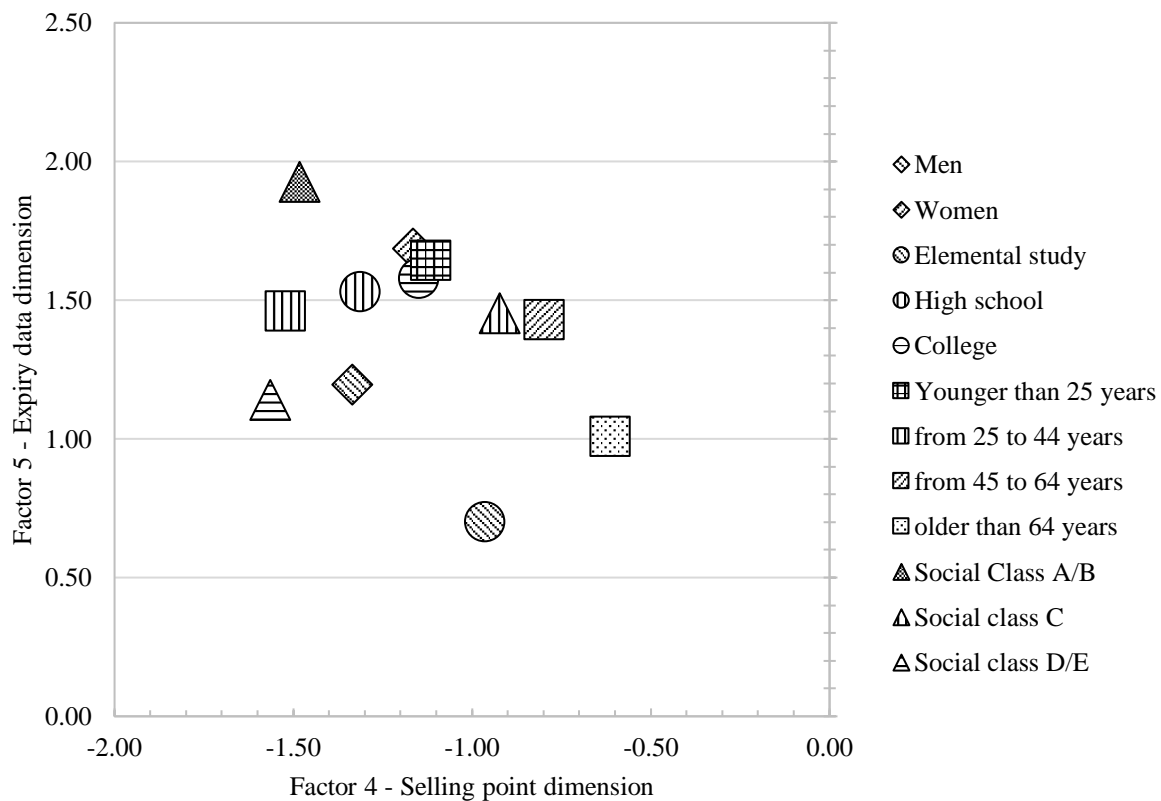
Consumers aged between 45 and 64 years are those who value more the attributes associates to healthy dimension (factor 2). Older consumer attaches more importance to the attributes of selling point dimension.

Social class also influenced consumers' responses. It was observed that consumers of highest social classes attach the greatest importance to healthy dimension and expiry data dimension and, on the other hand, they are those who give less importance to attributes of no inspection dimension.



Source: Own author

Figure 4 - Positioning maps for socioeconomic groups, factor 4 and 5



Source: Own author

Conclusions

The aim of this work was to indicate and measure the impacts of the main attributes considered by consumers from Dracena – Brazil on their purchase decision process. Results suggest that consumers buy beef with their eyes. Among studied attributes, appearance is the most important attribute in the process. In the purchase process, many attributes cannot be assessed and therefore consumers rely on the products' appearance to estimate other aspects of beef quality. In order to obtain a good-looking beef, it is necessary to spend great effort in all production chain.

The meat freshness, which is another intrinsic attribute, stands out on consumers' choice. In order to maintain freshness, it is advisable to have an active supply chain management, at least, since the animal slaughter. Yet there is alternative packaging that can improve communication with consumer about meat freshness.

Other intrinsic beef attributes, such as texture and smell, deserve attention of meat industry. Both attributes are experience attributes and then they are difficult to be evaluated at purchase place. If these attributes are not offering a minimum of quality, these attributes may be contributing to consumers' dissatisfaction.

Dracena's beef market in has different preferences. It is important to take into account the market heterogeneity to draw marketing strategies as well as to make public policy to the beef industry.

Weak Flesh Operation has revealed relevant problems of the Brazilian meat industry. Before, it was believed that the "only" meat safety problem was linked to the informal market. Today, it is known that even the largest companies, with market reputation, were adulterating their products, in detriment to the public health. In the short term, the precedent causes damages to the meat sector, but in the medium and

long term, the policy carried out by the Federal Police implies improvement in the beef industry.

The best-worst discrete choice experiment provided to be an appropriate methodology for drawing up a priority list for the beef sector. Nevertheless, it is important to point out that this method does not evaluate the absolute importance of an attribute. It measures the relative importance degree. Hence, country of origin labelling, even though the minor importance among studied attributes, may be relevant on consumers' purchase decision. Therefore, caution must be exercised in interpreting results.

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