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Chinese consumer preferences for organic labels on Oolong tea: evidence from a choice experiment

RESEARCH ARTICLE

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Abstract

Repeated food scandals in China have prompted growing consumer consciousness on food safety and health. Organic food, considered to be of higher quality, is being increasingly demanded by Chinese consumers. This study examines preferences for organic labels to provide insight on the sustainable development of the Oolong tea industry. Research was conducted using the choice experiment (CE) method in Fujian and Guangdong Provinces. The results demonstrate that place of origin, organic label, and brand attributes are all significant factors affecting the purchase of Oolong. Also, people demonstrated significantly positive attitudes toward organic labels and preferred Oolong tea from Fujian Province to those from Guangdong Province and Taiwan. Increasing trust can enhance consumer preference and willingness to pay (WTP) for organic labels. Contrary to previous studies, people have a higher WTP for Chinese organic labels than Japanese and American ones. This is probably because respondents are more familiar with domestic Oolong tea and trust more in Chinese organic certification. This provides an opportunity for domestic producers to tailor their organic food labels and better satisfy consumer demands. These findings suggest that the Chinese government should take more responsibility for reducing food-related fraud and thus improve consumer trust regarding organic food.

Keywords: Oolong tea, organic food, consumer preference, choice experiment
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1. Introduction

Pesticides and mineral fertilizers might enhance the productivity of agriculture, whereas more and more studies have revealed that these chemicals remain in food and harm human health (Carvalho, 2006; Yin *et al.*, 2018a). Organic food is critically demanded by consumers as it is perceived as a healthier and safer alternative (Bryła, 2016; Goetzke *et al.*, 2014). Recently, food scandals in China have evoked strong awareness of food safety and health concerns by Chinese consumers (Chen *et al.*, 2019b; Zhang *et al.*, 2014). After the melamine incident in 2008, many studies determined that people were willing to pay a premium for imported organic food (Quan *et al.*, 2018; Wu *et al.*, 2014). Demand for organic food has amplified in recent years (Scozzafava *et al.*, 2020; Willer and Lernoud, 2019). China has the third-largest land area for organic farming (2.3 megahectares (Mha) worldwide, following Australia (27.1 Mha) and Argentina (3.0 Mha) (Willer and Lernoud, 2019). Considering the recent population expansion and economic growth, massive domestic demand for organic food is apparent (Bekele *et al.*, 2017; Willer and Lernoud, 2019).

Tea is one of the most popular drinks in the world, and China is the largest tea producer globally (Gunathilaka and Tularam, 2016). Oolong tea is unique to China (Chen *et al.*, 2010), and its yield ranked the third-largest of all kinds of tea in 2018. Additionally, the export price of Oolong tea is higher than other tea products (Mei, 2020). Driven by higher economic profits, farmers use massive amounts of mineral fertilizers and pesticides to promote yields. With growing concerns about heavy metals and other chemical residues in Oolong tea (Chen *et al.*, 2020), the Chinese government issued an official campaign to ensure zero growth in pesticide use by 2020 to reduce the pollution caused by agricultural chemicals (Department of Agriculture, 2015). Local governments reduce pesticide use by offering subsidies to tea farmers. However, it is uncertain how long this trend will last, with subsidies being discontinued after 2020. To achieve sustainable development of the tea industry, efforts should go beyond the production side (Zhu *et al.*, 2013). With the development of economic incentives regulated by governments, consumers increasingly pay attention to environmental issues (Ghvanidze *et al.*, 2016). According to Ghvanidze *et al.* (2016), environmental consciousness is also reflected in consumption behaviors, in which consumers contribute to a sustainable society by choosing environmentally friendly food. Taken together, an effective way to solve environmental challenges in the Oolong tea industry is to promote organic Oolong tea consumption, which encourages farmers and companies to go green.

Organic food is a typical credence good, and the organic attribute is often indicated through an organic label (Yin *et al.*, 2019b). Before China implemented domestic official organic certification, organic food in the market was imported (Zheng *et al.*, 2013). An apparent barrier that restrains organic market share expansion is higher prices (Xie *et al.*, 2015). Developed countries as well as most developing countries have their own organic labels indicating the organic standards of local regions (Thøgersen *et al.*, 2019). Chinese food safety scandals have led to market chaos, which resulted in distrust of domestic organic labels (Wu *et al.*, 2014). Therefore, organic labels from other regions are prevalent in the Chinese organic market (Yin *et al.*, 2019a). With organic labels of different regions coexisting in the Chinese market (Yin *et al.*, 2019a), the attitudes toward various organic labels have emerged in a few studies, and the results indicate that Chinese consumers prefer organic labels from more developed regions (Li *et al.*, 2015; Yin *et al.*, 2016).

Organic food is a Western invention that regards it to be more sustainable than conventional food (Lockeretz, 2007; Thøgersen and Zhou, 2012); however, this triggers a question – do Chinese consumers always prefer organic labels from developed regions, even for traditional Chinese or unique foods? As the representative cash crop in southern China, few studies have measured the evaluation of organic Oolong tea with multiple organic labels among Chinese consumers. Many studies related to organic food preferences have been performed under the theory of panned behavior, considering consumer characteristics such as self-value, social norms, etc. (Qi and Ploeger, 2019; Yadav and Pathak, 2016; Zhang *et al.*, 2018). However, when choosing products, consumer characteristics as well as product attributes need to be considered (Boncinelli *et al.*, 2019). Compared with other approaches, a choice experiment (CE) approach can measure decisive attributes of preference for products and provide much more information regarding when to detect purchase

intention (Ghvanidze *et al.*, 2016). Research on Chinese consumption for typical organic foods using the CE approach is relatively scarce (Xu *et al.*, 2015). Taken together, this study values consumers' preferences for different organic labels of Oolong tea using the CE approach.

Previous research has indicated that trust is significant in purchasing decisions (Daugbjerg *et al.*, 2014; Lassoued and Hobbs, 2014). Low trust is associated with a lower evaluation of labeling itself, which further results in reducing purchase intention (Tonkin *et al.*, 2016). It seems that consumers are inclined to believe independent third parties to make certifications (Albersmeier *et al.*, 2010). Many types of organic labels exist on the Chinese market, and whether or not trust in organic labels impacts the organic food market has aroused researchers' interest. Chen *et al.* (2019a) measured the interaction effect of organic labels and trust and showed that consumers put more trust in organic labels from developed countries or regions. The interaction effect of attributes can reveal the relationship between product attributes. However, research on the interaction between trust and typical Chinese organic product consumption is still relatively scarce and needs to be explored in more depth.

In 2019, the total domestic sales of Oolong tea reached $ 4.23 billion and continue to show an increasing trend (Mei, 2020). Although total domestic tea sales are quite large, research on consumer preferences for organic tea is relatively scarce, considering that food safety has become a major concern among Chinese consumers (Zhou *et al.*, 2014) as well as the tremendous importance of the tea industry. Accordingly, this study aims to measure Chinese consumers' preference for organic Oolong tea. This research makes several contributions to understanding the question of whether different organic labels influence purchase decisions on Oolong tea products. First, this study investigates consumer preferences for various organic Oolong tea labels with important attributes (i.e. brand, origin place, and price). Second, Qi and Ploeger (2019) investigated consumers' intentions toward purchasing green foods and found that adding personal characteristic factors increased the percentage of explained purchase intention variances. Thus, this study determined the impact of consumer characteristics on preferences for organic Oolong tea. Third, many studies have pointed out that trust is an important key to determining willingness to pay (WTP) for organic food (Krystallis and Chryssohoidis, 2005; Nuttavuthisit and Thøgersen, 2017). This study measures subjective knowledge and trust interaction effects with chosen attributes when purchasing Oolong tea and gains accurate WTP values for various organic labels.

2. Design and methods

To measure product preferences, CE is often adopted (Chen *et al.*, 2019a; Gao *et al.*, 2019), as it can narrow bias by grouping given attributes into different components (Louviere *et al.*, 2000). This study can further estimate the effects of objective attributes and trust attitudes using conjoint CE. Results of conjoint CE are more accurate as they are less influenced by social desirability bias (Auger and Devinney, 2007).

2.1. Attribute selection

The attributes chosen were based on real market research and panel discussions. Firstly, the research team was divided into two groups. Group one went to the real tea market in Fuzhou (the capital of Fujian Province) in March 2019 to investigate the current prevalent organic labels on Oolong tea. Because e-commerce is one of the most important trading channels in China, group two searched the biggest e-commerce website (Taobao) for organic labels in the 50 top-selling shops. Other attributes were selected based on previous literature (Hoek *et al.*, 2017; Thøgersen *et al.*, 2019). Finally, this study specified four attributes, which are shown in Table 1.

The main locations of Oolong tea plantations are Fujian, Guangdong, and Taiwan (Chen and Yang, 2017). People's familiarity with this product influenced the effects of these attributes (Lähteenmäki, 2013). Thus, this study chose these three regions to narrow consumer bias. In addition, in reality, tea companies like to make different kinds of organic certifications for two purposes, i.e. to enter both domestic and foreign markets

Table 1. Product attributes and levels in the choice experiment.

Attributes	Number of levels	Levels
Place of origin	3	Produced in Fujian Produced in Guangdong Produced in Taiwan
Organic label	4	None Chinese organic label Japanese organic label United States organic label
Brand	2	Regional brand National brand
Price[1]	4	13.0 USD per 250 g 14.3 USD per 250 g 15.6 USD per 250 g 16.9 USD per 250 g

[1] 1 USD = 6.99 RMB (renminbi).

(Chen *et al.*, 2019a) and to use multiple logos or labels as a certification of quality (Bai *et al.*, 2013). Thus, Chinese consumers can buy Oolong tea with different countries' organic labels in the domestic market. Japan is the largest importer of Chinese Oolong tea, so companies are inclined to use Japanese organic labels (JAPLs) for export to Japan. Several recent studies have demonstrated that Chinese consumers showed a higher preference for organic labels from developed countries (Chen *et al.*, 2019a; Yin *et al.*, 2019a). In this research, the US organic label (USL) was chosen as the representative to examine consumer attitudes. Thus, Chinese organic labels (CHILs), JAPLs, and USLs were finally chosen. It should be noted that Oolong tea with JAPL and USL also is produced in the three Chinese provinces. The various organic labels are shown in Figure 1. This study also set the 'none' label to represent the conventional Oolong tea product. Brand is one of the essential factors that affects consumer consumption decisions. Usually, the national brand (NAB) is considered to be a sign of higher quality and safety compared to regional brands (Enneking *et al.*, 2007). However, due to the different tea-drinking habits from region to region, regional brands (RGBs) might be more accepted by local consumers than NABs. To our knowledge, few studies compare the effects of the NAB and RGBs on Chinese foods. The range of effective subsides or taxes was between 10 and 20%. Considering the higher price of organic products, four levels were set in the price attribute, including $13.00 per 250 g (the average price of a conventional product), and 10, 20 and 30% higher. The average price of conventional Oolong tea was set based on the self-drinking type product available in stores, which is also consistent with the findings of Chen *et al.* (2016).

A B C

Figure 1. (A) Chinese organic label, (B) Japanese organic label, (C) US organic label.

2.2 Experimental design

The accuracy of CE largely depends on the structure of profiles, which means that designated profiles should explain the variance of the attributes to a large extent while generating as few random errors as possible (Greiner *et al.*, 2014; Yao *et al.*, 2018). This study provided an opt-out option (i.e. neither option A nor option B) in each choice set. The opt-out option is often employed in non-hypothetical CE for imitating real-world purchase decisions (Grebitus *et al.*, 2013), thus enhancing the accuracy of estimates (Alfnes *et al.*, 2006). Given the literature above, three options are shown in Figure 2.

There were 96 (3×4×2×4) profiles by a full factorial design using Ngene 1.1 software (ChoiceMetrics), and the profiles grew exponentially for two compared alternatives in a choice set. It is impossible for the respondents to evaluate the entire choice set. Fractional factorial design was required to minimize the number of choice sets while maintaining the efficiency of the representatives (Kessels *et al.*, 2006). After optimal design, 36 choice scenarios were generated with 91.92% of D-efficiency, 0.054 D error, and 0.062 A error. 36 choice scenarios were divided into six blocks and each block contained six choice tasks. There were six versions of the questionnaire in this study. A respondent could only answer one questionnaire. The Chinese version of the questionnaire was used in the survey study.

To determine consumer trust in organic labels, respondents were required to answer four items derived from Wu (2012): 'I trust in the certification procedure of organic food and organic labels,' 'Do you believe that organic food in the market is produced in accordance with certain standards,' 'If I see an organic label on the front of the pack, I believe that this product is organic,' and 'I trust in the organic labels of other countries.' All items were rated on a five-point Likert scale from 1 for 'absolutely no trust' to 5 for 'absolutely trust'. Enlightened by previous studies, subjective knowledge was relative to actual consumption decisions (Hoek *et al.*, 2017; Pieniak *et al.*, 2010). Three items about subjective knowledge from a study about organic vegetables by Pieniak *et al.* (2010) were adopted: 'Compared with people around, I know a lot of foods with both characteristic of environmentally friendly and healthy,' 'I can evaluate whether food is environmentally friendly and healthy,' and 'People around me think I am an expert in food environmental and healthy attributes.' The degree of these three items was also rated from 1 for 'completely disagree' to 5 for 'completely agree'. The indices of the respondents' trust and subjective knowledge of organic foods were measured by the average scores of the aforementioned items.

2.3 Data collection

Investigation into Oolong tea should focus on target consumers because Oolong tea buyers pay more attention to the quality and safety aspects of Oolong tea. Oolong tea consumers are mainly located in Fujian and Guangdong Provinces (Chen and Yang, 2017). Thus, our face-to-face investigation was conducted in Fuzhou and Guangzhou cities, which are the respective capitals of the aforementioned provinces. Shopping online is a popular way to buy Oolong tea. As respondents from different cities can help us to draw generalized

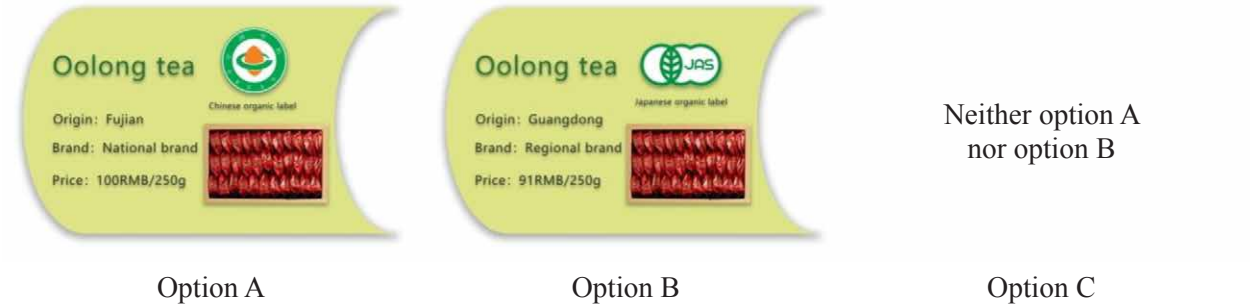

Figure 2. Example of a choice set.

conclusions, this study also adopted online investigation. Several graduate students in training went to three real stores selling Oolong tea in Fuzhou city between May and June 2019. The staff helped the investigators invite consumers who were buying self-drinking Oolong tea in the stores to fill out the questionnaire by scanning a QR code. After finishing the questionnaire, each respondent received a gift. The questionnaire was in sorted order to balance the number of different blocks. The same procedures were used in Guangzhou city in July 2019. During the online interview, an online store helped us to invite consumers who had bought self-drinking Oolong tea to fill out the questionnaire; people who finished the questionnaire could be given a 10-renminbi (RMB) coupon for the store. All questionnaires consisted of three parts: (a) subjective knowledge and trust test; (b) CE choices comparing alternatives; and (c) anonymous socio-demographic information about the respondents.

A total of 509 surveys were obtained in this study. This study eliminated invalid surveys based on a 'trap question.' The trap question method was employed to identify careless respondents to enhance the accuracy of results (Wang and Gao, 2017). In our questionnaires, the trap question was set to 'Please select the 'red' option in the following four options'. Researchers dropped the survey when other colors were selected. Finally, the remaining 450 surveys (88.4% of total) were used for the next estimation.

2.4 Models

According to the Lancaster consumer theory (Lancaster, 1966), consumer utility is derived from product attributes rather than the product itself. Furthermore, the random utility theory assumes that utility consists of observable representatives and unobservable random error terms (McFadden, 1973). Consumers choose between alternatives, which are bundled attributes in a choice set, for the highest utility. Such a relationship expressed in a mathematical way is:

$$U_{nit} = V_{nit}(\beta_n) + \varepsilon_{nit} = \delta(ASC) + \alpha_n(X_i) + \gamma_n(-P_i) + \varepsilon_{nit} \quad (1)$$

Where U_{nit} represents the utility of consumer n given alternative i in choice set t; $V_{nit}(\beta_n)$ is the observable utility of parameter β_n, while ε_{nit} is the random error. The parameter vector $\beta_n = (\delta, \alpha_n, \gamma_n)$ is the degree of consumer n's preference for each attribute; ASC indicates the 'none' option when the value is 0, and the value of 1 represents the given compared choice scenarios.

In discrete choice modeling, different hypotheses of the random error distribution and heterogeneity will lead to different models. The multinomial logit (MNL) model is the basic form of logit modeling. The MNL model assumes that all respondents share a homogeneous preference for the product attributes (Louviere *et al.*, 2000). Another logit model called the random parameter logit (RPL) model relaxes the hypothesis across respondents (Train, 2009). A generalized multinomial logit (G-MNL) model has also been used to investigate consumer preferences for different food attributes (Fiebig *et al.*, 2010; Liu *et al.*, 2019). This study specified MNL, RPL, and G-MNL models to evaluate consumer preferences for organic tea.

In this study, the main effect of the attributes was determined using Equation 2. The place of origin was a nominal variable, so that Guangdong (GD) and Taiwan (TW) were used as dummy variables compared with the baseline of Fujian. CHIL, JAPL, and USL were the categorical variables, and the 'none' label was used as the baseline. NAB was set as basic category compared to the RGB. Price was the metric variable in accordance with the four price levels designated in the experiment. The utility function model is expressed by Equation 2:

$$U_{nit} = ASC + \beta_1 Price_{nit} + \beta_{2n} GD_{nit} + \beta_{3n} TW_{nit} + \beta_{4n} CHIL_{nit} + \beta_{5n} JAPL_{nit} + \beta_{6n} USL_{nit} + \beta_{7n} NAB_{nit} + \varepsilon_{nit} \quad (2)$$

where ASC is the opt-out option and the coefficients from β_1 to β_{7n} are the parameter vectors of the attributes estimated.

For the interaction effects of the attributes, *Tru* and *Sub* were the explanatory variables representing consumer trust and subjective knowledge about organic labels, respectively. Indices of these two attitudinal variables were created by the mean values of the item scores. The utility function with interaction is expressed by Equation 3:

$$U_{nit} = ASC + \beta_1 Price_{nit} + \beta_{2n} GD_{nit} + \beta_{3n} TW_{nit} + \beta_{4n} CHIL_{nit} + \beta_{5n} JAPL_{nit} + \beta_{6n} USL_{nit} + \beta_{7n} NAB_{nit} + \beta_{8n}(GD_{nit} \times Tru_n) + \beta_{9n}(TW_{nit} \times Tru_n) + \beta_{10n}(CHIL_{nit} \times Tru_n) + \beta_{11n}(JAPL_{nit} \times Tru_n) + \beta_{12n}(USL_{nit} \times Tru_n) + \beta_{13n}(NAB_{nit} \times Tru_n) + \beta_{14n}(GD_{nit} \times Sub_n) + \beta_{15n}(TW_{nit} \times Sub_n) + \beta_{16n}(CHIL_{nit} \times Sub_n) + \beta_{17n}(JAPL_{nit} \times Sub_n) + \beta_{18n}(USL_{nit} \times Sub_n) + \varepsilon_{nit} \quad (3)$$

Consumer n's WTP for attribute x is estimated by Equation 4:

$$WTP_n = \beta_{nx} / \beta_{np} \quad (4)$$

where β_{nx} is the coefficient of non-price attribute x and β_{np} is the coefficient of price attribute np.

3. Results

3.1 Socio-demographics of consumers

The socio-demographics of the consumers are presented in Table 2. The results show that female respondents slightly exceeded men in number, unlike the results of some studies on orange juice (Gao *et al.*, 2019) and rice consumption (Wang and Gao, 2017), in that Chinese females are the primary shopper in the household. Respondents 25-34 years old occupied the largest proportion (40.44%), followed by 35-44 years old (25.33%), and under 24 years old (22.22%). This implies that younger consumers prefer Oolong tea more than older consumers (over 45 years old). Most respondents had a bachelor's or an associate degree. The monthly personal income of one-fifth of the respondents was 4,000-5,999 RMB and less than 2,000 RMB. The remainder of the monthly personal income levels (2,000-3,999, 6,000-7,999, 8,000-9,999, 10,000-14,999, and ≥15,000) were around 12%. This implies that consumers of different income levels all purchased Oolong tea. Beyond that, almost all of the consumers had more than three members in their households.

Two attitudinal aspects including trust and subjective knowledge were detected using questionnaires. All item scores are exhibited in Table 3. Using a Likert five-point scale, consumers showed an average value of 3.31 for trust in organic labels and a value of 3.22 for subjective knowledge tests. In the following, these two indices were used in a conjoint regression to detect their interaction effects with the attributes.

3.2 Main effect

The results of the three regression methods are shown in Table 4, which were calculated using Stata 15.0 software (StataCorp LLC, College Station, TX, USA). The coefficient of *tau* is significantly positive, which indicates that there was a discrepancy in the consumers' value of the various attributes. All coefficients of the chosen attributes in the models are statistically significant at the 10% level. Except for price, the coefficients of the other attributes were statistically significant at the 1% level. These results imply that place of origin, organic label, brand, and price were all significant factors. The ASC variable as the opt-out option means that consumers do not choose any given alternative, and this result implies that it would reduce consumers' utility. The coefficient of the price variable is significantly negative in the three models, which means increasing the price has a negative influence on consumers' utility. As for the place of origin variable, the coefficients were both significantly negative, implying that people had a lower preference for the Oolong tea produced in Guangdong and Taiwan. Furthermore, people disliked Oolong tea from Guangdong more. The 'none' organic label was used as the baseline for the organic label variable, and the results imply that people showed a preference for the organic label. The coefficients of the three organic labels were all

Table 2. Socio-demographic and economic characteristics of the sample.

Variable	Definition	Frequency (n=450)	Percentage
Gender	Male	190	42.22%
	Female	260	57.78%
Age (years)	≤24	100	22.22%
	25-34	182	40.44%
	35-44	114	25.33%
	45-54	46	10.22%
	55-64	5	1.11%
	≥65	3	0.67%
Education	High school degree or lower	23	5.11%
	Bachelor's degree or associate degree	287	63.78%
	Post-graduate degree	140	31.11%
Monthly personal income (RMB[1])	≤2,000	85	18.89%
	2,000-3,999	52	11.56%
	4,000-5,999	94	20.89%
	6,000-7,999	55	12.22%
	8,000-9,999	51	11.33%
	10,000-14,999	55	12.22%
	≥15,000	58	12.89%
Members of household (persons)	≤2	35	7.78%
	3	155	34.44%
	4	124	27.56%
	≥5	136	30.22%

[1] 1 USD = 6.99 RMB.

Table 3. Scores of attitudinal questions.

Attitude 1	Item	Mean (SD[1])	Attitude 2	Item	Mean (SD[1])
Trust	Trust Q1	3.43 (0.81)	Subjective	Sub Q1	3.42 (0.86)
	Trust Q2	3.05 (0.79)	knowledge	Sub Q2	3.44 (0.80)
	Trust Q3	3.38 (0.79)		Sub Q3	2.82 (0.98)
	Trust Q4	3.39 (0.79)			
Average		3.31 (0.62)			3.22 (0.73)

[1] SD = standard deviation.

positively significant at the 1% level. Organic labels could enhance the utility of consumers, among which, the one most preferred by consumers was the CHIL. In addition, although drinking Oolong tea is a regional habit, NAB was preferred more by consumers. In general, the organic label was the most important attribute among the attributes chosen.

3.3 Main effect with interaction in trust and subjective knowledge

This section investigates the conjoint effect of trust in the organic label and subjective knowledge about health and environment with the given attributes; the results are presented in Table 4. The interaction of trust with the main attributes show that the conjoint effects of trust with the three organic labels are positively significant at the 5% level. This indicates that more people showed trust in organic labels, the more they preferred organic labels. In the MNL model, the coefficients of trust's interaction with the CHIL, JAPL, and USL variables were 0.359, 0.312, and 0.287, respectively. The likelihood of buying Oolong tea with

Table 4. Estimation of the direct and interaction effects through the three models.[1]

Main effect				**Main effect with interaction**		
Variable[2]	**Multinomial logit model**	**Random parameter logit model**	**Generalized multinomial logit model**	**Multinomial logit model**	**Random parameter logit model**	**Generalized multinomial logit model**
ASC	-1.638*** (-5.46)	-5.238*** (-8.25)	-11.10*** (-3.82)	0.762 (1.22)	0.0278 (0.02)	1.109 (0.36)
Price	-0.00511* (-1.86)	0.00978** (-2.41)	-0.0202** (-2.09)	-0.0054* (-1.94)	-0.0104** (-2.56)	-0.0150** (-2.16)
GD	-0.883*** (-13.87)	-1.442*** (-10.76)	-2.977*** (-4.15)	-2.444 (-0.59)	-0.307 (-0.44)	-0.952 (-0.70)
TW	-0.615*** (-9.67)	-1.085*** (-7.85)	-2.150*** (-3.57)	0.0077 (0.02)	0.0834 (0.10)	0.352 (0.21)
CHIL	1.200*** (15.07)	1.810*** (11.34)	3.875*** (4.08)	-0.464 (-0.09)	0.303 (0.34)	0.649 (0.43)
JAPL	0.938*** (10.87)	1.422*** (8.73)	3.033*** (3.71)	-0.472 (-0.84)	-0.726 (-0.76)	-0.981 (-0.65)
USL	0.656*** (8.53)	1.004*** (7.64)	2.163*** (3.80)	-0.034 (-0.07)	-0.148 (-0.19)	-0.288 (-0.23)
NAB	0.200*** (4.46)	0.332*** (4.90)	0.639*** (3.39)	0.002 (0.01)	0.024 (-0.06)	-0.0759 (-0.11)
GD×Tru				0.124 (1.13)	0.142 (0.78)	0.197 (0.60)
TW×Tru				-0.121 (-1.17)	-0.262 (-1.28)	-0.534 (-1.10)
CHIL×Tru				0.359** (2.68)	0.461** (2.03)	0.810* (1.80)
JAPL×Tru				0.312** (2.15)	0.411* (1.70)	0.742 (1.59)
USL×Tru				0.287** (2.27)	0.448** (2.21)	0.821 (1.64)
NAB×Tru				0.824 (1.08)	0.120 (1.07)	0.246 (1.27)
GD×Sub				-0.336*** (-3.67)	-0.508*** (-3.32)	-0.633** (-2.20)
TW×Sub				-0.073 (-0.84)	-0.0971 (-0.57)	-0.0738 (-0.24)
CHIL×Sub				0.017 (0.15)	-0.015 (-0.08)	-0.141 (-0.45)
JAPL×Sub				0.128 (1.04)	0.248 (1.22)	0.245 (-0.73)
USL×Sub				-0.073 (-0.68)	-0.0985 (-0.58)	-0.234 (-0.73)
NAB×Sub				-0.021 (-0.34)	-0.0248 (-0.27)	-0.0704 (-0.48)
SD estimates						
ASC		4.100*** (9.75)			3.886*** (9.09)	
GD		0.963*** (5.17)			0.943*** (4.93)	
TW		1.636*** (8.92)			1.592*** (8.80)	
CHIL		1.384*** (6.76)			1.367*** (6.58)	
JAPL		1.365*** (6.25)			1.314*** (5.80)	
USL		-0.924*** (-4.07)			-0.915*** (-4.15)	
NAB		4.100** (9.75)			-0.398** (-2.32)	
tau_cons			1.001*** (5.85)			0.803*** (2.70)
No. of observations	8,100	8,100	8,100	8,100	8,100	8,100
Log likelihood	-2,338.5026	-1,966.3745	-1,955.1759	2,299.2515	1,945.3324	-1,942.2251

[1] *, **, and *** indicate significance at the 10, 5 and 1% levels, respectively.

[2] ASC = opt-out option; CHIL = Chinese organic label; GD = Guangdong; JAPL = Japanese organic label; NAB = national brand; SD = standard deviation; Sub = subjective knowledge about organic labels; Tru = consumer trust in organic labels; TW = Taiwan; USL = US organic label.

CHIL was the highest. Products with USL ranked last, yet USL still improved the preference for Oolong tea compared to the conventional one. In the RPL model, when considering heterogeneity, people with higher trust in organic labels still preferred CHIL compared to USL and JAPL. However, in this model, people preferred USL (0.448) more than JAPL (0.411). In the G-MNL model, the only coefficient of trust with CHIL was statistically significant at the 10% level. Taking the three models into consideration, CHIL played a more important role in influencing people to buy Oolong tea. On the other hand, only GD×Sub was negatively significant among the six conjoint items in the three models for the interaction between subjective knowledge and the chosen attributes. This means that people with higher subjective knowledge were less likely to buy Oolong tea from Guangdong. In addition, the heterogeneity preferences for the organic label and the brand attributes were not significant in all three models.

3.4 Interaction between the main effect with socio-demographics

In many previous studies, income, education, and social norms could have a significant impact on the consumption of organic food (Qi and Ploeger, 2019; Yadav and Pathak, 2016). Thus, this study verified the effects of socio-demographics on preferences for the attributes. Based on the principle of higher log likelihood and lower AIC and BIC, the RPL model was used as the representative among the three models in this sub-section. The interaction effects of the socio-demographics and the main effect chosen using the RPL model are shown in Supplementary Table S1. This study analyzed the results from the RPL model, which show that the coefficients of Income×CHIL and Age×CHIL are negatively significant. This implies that Oolong tea with CHIL could attenuate the utility of older and higher income consumers. This might be because older consumers have less trust in CHIL, and higher income people recognize imported food as safer and higher quality (Xie *et al.*, 2011). The *Age×GD* variable was negatively significant, implying that older people are less likely to buy Oolong tea from Guangdong. Conversely, the coefficient of the Edu×TW variable indicates that well-educated people are more likely to buy Oolong tea from Taiwan.

3.5 Willingness to pay

Table 5 demonstrated the WTP for various levels of different attributes, including the mean and the 95% confidence interval values of premium or discount through the three models. All results in Table 5 were statistically significant from zero at the 1% level. This study also focused on the results from the RPL model, because the RPL model had a higher log likelihood and lower AIC and BIC.

Compared with Oolong tea from Fujian, Chinese consumers showed a negative preference for Oolong tea from Guangdong and Taiwan, with a lower WTP of $21.08 and $15.87, respectively. Consumers especially discounted the Oolong tea from Guangdong more than that from Taiwan. A potential reason for this phenomenon is that Guangdong Oolong tea is less well-known. Thus, consumers would assume that

Table 5. Willingness to pay for place of origin, organic label, and brand.[1]

Attributes	Multinomial logit model		Random parameter logit model		Generalized multinomial logit model	
	Mean (US$)	CI [5%, 95%]	Mean (US$)	CI [5%, 95%]	Mean (US$)	CI [5%, 95%]
GD	-24.73	[-50.79, 1.34]	-21.08	[-38.04, -4.12]	-21.10	[-37.92, -4.29]
TW	-17.23	[-36.31, 1.86]	-15.87	[-29.40, -2.34]	-15.24	[-28.09, -2.39]
CHIL	33.58	[-1.66, 68.81]	26.47	[4.87, 48.08]	27.46	[-5.40, 49.52]
JAPL	26.26	[-1.90, 54.42]	20.79	[3.36, 38.22]	21.50	[3.37, 39.62]
USL	18.36	[-1.87, 38.60]	14.68	[1.97, 27.39]	15.33	[2.10, 28.56]
NAB	5.59	[-0.62, 11.81]	4.86	[0.65, 9.07]	4.53	[0.66, 8.40]

[1] CI = confidence interval; GD = Guangdong; JAPL = Japanese organic label; NAB = national brand; TW = Taiwan; USL = US organic label.

Oolong tea from Guangdong is of lower quality and taste (Mei *et al.*, 2012). As for the organic label, Oolong tea with an organic label is highly valued by Chinese consumers. Among the three organic labels, WTP for CHIL, JAPL, and USL was $26.47, $20.79, and $14.68, respectively, much greater than for conventional products. When the premium percentage of organic Oolong tea to the conventional one was considered, people would pay 203% more for CHIL, 160% more for JAPL, and 113% more for USL. The results in this study were consistent with previous studies in that consumers showed a positive and higher value for organic labels (Quan *et al.*, 2018). However, CHIL was the most valued by consumers in this study, whereas WTP for CHIL ranked last in other studies (Chen *et al.*, 2019a; Yin *et al.*, 2016). Additionally, consumers preferred NAB to the RGB. The premium for NAB is $4.86. NAB was recognized as more credible in terms of quality and safety, thus satisfying the demands of consumers.

4. Discussion

Chinese consumers showed a greater demand for safe and sustainable foods after the emergence of food scandals (Zhang *et al.*, 2014). Organic food is usually perceived as a safe and environmentally friendly product by developed-country counterparts (Loebnitz and Aschemann-Witzel, 2016). In this study, organic labels can enhance the utility of consumers, and positive attitudes from consumers were detected using the CE method. This result is consistent with other studies (Quan *et al.*, 2018; Yu *et al.*, 2014), i.e. Chinese people have a positive preference for organic food. In several previous studies, researchers examined consumer preferences for organic labels from different countries or regions, and the results demonstrated that Chinese consumers preferred organic labels from developed countries compared to CHIL (Chen *et al.*, 2019a; Li *et al.*, 2015; Wu *et al.*, 2014). Yin *et al.* (2016) also revealed that consumers preferred tomatoes with European Union (EU) organic labels than those with CHIL. In addition, research analyzing EU, Brazilian, Japanese, and CHILs on vegetables was performed, and the results showed that the WTP rankings for these organic labels from high to low were EU, Brazilian, Japanese, and CHILs (Li *et al.*, 2015). Similarly, consumers preferred infant milk powder with USL to those with CHILs (Yin *et al.*, 2018b). However, in this research, WTP for CHIL was much higher than that of JAPL and USL. Some studies confirmed that Chinese consumers did not always prefer foreign products unless a more symbolic value was attached (Ehmke *et al.*, 2008; Wang *et al.*, 2018; Zhou and Hui, 2003). This study demonstrated that the 'foreign halo' is attenuated on uniquely Chinese products such as Oolong tea. These inconsistent conclusions imply that Chinese consumers' preference for different organic labels is very much associated with the product category. Another potential reason for people preferring CHIL to organic labels from other countries is familiarity. Hoek *et al.* (2017) pointed out the importance of familiarity in consumers' point-of-purchase actions. Product familiarity determines the consumers' positive response to sustainable food choices. CHIL is preferred because China is the largest producer of tea and domestic certification of tea has been recognized as more reliable in China. Similarly, Japan also has a culture of drinking tea while the US does not, so the respondents were more familiar with Japanese tea culture and therefore put a higher value on JAPL. In addition, the focus group discussions in Yin *et al.* (2018b) indicated that participants from different areas tended to prefer their local foods. Thus, the preference for local tea might also extend to local certifications, such as CHIL versus foreign organic labels. Oolong tea from Fujian occupied the highest percentage of Oolong tea in the market, thus people were more familiar with Fujian Oolong tea and recognized it as the highest quality. On the contrary, Guangdong Oolong tea accounts for a lower market share, thus people might be unfamiliar with this product and put a lower value on Oolong tea from Guangdong. This further highlights that familiarity affects consumers' preferences and purchase intentions. Compared with the RGBs, NABs are more capable of production control, which was recognized as representing a higher quality assurance by consumers, especially after the food safety scandals. Thus, NAB had a positive effect on consumers' preferences.

The effect of consumers trust in China's food regulations or certifications has been an emerging issue in recent several studies (Chen *et al.*, 2019a; Liu *et al.*, 2019; Zhang *et al.*, 2014). The demand for organic food is significantly related to the food safety issue (Li *et al.*, 2020). This study measured the scale of trust in organic labels and the results indicate that people are inclined to trust organic labels. The interaction between trust and organic labels confirmed that trust has a positive effect on consumer preferences for various

organic labels. This conclusion is consistent with the study by Chen *et al.* (2019a) and Yin *et al.* (2019a). At an earlier stage, the majority of Chinese consumers considered the government as a faithful information source (Liu *et al.*, 2013). However, repeatedly exposed food scandals have shaken Chinese consumer trust in food safety regulations by the government (Liu *et al.*, 2019) and attenuated their trust in food certifications (Chen, 2013; Yin *et al.*, 2019a; Yu *et al.*, 2014). In previous studies, Chinese consumers illustrated a lower preference and WTP for CHIL because of a lack of faith (Chen *et al.*, 2019a; Li *et al.*, 2015; Xu *et al.*, 2015). Lack of trust is also thought to be one of the most significant barriers for the development of the organic food market (Nuttavuthisit and Thøgersen, 2017; Vega-Zamora *et al.*, 2019). In this research, Chinese consumers presented a positive evaluation of Chinese organic certifications. This is a significant reason why people prefer CHIL. Thus, an effort should be put into promoting the credence of organic food. It is imperative to push for firm and consistent standards in organic foods so that consumers can confidently trust in these products (Nuttavuthisit and Thøgersen, 2017). The levels of trust in organic foods could be managed through the functionality and authenticity dimensions (Vega-Zamora *et al.*, 2019). Chinese consumers are willing to pay a premium for products with CHIL, which provides a better opportunity for Chinese producers. Tea companies like to make different kinds of organic certifications to enter domestic markets (Chen *et al.*, 2019a) and display higher quality (Bai *et al.*, 2013). Thus, CHIL could be used alone in the domestic market.

The final score of subjective knowledge was slightly over the median score, which indicates that people have a relatively high subjective knowledge about health and environmental issues. However, after interaction with the attributes chosen, it was not a key factor in determining preference or purchase intention. A higher level of knowledge might have shown a correlation but not necessarily causation for buying sustainable food, e.g. enhancing the educational level did not change the consumers purchase decisions regarding sustainable alternatives (Garnett *et al.*, 2015). This study also considered the role of socio-demographics on choice. Education, income, and age separately had little influence on Oolong tea purchases. Higher income and older people were more reluctant to consume organic food with CHIL. It seems that richer and older consumers have a more stable bias for Chinese food due to previous food scandals. Yu *et al.* (2014) revealed that younger people are willing to pay more than older consumers for green/organic food. Higher-educated consumers seem to prefer organic labels from Taiwan. A potential reason for this is that products from Taiwan gained a good reputation for quality in earlier years, which might reflect on the higher value for labels or certifiers from Taiwan among well-educated consumers. However, socio-demographics alone are not enough to explain the discrepancy in consumption behaviors (Hoek *et al.*, 2017). Many other aspects (i.e. psychographic, habit, and intrinsic attributes of the product itself) need to be considered to fully measure the choice patterns (De Jonge *et al.*, 2015; Grunert *et al.*, 2015).

The limitations of this study are as follows. First, Oolong tea is only one kind of tea product. Studies can analyze other kinds of tea to make more general conclusions. Second, this study focuses on two provinces in China, thus the sample is limited. It might be expanded to other regions. Third, the average price of Oolong tea is generally higher than other kinds of tea and consumers of Oolong tea might be at a higher income level, so that consumer price sensitivity is not as apparent as in other studies (Aschemann-Witzel and Zielke, 2017; Xie *et al.*, 2015; Yin *et al.*, 2010). Last, the higher WTP for organic labels might change when different foods are involved. Thus, to further investigate consumers' attitudes and preference for organic labels, more kinds of food should be considered.

5. Conclusions and implications

This study focused on consumer preferences for organic labels among Chinese consumers. The research chose Oolong tea, a real product in the organic market to conduct this study. Using a CE, many significant factors that influence consumers' purchase intentions were analyzed. It was confirmed that organic labels have a positive influence on consumer preferences in China. Chinese consumers are more inclined to trust domestic organic certifications for tea than those from other countries. In addition, the place of origin was also a significant factor that impacted consumers' evaluation of products. As the largest origin for Oolong tea, Fujian Province was inferred as a better quality cue by consumers. NAB was also a positive factor

influencing the preference for Oolong tea. The highest premium for an organic label was about 203% for CHIL, followed by JAPL (160%), and USL (113%). Consumers would also pay a 4.87-dollar premium for Oolong tea with NAB compared to the RGB. In addition, consumers showed a higher trust in organic certification than the median level. People with higher trust were more likely to purchase products attached with CHIL, which indicates that enhancing trust in organic certification could lead to a higher WTP for organic food. This study also considered subjective knowledge about the environment and health and found that people with higher scores in this item preferred Oolong tea from Fujian Province. The socio-demographics were not very significant to organic Oolong tea purchasing decisions compared to the other attributes. Higher income and older people were less likely to choose CHIL, while well-educated people were more inclined to purchase Oolong tea from Taiwan.

This study proposed some policy implications for both policymakers and tea producers in China. First, Chinese consumers showed a highly positive value for organic Oolong tea. This is beneficial for sustainable development. As tea planters turn to sustainable production, they can generate profits since consumers will pay a premium for organic Oolong tea. Thus, the government should encourage tea producers and factories to make Chinese organic certifications, which is beneficial to consumers and factories. Second, no matter where the Oolong tea was produced, Chinese labels were more attractive in the domestic organic food market. Since companies are inclined to make foreign labels, especially certifications from developed regions, the results of this study indicate that a Chinese organic label is sufficient for the organic Oolong tea market in China. This provides a better opportunity for Chinese producers to cut costs on certifications. Third, this study illustrates the importance of trust in organic labels when eliciting consumer attitudes and WTP for Oolong tea. To generate growth in the consumption of organic Oolong tea, the Chinese government should adopt a responsible attitude to reduce food fraud and thus enhance the degree of consumer trust in organic food.

Supplementary material

Supplementary material can be found online at https://doi.org/10.22434/IFAMR2020.0113

Table S1. Interaction effects of the socio-demographics and main effects through RPL model.

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Conflicts of interest

The authors declare no conflict of interest.

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