

Sociodemographic and knowledge influence on attitudes towards food safety certification in restaurants

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Keywords

Catering, consumer education, consumer protection, food safety certification, food service, microbiological risk.

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doi: 10.1111/ijcs.12101

Abstract

Food safety certification can provide a level of assurance that restaurants attain satisfactory sanitary standards. Attitude is a possible predictor of behaviour and has been shown to vary according to consumer characteristics. The objective of this study was to identify consumer attitude with respect to the voluntary private certification of safety of restaurants. The relationship among attitude and consumer knowledge of safe practices to prevent microbiological contamination in restaurants and sociodemographic characteristics were also studied. The data were collected in the city of Campinas, Brazil in 2010, by interviewing 350 individuals using a survey instrument with two scales previously validated (attitude and knowledge) and sociodemographic questions. Attitude was measured using a 7-point response scale. Basic descriptive statistics and comparison tests were applied to the data using the software PASW, 18.0. The mean score of 5.3 indicates a positive attitude in respect to certification. The highest attitude scores were observed for the factor 5 (affect and inspection) and factor 4 (certification and consumer information). Comparing the scores, significant differences can be seen between total attitude and the age ranges ($P = 0.040$) and levels of knowledge ($P = 0.014$), individuals younger and with lower knowledge showing lower attitude scores. Higher knowledge was related to a more positive attitude score for factor 'certification substitutes'; and higher income and education level to a lower score for the 'importance of certification' factor. It is possible to stimulate both the development and promotion of restaurant certifications aimed at food safety.

Introduction

The increase of meals taken away from home is meaningful for different population segments (Instituto Brasileiro de Geografia e Estatística, 2010; Economic Research Service, 2012). Surveys from different countries show that the expenses with food consumed away from home are relevant (Instituto Brasileiro de Geografia e Estatística, 2010; Economic Research Service, 2012). In Brazil, the Household Budget Survey from 2008 to 2009 identified that 31% of food expenses were used in consumption away from home (Instituto Brasileiro de Geografia e Estatística, 2010). In the US, this percentage was 47.9 in 2010 (Economic Research Service, 2012).

Nevertheless, food safety problems in restaurants have raised concerns among consumers (De Jonge *et al.*, 2004, 2008; Choi *et al.*, 2010). These establishments are frequently indicated as locations where foodborne diseases occur, and among the main causes for this, one could cite the adoption of inadequate food production practices (Lynch *et al.*, 2003; Haapala and Probart, 2004; Almanza *et al.*, 2007; Rao *et al.*, 2007; Gurudasi and Sheth, 2009; Knight *et al.*, 2009).

Previous studies (Henson *et al.*, 2006; Fatimah *et al.*, 2010) suggested that consumers use food safety cues in restaurant

choice, such as observation of locale and staff hygiene. However, in the assessment of safety of a locale in eating out, consumers make mistakes because they sometimes use evaluation indicators not directly related to safety. In fact, restaurant choice occurs in the context of asymmetric information as the safety of food is, in general, an experience or credence characteristic for the consumer (Henson *et al.*, 2006; Fatimah *et al.*, 2010). Considering this situation of imperfect or asymmetric information, several tools have been used, including consumer education and certification (Caswell and Mojduska, 1996; Caswell, 2006; Fulponi, 2006; Moussa and Touzani, 2008). In this way, the safety certifications could help consumers in restaurant choices.

According to the United Nations Food and Agriculture Organization (Food and Agriculture Organization of the United Nations, 2006), certifications can be defined as processes by which third parties assure, by way of written documents, that a product or process conforms to an established standard. This standard varies according to the type of certification, and it may refer to food safety, origin and quality management, among others. Certification may be classified as compulsory, if regulated by law or decree by a regulatory organization; and voluntary, if not being regulated by an official organization (Henson, 2006).

Attitude can be considered as an important tool in understanding the behaviour of individuals (Gedrich, 2003). Authors have stated that knowledge, attitude and behaviour are interconnecting phenomena, such that a change in knowledge can cause changes in attitude and behaviour (Mueller, 1986; Medeiros *et al.*, 2004; Wilcock *et al.*, 2004).

Several studies regarding consumer attitude or opinion relative to food safety have been undertaken (Wilcock *et al.*, 2004). Among them, attitudes regarding certifications, such as Hazard Analysis and Critical Control Points (HACCP), International Organization for Standardization (ISO) 14000 (Arvanitoyannis *et al.*, 2003), organic and free form Genetically Modified Organism certifications (Bottonaki *et al.*, 2006; Kikulwe *et al.*, 2011; Tsourgiannis *et al.*, 2011) and meat certification (Krystallis *et al.*, 2007; Velho *et al.*, 2009) were studied. The majority of these studies observed a positive attitude or opinion of consumers regarding certification.

Characteristics of consumers, such as age, sex, education, income and health or food safety knowledge have been shown to influence attitudes regarding food safety and various food-related certifications (Angelillo *et al.*, 2001; Rimal *et al.*, 2001; Arvanitoyannis *et al.*, 2003; Knight and Warland, 2004; Wilcock *et al.*, 2004; Kennedy *et al.*, 2008; Tobin *et al.*, 2012).

However, no surveys specifically measuring consumer attitude in relation to voluntary certifications in restaurants were found in a review of the literature. Thus, based on the above, the objective of this study was to identify consumer attitude with respect to voluntary private certification of food safety in restaurants. Additionally, the relationship among attitude and consumer knowledge of the safe practices to prevent microbiological contamination in restaurants and consumer sociodemographic characteristics were studied.

Material and methods

Sample and data collection

The survey was carried out in the city of Campinas (State of São Paulo, Brazil), which covers an area of 796 km² with a demographic density of 1358.03 inhabitants per km². It has a population of 1 080 999 inhabitants, of which 521 209 are men and 559 790 are women, with an annual growth of 2.89% (Instituto Brasileiro de Geografia e Estatística, 2011; Sistema Estadual de Análises de Dados, 2011). In 2010, the municipality showed an urbanization rate of 98.28%, integrating one of the most developed regions in Brazil in terms of per capita income, human development index and industrial and economic representation (Sistema Estadual de Análises de Dados, 2011).

The sample was non-probabilistic and included 350 adult individuals (all over 18, of both sexes and resident in the city of Campinas). We included in the sample those who ate meals away from home. In addition, an equivalent number of men and women were selected because of the presupposition that differences exist between the genders with respect to their knowledge or attitudes. Additionally, only subjects who had heard of quality certifications were interviewed.

Cross-sectional data were collected in consumer interviews (face-to-face) in a bus terminal and in a shopping mall that were

chosen because of the intense circulation of individuals and because of the ease of obtaining authorization to carry out the interviews. The interviews were performed between the months of April and June of 2010 by the first author of the paper and by undergraduate students of the Faculty of Food Engineering of the University of Campinas (UNICAMP), duly trained according to the 'Interviewer's Manual'. Individuals were approached in a non-systematic way by the interviewers. To clearly specify the studied attitude object, a brief explanation about food safety certification in restaurants was provided to consumers at the beginning of the interview.

The research protocol was submitted to and approved by the Ethics Committee for Research with Human Beings of the Faculty of Medical Sciences/UNICAMP (Protocol number 1062/2008). The participating consumers signed a 'free and enlightened consent form' approved by the above-mentioned committee.

Questionnaire

A scale to measure consumer attitude with respect to voluntary safety certification in commercial restaurants, which presented adequate indicators for validity (content and construct validity) and reliability, developed by Uggioni and Salay (2012a), was used. This attitude scale (Likert type) was composed of 24 items (14 positive and 10 negative) that were grouped in five factors, named: (1) Certification and food safety; (2) Certification substitutes; (3) Importance of certification; (4) Certification and consumer information; and (5) Affect and inspection. Factor 1 involves items related to food safety assurance, such as 'Restaurant certification guarantees a constant standard of quality in the food served'. Factor 2 includes statements about activities that could substitute certification, for example: 'Observation of the restaurant hygiene conditions is sufficient to determine if the place offers safe meals, not requiring certification'. Factor 3 aggregates items related to the importance of certification, such as 'The certification of restaurants is necessary'. Factor 4 involves statements about the certification as a tool to inform consumers, for example: 'The certificates displayed in restaurants are a good way of informing the consumer about food safety'. Factor 5 presented only two items: 'I like certified restaurants' and 'To maintain their certification, the restaurants should submit to rigorous inspection with respect to food safety'. A more detailed explanation of the attitude scale is reported by Uggioni and Salay (2012a). The interviewees expressed their degree of agreement or disagreement with the statements using a 7-point scale (7 = agree a lot; 6 = agree moderately; 5 = agree slightly; 4 = neither agree nor disagree; 3 = disagree slightly; 2 = disagree moderately; 1 = disagree a lot). The total score for the attitude of each interviewee was obtained by adding up the scores obtained for each response and then dividing this total by the number of questions. For the negative items, the scores were computed inversely.

To analyse consumer knowledge with respect to safe practices to prevent microbiological contamination in restaurants, another scale, also validated, was used (Uggioni and Salay, 2013). This subject dealt with items related to the buying and storage of foods, on their pre-preparation and preparation and their distribution, also including items referring to the hygiene of the handlers, of the installations and of the utensils (23 multiple choice items). The total score for the knowledge of each individual was composed of

the sum of the right answers for the 23 questions of the instrument, in which a right answer was scored as equal to 1 and a wrong answer equal to 0. The scores were converted into a grade varying from 0 to 10 (Uggioni and Salay, 2013).

The questionnaire also included information related to the sociodemographic characterization, covering items such as age, gender, monthly family income and educational level of the consumers, as also education in an area of health.

Data analysis

The software Predictive Analytics Software (PASW Statistics) version 2010.18.0 (SPSS Inc., Chicago, IL, USA) and XLSTAT version 2006.06 (Addinsoft Inc., New York, NY, USA) were used to group and analyse the data.

The normality of the distribution of the variables was carried out by way of the Kolmogorov–Smirnov (KS) test, for which the decision was made between parametric [analysis of variance (ANOVA) and *t*-test] and non-parametric (Kruskal–Wallis followed by Dunn's paired multiple comparison and Mann–Whitney) tests.

The data obtained from the Likert scale developed, referring to the attitude of the consumer with respect to certification, and the sociodemographic data were analysed by way of basic descriptive statistics. ANOVA, the *t*-test and the Mann–Whitney test were used to verify significant differences ($P \leq 0.05$) between the groups of individuals interviewed.

The data on knowledge were analysed using basic descriptive statistics, and ANOVA and the *t*-test were used to verify the significant differences ($P \leq 0.05$) between the groups of individuals interviewed.

Results

Consumer characterization

With respect to age, 73.5% of the sample declared they were between 18 and 39. The majority of the consumers (72.9%) had completed high school or higher educational levels. With respect to monthly income, 56% reported having an income of up to 10 times the minimum salary and 16.0% having no income to up to two times the minimum salary. Education in an area of health was reported by 13.7% of the sample (Table 1).

Attitude with respect to the voluntary private certification of restaurant

The data followed a normal distribution for the attitude factors 1 (KS = 0.042; $P = 0.142$) and 2 (KS = 0.031; $P > 0.150$) and for the general attitude score (KS = 0.033; $P > 0.150$), so parametric tests were used to compare variables (test *t* de Student and ANOVA). However, for the attitude factors 3 (KS = 0.087; $P < 0.010$), 4 (KS = 0.146; $P < 0.010$) and 5 (KS = 0.157; $P < 0.010$), as the data did not follow a normal distribution, the non-parametric Kruskal–Wallis test followed by Dunn's paired multiple comparison and Mann–Whitney test were applied.

The mean score for consumer total attitude was 5.3, indicating a positive attitude towards voluntary certification of safety in restaurants. Regarding the factors, the highest attitude scores were

Table 1 Sociodemographic characteristics of respondents ($n = 350$), Campinas, Brazil, 2010

Characteristics		<i>n</i>	%
Gender	Masculine	175	50
	Feminine	175	50
Educational level	Basic/incomplete high school	41	11.7
	Complete high school	94	26.9
	Incomplete graduation	94	26.9
	Complete graduation	67	19.1
	Post-graduation	54	15.4
Monthly family income ^a	No income/up to 2 MS	56	16.0
	From 2 to 5 MS	70	20.0
	From 5 to 10 MS	70	20.0
	From 10 to 15 MS	29	8.3
	More than 15 MS	41	11.7
Age (years)	18–24	127	36.3
	25–39	130	37.2
	40–50	53	15.1
	More than 50	40	11.4
Education in the area of health	Yes	48	13.7
	No	302	86.3

^aMS, minimum salary (1 MS = R\$ 510 at the time of the survey).

observed for factor 5 (affect and inspection) and factor 4 (certification and consumer information) (Table 2).

Comparing the scores for attitude (of the whole scale), significant differences were not found between the gender ($P = 0.353$), education in the area of health ($P = 0.240$), educational level ($P = 0.105$) or family income ($P = 0.539$). Significant difference ($P = 0.04$) was found between the age ranges; the attitude of subjects below the age of 24 was significantly lower, or less positive, than subjects in the age range from 40 to 50 (Table 3).

On analysing the scores for the factors, significant difference was found between the genders ($P = 0.001$) for factor 2. In this case the attitude of the male consumers was significantly inferior to that of the female consumers. The score for the factor 2 of the consumers graduated in the area of health was significantly superior ($P = 0.011$) to that of the individuals who had not.

With respect to educational level, significant differences were found for factors 2 ($P = 0.003$) and 3 ($P = 0.011$). For factor 2, the consumers with the lowest educational level (basic/incomplete high school) showed a significantly inferior attitude to consumers with a higher educational level (complete graduation), who presented greater disagreement with 'certification substitutes'. For factor 3, it can be seen that consumers with complete high school indicated more agreement with 'the importance of certification' than consumers with incomplete graduation or post-graduation.

With respect to monthly family income, significant difference was observed for factor 3 ($P = 0.006$), for which the attitude of consumers with incomes of up to two minimum salaries was significantly superior to that of those with higher incomes.

For the age ranges, significant differences were found for factors 1 ($P = 0.001$), 3 ($P = 0.001$) and 5 ($P = 0.007$), for which the attitude of those younger than 24 was significantly inferior to that of the older consumers.

On analysing the scores for total attitude with respect to the level of consumer knowledge concerning safe practices to prevent microbiological contamination, a significant difference was found

Table 2 Descriptive statistics of consumer attitude with respect to voluntary certification for food safety in restaurants, ($n = 350$), Campinas, Brazil, 2010

Attitude factor ^a	Mean ^b	Standard deviation	First quartile	Median	Third quartile
Factor 1: Certification and food safety	5.3	1.0	4.6	5.3	6.0
Factor 2: Certification substitutes	4.5	1.2	3.6	4.5	5.4
Factor 3: Importance of certification	5.6	1.2	5.0	6.0	6.7
Factor 4: Certification and consumer information	6.2	0.9	5.7	6.7	7.0
Factor 5: Affect and inspection	6.4	0.9	5.6	7.0	7.0
Total	5.3	0.7	3.1	5.3	7.0

^aAn explanation about the attitude factors is reported by Uggioni and Salay (2012a).

^bThe mean score for attitude could range from 1 ("disagree a lot") to 7 ("agree a lot") and the score for negative items were reverted to calculate means.

($P = 0.014$). The attitude of interviewees with greater knowledge (scores above 5 on a scale from 0 to 10) was significantly superior to the scores of individuals with less knowledge (scores below 5) (Table 3). On analysing per factor, a significant difference was only found for factor 2 ($P = 0.002$) (Table 4).

Discussion

The present study confirms the findings of other papers regarding attitude or opinion of consumers with respect to food safety or other types of certification. That is, in general, observed a favourable attitude or opinion regarding to certification. For example, Arvanitoyannis *et al.* (2003) studied a consumer sample in Thessalonica, Greece and concluded that 70% were aware of the HACCP and ISO 14000 certifications. However, the concern with these was relatively low when compared with organic production certification.

A survey carried out by the Food Standards Agency (2010) indicated that consumers were quite concerned about the standards of hygiene in the places they go to, and among the indicators showing conformity to these standards was the presence of certificates attesting to the hygiene in restaurants (indicated by 30% of the sample). Nevertheless, the survey showed that observation of the hygiene of the place and of the workers was considered an important indicator by the consumers, with percentages of 73% and 59%, respectively (Food Standards Agency, 2010).

Van Ittersum *et al.* (2007) concluded that consumers from three countries in Europe appreciated the certificates of origin for regional products. However, Krystallis *et al.* (2007) perceived that Greek consumers attributed greater value to the 'visual' quality of the meat or to the confidence of local producers, rather than to quality certifications.

As a counterpart, the survey carried out by Velho *et al.* (2009) in Porto Alegre, Brazil showed that 88.7% of the sample considered the certification of bovine meat to be important. However, the authors observed that a significant percentage did not know what certification was. Henson *et al.* (2006) suggested that consumers may have a limited understanding of official inspection certificates, as they rarely take these certificates into consideration to evaluate the safety of restaurants.

Despite not including a well-defined set of items, factor 5 (affect and inspection) showed a high score in evaluating the attitude of the sample. From this factor, the statement 'I like certified restaurants' received a high score of 6.4. Peters and Slovic (2007)

reported that the affective component of attitude is an important predictor of behaviour.

The attitude score for the factor 4 (certification and consumer information) was also one of the highest on the scale. This result corroborated with one of the objectives of certification most directly connected with the consumer, that of informing him about the attributes of quality.

At the opposite end, the lowest attitude scores were identified for the factor titled 'certification substitutes'. One explanation for this is that consumers use other information clues to analyse the safety of restaurants, such as the local hygiene or the possibility of visiting the kitchen (Fatimah *et al.*, 2010; Sienny and Serli, 2010; Sanches and Salay, 2011).

The results of the present survey agree with those of other studies with respect to the influence of sociodemographic characteristics on consumer attitude. The authors indicated that in general, better educated, older and female individuals show a more positive attitude with respect to both food safety and the various certifications (Angelillo *et al.*, 2001; Arvanitoyannis *et al.*, 2003; Wilcock *et al.*, 2004; Kennedy *et al.*, 2008).

As in the present survey, Angelillo *et al.* (2001) emphasized an increase in age as a factor related to a more positive attitude. Perhaps the lower attitude is related to lower risk perception and food safety knowledge of younger individuals (Patil *et al.*, 2005; Sanlier, 2009; Uggioni and Salay, 2012b).

One interesting result that should be highlighted is that, to the contrary of the literature, for factor 3 ('importance of certification') the consumers with a lower educational level and lower incomes (completed high school and income of up to two times the minimum salary) indicated more positive attitudes than better-educated consumers. This may have occurred because this group of consumers believes it has difficulty in evaluating food safety in restaurants.

With respect to the influence of graduating in the area of health on consumer attitude, Sharif and Al-Malki (2010) studied the attitude, knowledge and practices of university students with respect to food contamination. The results showed that male students in the area of health presented higher scores when compared with male students in the area of humanities. Along the same lines, Stonerook *et al.* (1999), on analysing the attitude and knowledge of food service managers, observed that those who graduated in nutrition obtained higher scores than those who graduated in other areas.

Consumer's lack of knowledge results in lower attitude levels, as found by other studies and confirmed by the case studied in

Table 3 Comparison summary results of consumer attitudes regarding voluntary certification for food safety in restaurants, according to sociodemographic characteristics ($n = 350$), Campinas, Brazil, 2010

Variables	Factor				
	1	2	3	4	5
Total attitude ^a	- ^c				
Gender	-	Female > Male $P = 0.001^{**}$	-	-	-
Educational level	-	Post-graduation; Incomplete graduation; Complete high school > ^d Basic/incomplete high school $P = 0.003^{**}$	Complete high school > Incomplete graduation; Post-graduation $P < 0.001^{***}$	-	-
Monthly family income ^b	-	-	-	No income/ up to two MS > From 10 to 15 MS; More than 15 MS $P = 0.006^{**}$	-
Age	40-50 > 18-24 years $P = 0.040^*$	25-39; 40-50; more than 50 > 18-24 years $P = 0.001^{**}$	more than 50; 40-50 > 18-24 years $P = 0.001^{**}$	-	40-50 > 18-24 years $P = 0.007^{**}$
Education in the area of health	-	Yes > No $P = 0.011^*$	-	-	-

*Significant at the 5% level; **Significant at the 1% level; ***Significant at the 0.1% level.

^aFor total attitude and factors 1 and 2, the *t*-test and ANOVA were used. For the attitude factors 3, 4 and 5, the Mann-Whitney test and Kruskal-Wallis test followed by Dunn's paired multiple comparison and were applied.

^bMS = Minimum Salary (1 MS = R\$ 510.00 at the time of the survey).

^c(-) non significant.

^dThe symbol superior or inferior means that the comparison showed a significant superior or inferior attitude score.

Table 4 Descriptive statistics and results for the comparison between the groups with different levels of knowledge with respect to total attitude and attitude per factor ($n = 350$), Campinas, Brazil, 2010

Attitude and factors	Level of knowledge ^{a,b}	Mean	Standard deviation	P-value
Total attitude	Lower	5.2	0.7	0.014*
	Higher	5.3	0.8	
1	Lower	5.2	0.9	0.256
	Higher	5.3	1.0	
2	Lower	4.3	1.2	0.002**
	Higher	4.7	1.2	
3	Lower	5.6	1.1	0.077
	Higher	5.7	1.3	
4	Lower	6.2	0.9	0.356
	Higher	6.2	1.0	
5	Lower	6.4	0.8	0.718
	Higher	6.3	0.9	

*Significant at the 5% level; **Significant at the 1% level.

^aMore knowledge: scores equal or above 5 (0 to 10); less knowledge: scores below 5 (0 to 10).

^bLower knowledge $n = 169$; Higher knowledge $n = 181$.

present research (Saba and Vassallo, 2002; Costa-Font *et al.*, 2008; Teisl *et al.*, 2009; Tsourgiannis *et al.*, 2011). Toh and Birchenough (2000) evaluated the impact of culture and ambient on the attitude and knowledge of handlers in relation to food safety. The authors found a positive correlation between these two variables and reinforced the importance of education in forming attitudes. Angelillo *et al.* (2001), studying Italian consumers, found that an increase in educational level can be considered as a strong indicator of knowledge and a positive attitude in relation to food safety.

One of the limitations of this survey was the use of a non-probabilistic sample, which made it impossible to extrapolate the results to the entire population. It is suggested that new studies should be carried out with larger consumer samples.

Conclusions

This study showed that in general, the interviewed consumers presented a positive attitude with respect to voluntary private certifications of safety in restaurants. A positive attitude can eventually lead to positive behaviour regarding certified restaurant choice.

The present study also highlighted that the most relevant factors for this positive attitude were related to affect, inspections and consumer information. All the studied consumer characteristics have shown to interfere in attitude scores. However, it stands that generally younger individuals showed a less positive attitude. Also, higher knowledge (measured as level of higher education, knowledge of safe practices to prevent microbiological contamination in restaurants and education in health) was related to a more positive score for the attitude factor 'certification substitutes'. Individuals with higher income and education levels showed lower scores for the 'importance of certification' factor. Also, only age and knowledge regarding safe practices to prevent microbiological contamination in restaurants were related to total attitude scores.

Thus with information on positive consumer attitudes, it is possible to design actions to stimulate the development and promotion of certifications which can lead to improvements in the safety of food offered in restaurants.

Acknowledgements

The authors are grateful to the São Paulo Research Foundation (FAPESP) for providing funding for this research (Process 09/52215-5), to the National Council for Scientific and Technological Development (CNPq) for providing a fellowship to the first author (Process 141856/2007-6).

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