Street food: factors influencing perception of product quality

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Abstract

Purpose – The purpose of this study is to evaluate whether the perceptions of cleanliness and organization of the point of sale, hygiene and training of those who serve the public (service) and healthiness of the products, constitute a base for the perception of the quality of food sold in the street. Studies about development of street food trade have gained relevance in academic debate because of its social and economic significance. Usually, aspects related to sanitary issues are presented, and the factors that influence consumer perception regarding quality of food consumed are less explored. This was the focus of this work. The relationships among possible predecessors – attendance, cleanliness, organization and healthiness – were tested, all acting together, influencing the variable perception of product quality. Competitive models were tested because of theoretical divergences regarding the relationship between quality and healthiness, not yet totally clear in the literature.

Design/methodology/approach – A quantitative survey was carried out in the city of Diadema (SP, Brazil), getting 603 respondents, with data and theoretical models analyzed by structural equation modeling.

Findings – Results indicated that organization variable is not significant regarding perception of product quality, while attendance and healthiness directly affect this perception. On the other hand, cleanliness influences perceived healthiness and this, in turn, reinforces perception of product quality.

Practical implications – The focus of street food traders should be on clerk cleanliness and politeness (characteristics related to the service) that end up influencing the perception that the consumer develops regarding healthiness (characteristic related to product quality).

Originality/value – Usually research studies on this theme include only aspects related to sanitary and safety issues, and those which focus on consumer perception of food quality cover conventional outlets such as bars and restaurants. There are few ones performed as in this study that analyze street food consumer behavior regarding his/her perception of quality, cleanliness, care received, among others.

Keywords Consumer behavior, Structural equation modelling, Street food, Quality of food

Paper type Research paper

1. Introduction

In times of economic contingency and job loss, or when there are migratory/immigration movements, as observed by Basinski (2014), the street food trade constitutes an alternative for family income. Street food trade has three characteristics, namely, it is cheap, convenient and easily obtainable around cities, and it served in vans or kiosks usually located in commercial streets and at festivals (Bellia *et al.*, 2016).

Whether it is because of its economic, social and cultural importance, or because of public health implications, street food is a subject that is gaining interest in the literature (Alimi, 2016; Basinski, 2014; Franklin and Badrie, 2015; Grunert, 2010; Henderson, 2011). These studies have been developed covering the issues of food storage and production conditions, customers' perception, as well as the issue of health threat related to the street food.

Authors such as Benny-Ollivierra and Badrie (2007) and Franklin and Badrie (2015) investigated the conditions of street food trade in open-air festivals, noting that merchants often handle food and money resulting in low hygiene conditions. Some of the consumers interviewed claimed to have had health problems because of the ingestion of these foods. Ekanem (1998) studied the street food trade in South Africa. In addition to discovering that there were no minimum standards in terms of food production to preserve consumers' health, Ekanem (1998) suggests the need for greater governmental regulation, in terms of sanitation guidelines, for this type of trade.

In Brazil, Bezerra *et al.* (2010) performed a study to evaluate the quality of sandwiches sold on the street and the results indicated that 31.4 per cent of the samples were considered unfit for consumption, with levels of bacteria well above sanitation standards. To a large extent, this is because of the lack of vendors' knowledge about handling their own product (about 80 per cent stated that they had never received any type of training) (Benny-Ollivierra and Badrie, 2007).

Street food is consumed daily by 2.5 billion people worldwide. In India, it is estimated that 2.5 per cent of the population are considered street vendors. In Latin America, more than 30 per cent of the household budget in urban centers is spent on street foods (Bellia *et al.*, 2016). According to estimates by the Brazil Foodservice Institute (IFB) (Denone, 2017), the street food segment in Brazil reported sales of about R$14.6bn in 2016. Chung and Myers (1999) affirm that consumers of less purchasing power opt for street food because of the lower price when compared to food sold indoors, although they appreciate more elaborate spaces.

The above findings are not unique to the context of underdeveloped countries. Alimi (2016), when studying this type of trade in several developed countries, reinforces the issue of poor sanitation and unprepared vendors. That said, there is a need to research this theme deepen, as it impacts on public health, however, if well worked, it can be an important instrument of local development.

Thus, there is an important discussion to be made regarding the practices that surround street food, be it in terms of handling and preparing food, or in the way vendors present themselves to consumers.

Despite the problems surrounding the street food trade, this type of business is seen as a social integration link, which in itself would justify this research. Fonseca *et al.* (2013) consider street food as part of culture – in certain circumstances influencing decisively in the sense of belonging to a group based on the food choice and on consumption rituals – considering that gastronomy is an expression of cultural identity in the home or on the street.

Therefore, it is important to recognize the social dimension of street food and its consequences in terms of perception of product quality, organization of the point of sale,

cleanliness and healthiness and how these elements are considered in contexts that intend to evaluate this type of trade. All this leads to the following research question:

RQ1. What are the determinants of the perception of quality of food prepared and sold in street trade?

The objective of this study is to evaluate whether the perceptions of cleanliness and organization of the point of sale, hygiene and training of those who serve the public (service) and healthiness of the products, constitute a base for the perception of the quality of food sold in the street.

Competitive theoretical models were also tested involving the variables in question, with the objective of evaluating the most adequate relationship between the perception of quality and healthiness that is not completely clear in the researched literature (Asiegbu et al., 2016; Chrysochou and Grunert, 2014; Grunert, 2010; Ibáñez Casanova, 2003; Santos et al., 2012; Viana, 2013) and which represents a theoretical gap to be filled.

Section 2 presents a literature review, after which the methodology for empirical research is given in Section 3, followed by the discussion of the results obtained given in Section 4 and finally Section 5 concludes the paper.

2. Literature review
This section presents the literature review focused on the construction of variables and hypotheses supporting the development of the theoretical model that explains the consumers' perception of the quality of street food.

2.1 Perception of quality
The perception of quality is a global concept and depends on the factors consumers use to perceive and evaluate a service or product. Therefore, it is important to know the determining attributes of this evaluation (Ibáñez Casanova, 2003). For Grunert (2010), quality is something intangible that can be perceived before and after the purchase.

In general, consumer's feeling in relation to the quality of the products is significant in indoor and outdoor food, the latter being represented by street trade. For Tinoco and Ribeiro (2008), the perception of quality, in general, results from the comparison between customer expectations and perceived performance. For the authors, the service, organization of the sales point, cleanliness, safety to consume (in terms of healthiness), among other aspects, are determinants of the perceived quality of food consumed away from home.

When analyzing this for fast foods, Tiwari and Verma (2008) found that the justifications for the growth of this market are the lowest price, the ease in food preparation and the media promoted by the brand owners. These factors must be associated with the perception of quality that consumers develop through the variety of food, taste, environment and hygiene, speed of service, location and parking, and these variables affect consumers' choice of store. Almeida et al. (2014) propose that such variables are also associated to the perception of quality in street food trade. Brunso et al. (2002) complement the discussion with taste and appearance, healthiness, convenience and processing as important food trade variables in Western industrialized countries.

Regarding consumer perception, the literature specifically on street food is scarce and does not clearly determine the antecedents of perceived quality. However, based

on the literature on the subject and on food trade consumed away from home, possible determinants of quality were established (Santos *et al.*, 2012; Tinoco and Ribeiro, 2008), which will be explored in this work: service, cleanliness, organization and healthiness.

2.2 Perception of service

Fontanillas *et al.* (2013) developed a study in a restaurant in the city of Macaé, Rio de Janeiro, and showed that service is essential for the vitality and perpetuation of the business. The authors found that regardless of the product or service they seek, people form expectations regarding service quality.

Santos *et al.* (2012) point out that food sold on the street is not only a biological function but also a social one, since this consumption is a moment of encounter and conversation of the individuals involved. The researchers found that there are several factors that determine the acquisition of street food; however, even if the subjects do not trust the quality of commercialized food, several factors prevail at the risk of acquiring an illness.

Rossi *et al.* (2012) propose that consumers seek some reciprocity from the place where they eat, expressed in the form of good service. This good service is represented by the cleanliness, behavior, politeness and solicitude of the vendors.

Rheinländer *et al.* (2008) showed that, despite the general skeptical attitude towards the hygienic care of street vendors, trust in a well-known vendor has been identified as a decisive factor in choosing a street food location. Many consumers have stated that they usually buy street food from the same vendor, with whom they have developed trust. Thus, consumers seem to face the dilemma of general mistrust in food safety in the street food trade, establishing trust relationships with known vendors.

Loriato and Pelissari (2017) carried out a survey in Brazil, finding that the service is a determining attribute for consumers when deciding on a street food vendor. For the authors, consumers are becoming more interested in how they are treated, so service outweighs other considerations such as price.

Thus, the following hypothesis is formulated to guide the research:

H1. The perception of service positively influences the perception of product quality.

2.3 Perception of cleanliness

Avoiding dirt at the place of food commercialization was already desirable long before the discovery of the transmission of diseases by bacteria, so cleaning does not refer only to the removal of germs, and it is associated with moral and cultural issues (Van Der Geest, 1998; Drechsel *et al.*, 2000). In Ghana, for example, it has been found that dirt is seen much more as a moral degradation than a potential health hazard.

In relation to the criteria adopted for the purchase of street food, Santos *et al.* (2012) revealed that cleaning is a strong agent of consumers' choice between what to buy and what not to buy. In addition, 81 per cent of the respondents did not trust the quality of the products sold, which reinforces the importance of cleanliness, both of the vendor and the location.

These results corroborate the findings of Cardoso *et al.* (2008), whose evaluation of the profile of the consumers of street food indicated that 64.8 per cent of the interviewees considered cleanliness as a criterion in the acquisition of street food and 42.5 per cent, the vendor's cleanliness, despite 72.5 per cent indicating that street food posed a health risk to consumers.

Henderson's (2011) study compared the street food markets of Bangkok and Singapore and reported that the former's hygienic conditions are not as good as those observed in the latter, and although there is an intense flow of tourists, this no longer enhances this type of commerce in the country.

It is important to recognize the role of the variable cleanliness as it acts in attenuating the perceived risk of food consumption. Perception of risk has been defined as a person's point of view about the inherent risk in a given situation. In this case, the perception of risk is about food safety and corresponds to what the individual believes would be the risk intensity for their health (Schroeder *et al.*, 2007). Martins (2006), in a study with street food in Gauteng, South Africa, showed that cleanliness was part of a group of five main factors for the preference to buy from a specific vendor.

Thus, the following hypothesis is formulated to guide this research:

H2. The perception of cleanliness of the location positively influences the perception of product quality.

2.4. Perception of organization

In a study by Oliveira *et al.* (2008), consumers' habits and food preferences were described in six cities in the state of São Paulo, based on their knowledge of hygienic-sanitary conditions and foodborne diseases. Their research also surveyed consumers' perceptions about the quality of the food associated with the point of sale. Although vendors and consumers demonstrate knowledge about food safety, the food quality criterion used by both groups does not emphasize hygiene practices such as hand washing, cleaning utensils, washing raw vegetables and the effectiveness of disinfectants. Instead of this, the main criteria of food selection are related to the esthetics and organization of the point of sale, usually a little tent or a booth (Drechsel *et al.*, 2000; Probst, 2008; Rheinländer *et al.*, 2008).

Grunert *et al.* (1996) found strong correlation between the location and perceived quality in their studies on consumption of food away from home. The location seems to be one of the main indicators of quality consumer uses when evaluating the expected quality.

Walsh (2014), in studying street markets in Bangkok, infers that they do not present minimal strategies aimed at improving public perception on their products' quality. The author points out, above all, the lack of organization of the establishment that, to a certain extent, fails to increase their future sales because the region is frequented by tourists who, affected by the negative perception, tend to not return. The strategies the author mentions are those related to service, general atmosphere of the location, product portfolio, among others that would improve the perception of quality.

Thus, the following hypothesis is formulated:

H3. The perception of organization of the point of sale positively influences the perception of product quality.

2.5 Perception of healthiness

Grunert (2010) suggests the idea that in economic terms, healthiness is an invisible quality, which means that it cannot be directly accessed by consumers. Instead, healthiness is related to the quality of something but based on another quality indicator perceived by the consumer. For instance, healthiness of an apple is assumed based on cleanliness and color of

the fruit and not by a direct measurement of healthiness. When it comes to street food, quality is associated with the expected health benefit after consumption.

For Schnettler *et al.* (2015), the perception of healthiness in food consumption is unconsciously associated with disease prevention and health improvement. According to Chrysochou and Grunert (2014), well-being-related elements can positively affect consumer assessments on product healthiness and stimulate purchasing.

According to Viana (2013), there are few studies on perception of product healthiness in Brazil. The perception about a product's healthiness is inversely associated to the risk perceived by the consumption of it. Parry *et al.* (2004) comment that perceived risk of domestic environments is lower than perceived risk of street food trade. Thus, it is important to verify the risk conditions to reduce incidence of food poisoning, which invariably reinforces the perception of healthiness. Santos *et al.* (2012), by analyzing the profile of street food consumers in Bahia, concluded that to improve the quality of street food, it is necessary to educate consumers about choices for health.

Asiegbu *et al.* (2016) developed a study to determine knowledge on food safety based on the perceived microbial risk of street food consumers in Johannesburg, South Africa. The results highlighted some gaps in consumers' knowledge, attitudes and practices on the purchase and consumption of food sold by street vendors. The main consumption factors of these foods were accessibility, availability and convenience. Most consumers did not trust the safety of food sold, but this did not affect their preference.

Another interesting research is by Stojanovic *et al.* (2013). It shows that products that look healthier are more likely to be chosen by people accompanied by children, i.e. the presence of children influences the perception of quality regarding the benefit related to the food purchased.

In another context, Schnettler *et al.* (2015) associate the purchase of healthier foods to countries where there are lifestyle changes, where street food consumption is also influenced by the search for healthier foods, as in closed environments, such as fast-food, the sale of healthy products is not a recurring practice. Fewer still are the studies that relate consumer perceptions of health to perceived quality of products.

By the present literature, the perception of healthiness is related to and seems to be precedent of the perception of quality, but this relation, considering the existence of the other variables studied, does not seem clear (Asiegbu *et al.*, 2016; Chrysochou and Grunert, 2014; Grunert, 2010; Ibáñez Casanova, 2003; Santos *et al.*, 2012; Viana, 2013) and will be reason for greater attention and detailed tests throughout this study. Initially it is proposed the relationship between the perception of healthiness and quality of the product expressed in the hypothesis below:

H4. The perception of healthiness positively influences the perception of product quality.

3. Methodology
From the hypotheses developed based on the literature review, an initial theoretical model was constructed. This model guides the research and is presented in Figure 1.

The variables studied are latent variables and were measured using a questionnaire elaborated with statements that reflect their meaning in the studied context (Nunnally and Bernstein, 1994).
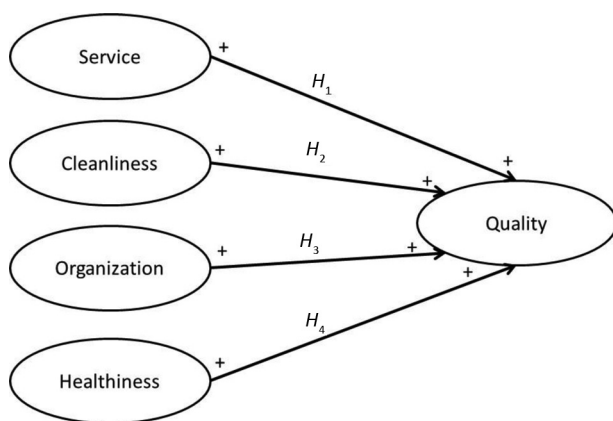
Source: Elaborated by the authors

Figure 1.
Initial theoretical
model

The questionnaire had three statements for each variable, thus ensuring the minimum number of items required for content validity (Hair *et al.*, 2009). The statements were developed based on the researched literature and are presented in Table I.

The street food trade may have its own characteristics regarding the consumer's perception of quality of the product, but this literature is still scarce. Thus, this research proposes and tests hypotheses based on nonspecific literature of street food trade, but which accounts for the perception of food quality and trade of food consumed away from home. The research chose to develop statements – adapting to its context the discussions and proposals of the authors reviewed – that could reflect the variables quality, healthiness, cleanliness, organization and service. Additionally, such statements have been subjected to various statistical tests and validation procedures that are detailed throughout this article (Byrne, 2010; Hair *et al.*, 2009; Marôco, 2014).

The variable "Service" refers to the perception of the consumer regarding the service received from the vendor. It relates to how the seller behaves about being kind, friendly and fast in the service. All the authors, in general, discuss the concepts and assumptions that form the variable "Service" and their studies were used as bases for the elaboration of the statements applied for this variable. Specifically served as a base, Fontanillas *et al.* (2013) who used as item in their scale "good customer service by the establishment's employees is important", Rossi *et al.* (2012) who used in their scale the items "one of the qualities of the waiter is friendliness" and "people value well trained waiters", and Loriato and Pelissari (2017) who used "appearance and hygiene of employees", "service speed" and "good service".

Within the dimensions of the model presented by Brunso *et al.* (2002), the processing characteristics are related to the procedures used for food production and to the expectations of consumers. For Oliveira *et al.* (2008), conditions of hygiene are those that most discourage consumers to purchase street food. In addition, the study by Rheinländer *et al.* (2008) found that, despite having basic knowledge about food safety, consumers do not emphasize basic hygiene practices (washing hands, utensils, etc.), but instead the selection criterion is affected by the esthetic appearance of the food and the location. The items for the variable "Organization" reflect the findings of these researchers, taking into account the specificity of the street food trade.

Variable	Statement	Source
Quality	The products are high quality Raw materials used are from a reliable source The products are hygienically prepared	Ibáñez Casanova (2003), Grunert (2010), Tinoco and Ribeiro (2008), Tiwari and Verma (2008), Almeida *et al.* (2014), Brunso *et al.* (2002), Santos *et al.* (2012)
Healthiness	The products are good for your health Food in the booths cannot cause illness The food sold does not cause me harm	Grunert (2010), Schnettler *et al.* (2015), Chrysochou and Grunert (2014), Viana (2013), Parry *et al.* (2004), Santos *et al.* (2012), Asiegbu *et al.* (2016), Stojanovic *et al.* (2013)
Cleanliness	The booths are clean and sanitized The location of the booths is clean The surroundings of booths are adequate for food trade	Van Der Geest (1998), Drechsel *et al.* (2000), Santos *et al.* (2012), Cardoso *et al.* (2008), Henderson (2011), Schroeder *et al.* (2007), Martins (2006)
Organization	The booths are organized The products sold in the booths are well arranged and presented The products sold in the booths are well advertised	Oliveira *et al.* (2008), Drechsel *et al.* (2000), Probst (2008), Rheinländer *et al.* (2008), Grunert *et al.* (1996), Walsh (2014)
Service	The vendors are kind and polite with customers The vendors handle money and food adequately The vendors are clean and appropriately attired to sell food	Fontanillas *et al.* (2013), Santos *et al.* (2012), Rossi *et al.* (2012), Rheinländer *et al.* (2008), Loriato and Pelissari (2017)

Source: Elaborated by the authors

Regarding the variable "Cleanliness", Schroeder *et al.* (2007) analyzed the attitudes and perception of risks associated with the meat market. Although the scales developed by the authors do not have a direct application to the consumer perception about street food cleanliness, their statements and discussions guided the development of the items used in this study.

The concept of healthiness is inversely related to the risk of intoxication that street food can cause (Viana, 2013). It concerns how safe the consumer feels when looking for street food, regardless of other issues such as price and accessibility. The authors reviewed for these research (Asiegbu *et al.*, 2016; Chrysochou and Grunert, 2014; Grunert, 2010; Parry *et al.*, 2004; Santos *et al.*, 2012; Schnettler *et al.*, 2015; Stojanovic *et al.*, 2013; Viana, 2013) follow this same line of reasoning, despite treating the issue in different ways according to the type of food and the fact that few of the authors focus on street food (Asiegbu *et al.*, 2016). Thus, in constructing the questionnaire for this latent variable, it was necessary to consider the theoretical bases of all of them and to adapt the questionnaire statements, when available, such as "I do not always think about food safety when I buy ready-to-eat food"

and "I'm sure I won't get ill when I eat ready-to-eat food" (Asiegbu *et al.*, 2016) or "I'm very concerned about how healthy the food is", "I eat what I like and do not worry about how healthy the food is", "How healthy the food is has little impact on my choices" (Viana, 2013).

In the same way as the other variables, the items for the variable "Quality" were developed based on different authors (Almeida *et al.*, 2014; Brunso *et al.*, 2002; Grunert, 2010; Ibáñez Casanova, 2013; Santos *et al.*, 2012; Tinoco and Ribeiro, 2008; Tiwari and Verma, 2008) that deal with the subject. As above, the items needed adaptation because of the inexistence of a scale adhering to the context of street food.

Data collection was carried out through a printed questionnaire, applied by interviewers specifically trained for this purpose, from January to February 2016. Respondents were approached at random and according to their willingness to respond to the interviewer at different times in working days, at arbitrarily selected locations, and which concentrate large number of people. No sampling technique was used to select the locations for data collection, but rather the bus terminals and the central region of the city of Diadema, in the State of São Paulo, since, at these locations, there is a significant presence of street food trade. During this process, characteristics such as gender, race and age were not determinant to select respondents.

The instrument of data collection included 15 statements accompanied by a Likert scale (1 = totally disagree; 7 = totally agree) that were designed to capture and evaluate respondents' opinions about the perception of quality and healthiness of the products, as well as service, organization and cleanliness of the point of sale (Vieira and Dalmoro, 2008). In addition, four questions were considered to qualify the profile of respondents who participated in the survey, questions related to the presence and circulation in the city, gender and schooling.

The questionnaire was submitted to five specialists, with PhDs in the area of administration and market professionals to guarantee the quality of the items developed. It was also presented to some potential respondents to ensure face validity (Nunnally and Bernstein, 1994).

A total of 603 responses were obtained, 302 related to the consumption of meat skewers and 301 to the consumption of tapioca, analyzed together in a single database. The responses concerning both products were not paired, i.e. those who responded to skewers did not respond to tapioca and vice versa, and the same questionnaire content was used for both (Hair *et al.*, 2009). Such precautions were taken because it is understood that the products studied are good representatives of the street food trade in Diadema and that, depending on the results obtained, the same collection tool may be expanded to other types of products. Meat skewers and tapioca have a high consumption in the city and can be considered good representatives of the street food consumed in the region (IPEPS, 2016).

According to Bentler and Chou (1987), to guarantee the minimum numerical representativeness and significance of the sample, a value equal to or greater than five respondents per questionnaire item is recommended. This ratio was applied in this study. There were a few missing data that were filled using the mean obtained for the item (Hair *et al.*, 2009).

The quantitative method involved descriptive statistical analysis, confirmatory factor analysis and structural equation modeling. All the calculations were performed using IBM SPSS Statistics 20.0 (descriptive analysis) and IBM SPSS Amos 22.0 software (confirmatory factor analysis and structural equation modeling).

To minimize the common method bias effect (Casaló *et al.*, 2010; Podsakoff *et al.*, 2000; Podsakoff and Organ, 1986) caused by using a single instrument of data collection, with all

information collected from the field at the same time, the following precautions were taken, called by Podsakoff *et al.* (2000) and Podsakoff and Organ (1986) as procedural methods:

- protection of the anonymity of the respondents, reducing their apprehension at the moment of answering; and

- assure respondents that there were no right or wrong answers and that they should answer the questions in the most honest way possible, because what was important was their opinion.

In addition, the collected data were tested for the common method variance to quantitatively verify the degree of risk that the common method bias would offer to the interpretation of the results found in the study (Podsakoff *et al.*, 2000; Podsakoff and Organ, 1986).

4. Results analysis
By observing the data in Table II, it is possible to verify that there is a certain balance between the respondents' gender and slightly more than 50 per cent of them have secondary or fundamental education, but almost a third chose not to answer the question about schooling. Almost 80 per cent of the respondents live in the city and just over three-quarters work or study in the city.

In the confirmatory factor analysis, the estimation of the measurement model involving the variables "Service", "Cleanliness", "Organization", "Quality" and "Healthiness" was done by the maximum likelihood methodology (Byrne, 2010; Marôco, 2014).

As far as normality is concerned, studies show that even data without a normal distribution may be acceptable as long as the ordinal element used in the data collection is greater than or equal to five points and the frequency distribution approaches a normal curve, giving a continuous character for the variables, without great distortions in the adjustment (Marôco, 2014). In addition, it is recommended that univariate kurtosis and

Residents in the city	Frequency	(%)
Yes	476	78.9
No	127	21.1
Total	603	100.0
Work or study in the city		
Yes	467	77.4
No	136	22.6
Total	603	100.0
Gender		
Female	318	52.7
Male	285	47.3
Total	603	100,0
Schooling		
Elementary school	56	9.3
High school	255	42.3
Degree	118	19.6
Post-degree	2	0.3
No response	172	28.5
Total	603	100.0

Table II.
Respondents' profile   **Source:** Elaborated by the authors

skewness measures (from each indicator) approach zero and are not higher, in magnitude, to 2 and 7, respectively (Marôco, 2014). The results of the univariate normality tests, as measured by the skewness (Sk) and kurtosis (Ku) parameters, indicated that none of the variables presented $|Sk| > 2$ and $|Ku| > 7$, so there is no extreme violation of normality.

After the evaluation of the normality assumptions, the measurement model (Figure 2) showed good indexes of adjustment quality, namely, $\chi^2 = 395.223_{(75)}$, $p < 0,001$, GFI = 0.917, NFI = 0.929, RFI = 0.900, IFI = 0.941, TLI = 0.917, CFI = 0.941, RMSEA = 0.084 (Byrne, 2010; Marôco, 2014). The correlations found between items of the same construct were incorporated into the model, improving their fit, not compromising the analyses performed (Byrne, 2010).

The evaluation of the measurement model was also made by analyzing the factor loadings of each item in its respective construct (factorial validity), composite reliability (CR) and average variance extracted (AVE – convergent validity) of each scale.

Table III shows the scales used with their items and respective factor loadings, their AVE and CR.

The CR evaluation showed that all the latent variables had values above the recommended value ($\geq$ 0,7), in the same way that all values of AVE were above the recommended limit ($\geq$ 0,5) (Byrne, 2010; Marôco, 2014).

Following the procedure suggested by Fornell and Larcker (1981), the discriminant validity of the scales is given by the comparison between AVE and the square of the
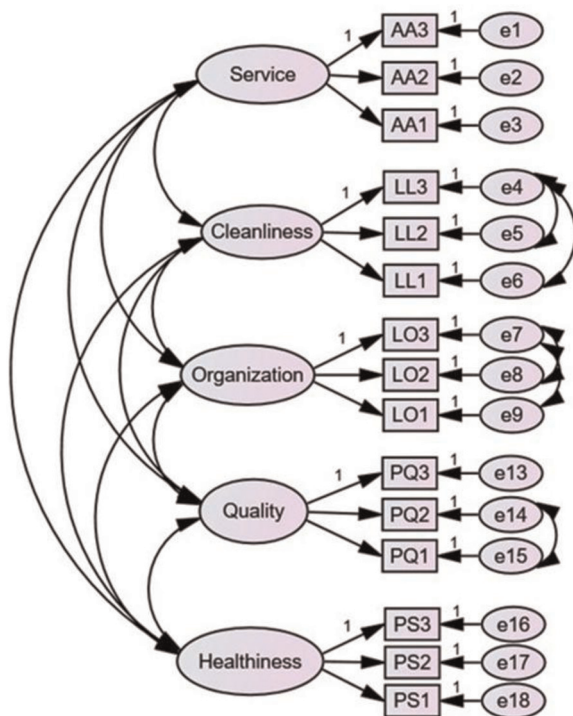
Source: Elaborated by the authors

Figure 2.
Measurement model

Variable	Item	Statement	Factor loading	AVE	CR
Quality	PQ1	The products are high quality	0.802	0.691	0.870
	PQ2	Raw materials used are from a reliable source	0.819		
	PQ3	The products are hygienically prepared	0.872		
Healthiness	PS1	The products are good for your health	0.826	0.689	0.869
	PS2	Food in the booths cannot cause illness	0.855		
	PS3	The food sold does not cause me harm	0.808		
Cleanliness	LL1	The booths are clean and sanitized	0.890	0.641	0.842
	LL2	The location of the booths is clean	0.755		
	LL3	The surroundings of booths are adequate for food trade	0.748		
Organization	LO1	The booths are organized	0.930	0.621	0.827
	LO2	The products sold in the booths are well arranged and presented	0.781		
	LO3	The products sold in the booths are well advertised	0.622		
Service	AA1	The vendors are kind and polite with customers	0.582	0.501	0.745
	AA2	The vendors handle money and food adequately	0.634		
	AA3	The vendors are clean and appropriately attired to sell food	0.873		

Source: Elaborated by the authors

Table III.
Confirmatory factor analysis

Pearson correlation for the latent variables (AVE must be higher than squared correlation). Table IV presents these data in which can be noticed that all squares of correlation are lower than the values of AVE, except for the correlations "Cleanliness – Service" and "Quality – Service" when compared to the AVE for "Service". These values were not discrepant to the point of invalidating the continuation of the study.

The scales met the requirements of factorial validity, CR, convergent validity and discriminant validity (Byrne, 2010; Marôco, 2014), making them valid for the study. Future studies dealing with the subject of street food and the constructs discussed here may benefit from these scales for their development.

To evaluate the sensitivity of the data collection toward the common method bias (de Almeida *et al.*, 2014; Podsakoff *et al.*, 2000; Podsakoff and Organ, 1986), the Harman's single-factor test was carried out, adapted to confirmatory factor analysis, to verify if a single latent factor would be responsible for all the indicators used. The test shows whether the variance generated by the common method, derived from systematic error, represents a

	Service	Cleanliness	Organization	Quality	Healthiness
Service	**0.501**				
Cleanliness	0.506	**0.641**			
Organization	0.317	0.610	**0.621**		
Quality	0.536	0.433	0.266	**0.691**	
Healthiness	0.301	0.362	0.271	0.520	**0.689**

Note: The value of calculated AVE are shown in bold and the others are the squared correlation
Source: Elaborated by the authors

Table IV.
Squared correlation between the latent variables and AVE

considerable risk to the analytical procedures developed (de Almeida *et al.*, 2014; Craighead *et al.*, 2011; Podsakoff *et al.*, 2000; Podsakoff and Organ, 1986).

In the test, a hypothetical single-factor model (common factor model) was compared to the five-factor model under study (Service, Cleanliness, Organization, Quality and Healthiness) by χ^2 difference and evaluation of adjustment quality indexes. Five-factor model had already presented the following data: $\chi^2 = 395.223_{(75)}$, $p < 0.001$, GFI = 0.917, NFI = 0.929, RFI = 0.900, IFI = 0.941, TLI = 0.917, CFI = 0.941, RMSEA = 0.084.

The unifatorial model was presented as a result $\chi^2 = 1375.610_{(85)}$, $p < 0.001$, GFI = 0.741, NFI = 0.751, RFI = 0.693, IFI = 0.763, TLI = 0.706, CFI = 0.762, RMSEA = 0.159. In addition to the adjustment quality indexes of this model being below the minimum recommendation of Byrne (2010) and Marôco (2014), the χ^2 difference test showed a significant difference between the two models ($\Delta\chi^2_{(10)} = 980.447 > \chi^2_{(critico)} = 18.307$, $p < 0.05$), indicating that the fit of the five-factor model is significantly better than the one-factor model, providing evidence of its robustness relative to the common method variance.

After the findings in the analysis of the measurement model, the analysis of the structural model for testing and validation of the proposed theoretical model was performed.

The initial theoretical model presented good adjustment quality [$\chi^2 = 395.223_{(75)}$, $p < 0.001$, GFI = 0.917, NFI = 0.929, RFI = 0.900, IFI = 0.941, TLI = 0.917, CFI = 0.941, RMSEA = 0.084] and the regression coefficients for the relationships between the variables "Service" and "Quality" ($\beta = 0.429$) and between "Healthiness" and "Quality" ($\beta = 0.433$) were significant ($p < 0.001$). However, the relations between the variables "Cleanliness" and "Quality" and between "Organization" and "Quality" were not significant.

Thus, *H1* and *H4* were accepted, corroborating Fontanillas *et al.* (2013) and Rossi *et al.* (2012) who demonstrate that the service received is essential in the customer's perception of quality and Viana (2013) who associates the perception of healthiness and the perception of quality of the product.

In turn, *H2* and *H3* were not confirmed, despite the existing literature providing favorable evidence to them. As such studies do not specifically focus on street food trade (Probst, 2008; Rheinländer *et al.*, 2008; Schroeder *et al.*, 2007; Van der Geest, 1998), there are opportunities for new studies on this topic.

The adoption of an specific theoretical model is appropriate to explain the relational structure of the data, but does not prove that the adopted model is the only one; it only demonstrates that the theoretical framework gathered is adequate for the data used, not excluding other theoretical models (Marôco, 2014). Thus, the relationship between the variable "Quality" and "Healthiness" – not totally clear in the researched literature (Asiegbu *et al.*, 2016; Chrysochou and Grunert, 2014; Grunert, 2010; Ibáñez Casanova, 2003; Santos *et al.*, 2012; Viana, 2013) – makes it necessary to challenge the theoretical model initially proposed. The competitive theoretical models proposed in face of the challenge present the variable "Healthiness" as mediator, consequent and intermediate between the antecedents (Service, Cleanliness and Organization) and Quality. The initial theoretical model, hereinafter referred to as Model 1, as well as its possible alternatives (Models 2, 3 and 4), are shown in Figure 3.

The four structural models presented good indexes of quality of adjustment (Byrne, 2010; Marôco, 2014), and their respective values are in Table V.

Despite the fit indicators found, χ^2 difference tests showed significant differences between Models 3 and 4 in relation to Model 1, the reference model. Model 3 in relation to Model 1 has a value of $\Delta\chi^2_{(1)} = 76.193 > \chi^2_{(critical)} = 3.841$ ($p < 0.05$) and Model 4 in relation to Model 1 has a value of $\Delta\chi^2_{(3)} = 119.025 > \chi^2_{(critical)} = 7.815$ ($p < 0.05$), indicating that
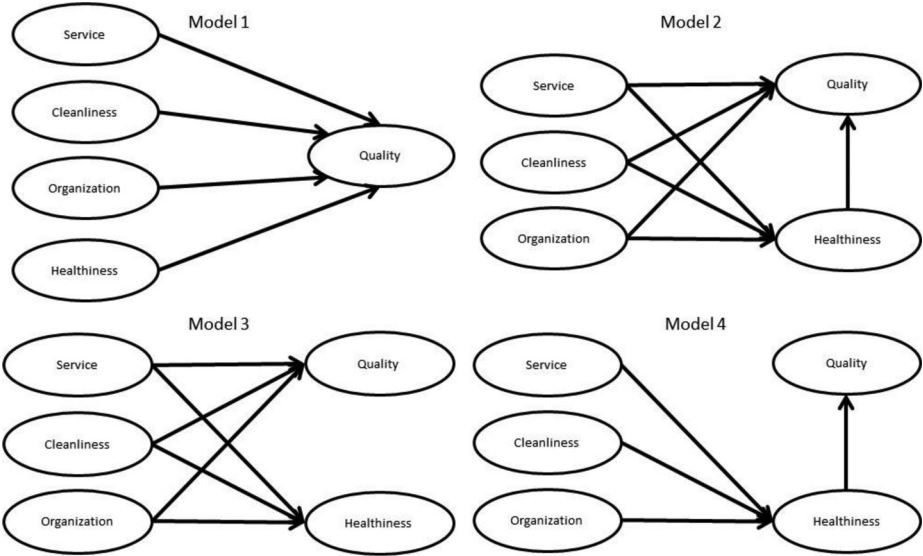
Figure 3.
Theoretical and
alternative structural
models

Source: Elaborated by the authors

Indexes	Critical value	Model 1	Model 2	Model 3	Model 4
χ^2	–	395.223	395.223	471.416	514.248
df	–	75	75	76	78
$\Delta\chi^{2\,i}$	–	–	0	76.193	119.025
Δdf^i	–	–	0	1	3
$\chi^2_{critical}$**	–	–	0	3.841	7.815
GFI	GFI > 0.9	0.917	0.917	0.903	0.896
NFI	NFI > 0.9	0.929	0.929	0.915	0.907
RFI	RFI > 0	0.900	0.900	0.882	0.875
IFI	IFI > 0.9	0.941	0.941	0.928	0.920
TLI	TLI > 0.9	0.917	0.917	0.899	0.892
CFI	CFI > 0.9	0.941	0.941	0.927	0.920
RMSEA	RMSEA < 0.1	0.084	0.084	0.093	0.096

Table V.
Fit indicators

Notes: ** $p < 0.05$; [i]Difference calculated related to the values in Model 1
Source: Elaborated by the authors

these models are worse than model 1. Such a procedure was not enough to show significant differences between Models 2 and 1, hence the need for more detailed analysis involving coefficients of determination (R^2) and regression (β).

Table VI shows that the regression coefficients between "Service" and "Quality" and between "Healthiness" and "Quality" (common to both models), are significant and of the same value, along with the coefficient of determination of "Quality". Because of the obtained coefficients, it is not possible to verify that Model 2 is better than Model 1, nor whether there is mediation of the construct "Healthiness" between the antecedents "Service", "Cleanliness"

|	Model 1	Model 2
β coefficients		
Service → Quality	0.429***	0.429***
Cleanliness → Quality	0.138	0,138
Organization → Quality	−0.059	−0.059
Service → Healthiness		0.243***
Cleanliness → Healthiness		0.332***
Organization → Healthiness		0.125
Healthiness → Quality	0.433***	0.433***
R^2 coefficients		
Healthiness		0.398
Quality	0.686	0.686

Note: ***$p < 0,001$
Source: Elaborated by the authors

and "Organization" and the consequent "Quality", making Model 1 the most appropriate because it is the most parsimonious.

By analyzing carefully in Model 2, the coefficients of regression between "Service" and "Healthiness" and between "Cleanliness" and "Healthiness" it is possible to verify statistical significance. These findings suggested a new challenge of Model 1 with Model 5, presented in Figure 4. This model was constructed from Models 1 and 2, considering the significant regression coefficients with the exclusion of the construct "Organization".

Model 5 presented good indexes of adjustment quality: $\chi^2 = 297.058_{(46)}$, $p < 0.001$, GFI = 0.925, NFI = 0.932, RFI = 0.902, IFI = 0.942, TLI = 0.916, CFI = 0.941, RMSEA = 0.095. The χ^2 difference test showed a significant difference of this model in relation to Model 1. Model 5 has in relation to Model 1 a module value of $\Delta\chi^2_{(29)} = 98.165 > \chi^2_{(critical)} = 42.557$ ($p < 0,05$) indicating that it is a better model in terms of adjustment.

Analyzing the regression coefficients of Model 5 (Table VII), it was verified that, in general terms, there was an improvement in the relations between the constructs, proving the result of the χ^2 difference test. The same occurred when the coefficients of determination are verified.
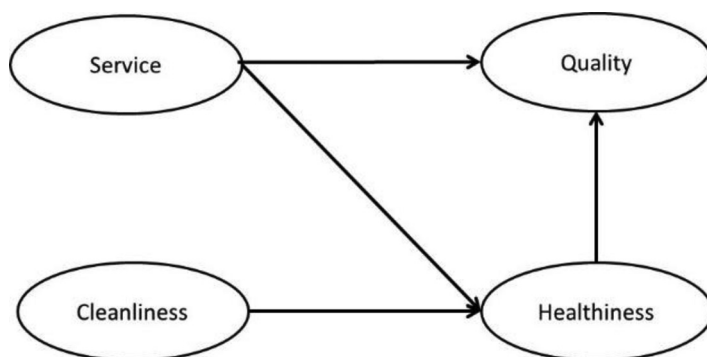
Source: Elaborated by the authors

Figure 4.
Final structural
model (Model 5)

Because of the challenges imposed on the model initially proposed, two other relationships were found that were not foreseen at the beginning of the study and could represent new hypotheses to be verified in future research.

As a final step, a multi-group test was carried out to verify the existence of difference in model 5 between the selected foods (meat skewer and tapioca). In structural equation modeling, multi-group models have options that categorize a given variable into two or more groups. Such models are considered multi-groups (Krull and MacKinnon, 1999) because they have variables of different natures that can differentiate them. As a result of the test performed, there was no significant difference between the meat skewer and tapioca groups, showing that a joint analysis of the two types of food did not compromise the findings.

5. Conclusion

The growth of the street food sector provides easy access to cheap food and new employment opportunities in the cities. Although this development is positive in many respects, it also presents new challenges in terms of public health for the urban population (Rheinländer *et al.*, 2008). Benny-Ollivierra and Badrie (2007) propose that street food vendors should receive training in safe practices. Training should include nutrition, food safety, risk analysis, critical control and preventive measures, environmental sanitation and personal hygiene.

In addition to specific health-related issues, such economic activity is subject to human perceptions, as any other in which there is a consumption relationship. This study sought to show the relation of some of these perceptions, trying to evaluate whether the perceptions of cleanliness and organization of the location, cleanliness and training of those who serve the public (service) and product healthiness constitute antecedents of perception of quality for street food.

The study concludes that the perception of service positively influences the perception of product quality, confirming Fontanillas *et al.* (2013) and Rossi *et al.* (2012), demonstrating that the service received is essential in the customers' perception of quality. In addition, it was possible to observe that the perception of healthiness positively influences the perception of product quality, corroborating Viana (2013) who associates the perception of healthiness and the perception of product quality.

Interestingly, it was not possible to demonstrate that both the perception of cleanliness and organization of the location positively influence the perception of product quality, contrary to what has been found in literature (Drechsel *et al.*, 2000; Probst, 2008; Rheinländer *et al.*, 2008; Schroeder *et al.*, 2007; Van Der Geest, 1998). It is

β coefficients	Model 5
Service → Quality	0.496***
Service → Healthiness	0.233***
Cleanliness → Healthiness	0.441***
Healthiness → Quality	0.449***
R^2 coefficients	
Healthiness	0.398
Quality	0.694

Note: ***$p < 0,001$
Source: Elaborated by the authors

Table VII.
Regression and determination coefficients - Model 5

worth remembering that the researched literature does not focus solely on street food trade, which may indicate that it has its own characteristics and that poor cleaning and organization are expected and that the service is more important along with the fact that the product is considered healthy.

Thus, street food vendors should focus their efforts on personal hygiene and training – both of which are related to the factor service in the research – and should portray the image of the products as healthy, since healthy products are associated with the quality of the product sold.

In a type of commerce that is characterized by massification and in which everyone is seen as equal, those who focus on consumer's needs the most will certainly be seen as different and better.

This research sought to work with street food, and for that purpose, two products were chosen: meat skewer and tapioca. Although such products are quite significant in the market of the researched city (Diadema), they do not represent the totality of street food commercialized and this can be seen as a limitation of the study, which proposed to be comprehensive enough to cover all kinds of street food.

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