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Effect of Production Process and Attitudes on the Intent to Buy Sustainable Beef

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ABSTRACT

Previous studies on food consumption explore limited dimensions of the sustainable food production process. A model of consumer concern over the agricultural production process was developed to assess the influence of environmental attitudes, product involvement, and brand equity on the intent to buy sustainable beef. Interviews with experts, two focus groups, and a literature review were used to propose a scale for production process concerns. A survey of 725 beef consumers was conducted to test eight hypotheses. Results suggest that product involvement and concerns over the production process are related to attitude towards the environment and intent to buy sustainable beef. Moreover, as a result, the consumer bears a positive attitude towards sustainable consumption and is more likely to buy a sustainable product. Meanwhile, the rejected hypothesis refers to the relationship between brand equity and purchase intention. This new conceptual model may be validated with other food commodities.

KEYWORDS

beef; marketing; production process; purchase intent; sustainability

Introduction

Topics regarding consumer perspectives of the production process in the agricultural sector have been separately studied by several authors. Some authors discuss the production source (Ay, Chakir, & Marette, 2017; Janßen & Langen, 2017; Stöckigt, Schiebenera, & Brand, 2018), traceability of meat (Cicia & Colantuoni, 2010; Oliveira & Spers, 2018; Wu et al., 2017), and animal welfare issues (Caputo, Van Loo, Scarpa, Nayga Jr, & Verbeke, 2018; Chini, 2015; Gao & Schroeder, 2009; Grunert, Bredahl, & Brunsø, 2004; Saunders, Guenther, Tait, & Saunders, 2013; Souza, Cassoti, & Leme, 2013; Ubilava, Foster, Lusk, & Nilsson, 2011; Zanoli et al., 2013),

CONTACT Eduardo Eugênio Spers a edespers@usp.br Doctoral Program in Business Administration and of the Master in Consumer Behavior, ESPM, Rua Álvaro Alvim, 123, São Paulo 04018-010, Brazil Color versions of one or more of the figures in the article can be found online at www.tandfonline.com/wifa. © 2019 Taylor & Francis Group, LLC while others discuss greenhouse gas (GHG) emissions and carbon dioxide (CO_2) reduction (Caputo et al., 2018; Carlsson et al., 2012; Echeverria, Moreira, Sepulveda, & Wittwer, 2014; Magistris & Gracia, 2016; Michaud, Llerena, & Joly, 2013). Moreover, some authors discuss social issues within sustainable production (Stöckigt et al., 2018). This study seeks to fill the gaps found in existing literature by observing each of these concepts on a scale that combines several of these factors within a single dimension called "concern over the sustainable production process."

In this study, these concepts are additionally incorporated into consolidated models. Among the gaps detected, it can be observed that several authors have partially analyzed the relationships between some aspects of sustainability. Barcellos (2007) studies the impact of consumer attitudes on purchase intentions and beef consumption behavior using "product involvement" as a moderator of the relationship between these variables. On the other hand, Silva, Lima Filho, and Freire (2015) analyze the influence of environmental awareness and attitudes toward sustainable consumption on the intent to buy beef while Oliveira and Spers (2018) analyze consumer attitudes towards perceived food production processes and the correlation of food safety and brand equity. Accordingly, this study aims to develop a model that broadly integrates these various constructs.

Classifying special food products as organic, natural, ecological, or fairtrade depends on their respective production processes. Conducted by the Boston Consulting Group, market research on the US market shows that these "green" products are entering large retail chains and have gained a significant market with a broad consumer base that purchases these socalled "responsible consumption" (RC) products. Based on this study, RC product sales have increased by 70% over the last three years and represent 15% of the total sales of American retailers (Smits, Wald, Vismans, & Huet, 2014).

The growing importance of fair trade certification on the southern market is shown by Doherty, Smith, and Parker (2015), who reinforce the view that intra-southern fair trade is growing significantly, principally within national markets but also across state boundaries. In addition, the research findings build on the existing theory of market creation and introduce the idea that private accreditation can contribute to the institutional composition of new ethical markets as labeling provides brand credibility and assurance to consumers. This is shown in both the positive outcomes of fair-trade labeling and through the recognition of product labels acknowledged by World Fair Trade Organization (WFTO) networks.

In South Africa, a range of social and eco-labels ("The Power of You" initiative) have formed a new network to promote the concept of sustainable behavior. Furthermore, in Kenya and South Africa, multinational

corporations (MNCs) and regional supermarkets are supporting fair trade, motivated by the cognitive resonance between the fair trade message and their growing understanding of sustainability and corporate social responsibility (CSR).

Fair trade certification is relevant for commodities exporting countries including Brazil. In developing countries, incentives for participating in the ethical market showcase how small producers can gain income and better quality of life (Boaventura, Abdalla, Araújo, & Arakelian, 2018).

This research contributes to the literature and adopts a socio-environmental approach to consumers' meat purchase intention. While several studies (Brunsø, Fjord, & Grunert, 2002; Gao & Schroeder, 2009) discuss the intrinsic characteristics of meat, there are only a few studies that analyze the influence of environmental attributes and food safety in the choice of meat by the Brazilian consumer. Additionally, the study of the influence of brands on purchase decisions can be considered an innovative theme as brand appreciation appears to be a recent phenomenon within the beef sector in Brazil. This study focuses on the brand as opposed to the concept of commodity in the Brazilian beef sector and discusses intangible brand attributes in relation to safe beef consumption.

The term "sustainability" within the beef sector is directly related to various socio-environmental factors. Cattle production is considered one of the sectors that most contributes to deforestation in Brazil. The conversion of forests into pastures is the best-known and well-documented environmental impact of the beef supply chain, with livestock farming accounting for 17% of GHG emissions (Sistema de Estimativas de Emissões de Gases de Efeito Estufa [Seeg], 2018; Drigo, 2013). In addition, issues related to animal welfare, slave labor, and gas (CO_2 and methane) emissions appear to be directly linked to the term "sustainable meat." In practice, the (meatpacking) industry and retail also consider these themes as the basis for defining their sustainable livestock platforms. Hence, when considering the term "sustainable meat," this study refers to the main socio-environmental issues mentioned above.

One of the disparities encountered was that a significant number of studies on the subject of food, especially meat, sustainability can be found abroad, while few exist in Brazil. The relevance of this research lies in linking constructs that deal with product involvement, concerns regarding the productive process, and consumer attitudes towards sustainability in the Brazilian beef sector. It is noted that previous studies have addressed environmental awareness and consumer attitudes; product involvement and behavioral attitudes and intentions; and even the relationship between attitude and intention to buy, in separate models. In contrast, this study includes these variables in a single structural analysis model. 4 😔 P. C. BURNIER ET AL.

In the absence of a specific scale to measure the factors related to the production process, this study proposes a construct based on a qualitative analysis as well as a literature review on the sustainability actions actually developed by the sector.

To respond to some of the gaps in the aforementioned studies, the main aim of this study is to propose a model that evaluates the effect of the environmental variable in beef purchase. The research problem seeks to address how the perception of sustainability, product involvement, and concern over the production process influences consumer intention to buy, in the context of a "sustainable" product. Accordingly, this study intends to propose a model that evaluates the influence of the environmental factor on the attitude and purchase intention for beef as well as to identify the relationship between the degree of consumer product involvement and concern over the production process, with the consumer's attitude toward brand equity, safety, and the willingness to pay for a sustainable product.

Literature review

The literature review comprised a survey of all studies with topics directly related to consumer views on product involvement, concern over aspects of sustainable meat production, attitudes towards sustainable consumption, and brand equity. These themes will serve as a basis to build the structural model to be proposed in this study.

Product involvement

Product involvement is an issue that has been addressed in consumer research. Seminal works on the scale for measuring consumer involvement were conducted by Laurent and Kapferer (1985) and Zaichkowsky (1985) and have garnered increasing acceptance from several researchers.

In 2007, Barcellos conducted a study based on the scale proposed by Jain and Srinivazan (NIP). The author states that consumers who are more involved with beef tend to purchase the product in a more thoughtful manner than those that are less involved, since the former use a greater amount of cognitive resources at the time of the decision. With beef consumption, the more involved consumers would tend to "think" more deeply about their behavior (which brand to buy, which cut would be more appropriate, in what way should it be prepared, etc.), while the less involved consumers would consume in a less thoughtful manner.

The study by Verbeke and Vackier (2004) also used the results of Laurent and Kapferer (1985) as a basis in order to treat consumer involvement as a multidimensional construct. High involvement leads the consumer to conduct an intense search for information and then, to carefully process this information and evaluate and balance the product attributes before forming a belief in and developing an opinion on their intention to purchase the product. An increased interest in agricultural ecology, animal welfare, and healthy consumption makes food products a particularly interesting research area for the theme of product involvement. The perceived risk makes food, especially beef, a product of interest in the study of the level of consumer involvement, as a bad choice could lead to health problems. Verbeke and Vackier (2004) further suggest that "all consumers, regardless of their level of product involvement, are interested in the tangible quality attributes (taste) whilst those highly engaged may still demand intangible attributes (e.g., quality assurance or stamps)." Consumers with low involvement ("indifferent meat consumers") are concerned more with tangible attributes such as price while those that are more involved also seek authenticity and quality assurance.

Other studies on the food industry have discussed some aspects of consumer behavior related to product involvement. Roe and Bruwer (2017) examine the extent to which product involvement influences wine purchase decisions at the retail level, given the anticipated consumption occasion. A low involvement consumer may sense a lack of expertise in or knowledge of wine as a product and be concerned with the probability of purchasing the wrong product for a given occasion, such as a celebratory occasion. Ferreira and Coelho (2015) have investigated the extent to which product involvement and price perceptions combined influence brand loyalty. The authors show that product involvement relates positively to influences brand loyalty and that this relationship is partially mediated by price perceptions.

Often, consumer behavior toward low involvement product categories can be attributed to habitual buying. Mishra, Kesharwani, and Das (2016) explore the relationships among risk aversion, brand trust, brand effect, attitudinal loyalty, and behavioral loyalty for low involvement day-to-day use of personal care products. Their results indicate that, for low involvement products, risk aversion is positively associated with attitudinal loyalty. The authors explain that due to a lack of trust, certain risk-averse customers stick with a particular brand. Applying this concept to beef consumption, i.e., a low involvement product, we may also expect that risk perception and trust issues would influence the brand equity dimensions: loyalty, brand image, and perceived quality.

New websites and applications have emerged to meet consumer demand for a better understanding of the different aspects of beef, which clearly demonstrates a greater interest in consumer involvement with this product. This study aims to identify the effect of product involvement on consumer 6 😔 P. C. BURNIER ET AL.

attitudes and meat purchase intentions. Based on the aforementioned studies, we propose the following hypotheses:

H1a: Product involvement (beef) is positively related to consumer concern over the production process.

H1b: Product involvement (beef) is positively related to attitude towards sustainable consumption.

H1c: Product involvement (beef) is positively related to brand equity.

H1d: Product involvement (beef) is positively related to the consumer's purchase intention.

Concern over the production process

Products with attributes obtained through sustainability processes and supply chain practices are distinguished by their attributes of credibility (both physical and process-related) and characteristics that members of the supply chain cannot readily discern by examining or consuming the product (Golan et al., 2004). Grunert et al. (2004) state that consumer concern over the way food products are produced has increased in recent years throughout most of Europe. There are three main areas of interest: organic production, animal welfare, and manufacturing of products in a more "natural" manner, i.e., without the use of advanced technology.

Quality-related attributes of the production process basically have a "belief" factor, as consumers will barely evaluate the conditions mentioned in meat production. During a study carried out by Grunert (1997) on organic pork, the consumers inferred organic meat to be a positive reference in terms of concern over the environment, health, and animal welfare as well as better taste. This study clearly shows the pitfalls of positioning a product in the market based on aspects of the production process, in which the effects of these factors on product quality are unclear to the consumer. Aspects of the production process can influence the expectations of quality more as an indicator of overall quality than as a singular attribute (Grunert, 1997).

Two current, elementary trends in the animal products market have been described in the study by Napolitano, Girolami, and Braghieri (2010): (1) consumers tend to increasingly rely on extrinsic signs and belief characteristics in the food purchase decision process, and (2) animal welfare is becoming progressively more important in the hierarchy of social issues.

Janßen and Langen (2017) identify a set of attributes as being the most important for German consumers when buying milk, among them being animal welfare. Additionally, the authors mention that the Federal Ministry of Food and Agriculture (BMEL), together with the German company for the protection of animals (Deutscher Tierschutzbund and V), started a campaign on animal welfare, launching a new seal that would only be carried on the packaging of appropriate meat products. The empirical results of the study illustrate the existence of three consumer segments with well-distinguished preferences with regard to sustainable product labeling and differentiated willingness to purchase (WTP) measures for the respective attributes. For the group called "price-conscious seal discriminators," some sustainable aspects provide negative usefulness when labeled exclusively (e.g., organic or GMO-free), but when labeled together (such as organic and GMO-free or animal welfare), they offer significantly positive utility even though they are redundant by definition. The research emphasizes that it is necessary to closely consider different types of consumers and the various stamps symbolizing sustainability.

Chini (2015) sought to investigate consumer values on animal production as well as expert opinions on how beef produced in pasture areas could be a differential. The signal attribute, animal welfare, was much discussed in this work, this being an attribute directly related to the meat production process. In this case, raising animals on pastures represents animal welfare.

Another study that addresses animal welfare (AWE) was carried out by Souza et al. (2013) to better understand consumer reactions to the mistreatment of animals in the industrial processes of meat production, which can cause pain, suffering, and stress. The study shows that, generally, consumers are unaware of management standards in meat production and that around 87% of respondents have difficulty connecting the food that they consume with the living animal. Even with meat being considered a commodity, some countries have labeling schemes. The main criteria certified in these schemes include herd tracking, origin guarantee, employee management, food safety and hygiene, and animal welfare, among others.

Some studies discuss the consumers' level of knowledge of the food production process, within the boundaries of different constructs. Hanf and Kühl (2005) argue that, based on consumer understanding, quality is a construct with multiple attributes; they consider orientation through the process as one of the main dimensions of the quality control system, i.e., the production system as a whole must be explicit, "from farm to fork" (Hanf & Kühl, 2005).

When consumers consider food safety, they think of the production process. The study by Oliveira and Spers (2018) sought to understand the degree of consumer knowledge on issues related to the production process. Four aspects were used to evaluate and measure the "Perceptions and Attitudes Facing Food Production Processes" construct: animal welfare, traceability, socio-environmental responsibility, and consumers' willingness to pay for products with these attributes. This study's proposed model will address the first three aspects. Based on the aforementioned studies, the following hypotheses are proposed:

H2a: Concern over the production process is positively related to the attitude towards sustainable consumption.

H2b: Concern over the production process is positively related to brand equity.

Attitudes toward sustainable consumption

Attitudes can be used to predict and anticipate behavior thereby making their study highly relevant to consumer behavior research. Accordingly, Silva et al. (2015) sought to understand the behavior of consumers of Brazilian beef related to the aspect of environmental sustainability. In this study, the authors analyze the influence of environmental awareness and attitudes towards sustainable consumption on intentions to buy environmentally sustainable beef. Among the results of this study, Silva et al. (2015) observe that the level of environmental awareness influences the intention to buy meat both directly and indirectly, mediated by consumer attitude. Moreover, consumer attitude also positively influences purchase intentions, i.e., consumers with greater environmental awareness are more likely to have a positive attitude toward sustainable consumption. Those who possess this positive attitude are more likely to intend to consume meat with environmentally sustainability attributes.

By studying the consumption of sustainable dairy products of 456 young people in Belgium and based on the theory of planned behavior (TPB), Vermeir and Verbeke (2008) identify which attitude forms one of the explanatory factors for the intention of sustainable food consumption. In addition, Barcellos (2007) uses TPB as the basis of her model to confirm the direct and statistically significant relationship between attitudinal constructs and behaviors of beef consumption.

Therefore, based on the aforementioned studies, we propose the following hypothesis:

H3: The attitude towards sustainable consumption is positively related to the intention to buy sustainable beef.

Brand and safety

According to Aaker (1996), perceived quality is one of the main aspects of brand equity and has been associated with price premiums, price elasticities, and continued brand use. The subject of branding has gained relevance in recent years in the field of agricultural commodities, particularly when the consumer is faced with making choices between similar products. By identifying reliable products, through known brands with which they themselves identify, the consumer is able to make, what they consider, an advantageous purchase (Hanf & Kühl, 2005). Joint actions of strong brands at different levels of the production chain can add value to the final product in terms of the consumer's perception of intangible attributes (such as food safety, traceability, and other attributes of trust) linked to the brand.

The production and industrialization sector of the food industry has undergone successive credibility crises due to product contamination and hence, the notion of food safety has gained strength. Food safety refers to the consumer's acquisition of good quality food, free from contaminants that are chemical (pesticides), biological (pathogenic organisms), or physical (glass, stones) in nature and from any other substance that could lead to health problems (Hobbs & Kerr, 1992). It has been the object of interest of several economic agents and some non-governmental organizations (NGOs), who emerge as agents of pressure on the institutional environment, concerned with the fear of health risks associated with the consumption of adulterated or contaminated foods (Spers, 2003).

Some surveys indicate that consumers' food choices have been more influenced by concerns about the impact of food systems on human health – food safety. The perception that a food item is safe appears to be a strong requirement in the choice of food products. Traceability during the different stages of the meat production chain is deemed a way of making the "safety" of the product more tangible (Oliveira & Spers, 2018).

Oliveira and Spers (2018) also mention that crises as well as lack of trust in product quality and safety have heightened consumer concerns about the purchase, consumption experience, and trust attributes of food products. Faced with the difficulty of evaluating the products that they consume first-hand, consumers begin worrying about questions such as the metaphysical attributes on top of the other factors related to product risks.

Aizaki, Sawada, Sato, and Kikkawa (2012) conducted a non-compensatory assessment of food safety concerns among Japanese consumers regarding the purchase of beef. The authors investigated how beef was evaluated by consumers, in terms of its country of origin and its status of testing for bovine spongiform encephalopathy (BSE) or "mad cow" disease. The results show that the willingness to pay (WTP) for each type of BSE-tested beef reveals that Japanese consumers consider BSE testing to be very important when ensuring the safety of the beef they buy.

Food safety in relation to BSE was also studied by Blue (2009). Over the past few decades, branding has become more pronounced in the Canadian beef industry, largely due to structural changes that place greater emphasis on marketing and promotion as ways of responding to and managing consumer concerns. The author examines the Alberta beef industry's branding initiatives prior to and following the BSE-inspired trade ban. Branding efforts may partially explain why beef consumption in Canada increased after a domestic case of BSE was discovered.

Supporting this idea, Mishra et al. (2016) suggest that consumers may rely on the brand image of a product to minimize their risk perceptions. The authors explain that certain risk-adverse customers stick with a particular brand due to a lack of trust. Risk aversion has both a direct as well as an indirect impact on purchase intention.

Among studies of green brands, it is worth mentioning Lin, Lobo, and Leckie's (2017) investigation of the formation of green brand image through customers' perceptions of the functional and emotional benefits associated with green brands and the influence of green brand image on purchase behavioral response. The results demonstrate that the provision of utilitarian and self-expressive benefits directly enhance the brand's green image. Moreover, utilitarian benefits and green brand image directly influence green brand loyalty with the green brand image being a relatively strong antecedent of brand loyalty.

Grunert et al. (2004) also emphasize the importance of the brand in minimizing consumer uncertainty at the time of purchase. Specifically, companies can signal a product to be of superior quality, reduce consumer uncertainty, and encourage consumers to pay a premium price for superior quality.

Based on Barcellos (2007), interviewed respondents associated the Federal Inspection Service (FIS) meat stamp with product safety and certification stamps with higher meat quality. The FIS stamp is usually present on both the packaging and on the meat itself, indicating that it comes from animals that have been slaughtered in FIS-enabled slaughterhouses.

Chini (2015) carried out 52 interviews among Brazilian and US consumers using a ladder interview approach; the results show that the safety aspect was the most important concern over health and food safety issues for Brazilians. These results demonstrate the importance of safety-related attributes when purchasing beef.

Given the above, this study considers both food safety and confidence in the meat as important elements of the brand; these factors will be evaluated through both brand equity and trust in the brand regarding food safety aspects.

Based on the aforementioned studies, the following hypothesis is proposed:

H4: Brand equity is positively related to the intention to buy sustainable meat.

Based on the findings of the literature review, which investigated numerous studies related to the food, and especially beef, sustainability theme, a structural model is proposed, as shown in Figure 1.



Figure 1. Proposed Structural Model. Source: by the authors.

The proposed model shows that greater consumer involvement in the selection and production of food leads to greater interest in the food production process, resulting in higher brand equity. Thereafter, this leads to positive consumer attitude towards sustainable consumption as well as to a greater likelihood for them to consume a sustainable product bearing the brand entailing food safety. Consumers who value both the brand and food safety are therefore more likely to have a positive attitude toward sustainable consumption. Furthermore, those who possess this positive attitude are more likely to intend to consume beef with the attributes of environmental sustainability.

Methods

This study adopts an exploratory sequential mixed method (Creswell, 2014) where the results of one step serve as a substrate for the following steps. Using mixed methods is justifiable as a single data source is unable to provide a complete solution to our problem (Creswell & Plano Clark, 2011).

Qualitative analysis

In the first approach, in addition to the usual literature review, we conducted five qualitative in-depth interviews with specialists in the areas of sustainability and marketing of the beef production sector, with the purpose of mapping relevant issues related to the intention to buy sustainable meat as well as establishing its nomological network.

We conducted a second qualitative study, based on two focus groups with eight participants each, to test the face and content validity of the constructs and their respective dimensions, as well as the nomological network proposed through the academic literature review, technical standards of the meat sector, and interviews with specialists.

Each group represented an important segment of meat buyers that were identified during the first phase of the study. The first group comprised consumers with functional buying habits, i.e., individuals who bought meat for daily consumption in regular meals while the second contained clients of a high-end meat market in the city of São Paulo, with the habit of buying meat for special occasions such as barbecues.

We tested the process of choosing the two groups using 16 hypothetical products that combined four attributes of meat sustainability, namely traceability, brand, quality, and animal welfare. These products were formulated based on the literature review and specialist interviews. The results of these qualitative steps served to corroborate the hypotheses that we have formulated and tested in this study.

Quantitative analysis

Measures

In addition to a specific section dealing with socio-demographic issues, five parts of the quantitative instrument dealt with constructs of interest to the survey, all measured on a seven-point Likert scale ranging from "strongly disagree" to "strongly agree."

The first part addressed questions related to product involvement (PIV) and consisted of 13 questions divided into the dimensions of pleasure value (PLE), symbolic value (SIV), importance attributed to risk (RIM), and risk likelihood (RIL) (Barcellos, 2007; Jain & Srinivasan, 1990; Laurent & Kapferer, 1985; Verbeke & Vackier, 2004).

Next, the second section dealt with concerns about the production process (CPP) through 24 issues divided into animal welfare (AWE), traceability (TRA), legality (LEG), social responsibility (SOR), environmental responsibility (ENR), and food safety concerns in meatpacking (FSC). We developed this scale from a triangulation of the literature review (Barcellos, 2007; Grunert et al., 2004; Grunert, Verbeke, Kügler, Saeed, & Scholderer, 2011; Oliveira & Spers, 2018), the results of the qualitative steps, as well as the EMBRAPA (2011) standards of good agricultural practices and the Sustainable Cattle Raising Indicator of the Sustainable Livestock Working Group and the Rainforest Alliance (SAN, 2010).

The third section contained eight items and dealt with attitudes related to sustainable consumption (ASC) from the "general green product" (GGP) and "food product" (FOP) constructs (Bedante, 2004; Lages & Vargas Neto, 2002; Roberts, 1996; Silva et al., 2015), followed by the fourth section that addressed the one-dimensional "intention to purchase" construct, which was measured using four items (Bedante, 2004; Silva et al., 2015; Tung, Shih, Wei, & Chen, 2012).

Lastly, the final section, comprising 16 items distributed among the dimensions of perceived quality (PQL), brand awareness (BAW), brand loyalty (BLO), brand global value (BGL), and safety (SAF) (Oliveira & Spers, 2018; Yoo, Donthu, & Lee, 2000), measured consumer expectations regarding the meat brand in terms of brand equity (BEQ). Further details about the questionnaire are provided in Table A1 – Appendix A.

All scales are adapted (DeVellis, 2003; Netemeyer, Bearden, & Sharma, 2003) and translated into Portuguese following a collaborative and interactive approach to instrument translation (Douglas & Craig, 2007). Thereafter, the instrument was evaluated by five experienced researchers (doctors and doctoral students) in the marketing area, professional specialists from a certification company, and the Sustainable Livestock Working Group (SLWG). Moreover, we performed a pretest with 40 individuals before the instrument was applied. As a result of the evaluation, we adjusted the statements on "concern over the production process" and "brand equity" constructs.

Minimum sample size

Using G*Power 3.1.9.2 software, we estimated the sample size based on the ability to detect an average effect of 15% in our structural model, alpha error probability of 5%, and a power of 95%. G*Power suggested that the appropriate minimum sample size was 334 observations per study. Given that we tested the measurement model using confirmatory factorial analysis and the structural model using structural equation modeling in two separate studies, our minimum sample should be at least 668 individuals.

Data collection

We prepared the questionnaire using the Survey Monkey digital platform and sent the corresponding link to more than 3000 individuals registered in the Brazilian consumer database of a market research firm. Appropriate filters were created to exclude consumers who rarely or never purchased meat and those individuals who did not eat meat.

A total of 795 consumers answered the survey, considering a safety margin for eventual losses related to data collection (poor completion, incomplete answers, and other problems inherent in the data collection process). We discarded questionnaires with a regular occurrence of missing values and those that the respondents left incomplete. The final sample comprised 725 individuals and 34 of the remaining missing values were filled with the corresponding mean values.

We received responses from consumers in the five Brazilian regions (north, south, northeast, center-west, and southeast) with São Paulo as the city with the highest number of respondents.

The individuals were separated into two groups through a lottery. Sample 1 (n=363) was used to test the adequacy of the measures through a confirmatory factorial analysis in the third phase of this study while sample 2 (n=362) was used to re-test the measures and to estimate the nomological relationships in the fourth phase of the study.

Quantitative data analysis

In the third phase, we tested the reliability of the scales as well as their convergent and discriminant validities. We performed a confirmatory factorial analysis using variance-based structural equation modeling. Harman's single factor test was used to verify the existence of common method variance and to verify whether respondents tended to answer all the questions under the influence of a single trace (Podsakoff & Organ, 1986).

We submitted the results of the third phase to new confirmatory tests (i.e., the fourth stage of the study) to rule out the possibility of sample bias. In the second sample (n = 362), in addition to the confirmatory tests performed in the previous step, we tested the structural model (see Figure 1) using the SmartPLS-3.0 (Ringle, Wende, & Becker, 2015) and 2000 subsamples automatically calculated by the software.

In this study, we use a confirmatory factorial analysis to verify the quality of the measures of the theoretical model. This method evaluates the adequacy of the structure of the data collected (see Tables 1–5) to the *a priori* theoretical representation of a measurement model (see Appendix Table A1).

In other words, "measurement theory specifies a series of relationships that suggest how questionnaire items (observable variables) represent a latent construct" (Hair, Black, Babin, Anderson, & Tatham, 2009, p. 590). All latent constructs (second- and first-order variables) and observable variables (questionnaire items) used in this study are listed in Table A1 (Appendix A).

To estimate the relationships proposed in the structural model (i.e., the hypotheses), we performed partial least squares structural equation modeling (PLS-SEM). This technique combines features of dependency techniques, i.e., factorial analysis, and interdependence, i.e., multiple regression analysis (Hair Jr, Hult, Ringle, & Sarstedt, 2016). Through a factorial analysis, the software calculates the construct factorial scores of the model from the observable variables that comprise them (items). For example, questionnaire items PI01, PI02, PI03, and PI04, which are interval-scale variables, form the sustainable beef purchase intention (SPI) construct score (standardized continuous variable).

For the second-order constructs, the factorial analysis uses the constituent construct scores to estimate an index, which is both continuous and standardized (Hair et al., 2009). Figure 2 illustrates an example of the types of constructs. The structure of each construct is available in Table A1 (Appendix A).

Finally, PLS-SEM tests the hypotheses through a series of distinct but interdependent multiple regression equations following the path model specification of the structural model (see Figure 1). Table 6 shows the results of this procedure.

Results and discussion

We present the results in four descriptive sub-sections. Section "Qualitative results" deals with the findings of the qualitative stage of the study. Next, Section "CPP and brand equity confirmatory factorial analysis" presents the confirmatory factorial analysis of the two scales proposed by the study. In the third sub-section, Section "Convergent and discriminant validity of first-order constructs", we evaluate the convergent and discriminant validity of the first-order constructs and the measurement model. Finally, we test the structural model in Section "Evaluation of the structural model".

Our sample was predominantly female (53% women) with 45% single respondents. Respondents' age were concentrated between 21 and 40 years (70%); they were generally highly educated with more than 33% having postgraduate degrees and, accounting for 72% of the total sample when added to the 39% with higher education. The distribution of income was varied with 40% having a monthly remuneration of between US\$267.33 to US\$1336.59, 31% between US\$1336.60 to US\$2673.19, 24% above US\$2673.20, and only 5% below US\$267.33 per month.

Another characteristic of the respondents that is worth highlighting is the fact that more than half of them buy meat for consumption on a daily basis. Of all respondents, 52% buy meat for day-to-day use while 24% do so for special occasions (e.g., barbecues). Item descriptive statistics are included in Appendix A.

Qualitative results

The experts interviewed indicated that in addition to the tenderness of the meat, consumers are concerned with knowing the origin of the animal (traceability) and with food safety. Meat branding leads consumers to be more secure in purchasing a product of the desired quality including a

safer product from controlled farms. Animal welfare is seen as an important attribute mainly by consumers with greater involvement in the meat purchase. The relevance of these attributes varies according to which occasion the meat is being purchased for, specifically, whether it is a day-to-day or recreational purchase (barbecue). Price influences the choice of meat in day-to-day shopping, as shared by some focus group participants.

The results of the qualitative phase facilitated the definition of some questionnaire items related to animal welfare, traceability, food safety concerns related to meatpackers, variables included in the new measurement scale of the CPP construct. The presence of the FIS seal was pointed out by the two focus groups as being one of the items observed at the time of purchase, proving Barcellos' (2007) observation that this seal is commonly associated with meat safety. Moreover, brand has a relevant role in ensuring the origin of the meat. As such, during the focus group discussions, we identified traceability enhancement to be a means of conveying consumer confidence in food safety, as reported in the studies by Hanf and Kühl (2005) and Oliveira and Spers (2018). Based on the findings of the qualitative phase, in addition to the CPP scale and its dimensions, we identified the need to include the safety variable in the brand equity construct since both are directly associated, as previously mentioned.

CPP and brand equity confirmatory factorial analysis

In order to test the adequacy of the scale of both CPP and the new dimension "safety" of the brand equity construct proposed from the qualitative results of this research, a confirmatory factorial analysis was conducted using the factors of the PLS algorithm. This procedure was performed with two samples that were drawn from the original sample of 725 individuals in order to avoid the possibility of false-positive factorial adequacy due to potential sampling bias. The results of the procedures are presented in Tables 1 and 2.

We observe that the reliability and convergent/discriminant validity assumptions were respected for both scales in each of the two samples, since the extracted variances (AVE) are greater than 0.500, the composite reliabilities (CR) greater than 0.700, and the roots of the extracted variances exceed the correlations between the constructs and their peers (Fornell & Larcker, 1981; Hair et al., 2009). These results are obtained without excluding items, which suggest that the proposed structure remains constant and adequate in different samples.

Therefore, these results indicate that the dimensions of the two scales can satisfactorily explain the variation of the items linked to them. Moreover, they are sufficiently different from each other since their

			Sample	1						Sample	2		
	AWE	ENR	FSC	LEG	SOR	TRA		AWE	ENR	FSC	LEG	SOR	TRA
AWE	0.910						AWE	0.908					
ENR	0.751	0.950					ENR	0.694	0.944				
FSC	0.733	0.768	0.915				FSC	0.646	0.757	0.919			
LEG	0.757	0.827	0.813	0.928			LEG	0.701	0.792	0.772	0.931		
SOR	0.659	0.827	0.692	0.788	0.959		SOR	0.665	0.845	0.732	0.841	0.948	
TRA	0.664	0.612	0.654	0.627	0.582	0.835	TRA	0.575	0.619	0.653	0.674	0.611	0.831
CR	0.951	0.974	0.954	0.961	0.978	0.902	CR	0.949	0.970	0.956	0.963	0.973	0.898
AVE	0.828	0.903	0.838	0.862	0.919	0.697	AVE	0.825	0.891	0.844	0.866	0.900	0.690

 Table 1. CPP confirmatory factorial analysis.

Note. The diagonals represent the root of the extracted variance.

Bold values refer to the quality of the measure, so there is no hypothesis testing (significance) here.

Table 2. BEQ confirmatory factorial analysis.

		Sam	nple 1					Sam	ple 2		
	BAW	BGL	BLO	PQL	SAF		BAW	BGL	BLO	PQL	SAF
BAW	0.877					BAW	0.868				
BGL	0.592	0.861				BGL	0.594	0.880			
BLO	0.671	0.777	0.913			BLO	0.661	0.789	0.891		
PQL	0.749	0.596	0.578	0.917		PQL	0.752	0.578	0.627	0.943	
SAF	0.580	0.635	0.655	0.532	0.793	SAF	0.555	0.649	0.626	0.539	0.783
CR	0.908	0.896	0.938	0.941	0.871	CR	0.902	0.912	0.920	0.960	0.862
AVE	0.768	0.742	0.833	0.841	0.628	AVE	0.754	0.775	0.794	0.890	0.612

Note. The diagonals represent the root of the extracted variance.

indicators have a more intense relationship with the latent variable that they are associated with, than with the other latent variables of the scales.

Convergent and discriminant validity of first-order constructs

A procedure similar to that of Section "CPP and brand equity confirmatory factorial analysis" was adopted to attest the convergent and discriminant validity of the first-order variables and the measurement model using the path weighting scheme since all dimensions under study already have a structurally consolidated factor. The results of this step are shown in Tables 3 and 4.

Table 3 shows the results related to sample 1, which were obtained without the exclusion of items as a validity/reliability adjustment strategy. However, it was observed that two items of the product-involvement construct – EP09R "I have little to lose by mismanaging beef" and EP13 "I never know if I am making a good meat choice," of the importance of risk (RIM) and likelihood of risk (RIL) dimensions, respectively – presented low factorial loads (0.200 and 0.466, respectively).

In the second sample, we tested the measurement model again using the same procedures, a priori without excluding the two potentially problematic items, to verify if the structure of the model remained constant. Again, the fact that the items had low factor loads (0.005 and 0.220, respectively) was observed, which suggested that the indicators did not reflect the

Table	3. Conve	ergent an	d discrim	inant vali	dity of fii	rst order	construct	s – Samp	le 1.									
	AWE	BAW	BGL	BLO	ENR	FOP	FSC	GGP	LEG	PLE	PQL	RIL	RIM	SAF	SIV	SOR	SPI	TRA
AWE	0.910																	
BAW	0.269	0.877																
BGL	0.272	0.590	0.861															
BLO	0.258	0.668	0.777	0.913														
ENR	0.750	0.311	0.348	0.327	0.950													
FOP	0.606	0.258	0.261	0.230	0.655	0.858												
FSC	0.731	0.359	0.335	0.303	0.767	0.569	0.915											
GGP	0.637	0.328	0.312	0.303	0.743	0.796	0.649	0.841										
LEG	0.756	0.336	0.296	0.305	0.827	0.610	0.813	0.706	0.928									
PLE	0.066	0.276	0.239	0.232	090.0	0.059	0.133	0.080	0.098	0.888								
PQL	0.227	0.749	0.597	0.578	0.243	0.289	0.351	0.309	0.334	0.360	0.917							
RIL	-0.081	-0.464	-0.322	-0.382	-0.117	-0.141	-0.212	-0.222	-0.215	-0.449	-0.428	0.688						
RIM	0.223	0.293	0.317	0.282	0.203	0.243	0.259	0.253	0.226	0.365	0.305	-0.306	0.728					
SAF	0.318	0.596	0.633	0.656	0.383	0.305	0.340	0.362	0.370	0.242	0.547	-0.286	0.294	0.789				
SIV	0.211	0.294	0.223	0.295	0.246	0.158	0.188	0.187	0.193	0.326	0.188	-0.303	0.412	0.250	0.938			
SOR	0.659	0.334	0.336	0.358	0.827	0.526	0.691	0.662	0.788	0.171	0.272	-0.181	0.232	0.390	0.276	0.959		
SPI	0.547	0.233	0.228	0.180	0.592	0.784	0.504	0.674	0.537	0.077	0.242	-0.134	0.221	0.262	0.145	0.473	0.873	
TRA	0.661	0.425	0.415	0.414	0.611	0.571	0.654	0.614	0.627	0.189	0.389	-0.246	0.286	0.472	0.257	0.581	0.506	0.835
Я	0.951	0.909	0.896	0.938	0.974	0.893	0.954	0.924	0.961	0.937	0.941	0.707	0.732	0.868	0.957	0.978	0.928	0.902
AVE	0.828	0.769	0.742	0.833	0.903	0.737	0.838	0.708	0.862	0.788	0.841	0.473	0.531	0.622	0.881	0.919	0.763	0.697
Note. T	ne diagona	ls represen	It the root	of the extr	acted varia	nce.												

dimensions with which they were associated in terms of measurement. Therefore, we opted to exclude these items, thereby achieving the reliability/validity indexes for sample 2 as shown in Table 4.

Similar to the first-order constructs, the second-order constructs were submitted to tests in two samples to evaluate their measurement quality. In addition, the discriminant tests were also used to verify possible multicollinearity problems among the predictors. Table 5 shows promising results regarding reliability and validity, as well as low correlations between latent variables (<0.800), which suggest that there are no harmful linear relationships in the model.

Evaluation of the structural model

The results of the structural model analysis indicate that all hypotheses were supported, with the exception of H4 (BEQ \rightarrow SPI) and H1b (PIV \rightarrow ASC). Table 6 shows that 60% of the variation in sustainable meat purchase intention is explained by the predictors ASC (H3) and PIV (H1d), and that the effect of ASC (large, >0.35) is about 80 times that of PIV. Although the direct effect of PIV is small (<0.150), it is important to highlight that its indirect effect exerts an important influence on consumer purchasing intentions through CPP (H1a, H2a) and mainly, ASC (H1b).

On the relationship between brand equity and PIV (H4), a positive relationship between the constructs was expected. However, the results indicate that the larger (smaller) the brand equity, the smaller (larger) will be the consumer's intention to buy. Although the relationship was not supported, there is an inconsistency in the fact that the observed relationship was negative since the original hypothesis suggested a positive relationship. On the other hand, the observed relationship between PIV and ASC is positive although H1b was not supported due to the low significance level obtained. These issues will be discussed in Section "Conclusions".

Although brand equity was not confirmed as a predictor of SPI, the results showed that the construct is influenced directly by CPP (H2b) and by PIV (H1c), the latter ($f^2 = 0.246$) being about twice as effective in generating brand value as the former ($f^2 = 0.135$).

Thus, consumer involvement with the product leads them to attach greater importance to the meat production process, making their attitudes converge toward more sustainable consumption; the union of these factors leads them to buy sustainable meat. Section "Conclusions" discusses these results based on the theoretical framework and qualitative research findings.

Continuing with the relationships estimated in the structural model, it is important to emphasize that we performed tests to evaluate

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$ \begin{bmatrix} 157 & -0.411 & -0.325 & -0.373 & -0.226 & -0.267 & -0.257 & -0.272 & -0.214 & -0.516 & -0.445 & \textbf{0.742} \\ \hline 164 & 0.337 & 0.278 & 0.295 & 0.150 & 0.208 & 0.247 & 0.236 & 0.210 & 0.425 & 0.359 & -0.392 & \textbf{0.857} \\ \hline 283 & 0.569 & 0.649 & 0.625 & 0.377 & 0.351 & 0.235 & 0.316 & 0.362 & -0.343 & 0.293 & \textbf{0.783} \\ \hline 285 & 0.238 & 0.232 & 0.364 & 0.451 & 0.845 & 0.710 & 0.841 & 0.231 & 0.254 & -0.343 & 0.296 & 0.383 & \textbf{0.942} \\ \hline 565 & 0.317 & 0.364 & 0.451 & 0.845 & 0.710 & 0.841 & 0.231 & 0.269 & 0.238 & 0.306 & 0.383 & \textbf{0.942} \\ \hline 565 & 0.314 & 0.364 & 0.451 & 0.845 & 0.842 & 0.533 & 0.247 & 0.186 & 0.264 & -0.259 & 0.238 & 0.942 \\ \hline 573 & 0.485 & 0.374 & 0.439 & 0.617 & 0.550 & 0.653 & 0.673 & 0.246 & 0.264 & -0.330 & 0.540 & \textbf{0.898} \\ \hline 573 & 0.948 & 0.374 & 0.439 & 0.617 & 0.550 & 0.652 & 0.630 & 0.673 & 0.296 & 0.960 & 0.663 & 0.847 & 0.859 & 0.960 & 0.973 & 0.943 \\ \hline 573 & 0.948 & 0.775 & 0.794 & 0.891 & 0.732 & 0.844 & 0.769 & 0.866 & 0.785 & 0.890 & 0.550 & 0.734 & 0.605 & 0.961 & 0.973 & 0.943 & 0.893 \\ \hline 575 & 0.754 & 0.775 & 0.794 & 0.891 & 0.732 & 0.846 & 0.785 & 0.890 & 0.550 & 0.734 & 0.605 & 0.960 & 0.973 & 0.943 & 0.808 \\ \hline 595 & 0.754 & 0.775 & 0.794 & 0.891 & 0.732 & 0.844 & 0.769 & 0.866 & 0.785 & 0.890 & 0.560 & 0.734 & 0.605 & 0.808 & 0.900 & 0.807 & 0.690 \\ \hline 505 & 0.754 & 0.775 & 0.794 & 0.891 & 0.732 & 0.846 & 0.785 & 0.890 & 0.550 & 0.734 & 0.605 & 0.900 & 0.807 & 0.690 \\ \hline 505 & 0.754 & 0.775 & 0.794 & 0.891 & 0.732 & 0.846 & 0.785 & 0.890 & 0.550 & 0.734 & 0.605 & 0.900 & 0.807 & 0.690 \\ \hline 505 & 0.754 & 0.775 & 0.794 & 0.891 & 0.772 & 0.844 & 0.769 & 0.866 & 0.785 & 0.890 & 0.550 & 0.734 & 0.605 & 0.900 & 0.807 & 0.690 \\ \hline 505 & 0.754 & 0.774 & 0.774 & 0.891 & 0.772 & 0.844 & 0.769 & 0.866 & 0.785 & 0.890 & 0.550 & 0.734 & 0.600 & 0.801 & 0.690 \\ \hline 505 & 0.754 & 0.774 & 0.774 & 0.891 & 0.772 & 0.844 & 0.769 & 0.866 & 0.785 & 0.890 & 0.550 & 0.734 & 0.600 & 0.901 & 0.901 & 0.901 \\ \hline 505 & 0.754 & 0.774 & 0.734 & 0.801 & 0.700 & 0.801 & 0.780 & 0.784 & 0.780 & 0.900 & 0.901 & 0.$		27	0.751	0.578	0.628	0.292	0.311	0.355	0.328	0.315	0.441	0.943							
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	ASC	BEQ	CPP	PIV	SPI		ASC	BEQ	CPP	PIV	SPI
ASC	0.945					ASC	0.942				
BEQ	0.371	0.842				BEQ	0.444	0.842			
CPP	0.766	0.444	0.872			CPP	0.791	0.459	0.868		
PIV	0.218	0.454	0.278	0.716		PIV	0.320	0.545	0.343	0.724	
SPI	0.754	0.267	0.598	0.181	0.873	SPI	0.791	0.351	0.619	0.318	0.898
CR	0.944	0.924	0.941	0.806	0.928	CR	0.941	0.924	0.938	0.813	0.943
AVE	0.894	0.709	0.761	0.513	0.763	AVE	0.888	0.709	0.754	0.524	0.807

Table 5. Model convergent and discriminant validity.

Note. The diagonals represent the root of the extracted variance.



Figure 2. Example of first and second-order constructs. Source: by the authors.

Hypotheses	Path coefficient	f²	VIF	Standard deviation	T statistics	p Values	R ² adjusted
H3: ASC-> SPI	0.782	1,322	1,259	0.029	27,095	0.000	0.629
H4: BEQ -> SPI	-0.047	0.004	1,608	0.044	1,065	0.287	
H1d: PIV -> SPI	0.093	0.016	1,439	0.045	2,084	0.037	
H2b: CPP-> BEQ	0.308	0.135	1,133	0.045	6,769	0.000	0.378
H1c: PIV -> BEQ	0.440	0.276	1,133	0.048	9,166	0.000	
H1a: PIV -> CPP	0.343	0.133	1,000	0.051	6,662	0.000	0.115
H1b: PIV -> ASC	0.055	0.007	1,133	0.036	1,524	0.128	0.627
H2a: CPP \rightarrow ASC	0.772	1,418	1,133	0.028	27,202	0.000	

Table 6. Evaluation of the structural model.

multicollinearity to corroborate with the initial exploratory evaluation of possible problems in the model. The variance inflation factor (VIF) values were all greater than one, indicating the existence of regression values already skewed by multicollinearity, according to Bowerman and O'Connell (1990). However, these values are considered acceptable as they are less than three (Ringle et al., 2015). In general terms, this indicates that, although the independent variables are moderately correlated, impairment of the analysis of the model is reduced.

Conclusions

The first relevant conclusion of this study is the confirmation of a scale that can measure items related to the production process. The scale developed with six latent variables and 24 items is adequate to measure the construct "concern over production process" or CPP. The discriminant and convergent validations attest the possibility of using these items in the measurement of this construct. Previous studies explore only some dimensions of the production process as observed in Oliveira and Spers (2018) and Barcellos (2007), who found animal welfare, traceability, and socio-environmental responsibility to be relevant in determining consumer's concern with the production process. Some criteria used in socioenvironmental certification standards (SAN, BPA, GIPS/GTPS) cover items related to good practices that were also evaluated in this study.

This study also validated the "food safety" variable included in the brand equity construct, which endorses the relationship. The relevance of food safety in beef consumption was discussed by Oliveira and Spers (2018) and Hanf and Kühl (2005), who confirmed the relevance of the production practices that are oriented to ensure traceability, and the ability to transmit trust as an antecedent to food safety.

Results have confirmed six of the eight hypotheses indicated in the proposed model. The involvement of the consumer in food choice and preparation increases interest in the production process and brand equity. This also results in the consumer bearing a positive attitude toward sustainable consumption as well as being more likely to buy a sustainable product.

The rejected hypotheses refer to the relationship between brand equity and purchase intention. While this needs to be validated by future studies, one way of explaining this result is that beef is still regarded a commodity in Brazil and brand value is yet to affect the intention to buy beef, although there are significant investments in brand communication by companies such as Friboi, Maturata, and Swift. Another explanation for the rejection of this hypothesis could be related to the recent "Carne Fraca" (weak meat) scandal that occurred in Brazil in March 2017. Resulting from this event, known brands such as JBS and Friboi (among others) were accused of involvement. Of the 725 respondents in this study, 75% were familiar with the Friboi brand. Thus, the respondents may have associated this brand with the scandal leading to negative purchase intention of their product.

During the beef selection process, beyond intrinsic attributes (color, tenderness, and appearance), consumers also consider food safety attributes including concern about the production process (CPP) and, in turn, knowledge of animal origin. Moreover, it is observed that product involvement increases consumers' concerns regarding the animal production process as well as the brand, and influences purchase attitude and the intention to buy a "sustainable" product.

This study indicates that the proposed new conceptual model fills a theoretical gap to reveal important relationships that contribute to the understanding of the environmental attributes that influence the purchase intent attitudes. The results of the in-depth interviews and focus groups validate the relevance of the variables included in the proposed model. Specifically, product involvement and concern over the production process are related to attitude and intention to buy sustainable beef. However, brand value (including food safety) is not related to the intention to buy sustainable beef.

This study also yields managerial contributions by indicating that there is a positive consumer perception of brands with socio-environmental attributes and which provide knowledge of their production processes. Hence, both the food industry and retailers should consider providing a better explanation of attributes such as animal welfare, traceability, and social responsibility in their consumer communication strategy.

The new model proposed in this study should be used as a reference for other researches dealing with socio-environmental topics, including other segments of the food industry in Brazil and other international and crosscultural studies. Empirical studies should be carried out in order to validate the suggested relationships between these dimensions. The use of the six variables that form the construct "concern over the production process" (animal welfare, traceability, legality, social responsibility, environmental responsibility, sanitation in slaughterhouses) should also be tested with other consumers' profiles.

Disclosure statement

No potential conflict of interest was reported by the authors.

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Descriptive statistics.
A1.
Table

Second- order variables	First-order variables	ltem code	ltem	*W	SD*	M**	SD**
Product	Pleasure value (PLE)	PIV01	Meat is important to me	5.686	1.583	5.823	1.520
Involvement		PIV02	For me meat is absolutely necessary	5.141	1.811	5.239	1.799
(PIV)		PIV03	I enjoy a meal with meat more than a meal without meat	5.584	1.772	5.660	1.720
		PIV04	I appreciate meat very much	5.804	1.557	5.828	1.577
	Symbolic value (SIV)	PIV05	You can tell a lot about a person based on his/her choice of meat	3.986	1.967	3.830	2.062
		PIV06	My choice of meat conveys about me to other people	3.967	2.026	3.809	2.104
		PIV07	My choice of meat gives other people an image of me	3.892	2.020	3.820	2.088
	Risk importance (RIM)	PIV08	I would find a bad choice of meat terrible	5.144	1.833	5.158	1.976
		PIV09 R	I don t have a lot to loose when I make a bad choice of meat (rev)	2.920	1.994	2.994	2.087
		PIV10	I find it very annoying to make a wrong choice of meat	5.080	1.994	5.006	2.087
	Likelihood of risk (RIL)	PIV11 R	When I buy meat, I know that I make the right choice (rev)	5.365	1.776	5.303	1.773
		PIV12	I feel lost when having to choose meat	5.435	1.478	5.396	1.540
		PIV13	I never know if I make the right choice of meat	2.565	1.478	2.604	1.540
Concern over the	Animal Welfare (AWE)	CPP01	I am concerned if animals were created in a natural and free way	3.615	2.020	3.672	1.983
Production		CPP02	I am concerned if animals received a humane and ethical treatment	3.413	1.969	3.417	1.928
Process (CPP)			throughout their life				
		CPP03	I am concerned if animals received adequate feeding and sanitation.	5.576	1.732	5.668	1.639
		CPP04	I am concerned if slaughter was carried out painlessly and according to	5.430	1.764	5.314	1.893
			animal welfare standards				
	Traceability (TRA)	CPP05	I only choose one beef when it is possible to identify its origin	4.890	1.871	4.906	1.878
	•	CPP06	I try to choose foods that have quaranteed origin	5.710	1.489	5.668	1.505
		CPP07	I try to choose food that can be traced back to its origin in case of	5.017	1.866	5.011	1.868
			any problems				
		CPP08	A traceable food is a safer food.	5.680	1.549	5.794	1.488
	Legality (LEG)	CPP09	I am concerned if producers and meatpackers follow labor standards	5.403	1.720	5.263	1.865
			(workers register, safety at work) .				
		CPP10	I am concerned if producers and meatpackers use child labor or	5.558	1.712	5.532	1.805
			forced labor				
		CPP11	I am concerned if producers work within the legality	5.702	1.625	5.586	1.719
		CPP12	I am concerned if meatpackers work within the legality	5.776	1.616	5.744	1.639
	Social	CPP13	I am concerned if producers and meatpackers worry about benefits to offi-	5.017	1.860	5.135	1.824
	Responsibility (SOR)		cials and families (health plan, early childhood education)				

		CPP14	I am concerned if producers and meatpackers promote development of	4.934	1.897	4.870	1.922
	Environmental responsi-	CPP15 CPP16 CPP17	communities I am concerned if producers value hiring and training of local labor I am concerned if meatpackers value hiring and training of local labor I am concerned if producers adopt practices that reduce greenhouse	4.948 4.953 5.133	1.865 1.851 1.840	4.928 4.920 5.047	1.895 1.870 1.906
	bility (ENR)	CPP18 CPP19	gases emission I am concerned if beef comes from farms that have not had deforestation I am concerned if beef comes from farms that conserve water and avoid	5.080 5.097	1.833 1.808	5.039 5.067	1.925 1.880
		CPP20	its waste I am concerned if beef comes from meatpackers that conserve water and	5.088	1.812	5.097	1.848
	Food Safety concerns in	CPP21	avoid its waste lam concerned if beef comes from meatpackers properly inspected by health intrinvities	5.834	1.586	5.895	1.492
		CPP22	I am concerned if beef comes from meatpackers that have good hygiene	5.840	1.558	5.727	1.589
		CPP23	practices in relation to staughter environment and machimery I am concerned if beef comes from meatpackers that take care of the bydiane of emphases (uniforme) and of instruments used	5.837	1.562	5.681	1.601
		CPP24	I am concerned if beef comes from meatpackers that have waste and	5.536	1.665	5.406	1.771
Sustainable	General Green	ASC01	endent control I would be willing to stop buying products from companies guilty of pol- urition the convincent	5.014	1.800	5.086	1.858
Attitude (ASC)		ASC02	I make a special effort to reduce the useproducts that use scarce nat-	5.293	1.666	5.183	1.753
		ASC03	ural resource When possible, I always choose products that cause less pollution	5.589	1.541	5.448	1.712
		ASC04	I do not buy a product when I know the possible damage it can cause to	5.372	1.616	5.232	1.728
		ASC05	When I buy products and foods the concern over the environment inter-	5.188	1.675	5.144	1.760
	Food Products" (FOP)	ASC06	teres with my purchase decision I prefer foods that are produced respecting the environment	5.686	1.501	5.644	1.582
		ASC07	I buy organic products because they are healthier	5.161	1.760	5.196	1.748
		ASC08	I am willing to pay a little more for products and foods that do not harm the environment	5.343	1.626	5.385	1.674
Sustainable Beef	Sustainable Beef	SPI01	I would buy a sustainable meat if it is available where I do my shopping	5.598	1.553	5.615	1.530
Purchase Intention (SPI)	Purchase Intention (SPI)	SPI02	I would trade the meat I consume today for another because it is sustainable	5.299	1.767	5.313	1.761
		SPI03	I would be willing to pay more for a meat that is sustainable	5.097	1.769	5.249	1.829
Brand Equity (BEQ)	Perceived Quality (PQL)	SPI04 BEQ01	There is a high probability that I will buy a sustainable meat in the future Brand X is of high quality	5.677 5.613	1.515 1.317	5.670 5.754	1.615 1.299
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Table A1. Contir	.ned.						
Second- order variables	First-order variables	ltem code	ltem	*W	SD*	M**	SD**
		BEQ02	Brand X is reliable	5.479	1.347	5.565	1.351
		BEQ03	Brand X has a constant quality standard	5.582	1.276	5.660	1.293
	Brand Awareness (BAW)	BEQ04	I can recognize X among other competing brands.	5.394	1.547	5.417	1.625
		BEQ05	When I think of meat, some characteristics of X come to my mind quickly	5.275	1.603	5.360	1.649
		BEQ06	I can quickly recall the symbol or logo of X.	5.543	1.507	5.326	1.782
	Brand Loyalty (BLO)	BEQ07	I consider myself to be loyal to X	4.396	1.886	4.291	1.988
	•	BEQ08	X would be my first choice	4.983	1.768	4.875	1.836
		BEQ09	I will not buy other brands if X is available at the store	4.388	1.948	4.172	2.069
	Brand Global Value (BGL)	BEQ10	Even if another brand has same features as X, I would prefer to buy X	4.542	1.920	4.483	1.996
		BEQ11	If there is another brand as good as X, I prefer to buy X	4.454	1.902	4.522	2.018
		BEQ12	If another brand is not different from X in any way, it seems smarter to	4.883	1.629	4.890	1.760
			purchase X				
	Safety (SAF)	BEQ13	If beef is branded, then it is a safe beef	4.327	1.894	4.465	1.989
	•	BEQ14	There are no risks involved in the consumption of branded beef	3.613	2.025	3.597	2.108
		BEQ15	It is safer to eat branded beef	4.818	1.816	4.870	1.803
		BEQ16	I pay attention to food safety issues in choosing the brand	5.321	1.535	5.431	1.558
Notes. M: mean; SD:	standard deviation; * Sample 1;	** Sample 2.					