

**Green food consumption in China: segmentation based on attitudes
towards food safety**

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Abstract

The prevalence of food scares in China has led to acute, public concern with food safety. This has led to demand for both certified organic and green food, a segment that refers to pesticide-reduced food. The objectives of this paper are twofold; firstly, to examine the demographic factors that drive demand for green food, and secondly, to segment Chinese consumers based on their attitudes towards food safety. An online survey was used to collect consumer behaviour information. A total of 402 responses were obtained covering 24 provinces and municipalities in China. Binary probit analysis, ANOVA analysis, and cluster analysis are used in this paper. Income, education, age, gender, presence of young children, household size and overseas experience are variables that have an impact on green food purchase. Young, wealthy males, who have young children and live in a small household, are likely to buy green food. The survey shows that Chinese consumers are willing to pay a price premium for green food; however price will be a major factor restricting the growth of the green food label in China, given market prices. Three segments, the “distrustful consumer”, the “ambivalent” and the “trusting consumer” are identified for market segmentation purposes. Market segmentation, based on attitudes, was found to be related to green food purchase. The contribution of the paper includes identifying the determinants of green food purchase and providing some insights into market segmentation. A key task for actors involved in the food supply chain in China is to provide more information to consumers on food safety and the green label. Avenues for future research are outlined in the paper.

Keywords: food safety, green food market, China, factors influencing green food purchase, probit/logit model.

Introduction

Frequent food scares and the widespread use of pesticides in Chinese agriculture has led to the expansion of the green food market in China. The “green food” brand is popular and readily available in China (Zhou et al., 2004). Green food refers to a certification scheme that is unique to China and it is comparable to, but differs from, organic products (Marchesini, Hasimu and Spadoni, 2010). The label (see Figure 1) refers to the “controlled and limited use of synthesized fertiliser, pesticide, growth regulator, livestock and poultry feed additive and gene engineering technology” (Liu, Pieniak and Verbeke, 2013:94). The primary driver of demand for green food is the lack of confidence in the safety and quality of Chinese produce (Morgan and Wright, 2014), along with improvement in living standards and the expansion of the middle class (Zhang & Han, 2009; Zhong & Yi, 2010; Sun & Mu, 2012). The prevalence of food safety scandals, such as the outbreak of the melamine food scandal in the dairy industry (Geng, Trienekens & Wubben, 2013), had led the Chinese central government to strongly support the green food market. Although China has plenty food safety regulations, enforcement is weak. Developing countries like China are said to lack the institutional and technical resources to rigorously monitor and enforce food safety standards (Jin, Lin & Yao, 2011). From a marketing perspective, it is critical to understand consumers, their needs, attitudes and behaviours. Although the literature on green food is expanding, market segmentation studies are rare. The purpose of this paper is to: (1) examine how the green food market can be segmented based on behavioural and demographic bases, and (2) to identify the determinants of green food purchase. This study contributes to the growing body of research on green food consumption in China.



Figure 1: Chinese Green Food Certification Sign (A Level)

The number of studies conducted on Chinese consumers and green food is small but growing. Liu, Pieniak and Verbeke (2013) have provided a review of the literature on safe food, focusing on consumer attitudes and behaviour, such as purchase intent and willingness to pay. Their findings show that Chinese consumers have high awareness of safe food, but limited knowledge about safe food. Despite this, attitudes towards safe food are positive and Chinese consumers are willing to pay more for safe food. There is strong support for demographic profiling in these studies. Chinese studies show that gender, age, family size and average household income per year, are the main socio-economic factors influencing willingness to pay for green food (Xia & Zeng, 2007; Xia & Zeng, 2008). Market segmentation studies on the organic food market are very common in well developed markets (Chen, 2010; Gil, Gracia and Sanchez, 2000). Very few studies have sought to segment the Chinese green food market, apart from one segmentation study on organic food consumers based on lifestyle (Lobo and Chen, 2012), a study on genetically modified food (Zhang et al., 2010) and segmentation studies of the food market in general (Zhang et al., 2008). This study adds to the literature on green food by investigating whether segments exist based on attitudes towards food safety.

Research Design

The population of interest was consumers of green food in urban China. The survey instrument was originally developed in English and translated into Chinese. The survey contained a section on socio-demographic information and it covered purchase motivations, sources of information used in decision-making, outlets used to buy food, willingness to pay a premium for green food and consumer attitudes towards food safety. The survey was pilot tested on a convenience sample. Based on feedback from the participants, some questions were reworded to avoid ambiguity.

An online and paper-based survey was conducted in 2014. The internet was used to save time and money and access a large number of participants (Sue and Ritter, 2007). It was seen as appropriate since China's usage rate of the internet is growing rapidly and it is a good way of recruiting the educated and affluent segments of Chinese society (McKinsey Global Institute, 2013). The survey was promoted by a major online wine merchant. After examining the preliminary results, student researchers were asked to target older consumers in an attempt to achieve a more balanced sample in terms of age. A total of 402 consumers responded to the survey.

The survey was informed by the literature. A series of 10 statements were used to evaluate attitudes towards safety. The scale was adapted from Chen (2010) and previously validated by Knight and Warland (2005) and Henson and Traill (2000). The components attributed to food safety were channel of distribution and origin (i.e., imported food brands can be trusted, food consumed in restaurants can be trusted, food sold in supermarkets can be trusted, food sold in farmer's markets can be trusted; Chinese food brands can be trusted); government-oriented (green-labelled foods that are inspected and checked by the Chinese government can be trusted; I trust the government to ensure that the level of pesticide residues in food is safe); food processing related (I am satisfied that the additives in food today are not harmful to my health) and personal opinion on overall food safety (food is not as safe as it used to be; I am not provided with enough information to judge properly whether food is safe or not). The respondents were asked to rate this set of variables on a 5-point Likert scale (1= strongly disagree and 5= strongly agree). It must be noted that this survey measured general attitudes towards food safety and not specific attitudes, such as attitudes towards a particular behaviour (see Ajzen, 1991).

The logit/probit model

Modelling is used to understand, explain, and predict the choices that are made. To do so, one can create an economic model of utility derived from the choice of each alternative. Generally, a single equation limited dependent variable model such as the probit or Logit model may be summarised by the following equation. Utility is derived from the selection of an alternative j ($j = 1,0$) by the individual i ($i = 1, \dots, t$) and that choice is a function of the attributes (e.g., price, quality) of that alternative to the individual, and the characteristics (e.g., income, educational attainment, presence of young kids) of the individual. The binary probit/logit model is used for explaining a dichotomous, dependent variable with the empirical specification formulated in terms of a latent-response variable. It has been widely used in diverse fields; originally in toxicology, and now it has gained popularity in econometric analyses (Maddala 1983; Ben-Akiva and Lerman, 1985). In this study, the dependent variable may take on only two values to indicate whether a consumer wants to buy organic food or not.

In the binary model, we assume that the decision of the i th household consumer to buy green food or not depends on an unobserved utility index I_i (threshold) that is determined by explanatory variables in such a way that the larger the value of the index I_i , the greater the probability of the household buying green food (P_i). Let us define the index I_i as

$$I_i = x_i' \beta + \mu_i \quad \dots (1)$$

In practice, I_i is unobservable. If the threshold is set to zero (in fact, the choice of a threshold value is irrelevant, as long as a constant term is included in x_i), what we can observe is a dummy variable y_i ,

$$\begin{aligned} y_i &= 1 && \text{if } I_i > 0 \\ y_i &= 0 && \text{otherwise} \end{aligned} \quad \dots (2)$$

To capture the relationship between I_i and P_i , we model the probability of observing the values of one and zero as

$$\begin{aligned} \Pr(y_i = 1 | x_i; \beta) &= \Pr(I_i > 0) = 1 - F_{\mu_i}(-x_i' \beta) \\ \Pr(y_i = 0 | x_i; \beta) &= F_{\mu_i}(-x_i' \beta) \end{aligned} \quad \dots (3)$$

F_{μ_i} is the cumulative distribution function (CDF) of μ_i , which takes a real value and returns a value ranging from zero to one. In the probit model, μ_i in the regression of latent dependent variables follows a standard normal distribution. In the logit model, μ_i in the regression of latent dependent variables follows a logistic distribution.

Given a sample of n observations, a likelihood function (4) can be developed from the above design and maximised with respect to β in order to obtain the maximum likelihood estimates (MLE) $\hat{\beta}$ (Maddala, 1983). The likelihood function is given by

$$l(\beta) = \log L(\beta) = \sum_{i=0}^n y_i \log(1 - F(-x_i' \beta)) + (1 - y_i) \log F(-x_i \beta) \quad \dots (4)$$

Probit regression is an approach to handle categorical dependent variables, which is based on a rational choice perspective on behaviour (Green, 2002). It consists of observable independent variables and unknown parameters. Values of unknown parameters are estimated from a sample of observed choices made by decision makers when they are confronted with a choice situation.

Findings

The following section offers a demographic profile of the sample, reports on the drivers and barriers to purchase of green food, willingness to pay, purchase motivations, interest in green food, clusters based on attitudes towards food safety, and finally, results from the probit/logit model are described.

Description of sample

Approximately one third of the sample (36%) is a self-reported buyer of green food. Table 1 offers a demographic profile of the sample and Table 2 describes the sample according to location, such as city tiers. There is a female bias with 60% females and 40% males. This may be due to fact that women are more interested in the topic than men. Most respondents were young, with 62.2% of respondents in the 26-45 year age bracket. Main occupations cited were administrative/clerical (35%), teacher/researcher (16.9%), university student (17.4%), public servant (8.7%) and businessperson (8.2%). The majority of respondents were married (80%) and most respondents (68%) had a child. Household income was relatively high, with 24.1% of the sample earning between \$1,732 and \$3,464 a month (6 to 10,000 RMB). The respondents were well educated, with 42.3% having an undergraduate degree. Analysis of location showed that respondents came from diverse regions in mainland China, tier 1 cities, the regional capital cities and non-capital cities. Family income was higher in tier 1 cities, number of years spent in education was higher and average age was lower. Despite the one child policy, the Chinese culture of living with the extended family means average household size (3.45 persons) is much higher than Australia (see Table 2). Market reports show that wealth is concentrated in the tier 1 cities of Shanghai, Beijing and

Guangzhou and the top third (approximately 20 million people) have spending power that is similar to average Australians (Morgan and Wright, 2014).

Table 1: Summary of findings on demographics

Variable		Responses	Percentage
Gender (n=402)	Male	161	40%
	Female	241	60%
Age (n=402)	Below 18	6	1.5%
	18 - 25	82	20.4%
	26 - 35	125	31.1%
	36 - 45	125	31.1%
	46 - 55	39	9.7%
	56 and over	25	6.2%
	Married (n=402)	Yes	322
No		80	20%
Children (n=402)	No children	48	11.9%
	Young children – aged below 12	176	43.8%
	Older children – aged 12 and over	98	24.4%
Household Income Per Month (n= 402)	Less than 3000 RMB	25	6.2%
	3,001 to 6,000 RMB	82	20.4%
	6,001 to 10,000 RMB	97	24.1%
	10,001 to 20,000 RMB	89	22.1%
	20,001 to 30,000 RMB	68	16.9%
	30,001 to 50,000 RMB	32	8%
	More than 50,000 RMB	9	2.2%
Education (n=402)	Senior High School or below	26	6.5%
	Technical and/or Vocational School	24	6%
	Junior colleges	81	20.1%
	Undergraduate	170	42.3%
	Post-graduate	101	25.1%

Occupation (n=402)	Company staff/clerical	141	35.1%
	Public servant	35	8.7%
	Business person	33	8.2%
	University student	70	17.4%
	Military	4	1%
	Doctor	3	0.7%
	Teacher and/or researcher	68	16.9%
	Labourer & related	13	3.2%
	Home duties	12	3%
	Retired	16	4%
	Other	7	1.7%

Note: approximately 1 Chinese Yuan/Renminbi = 0.1732 AUD.

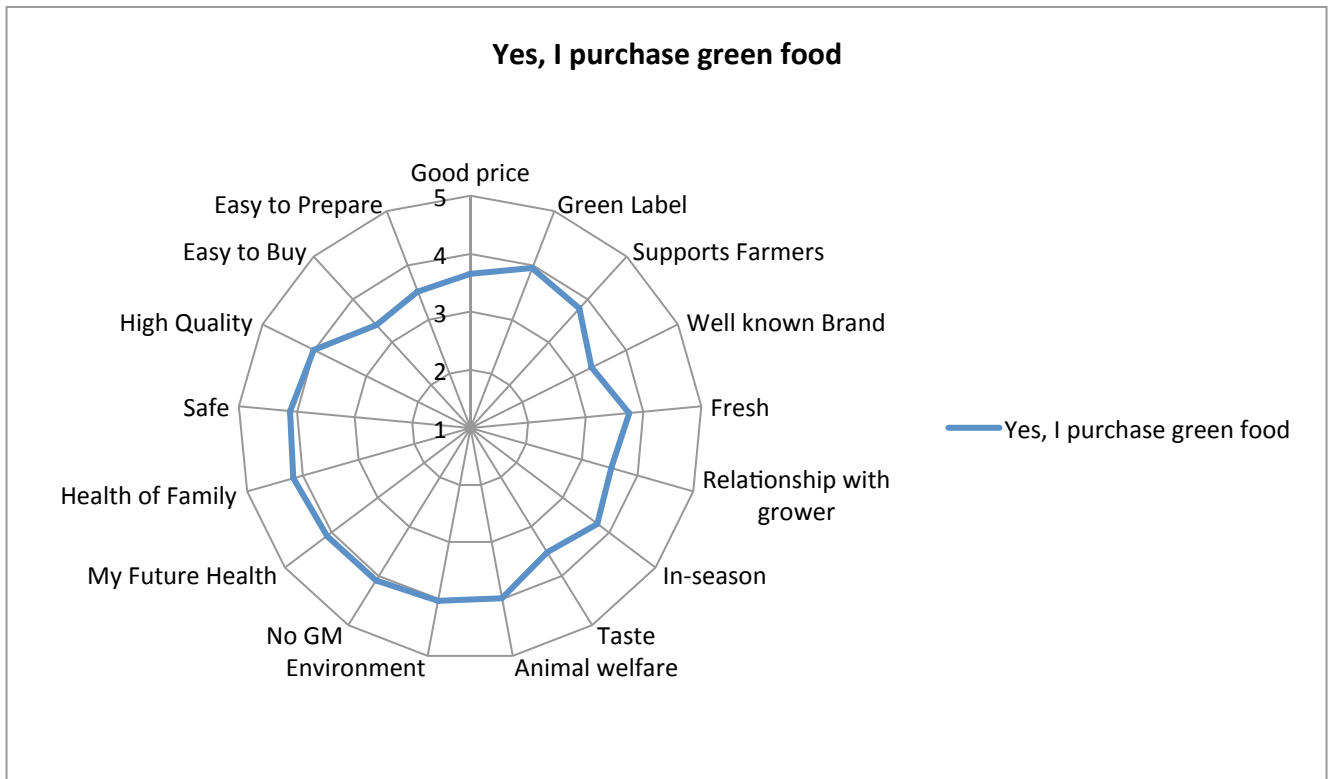
Table 2: Basic statistics of survey samples at city tier level

City tier	Sample s	Female	Family size	Family Income (RMB)	Average age	Education (years)	Household with young kids
1st	103	61	3.45	21,700	38.33	15.96	54
2nd	215	129	3.40	13,300	41.34	15.36	89
3rd	84	51	3.36	13,480	40.00	15.64	36
Total	402	241	3.40	16,160	39.89	15.65	179

Purchase motivations, drivers/barriers to purchase of green food.

The respondents scored medium to high on all items related to purchase motivations ($M > 3$ on a 5-point Likert scale). While most of the motivating factors were considered important, the green food label/pesticide reduced, coming from humanely-treated stock; environmentally-friendly, absence of genetically modified ingredients, high quality, health and safety, all received the highest scores. Intrinsic attributes such as freshness and taste received slightly lower scores (see Figure 2). One way Anova was performed to identify variations in purchase motivations between buyers of green food and non-buyers, but the results were not significant. The respondents were inclined to agree that green food offered good value for money and signalled good social image; however the score for variety and accessibility of outlets was lower. One way Anova showed that there were no significant differences in mean values between buyers and non-buyers of green food.

Figure 2: Green Food Buyers: Reasons for Purchase



(n= 177)

Note: a 5 point importance scale was used, where 1= unimportant and 5 = very important.

Table 3: Drivers and barriers to green food purchase

	Good social image	Good variety	Outlets accessible	Good value for money
Mean	3.53	3.27	3.00	3.63

(n= 402).

Note: a 5 point Likert scale was used, where 1= strongly disagree and 5 = strongly agree was used.

Willingness to pay for green food and type of green food bought

The research indicates that most consumers are willing to pay more money for green food than for conventional food. Nearly half of the sample (48%) in tier 1 cities is willing to pay up to 30% more for green food, and around one third (32%) is willing to pay up to 50% more (see Figure 3 and Table 4). Not surprisingly, the percentage of respondents willing to pay a price premium decreases as the premium increases. Fruit and vegetables are the most popular type of green food bought (see Table 5). Other commonly bought food products were dairy (49%), meat (35%) and packaged goods (25%).

Figure 3: Willingness to pay premium prices by city tiers

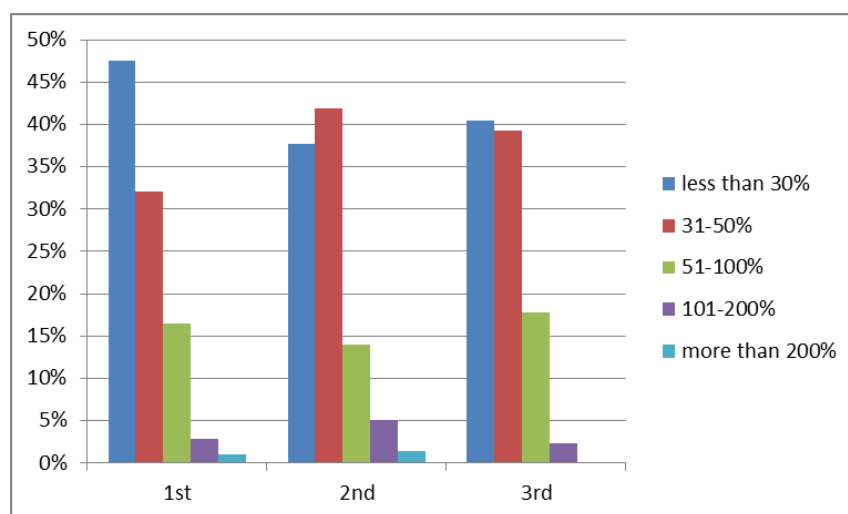


Table 4: Willingness to pay premium prices by city tiers

City tiers	Less than 30%	31-50%	51-100%	101-200%	More than 200%
1 st	48%	32%	17%	3%	1%

2 nd	38%	42%	14%	5%	1%
3 rd	40%	39%	18%	2%	0%

Table 5: Type of green food products purchased

Product Class	Fruit and Veg	Dairy	Meat	Bread	Packaged	Other	Other, specify
Frequency	330 82%	199 49%	144 35%	64 16%	99 25%	15 4%	Oil, mushrooms

n=402

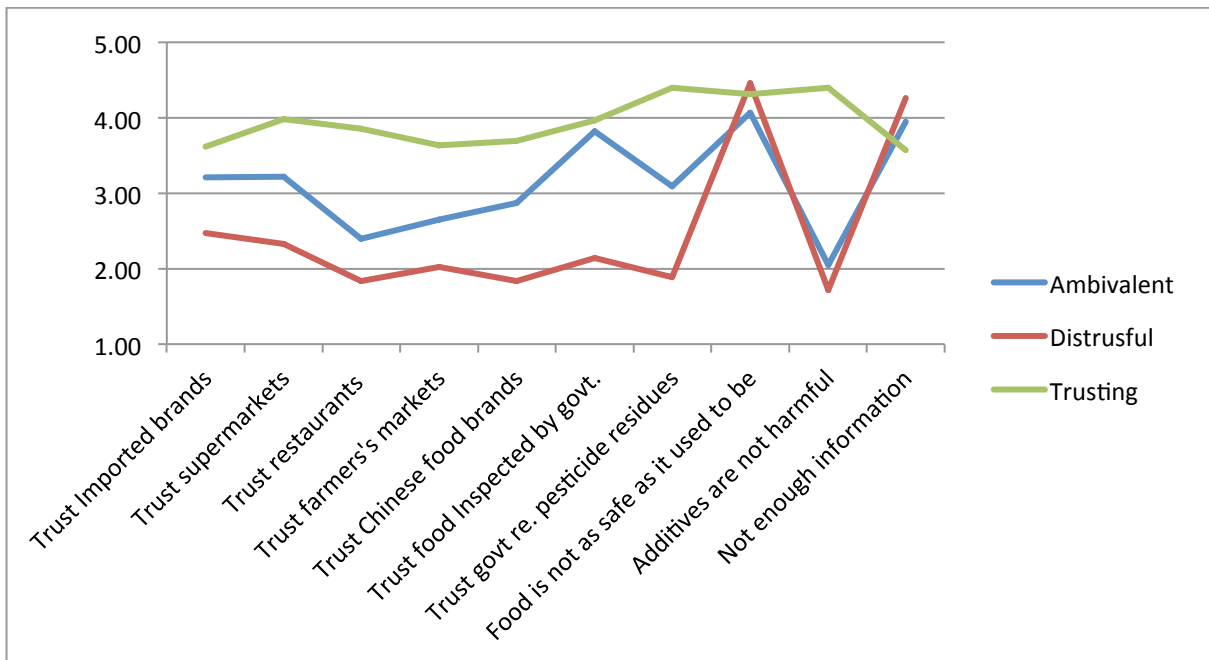
Food safety clusters

Another objective of this paper was to examine if the Chinese green food market could be meaningfully segmented on behavioural segmentation bases, such as attitudes towards food safety. A series of ten statements were used which were validated by previous scholars. The technique of quick cluster analysis (K-means) was carried out on one set of food-related variables. The aim was to identify groups of people having similar attitudes towards food safety, as reflected by their self-reported attitudes.

The cluster results here reveal that there are three segments (see Figure 4). The first segment is ambivalent and likely to disagree with several statements or tick the neutral category. They mirror the distrustful segment but are not as forthright in their views. The second segment is clearly distrustful. They tend to disagree with a wide range of statements, including the statement that the green labelled products that are inspected and checked by government can be trusted. They disagree with statement that additives are not harmful. They agree that food is not as safe as it used to be and they agree that are not provided with enough information in order to make judgements about food safety. The third group tends to be trusting and non-judgemental. They do, however, agree that food is not as safe as it used to be. After the clusters were identified, the next step was to run cross tabulation analysis with chi square testing to explore the relationship between various socio-

demographic factors and the clusters. This study found that only one demographic variable was significant: being married with children (see Table 6). The ambivalent and distrustful segments were likely to have children. Purchase of green food was found to be significant. There were a lot more non-buyers of green food than buyers in the distrustful segment, which was surprising. Slightly more buyers than non-buyers were found in the ambivalent cluster and there were more non-buyers in the trusting segment.

Figure 4: Clustering Chinese green food consumers



Note: a 5 point Likert scale was used, where 1= strongly disagree and 5 = strongly agree was used.

Table 6: Demographic profile of the food safety clusters

Variable		Clusters			Chi Square
		(1) Ambivalent (n=168)	(2) Distrustful (168)	(3) Trusting (63)	
Gender	Male	59	68	32	Chi-Square = 4.763 Sig. = .092
	Female	109	99	31	
Age	0-34	36	33	19	Chi-Square = 8.170 Sig. = .086
	35-54	97	114	36	
	Over 55	35	21	8	
Education	High School/Vocational	53	50	27	Chi-Square = 9.426 Sig. = .051
	Undergraduate	75	66	28	
	Post-graduate	40	52	8	
Marital Status	Yes	132	134	53	Chi-Square = .889 Sig. = .641
	No	36	34	10	
Married with Children*	Yes	116	119	38	Chi-Square = 9.972 *Sig. = .007
	No	16	15	15	
Household Income	< 6,000 RMB	43	46	17	Chi-Square = 2.834
	6,001 – 10,000	44	35	17	

	RMB				Sig. = .829
	10,001 – 30,000	66	66	24	
	RMB				
	More than 30,000	15	21	5	
	RMB				
Willingness to pay more	Yes – Below 30%	63	74	22	Chi-Square = 2.563
	Yes – Above 31%	105	92	41	Sig. = .278
Green Food Purchase*	Yes	87	63	26	Chi-Square = 7.198 .
	No	81	105	37	*Sig.=.027
Overseas Experience	Yes	69	78	30	Chi-Square = 1.298
	No	99	90	33	Sig.=.522
Location	Tier 1	30	98	40	Chi-Square = 5.768
	Tier 2	35	89	44	Sig.=.217
	Tier 3	18	26	19	

n=398.

*indicates a significant result, $p < 0.05$

Degree of interest in green foods

One question with 6 statements was used to measure consumers' interest in green food. Reliability testing was undertaken and Cronback's alpha was used to measure the reliability of the six variables. Deleted of two items resulted in a score of 0.692; this indicates that the factor is internally reliable since the coefficient is 0.692, although it is somewhat short of the 0.8 criterion for internal reliability (see Table 7).

Table 7: Reliability output for interest in green food

Factor	Cronback's Alpha Score	Number of items
Interest in Green Food	0.692	4
I get bored when people talk to me about it.		
It offers nothing more than conventional food.		
I do not pay attention to information about it in magazines, on TV, in stores or on the internet		
When I am with a friend we seldom talk about it.		

Food safety clusters, purchase motivations and interest in green food

Furthermore, we ran a one way ANOVA to test differences between the three segments. . Items such as the brand name, long-term relationship with grower, taste, no GM ingredients, safely, quality, ease of purchase, were significant. The distrustful segment attaches slightly less importance to intrinsic attributes such as brand name and taste, as well as price and support for Chinese farmers, compared to other segments. The trusting segment attaches slightly more importance to a wider range of variables: the brand name, freshness, taste, environment, lack of GM ingredients, health, safety, quality, price, relationship with growers, support of Chinese farmers, ease of purchase and

ease of preparation. The results are displayed in Table 8. A one way Anova was also run to test whether there were differences in terms of consumer interest in green food between the three segments. The result was significant. The ambivalent and distrustful segments had higher mean values than the trusting segment. The trusting consumer was not likely to show interest in green food.

Table 8: Purchase motivations and interest in green food—per segment

Reasons	Ambivalent Segment	Distrustful Segment	Trusting Segment
The green food I buy is competitively priced.	3.73	3.52	4.17
The food I buy has the green label and is pesticide reduced.	4.01	3.98	4.02
The green food I buy helps support Chinese farmers.*	3.85	3.60	4.05
The green food I buy has a well-known brand name or comes from a well-respected region.*	3.43	2.97	3.94
Produce is fresh.	3.72	3.74	4.22
The green food I buy comes from a farmers market and there is a long-term, trusting relationship with grower.*	3.33	3.37	4.22
Sourced within season.	3.76	3.68	3.77
Tastes good.*	3.63	3.48	3.95
Comes from humanely treated livestock.	4.06	4.00	4.08

Environmentally-friendly in the way it is produced, packaged and transported.	4.08	4.08	4.32
Does not contain genetically modified ingredients.*	4.02	4.10	4.43
Green food will improve my future health.	4.16	4.13	4.38
Green food will improve the future health of my family.	4.21	4.20	4.35
Green food is safe.*	4.14	4.16	4.44
Green food is high quality and has high nutritional value.*	3.96	4.04	4.30
Easy to buy*	3.30	3.32	3.79
Easy to prepare*	3.43	3.29	3.79
“Interest in green food” factor*	3.17	3.25	2.42

- Sig. $p > 0.05$

Determinants of green food purchase - demographics

Table 9 shows the results of the binary probit model for green food purchase. Results show that demographic variables, notably, age, gender, presence of young children in the family, family size, education, income and overseas experience have an impact on green food purchase. Income, age, gender, presence of young kids (12 years old and under), family size are significant at the 5% level. Higher education and having overseas experience are significant at the 10% level. Age (older), male, family size (larger), and education attainment below university are negatively related to green food purchase. Young, wealthy males, who have young children and who live in a small household are likely to be buyers of green food.

Table 9: Estimates of binary probit model for green food purchase

Variables	Coef.	Std. Err.	z	P>z
Age	-0.129818	0.0639425	-2.03	0.042**
Gender (Male:1; Female: 0)	-0.3155194	0.1370279	-2.3	0.021**
Presence of kids under 12 years old	0.2213435	0.090355	2.45	0.014**
Family size	-0.1522628	0.0663902	-2.29	0.022**
Education attainment below university	-0.2931753	0.1597256	-1.84	0.066*
Income	0.1142806	0.0535156	2.14	0.033**
Overseas	0.2334513	0.137162	1.7	0.089*
_cons ((Intercept/constant term)	0.1590166	0.4194188	0.38	0.705
LR chi2(8)	54.45			
Log likelihood	-248.5461			
Pseudo R2	0.0987			

Note: ** indicates 5% significance and * indicates 10% significance.

Discussion

This research indicates that consumers who buy green food are motivated by the same factors as those who do not. In general, Chinese consumers attach importance to a wide range of factors in their food choices, such as the green food label, animal welfare; environmentally-friendly production methods, absence of genetically modified (GM) ingredients, high quality, safety, self-health and health of one's family. A study of Chinese consumers reported that environmental values serve to influence green food purchase intentions; however barriers to purchase exist such as price and inconvenient channels (Zhu, Li, Geng & Qi, 2013). The importance given to "no GM ingredients" is somewhat surprising since GM food ingredients are not prohibited in green foods and several studies suggest that Chinese consumers accept GM foods (Huang et al., 2006; Zhang et al., 2010). The other findings on reasons for buying green food are consistent with the organic food

literature (it must be noted that green food and organic food are separate and distinct categories). The factors enticing people to buy organic products include health; product quality and concern about environmental degradation (Pearson, 2002; Yiridoe et al., 2005; Pearson & Henryks, 2008). This study investigated willingness to pay (WTP) for generic green foods. The study found that almost half of the Chinese respondents from tier 1 cities are willing to pay up to 30% more for green food. Previous studies show that consumer willingness to pay in China is very low due to income level differences, with only 11.3% willing to pay 16-30% more (Xu and Wu, 2010; Wu, Xu and Gao, 2011). It must be noted that there is a very large price differential between green food and conventional food, with the latter being two to three times higher than conventional food (Yin, Wu, Du and Chen, 2010). One trade report found that the price differential between the cheapest vegetable (loose product in the Wet markets) and the most expensive (organic in premium retailers) is up to eight times (Morgan and Wright, 2014). Given that fruit and vegetables are the most popular type of green food bought by the sample, one can conclude that price will be a major factor restricting the growth of the green food label in China. However, caution should be exercised in interpreting the WTP figure, since the study did not investigate WTP for specific green foods.

This study identified three segments based on attitudes towards safety. There is a difference in green food purchasing behaviour between the clusters. Relatively high numbers of people in the “distrustful segment” were categorised as non-buyers of green food. This finding is puzzling. Food safety failures, in particular the melamine case in China, are dangerous and even fatal for some consumers. Studies on organic food consumers have found that consumers tend to buy organic food primarily to avoid the so-called risk of ingesting chemicals founded in conventional food (Ott, 1990; Jolly, 1991; Wilkins & Hillers, 1994). Likewise, one would expect Chinese consumers to buy green food as a risk avoidance strategy. There is some controversy however around the attitude-behaviour link since intervening factors such as search time, availability and price can affect behaviour. One study found that purchase of green food was positively related with food safety concern, the label and attitude towards green-labelled products (Bing et al., 2011). A study has found that although Chinese respondents are strongly dissatisfied with food safety conditions, some are unwilling to shoulder the extra cost (Xu and Wu, 2009). Consumer decision making often evokes paradoxes and conflicts between attributes (Bingen, Sage and Sirieix, 2011). Research has identified lack of familiarity with the label, doubt about certified traceable food, and worries about excessively high prices as limiting factors (Wu, Xu and Gao, 2011). One study found that just 65% of Chinese consumers recognise the green food logo/label (Liu et al., 2012), and it was concluded that more

information needs to be distributed to consumers. Non-purchase may simply reflect a lack of trust in the state-regulated green label. The problem of fraud, where companies falsely advertise pesticide-treated produce as organic, is an ever-present concern, leading to a large trust deficit (Marchesini et al., 2012; Li, Ge & Bai, 2013). For actors in the food chain, building and maintaining integrity of the green brand with Chinese consumers will be necessary. It is interesting that the “ambivalent cluster” buys green food. In health psychology studies, researchers are interested in the concept of risk; it is natural for humans to respond to threats by worrying and by engaging in some form of threat appraisal (MacGregor, 1991). The outcomes of the threat appraisal process are threefold (1) an individual ignores the threat if it is seen as irrelevant or insignificant; (2) an individual takes action if the threat is believed to be serious and relevant; and/or (3) an individual attempts to minimize the threat through denial or avoidance (Witte & Allen, 2000). Non purchase of green food may reflect what Bingen et al., (2011:411) call “...emotion-centred strategies that tend to be more fatalist and sometimes less efficient with respect to resource mobilisation.”

Our study found that green food seems to be favoured by wealthy, educated Chinese males who have a young child. Apart from gender, these findings are in accordance with the literature. For instance, a study by Zhu et al., (2013) found that income and education influence green food purchase intentions and behaviours. Chinese studies report that gender – being female - is an important demographic variable, along with income, education and family size, that influences willingness to pay for green food (Xia & Zeng, 2007; Xia & Zeng, 2008). Studies on Western consumers show that concern for young children is likely to increase organic food consumption (Kriwy & Mecking, 2012); the organic food buyer is likely to be female (Lockie *et al.*, 2004), female with children (Dettmann & Dimitri, 2009; Van Doorn & Verhoef, 2011) and is likely to be highly educated (Govindnasamy & Italia, 1990; Kriwy & Mecking, 2012). This finding on gender is interesting. It may reflect changing roles in modern society, where males are increasingly assuming responsibility for food shopping. China’s one child policy may intensify the safety concerns of fathers or make them more cautious or conservative in their handling of risk. This study found that green food purchase is seen as an indicator of social status. In the literature, it is emphasised that food purchases are influenced by inter-personal influences such as family, friends and peer networks, along with cultural norms (Xu, Zheng and Zhou, 2015). For instance, although green food is bought mainly for private consumption and not public consumption, gift-giving (i.e., attractively packaged gifts of fruit) is common in Chinese culture. These potential influences on male buying behaviour need to be explored in future studies.

The study presented here leaves open several questions and avenues for future research. The intensification of concern about safety in China demands a deeper insight into the concept of perceived risk, the response of Chinese food consumers to risk, the trade-offs and coping strategies they adopt given the constraints they face. For instance, the practise of washing and soaking vegetables to remove pesticide residues is common. It is argued that consumers handle risk in ways that are more ambivalent, more diverse and complex than envisaged by policy makers (Halkier, 2011). The fact that Chinese males are more likely than females to buy green food deserves investigation. An in-depth qualitative study of Chinese males/couples who are parents of young children is needed to probe motivations behind green food consumption. More market segmentation studies are warranted, using larger sample sizes, with a focus on demographics, behavioural or psychographic bases.

Conclusion

The contribution of this paper includes identifying the determinants of green food purchase along with market segments in the green food market. Results show that demographic variables, notably, income, age, gender, education, presence of young children in the family, household size and overseas experience have an impact on green food purchase. Wealthy, young males, who have young children and who live in a small household are likely to be buyers of green food. Three groups of consumers were identified based on their attitudes towards food safety: the ambivalent, distrustful and trusting consumers. A key task for actors involved in the food supply chain in China is to provide more information to consumers on food safety. This study had its limitations, such as the sample size given the population of China, reliance on self-reported data and potential that the survey method results in socially desirable responses.

Acknowledgements: The research was funded by a mid-career researcher grant from James Cook University, Townsville, Australia

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