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Abstract

Consumers' attitudes and personal values were assessed, investigating if those constructs affect the consumption of pork products. Empirical data was collected through a survey performed with 482 consumers in Brazil, according to Q-PorkChains project definitions. Attitudes towards the environment and nature are quite positive, although ethnocentrism is also present. Industrial food production seems to be an accepted system, but consumers are showing that environmental sustainability must not be forgotten. Consumers with more 'traditionalist' values prefer fresh, whilst those with 'adventurous' values prefer processed pork products. The development of innovative pork products aiming to attend to these different groups represents interesting opportunities for the pork chain.

Keywords: pork, consumers, values, attitudes, Brazil

1. Introduction

The present paper describes a quantitative survey of Brazilian pork meat consumers' attitudes and values and the relation these have to the consumption of pork products (fresh and processed). From many studies of eating, it is known that food choice, consumption and liking are controlled by a very large number of variables. In general terms, they can be characterized as food, person and environmental variables, which are normally analysed independently, as researchers tend to specialize and focus on smaller classes of variables. Therefore, developing and exploring integrative research designs is a challenge in food research (Meiselman, 2007). For instance, Shepherd and Raats (2006) present in their book an overview of determinants of food choice covering different models, biological and learning influences on food choice, societal influences on food, food choices across the lifespan and changing dietary behaviour within the population. Lusk and Briggeman (2009) investigated consumers' food value systems. Based on previous literature related to human values and food preferences, they revealed that on average the values of safety, nutrition, taste, and price were among the most important to consumers, whereas fairness, tradition, and origin were among the least important values.

Hence, psychographic variables, such as values, attitudes, interests and opinion can be considered valuable tools to better understand food consumer behaviour and to segment markets. Values and beliefs are thought to be the building blocks of attitudes (Eagly and Chaiken, 1995; Verplanken and Holland, 2002). Several researchers have shown a value-attitude-behaviour relationship and the common assumption is that the causality flows from values through attitudes to behaviour. This means that values have an impact on attitudes, which in turn influence people's behaviour. (Drezeens *et al.*, 2005). However, the majority of the previous studies on consumer values and attitudes towards food products were conducted in developed countries (Bernard *et al.*, 2003; Grunert and Juhl, 1995; Stienstra *et al.*, 2002; Thøgersen and O'lander, 2002) and very few in emerging markets such as Brazil, China, India and so many others.

Brazil is a country of continental dimensions (850 million hectares), with an emerging and growing consumer base, strong, growing economy and a strategic role in South America. Agriculture plays an important role in the country's economy, accounting for 10% of GDP and 40% of Brazilian exports. The country is the world's leading producer of meat (beef, poultry, and pork), coffee, sugarcane, soybeans and

oranges (De Barcellos *et al.*, 2011a). In 2014, the Brazilian agricultural products market is forecast to have a value of $49,739.9 million, an increase of 10.7% since 2009 (Datamonitor, 2010).

The population is currently estimated at 195 million inhabitants and the country is formed by people descending from a large variety of cultures. As in Europe, consumers in Brazil are a heterogeneous group, making significant variability in food consumption behaviour expected. Regional differences are strongly marked in the Brazilian food context. People from the northeast part of the country have very different eating habits than people from the southern states. In the 19th century, the southern region received the first strong colonization wave of immigrants from Europe and many of the eating habits from that region were established based on those influences. Hence, pork consumption is higher in the south and southeast compared to in the north, northeast and central west regions.

According to De Barcellos *et al.* (2011a) in spite of being the world's most consumed meat, pork consumption ranks only third place in Brazil. Annual consumption lies around 14 kg a year per inhabitant, which is very low compared to the country's poultry and beef consumption (36 and 37 kg/inhabitant/year respectively). Brazilians prefer processed meat products, like sausages, salami and ham, which represent nearly 65% of total pork consumption. Fresh cuts have a somewhat negative image, mainly due to historic notions about pork production systems (unprofessional and not clean) and many misconceptions about the consequences of pork meat consumption (related to transmissible diseases and zoonosis).

Yet, Brazilian pork production has increased 21.8% in the last five years, following the trends of internal demand and growing Brazilian participation in the global market. Hence, growing income, population and exports are the three pillars for the solid expansion of the pig production chain in Brazil.

Domestic consumption represents around 87% of overall Brazilian pork production. The excess 13% is exported, mainly to Russia and Asian countries. Brazil can be seen as an important market for pork meat products. In 2010, 2.8 million tons were internally consumed and the country ranked 6th in world pork consumption. Brazil is also an important player in terms of global pork production, being the 4th largest producer and 4th largest exporter (ABIPECS, 2010).

Overall, Brazilians' perceptions toward foods (and meat in particular) are changing as a result of globalization and urbanization. From a demand and consumption standpoint, people in Brazil are achieving a higher level of education and showing a higher demand for quality food products. In large urban centres, consumers are placing more value on convenience and giving priority to supermarkets and hypermarkets that provide a faster way of shopping (De Souza *et al.*, 2008).

Generally speaking, Brazilians like to cook from scratch using raw and unprepared ingredients produced primarily by small and mid-sized farmers. Nevertheless, modernization is unavoidably bringing an increase in sales of manufactured foods and fast-foods among households, particularly in the high-income group. But are consumers' values and attitudes impacting on their eating habits? Can values and attitudes impact on the consumption of different pork products, such as fresh or processed pork products?

In this respect, the objective of the present work is to analyse Brazilian consumers' values and attitudes, and the relation of these to the consumption of pork products (either fresh or processed), helping to integrate variables from different areas of food consumer research (food, people and environment). Data was collected from 482 individuals in eight cities from the southern and central-western region of Brazil.

The paper starts with an introductory literature review followed by an outline of the research method. Main conclusions are drawn, as well as implications for an integrated management of pork chains that meets consumer expectations.

2. Literature review

In this study, we followed a theoretical rationale in which attitudes are used as a bridging concept. For instance, Thøgersen and O'lander (2002) have shown that there is a causal relationship between values such as universalism (welfare for all people and protection of nature) and benevolence (welfare of close others) on the one hand and environment-friendly attitudes and behaviour on the other. Yet, attitudes are linked not only to values and consumer behaviour with respect to fresh and processed pork products, but also to each other (Dreezens *et al.*, 2005). For this reason, different attitude scales were used, as presented in the following section.

Values theory

Values underlie a large and important part of human cognition and behaviour. An examination of values provides

both an overall picture of a central cognitive structure of the individual, and a means of linking central beliefs to attitudes. As they serve as standards of conduct, they tend to be limited in number, universal across cultures, temporally stable, and may serve as good predictors of an individual's behaviour over extended periods of time (Rokeach, 1973, Wedel *et al.*, 1998).

Values are commonly regarded as the point of intersection between the individual and the society because they help the individual to understand the interpersonal world and guide the individual's adaptation to the surrounding conditions (Grunert and Askegaard, 1997). There is also evidence of a causal relation from values through beliefs to attitudes and on to behaviour.

According to Schwartz (2005), 'when we think of our values, we think of what is important to us in our lives (e.g. security, independence, wisdom, success, kindness, pleasure). Each of us holds numerous values with varying degrees of importance. A particular value may be very important to one person, but unimportant to another'. Consensus regarding the most useful way to conceptualize basic values has emerged gradually since the 1950's and many theorists and researchers conceptualize them as beliefs, tied inextricably to emotion. They refer to the desirable goals people strive to attain. Values are also known to be ordered by importance relative to one another. People's values form an ordered system of value priorities that characterize them as individuals. This hierarchical feature of values also distinguishes them from norms and attitudes (Schwartz 1992, 1994, 2005, 2006; Schwartz and Bilsky, 1987).

The Values Theory (Schwartz, 1992; 1994; 1996) postulates that ten universal values form a circular structure of motivationally opposed but compatible elements. Each of the ten basic values can be characterized by describing its central motivational goal:

1. *Self-direction*. Independent thought and action; choosing, creating, exploring.
2. *Stimulation*. Excitement, novelty, and challenge in life.
3. *Hedonism*. Pleasure and sensuous gratification for oneself.
4. *Achievement*. Personal success through demonstrating competence according to social standards.
5. *Power*. Social status and prestige, control or dominance over people and resources.
6. *Security*. Safety, harmony, and stability of society, of relationships, and of self.

7. *Conformity*. Restraint of actions, inclinations, and impulses likely to upset or harm others and violate social expectations or norms.
8. *Tradition*. Respect, commitment, and acceptance of the customs and ideas that traditional culture or religion provide the self.
9. *Benevolence*. Preserving and enhancing the welfare of those with whom one is in frequent personal contact (the 'in-group').
10. *Universalism*. Understanding, appreciation, tolerance, and protection for the welfare of all people and for nature.

In addition to identifying ten motivationally distinct basic values, the Values Theory also explicates the dynamic relations among them. Actions in pursuit of any value have psychological, practical, and social consequences that may conflict or may be congruent with the pursuit of other values. For example, the pursuit of novelty and change (stimulation values) is likely to undermine preservation of time-honoured customs (tradition values). In contrast, the pursuit of tradition values is congruent with the pursuit of conformity values: both motivate actions of submission to external expectations.

The values are represented by a circular structure and the closer any two values in either direction around the circle, the more similar their underlying motivations. The more distant any two values, the more antagonistic their underlying motivations. The conflicts and congruities among all ten basic values yield an integrated structure of values. This structure can be summarized with two orthogonal dimensions.

1. *Self-enhancement vs. Self-transcendence*. On this dimension, power and achievement values oppose universalism and benevolence values. Both of the former emphasize pursuit of self-interests, whereas both of the latter involve concern for the welfare and interests of others.
2. *Openness to change vs. conservation*. On this dimension, self-direction and stimulation values oppose security, conformity and tradition values. Both of the former emphasize independent action, thought and feeling and readiness for new experience, whereas all of the latter emphasize self-restriction, order and resistance to change.

Attitudinal theories

Attitudes are hypothetical constructs that represent an individual's views (forms of judgments) of an attitude 'object' (Jung, 1971). Attitudes appear to develop on the model around affect, cognition and behavioural intention. The affective response is a physiological response that

expresses an individual's preference for an entity. The cognitive response is a cognitive evaluation of the entity and forming an attitude. The behavioural intention is a verbal indication of the intention and the formation of such an attitude by an individual. It has been popular for decades to evaluate human behaviour through investigation of attitudes.

The ubiquity and importance of evaluative reactions is constantly reaffirmed, with increased emphasis being placed on processes in attitude formation and activation. Evaluative reactions have been shown to occur without awareness, even in the absence of conscious intent to evaluate a stimulus object. Several theoretical streams (e.g. cognitive dissonance – Festinger, 1957; the elaboration-likelihood model – Petty and Cacioppo, 1986) have developed and provided useful frameworks for research on attitude formation and organization. Investigators also identified factors that moderate the effects of attitudes and intentions on overt actions. Other investigations applied or tested the theories of reasoned action and planned behaviour (Ajzen, 1985; Fishbein and Ajzen, 1975). There is now little doubt that these theories can be usefully employed in various domains, yet it appears that human evaluations vary with the attitude object and as a function of individual differences.

This indicates the need for a focused approach and consideration of attitudes towards specific objects only – these necessarily being domains that are close to the focus each time subject. Previous research has indicated seven major attitude domains as possible determinants of attitudes towards animal-related food production and pertinent production systems. These are perceived knowledge about genetic engineering (Frewer *et al.*, 1997), attitudes towards the environment and nature (Frewer *et al.*, 1997), attitudes towards science and technology (Hamstra, 1991; Sparks *et al.*, 1994), food neophobia (Pliner and Hobden, 1992), trust in regulators (Frewer *et al.*, 1996), and interest in food production (Hamstra, 1991).

Thus, this study investigates the following attitude-specific domains: (a) attitudes towards environment and nature; (b) attitudes towards local employment and local economy (ethnocentrism); and (c) attitudes towards landscape preservation and environmental protection. In sum, in this paper, we are interested in investigating the relationship between values, attitudes and consumption of pork products. For instance, there is cross-cultural evidence for the link between values, environmental attitudes, and environmental behaviours (Schultz *et al.*, 2005). There is also strong evidence that particular value orientations are associated with consumption of particular differentiated food products, such as genetically modified foods (Dreezens *et al.*, 2005) and organic foods (Krystallis *et al.*, 2008). This means that consumer segments with different value structures are likely to demonstrate different beliefs and purchasing behaviour towards products with differentiated physical and nonphysical attributes that motivate different parts of an individual's value structure

3. Methodology

Research approach and sampling

The present work is part of a wider EU-funded project (Q-PorkChains) on the consumption of pork-based products in six countries on three continents (4 EU countries, Brazil and China) and results presented in this paper refer specifically to the Brazilian sample. Results from the European and Chinese surveys can be found elsewhere (Krystallis *et al.*, 2009, Perrea *et al.*, submitted, De Barcellos *et al.*, submitted).

In order to represent to some extent the diversity found in a country with continental dimensions like Brazil, the Q-PorkChains survey was applied in different locations. Hence, quantitative descriptive data were collected through a consumer survey in eight Brazilian cities from four selected states:
- Curitiba and Ponta Grossa were selected from the state of Paraná;
- Porto Alegre and Santa Rosa from the state of Rio Grande do Sul;
- Cuiabá and Campo Verde from the state of Mato Grosso;
- Goiânia and Rio Verde from the state of Goiás.

Participants were randomly selected by TNS-Interscience researchers in line with predetermined quotas pertaining to age and region. Unlike in the European survey, the questionnaire was completed through personal interviews, because the application of self-administered electronic questionnaires could seriously restrict the sample, given the characteristics of the population. The target population was intentionally divided into three different groups (from 18 to 30 years old, representing 33% of the sample, from 31 to 50 years old, representing 34% of the sample and 51 to 65 years old, representing 33% of the sample), with specific quotas according to age and locality of residence (equally divided between the four states). A total of 482 respondents were interviewed. Table 1 presents the socio-demographics of the sample per state.

Female respondents represented 50.2% of the total sample, and men, 49.8%. According to the predetermined quota,

Table 1. Socio-demographics of the sample in four selected states.

	Rio Grande do Sul		Paraná		Mato Grosso		Goiás	
	N	%	N	%	N	%	N	%
Gender								
Male	61	50.0	60	50.0	59	49.2	60	50.0
Female	61	50.0	60	50.0	61	50.8	60	50.0
Age								
18-30 years old	37	30.4	40	33.3	39	32.4	41	34.1
31-50 years old	47	38.5	42	35.0	43	35.8	41	34.1
51-65 years old	38	31.1	38	31.7	38	31.8	38	31.8
Education Level								
Primary Incomplete	24	19.7	20	16.7	20	16.7	13	10.8
Primary complete	38	31.1	32	26.7	35	29.2	34	28.3
Secondary	49	40.2	56	46.7	49	40.8	58	48.3
University	11	9.0	12	10.0	16	13.3	15	12.5
Financial situation								
Well-off	12	9.8	11	9.2	12	10.0	12	10.0
Reasonable	11	9.0	13	10.8	11	9.2	12	10.0
Modest	29	23.8	24	20.0	28	23.3	24	20.0
Difficult	42	34.4	42	35.0	38	31.7	48	40.0
Not well-off	28	23.0	30	25.0	31	25.8	24	20.0
Occupation								
Self-employed farmer	1	0.8	0	0.0	6	5.0	2	1.7
Self-employed in general	39	32.0	27	22.5	26	21.7	28	23.3
Managing employee	2	1.6	0	0.0	1	0.8	1	0.8
Salaried Employee	26	21.3	41	34.2	20	16.7	28	23.3
Skilled worker	9	7.4	8	6.7	17	14.2	16	13.3
Unskilled worker	3	2.5	2	1.7	4	3.3	0	0
Student	5	4.1	8	6.7	7	5.8	9	7.5
Retired	15	12.3	7	5.8	16	13.3	12	10.0
Unemployed or on leave	3	2.5	4	3.3	2	1.7	16	13.3
Not engaged in active employment	12	9.8	20	16.7	10	8.3	6	5.0
Other	7	5.7	3	2.5	11	9.2	2	1.7

50% of the respondents lived in urban areas and 50% in small cities with high density of pork production. Overall, 50% of the respondents were married, 25% not married but living together, 10% were single living alone, 9% were divorced and 6% widowed.

Questionnaire content

The master questionnaire for the study was developed in English and was then translated into Portuguese. All items were cross-checked using the back-translation procedure. In addition, the questionnaire was pre-tested in personal interviews with 15-20 participants.

Respondents were asked to participate in a personal interview based on a structured questionnaire. The Brazilian questionnaire consisted of seven sections composed of variables related to food, people and environment: (1) Socio-demographic and anthropometric (self-reported height and weight) characteristics of the respondent; (2) Food-related lifestyle questions; (3) Schwartz Pictorial Value Questionnaire; (4) Attitudes towards environment and nature and towards industrial food production; (5) Ethnocentrism; (6) Conjoint study measuring citizen attitude towards pig production systems; (7) A questionnaire on the frequency of intake of pork-based food products including questions on the frequency of pork consumption (11 products/categories of products), the occasions or

'when' (working day, any day, weekend, special occasions), the company or 'with whom' (alone, with family, with friends, with others) and the place of actual consumption or 'where' (at home, outside of home). For this study, sections 1, 3, 4, 5 and the frequency of consumption of the 11 selected products were used for analysis. Pork products were aggregated in categories defined as 'fresh' or 'processed' aiming to investigate possible differences between consumers with different values and attitudes, as will be presented on Table 2.

The survey was conducted through personal (face-to-face) interviews, because the application of self-administered electronic questionnaires could seriously restrict the sample, given the characteristics of the population. In Brazil, fieldwork was carried out from March 20 to 31, 2008. All interviews were made by TNS-Interscience researchers at the place of purchase of pork meat, basically supermarkets and local butchers. Respondents were randomly intercepted, and the time for conducting the interviews ranged from 45 to 60 minutes.

Questionnaire measures

Personal values

The Schwartz Value Survey (SVS) used to be the single method of measuring values, but the instrument demanded a high level of abstract thought and presented value concepts outside of any specific context. Current research uses the Portrait Values Questionnaire (PVQ), which is designed to be more concrete than the SVS yet to measure the same 10-value construct. The PVQ used in this study includes short

Table 2. Product name and classification in fresh and processed pork products.

Product name	Classification
Pork ribs	FRESH
Loins and chops	FRESH
Fresh ham	FRESH
Others (entrails, fat, tail, ear)	FRESH
Sausages, minced pork meat, brochette, dry meat	PROCESSED
Stuffed meat, escalope, roasted meat, sate	PROCESSED
Lasagne, pizza, spaghetti, *feijoada*	PROCESSED
Ham, salami, *mortadela*	PROCESSED
Bacon	PROCESSED
Sausages	PROCESSED
Paté	PROCESSED

verbal portraits of 21 different people. Each one describes a person's goals, aspirations, or wishes that point implicitly to the importance of a value. For example, 'Thinking up new ideas and being creative is important to him. He likes to do things in his own original way' describes a person for whom self-direction values are important. 'It is important to him to be rich. He wants to have a lot of money and expensive things' describes a person who cherishes power values. For each portrait, respondents answer, 'How much like you is this person?' They check one of six boxes labelled: very much like me, like me, somewhat like me, a little like me, not like me, and not like me at all. Respondents' values are inferred from their self-reported similarity to people described implicitly in terms of particular values (Schwartz *et al.*, 2001). Schwartz's is the most widely used and accepted theory of values. The Schwartz PVQ was chosen to be used in this study because it is universally applicable and considered to be stable across cultures (Schwartz, 1992; Schwartz and Bilsky, 1990). As explained before, the survey was replicated in four European countries, China and Brazil, as part of a larger EU research project.

Attitudes

Attitude towards nature and environment was measured by five items from Dunlap *et al.* (2000), attitude towards industrial food production by five items from Beckmann *et al.* (2001), attitude towards landscape preservation by three items from Lindeman and Väänänen (2000), and attitude towards local employment and attitude towards the local economy (ethnocentrism) by eight items from Shimp and Sharma (1987). All attitude items were answered on seven-point interval scales ranging from 1 ('completely disagree') to 7 ('completely agree').

Frequency of consumption of selected pork products and their classification

Frequency of consumption of the selected pork products was measured on an 8-point interval scale, ranging from 'never' to 'daily'. Yet, in order to ease comparison to the similar study made in four selected European countries and in China, frequency of consumption was transformed into a mean variable, further used in the regression analysis.

Quality control and data screening

Respondents' questionnaires were edited by the field professional market research agency to ensure accuracy and precision of the response prior to coding and transcription of the data in SPSS 15.0 format. The EM-algorithm (Dempster *et al.*, 1977) was used to provide imputed data. The EM-

algorithm is a technique that finds maximum likelihood estimates in parametric models for incomplete data. The missing values were predicted by an iterative two-step procedure. The variables imputed by this technique are the PVQ-scale and all the attitude scales. Data were scrutinized for outliers and different methods were applied, but no potential outliers changed the parameters of preliminary factor analyses.

Data analysis

First, univariate statistics was applied in order to measure attitude and value items. Overall, results did not indicate statistically significant differences between the four selected states, and for this reason, the following steps were analysed in an aggregated way. Next, we investigated the values and attitudes structure by an exploratory factor analysis (EFA). The principal component analysis with varimax rotation was applied. KMO (Keiser-Meyer-Olkin) score was greater than 0.7 and Bartlett's test was significant (Hair Jr. *et al.*, 1998). We found seven factors (four factors for attitudes and three factors for values) for an eigenvalue higher than 1. The explained variance was 62.602%. Reliability was measured by Cronbach's Alpha test. Factors presented satisfactory Cronbach's Alpha – all greater than 0.6 (Hair Jr. *et al.*, 1998).

In order to verify if there is any relation between some groups of variables identified in the study, a regression analysis was performed. The general purpose of multiple regression is to learn more about the relationship between several independent or predictor variables and a dependent or criterion variable. Therefore, the same pool of attitudes and values identified by the EFA was used as independent variables (predictors); and frequency of pork consumption of processed and fresh pork products was used as dependent variables. Educational level, household size and marital status were used as control variables. To conduct the regression analysis we averaged the statements of each variable, both dependents and independents.

4. Results

Values and attitudes

Values and attitudes were then analysed, by means of an exploratory factor analysis to test their structure (see Tables 3 and 4). Five factors were obtained within the attitudes and three factor with values, although results showed that not all the variables/dimensions within the original scales could be confirmed in the survey applied in Brazil. Variables that presented fitting problems were therefore excluded from the subsequent analysis.

In the scale 'Ethnocentrism', for example, the variable represented by question 1 ('Buy products made in Brazil: keep the country working.') had to be removed due to its very low reliability score. The mean value of 5.64 indicates a relatively high ethnocentric orientation from the sample.

All the three items of the scale 'Attitudes towards landscape preservation' were kept. The loadings were quite satisfactory, indicating that the items were highly correlated with the factor. This was the attitudinal construct with the highest mean (6.62), indicating that interviewed consumers are concerned that the food they eat is produced, prepared and packaged in a sustainable way.

The scale 'Attitudes towards industrial food production' also presented quite satisfactory item loadings, but two variables of the original scale have been withdrawn ('The food industry is very concerned about the nutritional value of their products' and 'The majority of food products can be eaten without risk'). The other three items were retained. Interestingly, attitude towards industrial food production was also positive (mean 5.39) indicating that for Brazilian consumers, sustainability and industrial food production can coexist, a somewhat different result from what is usually found in Europe. For the majority of Europeans, industrial food production is related to technology (reflecting consumer perceptions about the industrial food production systems that prevail as a source of food supplies to Western societies) and would also have a (possibly negative) influence on more sustainable production methods (unpublished results).

Finally, in the scale 'Attitudes towards environment and nature', originally composed by five items, only three were kept and the items 'The earth is like a spaceship with very limited room and resources' and 'If things continue on their present course, we will soon experience a major ecological catastrophe' were excluded from the analysis. The obtained mean for this construct was the lowest amongst the four investigated attitudes (5.34).

Overall, reliability of the scales in the Brazilian context was considered satisfactory to moderate, with Cronbach's Alpha ranging from 0.624 to 0.843. Next, Table 4 presents the results of the exploratory factor analysis of the personal values.

When analysing and interpreting the 10 value dimensions of PVQ, items from the dimensions 'Conformity', 'Security' and 'Tradition' were aggregated into only one factor. Based on the resulting characteristics of the individuals in this group, this new factor was named 'Moral and hierarchical

Table 3. Exploratory factor analysis of the attitude scales.

Item description	Loading	Mean	S.D
Ethnocentrism (α=0.843)		5.64	1.18
1. A real Brazilian should always buy products made in Brazil	0.797	5.73	1.73
2. We should always buy products made in Brazil instead of letting other countries become richer because of us	0.794	5.74	1.48
3. Brazilian products above all	0.785	5.50	1.64
4. This can cost me in the long run, but I prefer to support Brazilian products	0.726	5.61	1.87
5. It is always better to buy Brazilian products	0.634	5.47	1.69
6. Buying products produced in Brazil supports the local community's livelihood	0.618	5.70	1.54
7. Brazilian consumers that purchase products made in other countries are responsible for putting their fellow Brazilians out of work	0.589	5.88	1.49
Attitudes towards landscape preservation (α=0.811)		6.62	0.73
1. It is important that the food I normally eat has been prepared in an environmentally friendly way	0.878	6.56	0.94
2. It is important that the food that I normally eat has been produced in a way which has not shaken the balance of nature	0.842	6.58	0.94
3. It is important that the food that I normally eat is packaged in an environmentally friendly way	0.798	6.73	0.69
Attitudes towards industrial food production (α=0.773)		5.39	1.28
1. Modern food production removes vitamins and minerals from food products (R)	0.851	5.30	1.52
2. Most food manufacturers are more interested in earning money than in the nutritional quality of their products (R)	0.829	5.38	1.55
3. Most foods are so processed that they have lost their nutritional value (R)	0.742	5.48	1.57
Attitudes towards environment and nature (α=0.624)		5.34	1.41
1. The balance of nature is strong enough to cope with the impacts of modern industrial nations	0.806	4.83	2.23
2. The so-called 'ecological crisis' facing humankind has been greatly exaggerated	0.734	4.59	2.17
3. Humans are severely abusing the environment	0.521	6.63	0.85

values', representing a more traditional behaviour. Most of the values aggregated here belong to collectivistic values.

Items from the PVQ dimensions 'Stimulation', 'Achievement', 'Hedonism' and 'Power' were also aggregated into a new factor, named 'Adventure and freedom values', representing a more adventurous and exciting way of life. This new factor contains mainly individualistic values.

Finally, the original items from the dimensions 'Universalism' and 'Benevolence' and single items from 'Security' and 'Self-direction' from the PVQ were aggregated into a new factor called 'Universalism and benevolence'. Mean values for this factor were the highest (4.56), followed by 'Moral and hierarchical values' (3.74) and 'Adventure and freedom' values, indicating that for the Brazilian respondents collective values seem to overtake individual ones.

The findings also suggest that the values and attitudes in Brazil are somewhat different from those in Europe and the US, where the PVQ instrument was developed. Analyses in more than 200 samples from more than 60 nations from every inhabited continent support the distinctiveness of the 10 values and the circular structure of relations among them (Fontaine and Schwartz, 1996; Schwartz, 1992, 1994, Schwartz and Sagiv, 1995; Schwartz *et al.*, 2001). Nonetheless, 5% of the samples deviated considerably from the theorized pattern. Deviations were most common and extreme in samples from sub-Saharan Africa, India, Malaysia, and rural areas of less-developed nations and suggest that the values theory may not hold universally (Schwartz *et al.*, 2001). The authors infer that the problem may not lie with the theory, but on the instrument employed to measure values. Although the orthogonal dimensions seem to hold in our study, it would be desirable to apply the survey to a representative sample within the population. The

Table 4. Exploratory factor analysis of the personal values

Item description	Loading	Mean	S.D
Moral and hierarchical values (α=0.649)		3.74	0.94
1. It is important to him/her to always behave properly. He/she wants to avoid doing anything people would say is wrong.	0.720	3.89	1.43
2. He/she believes that people should do what they're told. He/she thinks people should follow rules at all times, even when no-one is watching.	0.596	3.47	1.48
3. It is important to him/her to live in secure surroundings. He/she avoids anything that might endanger his/her safety.	0.585	3.49	1.61
4. It is important to him/her to get respect from others. He/she wants people to do what he/she says.	0.533	3.76	1.45
5. Modesty is important for him/her. He/she would do his or her best not to arouse others' attention.	0.509	4.12	1.30
Adventures and freedom values (α=0.671)		3.72	0.99
1. Being very successful is important to him/her. He/she hopes people will recognize his/her achievements.	0.733	4.32	1.28
2. He/she likes surprises and is always looking for new things to do. He/she thinks it is important to do lots of different things in life.	0.700	4.02	1.42
3. He/she seeks every chance he/she can to have fun. It is important to him/her to do things that give him/her pleasure.	0.637	4.38	1.49
4. He/she looks for adventures and likes to take risks. He/she wants to have an exciting life.	0.521	3.13	1.70
5. To be rich is important for him/her. He/she wants to possess a lot of money and expensive things.	0.500	2.78	1.60
Universalism and benevolence		4.56	0.81
1. He/she believes that everyone should care about nature. The protection of ecological environment is rather important for him/her.	0.671	4.59	1.30
2. Loyalty to friends is very important to him/her. He/she wants to devote himself to people close to him/her.	0.670	4.70	1.16
3. It is very important to him/her to help the people around him/her. He/she wants to care for their well-being.	0.628	4.80	1.13
4. He/she thinks it is important that every person in the world should be treated equally. He/she believes everyone should have equal opportunities in life.	0.585	4.67	1.25
5. It is important to him/her that the government ensures his/her safety against all threats. He/she wants the state to be strong so it can defend its citizens	0.568	4.38	1.34
6. Making decisions on one's own is important for him/her. He/she likes freedom and independence.	0.527	4.84	1.18
7. Listening to opinions different from his/hers is important for him/her. He/she would try to understand others' opinions even if he/she does not agree with what they say.	0.527	3.95	1.43

adaptation of the scales locally could better cover Brazilian food-related attitudes and values.

Next, multiple regression analysis is applied, aiming to investigate the relations between attitude and values and consumption of fresh and processed pork products.

Regression analysis between attitudes and values and consumption of pork products

The regression analysis indicated a positive association between consumption of fresh meat and processed meat (Table 5). Keeping all the other variables constant, the main associated factor to fresh meat consumption is processed meat consumption. A 0.401 increase in the frequency of fresh meat consumption will be expected for each unit increase in frequency of processed meat consumption. Frequency of fresh meat will increase 0.896 for each household

Table 5. Regression model for fresh pork products and processed pork products.

	Fresh pork products consumption[1]	Processed pork products consumption
Main effects		
Attitudes towards environment and nature	-0.170	0.013
Attitudes towards industrial food production	-0.163**	0.112**
Attitudes towards food and environment	0.057	-0.069
Ethnocentrism	0.005	0.086*
Moral and hierarchical values	0.181**	-0.219**
Universalism and benevolence	0.017	0.064
Adventures and freedom values	-0.172**	0.079
Processed pork products consumption	0.401**	-
Fresh pork products consumption	-	0.376**
Control variables		
Age	0.099**	0.107*
Education	-0.116**	0.141**
N. p. household	0.896*	0.105*
R^2	0.214	0.264

[1] ** $P<0.01$; * $P<0.05$.

member. A 0.116 decrease in frequency of fresh pork meat consumption will be expected for higher educational level. 'Attitude towards industrial food production' has a negative impact on fresh meat consumption and for each increase in the attitude, consumption will decrease by 0.163. Consumers who present a higher score in the 'Adventure and freedom' values scale will decrease consumption of fresh pork products by 0.172. Accordingly, those consumers presenting higher scores in 'Moral and hierarchical' value will increase consumption of fresh pork products by 0.181.

In regard to processed pork products, the association between fresh and processed meat was also observed. A 0.376 increase in frequency of consumption of processed products will be observed for each unit increase in fresh meat consumption. This is therefore the main predictor of processed meat consumption. The second most important determinant of processed products consumption is 'Moral and hierarchical' values, which is inversely associated. Each increase in the score of 'Moral and hierarchical' values will decrease frequency of consumption of processed meats by 0.219 times. As expected, attitudes toward industrial food production have a positive impact on the frequency of processed pork product (increase of 0.112 for each unit). Ethnocentric Brazilians will be more likely to eat processed meats (0.086 increase).

The investigated socio-demographic variables were all significant in this model, meaning that from one

educational category to the next higher one (and keeping all other variables constant), the frequency of consumption of processed pork products will increase 0.141. The higher the number of people in the household, the higher the consumption (0.105); and finally, age also has a positive impact. For each unit of age, consumption increases 0.107.

We can infer that consumption of fresh pork meat varies negatively in relation to 'Attitudes towards industrial food production', which indicates that someone who likes to eat fresh products tends to be negative towards industrial food production, preferring the 'natural way'. Also someone who scores high in 'Adventure and freedom values' is not so prone to prepare fresh pork products from scratch, because it certainly takes some time to prepare and it might be considered less convenient. For this kind of consumer, time is dedicated to adventure and fun.

Finally, it can also be noticed that people with more traditional values tend to avoid processed pork products, because they normally prefer to prepare the food they eat at home from scratch. Ethnocentric influences were also identified and are congruent with the profile. Universalism and benevolence were not significant in both cases, which might indicate that those are not good predictors for pork consumption. Similarly, most of the attitudes were not good predictors of consumption in this model, although supporters of 'Industrial food production' confirmed the

preference for processed products, which is an interesting result for the pork chain.

Conclusions

Brazil is one of the world's largest producers of meat (pork, beef, and poultry) and it competes directly with other countries in the international market. Its competitive advantages are related to land availability, relatively cheap labour, facility to obtain inputs, access to production technologies and other aspects such as business strategy and organization advances that have taken place in the last decades. In primary production, structural changes are taking place, such as significant increases in the scale of operations, specialization and technification, following the growing integration with the industrial sectors. Environmental changes and broader societal demands are also impacting the firms' strategies. Nevertheless, one of the most significant changes is related to the image of pork in the eyes of the consumer. With the emergence and strengthening of large industries, constant offer and defined standards were needed. In Brazil, the industrial pork sector is highly concentrated, with the three biggest industries being responsible for 44.13% of the total pig slaughter in 2008. This concentration led to strong branding and broadening of the commercialization to a national basis. Most industries followed the strategy to strengthen their own brand, resulting in enhanced trust in and safety of fresh, as well as processed pork products. Consequently, the quality of the final product increased enormously, changing the supply for retailers and the satisfaction at the household level.

One of the pillars of these leader companies has been constant innovation in processed products (hams, sausages, mortadelas, salamis), the types of pork products preferred by Brazilian consumers. The development of innovative ready-to-eat pork products is still modest, but promising. Yet, this degree of innovation is not found in fresh cuts for the domestic markets. In this regard, the search for more sophistication in the food industry could stimulate investments in new production lines that could supply the domestic market with premium products.

Consumers in Brazil seem to be open for such improvements. Nowadays, with the ease of access to information, the increasing concern with health issues and wellbeing and the growing of income and educational levels, Brazilian consumers are demanding better products in terms of their intrinsic (flavour, fat content, taste) as well as extrinsic cues (brand, certification labels, sustainability, etc.). Brazilians' values and attitudes are also changing, being shaped by the rapidly changing environment that is surrounding them.

The increase in consumption of any kind of product (in special food) can certainly bring benefits to production chains, since it is based on consumption that information and resources flow from one segment to the previous one (retailers, wholesalers, industry, production, inputs). Considering the growth of economic power from developing markets and the demographic changes that are happening in the western and eastern world, new challenges are posed to pork production chains. Chain members must know how the product is produced, distributed and consumed, in order to reach the markets' demands. In that sense, from a food company and retailers' perspective, to understand and segment consumers based on psychographic variables such as attitudes and values can be strategic when tailoring communication action and the offers to the markets.

Results from this survey indicate that attitudes towards environment and nature are quite positive in Brazil, although ethnocentrism and positive attitudes towards industrial food production are also strong. Those results are interesting, considering that the population is reaching 200 million people, and this a market not to be ignored by agri-food chains. In a country with such dimensions, industrial food production seems to be an accepted system, but consumers are showing that environmental sustainability must not be forgotten. Attitudes can indeed impact the consumption of pork products, even for a small segment of the population, and recent studies have confirmed this trend in Brazilian society (De Barcellos *et al.*, 2011b).

Personal values are also an interesting construct to help us better understand this emerging market. Collectivistic values are more important than individualistic ones in this study, something that has already been validated in Geert Hofstede's Cultural Dimensions (2011), where Brazil has shown a low Individualism rank of 38, indicating a very collectivistic society.

With respect to the consumption of fresh products, results show that consumers with more traditionalist values prefer fresh pork products, probably because they want to know exactly what is in the food they are eating or feeding their families. They may not completely trust what companies say their processed products contain or what they are made of. These consumers may also want total control of what they are eating, both in terms of ingredients and also of cooking methods. In fact, traditional people normally prefer to prepare the food they eat at home from scratch. Ethnocentric influences were also identified within this profile.

Consumers with 'adventure and freedom' values tend to avoid fresh products, maybe because they like to have free

time to spend in their adventures and leisure, and fresh products usually take more time and work to cook. They prefer processed products because they are more convenient, easy to prepare and are less perishable than fresh products. In that sense, to target consumers that value freedom and adventure the offering at the retail level could include fresh products that are conveniently packaged and easy to prepare.

The results therefore present interesting opportunities for the pork chain. The development of high-quality fresh pork products, presented in a convenient way in terms of cuts, seasoning and packaging could stimulate those customers who are more 'adventurous' to try fresh pork. Members of the pork chain could also provide recipes and new ways to prepare pork, thereby educating consumers. As is happening in many countries, 'the gourmet' figure is back and highly ranked, which could stimulate newcomers to the cooking domain.

In terms of processed products, the development of healthy lines (such as products with lower levels of salt, nitrates, fat) and added-value products (such as premium ham with origin denomination, something not seen in the Brazilian market at the moment) and also premium ready-to-eat pork products could stimulate the 'traditional' consumer to try these categories. In many countries, retailers contribute much to the market with their own brand-name products available on the shelves, but in Brazil this is rarely seen.

In sum, both strategies could not only benefit the industry and retailers – which would certainly sell more products, but would also stimulate producers at farm level, investing in better production methods. Of course those strategies would eventually also benefit consumers, through increased availability and variety of quality pork products.

In theoretical terms, this paper integrates psychographics (attitudes and values) with consumption variables, in an attempt to better explain consumer behaviour towards pork products. Psychographics are considered a valuable tool in effective market segmentation, since lifestyle, attitude, values and preferences are crucial factors in analysing how consumers choose and buy their selected products. In particular, values are commonly regarded as the point of intersection between the individual and the society because they help people understand the interpersonal world and guide the individual's adaptation to the surrounding conditions (Grunert and Askegaard, 1997). There is also evidence of a causal relation from values through beliefs to attitudes and on to behaviour. We acknowledge, however, that understanding consumers' food choices is a complex task, and there are other potential factors that might be

relevant which were not presented here. Factors related to food, people and environment should be considered (Meiselman, 2007).

In our sample, attitudes towards environment (in general) were not good predictors of pork product consumption, something previously found by Krystallis *et al.* (2009) and De Barcellos *et al.* (2011b) in Europe and Brazil, respectively. We can infer that pork consumption by Brazilian consumers is not influenced by their attitudes towards the environment, or by values related to universalism and benevolence. Behaviour seems to be driven by practical aspects related to the consumer's profile. We can hypothesize that information about pork production practices and its environmental impacts were either not available or acknowledged by participants, since they are not impacting their consumption frequency. Although means were very high for participants' 'attitudes towards landscape preservation', in practice they do not lead to any reduction or increase in pork consumption. The same is true for the values 'universalism and benevolence'. Interestingly, the same participants have positive attitudes towards industrial food production, indicating that industrialization and environmental awareness are not antagonistic for people living in a developing nation. New green technologies and organizational strategies might help explain such phenomena and should be further explored theoretically.

In terms of location specificity (the four selected regions), results did not indicate statistically significant differences. We believe that more studies investigating food choices are necessary in Brazil, in order to better comprehend regional differences. For emerging markets such as Brazil, the stage leading from awareness to action (in this case awareness about the impacts of pork production and consequent impacts on consumption) is not yet completed. Environmental issues are a new topic in Brazil and the increasing empowerment and better access to information and education of the population might shape the future in a different way. Food chain stakeholders and researchers must follow these movements closely.

Finally, although results cannot be generalized, the approach proposed in this study could be transferred to another context, as it provided useful managerial and theoretical insights. Future studies could further investigate relationships between variables related to food, people and environment, such as socio-demographic and anthropometrics, food-related lifestyles, attitude towards pig production systems, and the occasions, the company and the place of actual consumption.

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