

Chinese Consumers' Willingness to Pay for Almonds as a Healthy Snack

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Abstract

This study uses 360 choice experiment data gathered in five large Chinese cities of Beijing, Shanghai, Guangzhou, Wuhan and Kunming during the traditional Chinese holidays of spring 2016 to analyze respondents' acceptance of almonds as a healthy snack food. The purchasing impact of Country of origin (COO), price, organic, brand, freshness, taste and consumer specific profile of education and their food expenses were examined. Mixed logit model was applied and the results show that: 1) there existed positive purchase attitudes toward the health featured almond snacks; 2) California imported almonds were preferred to the domestic Chinese almonds and the imported almonds were valued higher; 3) when purchase almonds, Chinese respondents were found to be unlikely price sensitive; and 4) their purchase decision was found to be unlikely affected by organic, crop freshness and the decision was made without the influence of respondents' educational background.

Keywords: almonds, price acceptance, Chinese consumers, Country of origin, almonds demand

1. Introduction

Even though China's overall food consumption volume has remained stable in the past decade, its food trend has unfolded new patterns. Responding to recurrence of food safety incidents, the market has shown rising demand for healthy animal proteins such as seafood (Xu et al. 2012), organic foods (Leobnitz and Aschenmann-witzel, 2016), imported luxury beverages of red wines (Xu et al. 2014; Masset et al. 2016), and lately the imported healthy snack of pistachios (Xu and Wang, 2014). The consumption of these relatively expensive but entertaining food items is well documented in the Western literature as a result of trending food styles in affluent and industrialized countries. China's new crave for novel and luxurious food is just being noticed. Little if any research has been conducted to explore this new food pattern and to look for reasons behind the change. This study fills in the gap by analyzing Chinese' emerging demand for almonds as a nutritious and healthy snack food and examining factors that affect consumption price willingness to pay. Factors that impact the purchase of domestic and imported almonds are measured to understand whether consumers would offer a price premium for selected product specific attributes of country-of-origin, brand, organic, freshness, and taste. The aim is to provide important policy implications to food policy planners to help them identify consumption motivations and to propose effective economic interventions. The ultimate goal is to aid the understanding of optimized consumer welfare related to this new food demand. The findings will also provide specific marketing and pricing insights about China's almond consumption to assist domestic and international marketers in their crafting of effective marketing strategies.

China is proven to be one of the world's major consumers of almonds which has recent years dominated eastern Asia's nuts import (USDA Agricultural Marketing Resource Center, 2017; USDA Foreign Agricultural Service, 2016). The domestic Chinese almonds are exclusively from its north-western inland Xinjiang province and the domestic supply is not sufficient to meet the growing demand. The rising international supply is primarily from California with almost all of imported nuts are consumed in China's metropolitan areas. For example, a peak volume of 99,811 metric tons of California nuts were sold in large cities in 2012 (a 13.21 billion dollars value, Anuford China, 2017), generating an overall market share of 15.44% for California almonds growers (Chen &

Liu, 2015). To these growers and the marketers, China plays a vital role and adds significantly to their farm level revenues (Morecraft, 2015). The robust demand has signaled a deduction in import tariff: Chinese government lowered the import tariffs from 24% to 10% in 2015, which further lifted import volume (Yang & Fale, 2015a). The recently started trade tension between the U.S. and China has resulted in a boost in almond tariff of 25%, causing the loss of consumer as well as producer welfare. Worldwide, the International Nut and Dried Fruit Council Foundation (INC) has categorized almonds as the most consumed tree nuts for high income countries. The emerging demand from China has just created a new market for the export seeking almonds sellers.

Tree nuts are a traditional snack food in China and almonds are newly recognized as a premium nut with beneficial nutritional values (USDA Gain report, 2016; South China Morning Post, 2015). Even though a majority of imported almonds are consumed as ingredients in manufactured food, the remainder is consumed as snack food and this portion has been rising for three reasons. First, the government issued Chinese Nutrition Dietary Guidelines recommends the consumption of tree nuts or beans of 30-50 grams daily which leads to more intake of tree nuts in Chinese's diet (Chinese Nutrition Society, 2016). Second, the growing demand from affluent consumers for imported food was driven by the loss of consumption confidence of domestic food. To the wealthy households, California almonds are believed to be less contaminated with hazardous agricultural chemicals than products from elsewhere (South China Morning Post, 2015). Thus, California almonds excel the homegrown nuts and other imported nuts to top the food choice of the expanding middle- and high- income segments (International Nuts and Dried Fruits Council, 2016, Morecraft, 2015). Third, urbanization has prompted tree nuts consumption (Yang & Gale, 2015ab). China's most recent census shows that due to the gradual removal of rural-urban migration barriers, 52% of China's gigantic population has migrated to urban areas where their demand for quality foods is flourishing (Feng & Shi, 2006). With greater disposable income to spend, these urban population consumes 2.5 times more tree nuts than their rural counterparts (National Bureau of Statistics of China, 2018; Yang & Gale, 2015b; Taobao, 2017). Lately, the safer California almonds have made to a must-have item in Chinese's holiday gift baskets besides being sold as a daily snack in "mom & pop" stores, franchised outlets, convenience stores, supermarkets, hotels and restaurants, and even online stores (USDA Gain report, 2016). This study focuses on the consumption of baked and flavored whole kernel nuts as a snack food.

This study is the first to examine Chinese consumption choice of almonds as a health featured snack food. It utilizes survey data to describe factors affecting consumption needs and to propose policy implications. It aims to: 1) analyze the impact of product specific attributes including country-of-origin, organic, brand, freshness, and taste on consumption demand; 2) examine consumer specific attributes of education and food budget on consumption choice; and 3) understand purchase related behavioral differences and price acceptance for domestic and imported almonds. On this track, we answer these questions: 1) how Chinese consumers' valuations would change towards imported almonds vs. homegrown almonds; 2) whether a price premium is acceptable for the California imported almonds in comparison to Chinese alternatives; and 3) what product specific attributes are considered and how important each of these attributes is in changing consumption decision. The findings are imperative to almonds producers and marketers nationwide and worldwide to assist in the crafting of effective marketing plans and pricing decisions. This study also provides new understandings about China's emerging consumption behavior towards this healthful snack food. Digging into driving forces behind the new demand would expand food policy makers' knowledge about new consumption needs to help propose appropriate and timely policy interventions.

2. Materials and Methods

Results of a literature review are presented in Table 1. Based on the literature review, attributes and attribute levels were chosen (Figure 1). We included an additional product specific attribute of kernel freshness to understand the impact of new crop on almond choice. The demographic variables of income and education are included in the mixed logit model to explain how consumer specific attributes lead to changes in consumption pattern.

Table 1. Literature review

	Authors and publication year	Research findings
Country of origin	Balestrini and Gamble, 2006	Chinese consumers use COO to evaluate wine quality.
	Chrysochoidis, G., A. Krystallis, and P. Perreas, 2007	The impact of COO on Greek consumers' selection of ham, cheese, and beer was prominent.
	Insch, A., and E. Jackson, 2013	COO was an insignificant factor on food choice of New Zealand consumers. Price, taste, health concern and product quality were more influential in food choice.
	Dobrenova, F., Grabner-Krauter, S., and R. Terlutter, 2015	Respondents in 13 countries were online surveyed and the results showed a positive COO impact on perception and purchase intention of Japanese functional foods.
	Williamson, P., L. Lockshin, I.L. Francis, S. M. Loose, 2016	COO, next to wine quality ratings, was the second most important factor affected red wine selection of Chinese consumers.
	Zhu, Jackson and Wang, 2017	Chinese consumers tended to choose imported grain because of perceived better quality and safety reasons.
	Chao, 1993	If consumers viewed products from a country as usually low in quality, they would seek other quality indicators. And price was often used as such an indicator.
Price	Wu, Li, and Samuel, 1995	Chinese consumers were found sensitive to the price change of seafood.
	Camillo, 2011	Price was positively correlated with one's education and salary.
	Mann et al. 2012	Price was more important than COO in affecting purchases.
	Wang and Huo, 2016	Chinese consumers were willing to pay a positive premium for certified fruits. But this willingness to pay was affected by gender, education, and income.
Brand	Jin, Zhang, and Xu, 2017	Chinese consumers were willing to pay a 10% premium for traceable pork that had a detailed information label.
	Gluckman, 1990; Orth and Krska, 2002	Consumers relied on brand to discern quality.
	Laroche et al. 2005	Chinese consumers experienced difficulty in differentiating similar brand, but they categorized brands into four sets and then chose among the product within a categorized set.
	Lockshin, Jarvis, d'Hauteville, Perrouty, 2006; Gergaud and Livat, 2007; Camillo, 2011	Knowledgeable consumers tended not to use brand but used price to evaluate wine quality.
	Zhu, Jackson and Wang, 2017	Consumers paid additional attention to brand, rather than price, when judging grain quality.
Taste	Peterson and Yoshida, 2004	Japanese respondents rated U.S. rice as tasting better than domestic rice, followed by Australia rice (9.6%) and Chinese rice (6.2%).
	Hanis et al. 2012	Food safety concerns were the most important factor in choosing grain, and taste was the second most important factor.

Table 2. An example choice experiment card

Product number	Country of origin	Price Yuan/Jin	Organic	Brand	New crop	Taste
1	Domestic	80	Organic	Branded	Old	Good
2	California	60	Non-organic	No brand	Old	Not good
3	Other countries	80	Organic	No brand	New	Good
Not interested in purchasing						

A three and half page full questionnaire survey including 45 questions were used in the face-to-face interview. The first part of the questionnaire inquired about almond consumption quantity, frequency, price acceptance, and other quantity influential factors. The second part asks the consumption of imported almonds, attitudes towards and price willingness to pay for imported products. The last part includes survey takers' demographic profile as well as their income level. If a respondent has never purchased almonds and does not plan to purchase in the soon future, an alternative questionnaire was given to inquire about reasons not purchase, demographic profile, income level, and consumption attitude towards imported foods.

Undergraduate agricultural economics students from China Agricultural University administered the face-to-face interview at selected food supermarkets in Beijing, Shanghai, Guangzhou, Kunming and Wuhan. Food supermarkets were chosen based on their proximity to the student's home. Interviews took place in late January and early February of 2016 during the winter break when students returned hometown for the spring festival. The interview results in 108 useful responses from Beijing, 54 each from Guangzhou, Kunming, and Wuhan, and 36 from Shanghai, for a total of 306 observations. Due to some respondents did not complete the conjoint analysis questions in its entirety, a total of 269 observations were used in the conjoint analysis. To understand reasons of not consuming almonds, we approached 67 respondents who completed the no purchase questionnaire (43 from Beijing, 1 from Shanghai, 17 from Guangzhou, 2 from Kunming, and 4 from Wuhan). To ensure scale validity, a pilot testing was conducted with respondents from each testing region. After opinions from each selected respondent were gathered and learned about what they thought were the best scales, the original scales were adjusted. The pilot study also resulted in the drop of some of the questions and combinations of scales in order for our respondents to present their attitudes in a clearer way.

The choice-based conjoint analyses (CBC) framework is appropriate for price willingness to pay analysis. Due to the fact that almond purchase is affected by a bundle of attributes, the CBC framework is capable to estimate trade-offs in between these selected attributes. Batsell and Lodish (1981) were one of the first to apply the CBC method and multinomial logit model (McFadden 1970) to estimate consumers' beverage preference for the understanding of trade-offs between attributes. An important benefit of CBC is its capacity to predict possibility of one attribute being chosen among a list of attributes in a competing set, imitating the real-world situation where consumers are provided with consumption options in a marketplace. Agribusiness researchers Lusk and Hudson (2004) pointed out that CBC method closely mimics consumers' typical shopping experiences to allow for close examination of variation importance between competing attributes.

CBC framework applies the random utility theory developed by Lancaster (1966) who defined that utility of the i^{th} consumer $U_i (i=1, \dots, I)$ derived from the j^{th} alternative (out of a choice set of C) is a function of the selected attributes associated with the product alternative j :

$$U_{ij} = \beta x_{ij} + \varepsilon_{ij} \quad (1)$$

Where β is a vector of unknown parameters of interest, x is a vector of selected attributes for product j selected by consumer i , and ε is a stochastic error term resulted from measurement errors.

According to McFadden (1974), the probability P_{ij} that individual i will choose alternative j from choice set C is the probability that the utility associated with choice j is greater than the utility associated with all other k choices in the same set. Thus,

$$P_{ij} = P[(\varepsilon_{ij} - \varepsilon_{ik}) > (\beta x_{ij} - \beta x_{ik}); j \neq k \in c] \quad (2)$$

Assume the error terms ε are independent and identically distributed with the Weibull (Gnedenko, extreme value) distribution (McFadden 1974), and that independence of irrelevant alternatives (IIA) is controlled, the probability of individual respondent i chooses alternative j is (P_{ij}):

$$P_{ij}(j) = \int \frac{\exp(\beta x_{ij})}{\sum_{k=1}^J \exp(\beta x_{ik})} \delta(\beta) d\beta \quad (3)$$

Given the demand theory of the downward sloping demand curve, we assume that

$$\frac{\partial U}{\partial p} < 0 \quad (4)$$

The above condition holds because in a perfectly competitive market, when price goes up, consumption demand will drop. In addition, a mixed logit model is used to estimate heterogeneity of consumption preferences caused by consumer profile difference (Carlsson et al. 2007). Willingness to pay can be estimated using (Mayen et al. 2007):

$$WTP_j = \frac{\beta_{j=1} - \beta_{j=0}}{-\beta_{price}} \quad (5)$$

WTP denotes the amount of money an individual consumer is willing to give up in exchanging for consumption utility associated with a specific product attribute. Given the estimated WTP for a least preferred level to the most preferred level must be positive, the WTP estimate is expected to be greater than zero when change from a least preferred attribute level to the most preferred level. For all attributes with base levels, the base level is set up at zero ($\beta_{j=0}=0$). The estimated utility framework is:

$$\begin{aligned} Utility = & \beta_1(China) + \beta_2(California) + \beta_3(price) + \beta_4(organic) + \\ & \beta_5(brand) + \beta_6(new\ crop) + \beta_7(taste) + \beta_8(education) + \\ & \beta_9(food\ expense) + \beta_{10}(education * food\ expense) \end{aligned} \quad (6)$$

Survey respondents' demographic information shows in Table 2. The sample is from a group of relatively young consumers with mean age of 34.5 years old and it includes more female respondents of 61% than male respondents (39%). Although more than half of the respondents (62%) held a bachelor's or more advanced degree, there are 16% of them either held a high school certificate (9%), graduated from an intermediate school (4%), or from an elementary school (3%). The difference in education may predict different purchase preference and thus this education attribute is included in the mixed logit model. The sample's income varies. On the high side, tabulations for the before tax monthly income indicated that 49% of the sample had an income of higher than \$1588 with 10% of them earned the highest income of above \$3176 (1 USD=6.3, the dominant USD and Chinese Yuan exchange rate in spring 2016). On the low side, 18% of the respondents reported an income of \$592 or less. Even though, income represents the respondent's overall earning, food expense can better predict the household's snack demand. The sample's average monthly food expense was between \$238 and \$317 with 37% of them spent over \$318 per month. The survey further inquired about monthly expense on snack food and 50% of the respondents reported an expenditure of more than \$32 on snack food with only 23% spent less than \$19. Possibly a result of the one-couple-one-child policy, the sample's mean household size was 3.4 with 43% of the respondents reported three family members. However, bigger families were included in the sample: 36% of the sample had four or more family members.

Table 3. Respondents' demographical profile

		Count	Percent
Age	Less than 23 years old	16	5%
	23-26	59	19%
	27-29	46	15%
	30-34	49	16%
	35-39	45	15%
	40-44	34	11%
	45-49	26	9%
	50 or older	31	10%
	Total	306	100%
Gender	Male	118	39%
	Female	188	61%
	Total	306	100%
Education	High school or below	49	16%
	Job preparation schools	68	22%
	Bachelor's Degree	124	41%
	Master and Ph.D.	65	21%
	Total	306	100%
Monthly before tax income USD	Less than \$ 592	56	18%
	\$ 593-1270	57	18%
	\$ 1271-1587	45	15%
	\$ 1588-1905	45	15%
	\$ 1906-2857	48	16%
	\$ 2858-3175	24	8%
	\$ 3176 or more	31	10%
	Total	306	100%
	Monthly before tax food expense USD	Less than \$159	65
\$160-238		62	20%
\$239-286		38	12%
\$287-317		31	10%
\$318-397		43	14%
\$398-476		32	11%
\$477 or more		35	12%
Total		306	100%
Monthly before tax snack food expense USD	Less than \$13	29	10%
	\$13-19	41	13%
	\$20-29	47	15%
	\$30-32	36	12%
	More than \$32	153	50%
	Total	306	100%
Household size	Two or less	62	21%
	Three	133	43%
	Four	52	17%
	Five	44	14%
	Six or more	15	5%
	Total	306	100%

Respondents were asked to report their almond purchase frequency (Table 4). Even though 22% of the sample did not purchase almond, 27% of them purchased almond monthly or more often. The average purchase frequency was once every three months. The sample's average purchase quantity was 1.5 Jin (or 1.7 pounds) per store visit with 32% of respondents purchased more than 1.1 pounds each visit. With the 71% respondents who answered the purchase price question, the average reported price was 43 Yuan (about \$6.8) per pound of almond and 48% of the respondents rated the price as appropriate. Due to the fact that almonds were popularly used as a gift, the survey asked respondents about how frequent they purchased for self-consumption. The reported

sample average was once per week with 43% ate at least once every two weeks and 21% of them ate at least three times each week. One average, the respondents ate a small handful of kernels. Almond purchases occurred mainly from medium or large supermarkets (35%) but convenient stores, nuts wholesale markets and retail stores were also visited. It is worth noticing that 12% of the sample indicated the use of online stores for almond shopping. China's recent expansion of online transaction platforms, the so-called Chinese Amazon, has popularized almonds purchase. More respondents reported the purchase of Chinese almonds (44%) than imported nuts (34%) and if imported almonds are bought, an average of 1.9 Jin per store visit (2.1 pound) was reported.

Table 4. Almond purchase behavior

	Count	Percent
Almond purchase frequency		
Less than one month	35	11%
One month	48	16%
Two months	21	7%
Three months	28	9%
Longer than three months	107	35%
Do not purchase almond	67	22%
Total	306	100%
Purchase quantity per store visit (unit: Jin, 1 Jin =1.1 pound)		
0.5 or less	40	13%
(0.5-1]	100	32%
(1-2]	66	22%
Greater than 2	30	10%
Did not answer	70	23%
Total	306	100%
Purchase price for one Jin (1.1 pounds) of almond		
30 Yuan or less	37	12%
(30 to 40]	81	27%
(40-50]	57	19%
(50-60]	29	9%
Greater than 60	12	4%
Did not answer	90	29%
Total	306	100%
Is the above price acceptable?		
Too expensive	87	29%
Appropriate	148	48%
Did not answer	71	23%
Total	306	100%
How frequent do you consume almond?		
Five times per week or more often	36	12%
Three times to four times per week	28	9%
Once every two weeks, once or twice every week	66	22%
Once every three weeks to once per month	36	11%
Less often than once per month	73	24%
Did not answer	67	22%
Total	306	100%
How much do you consume each time?		
Three to five kernels	42	14%
Six to eight kernels	60	19%
A small handful	116	38%
More than a small handful	21	7%
Did not answer	67	22%
Total	306	100%
Where do you shop for almond?		

Medium or large food supermarkets	107	35%
Small marts or convenient stores	21	7%
Nuts wholesale markets	30	10%
Nuts retail stores	33	10%
Imported foods markets	12	4%
Online stores	36	12%
Did not answer	67	22%
Total	306	100%
Do you purchase Chinese almonds or imported almonds?		
Chinese almonds	134	44%
Imported almonds	105	34%
Did not answer	67	22%
Total	306	100%
Purchase quantity for imported almond per store visit		
0.5 Jin or less	21	7%
(0.5-1]	59	19%
(1-1.5]	6	2%
(1.5-2]	18	6%
Greater than 2 Jin	27	9%
Did not answer	175	57%
Total	306	100%

Respondents were asked to rate the influence of 10 factors in their almond purchase on a 1-7 likert scale, with 1 represents the least amount of influence and 7 the most influence (Table 4). The most rated factor was taste (5.92) followed by information label (5.3), color of kernels (5.21), and new crops (5.11). Price was rated less influential (4.96). Taste, product label, color and freshness were better factors to predict purchase than price. Interestingly, country-of-origin appeared to be the least considered factor (2.94) in almond purchase.

Table 4. Factors affecting almond purchase

Variable (n=239)	Mean rating (scales 1-7)	Standard deviation
Taste	5.92	1.38
Label is informative	5.30	1.73
Color	5.21	1.62
New crop	5.11	1.68
Price	4.96	1.64
Popularly purchased	4.35	1.89
Brand	4.33	1.78
Organic crop	4.02	1.91
Package attraction	3.68	1.55
Country of origin	2.94	1.81

3. Results and Discussion

Table 5 shows the estimated coefficients and test statistics from the mixed logit model. The model's goodness-of-fit for the *five cities* model was statistically significant ($\text{Prob} > \chi^2$ is close to zero with LR χ^2 of 79.17), indicating that the selected model fits significantly better than the null model. Similarly, model's goodness-of-fit is statistically significant for the *Shanghai*, *Guangzhou*, *Kunming* and *Wuhan* models. But, the *Beijing* estimation shows low goodness-of-fit statistics, meaning that the fitted variables are not better than the null model. Country-of-origin affects consumption choice: in the *five cities* model, the *China* variable was statistically significant ($\alpha < 5\%$) meaning that sampled respondents preferred Chinese almonds to other countries' almonds (not including California almonds). The *California* variable is bigger in magnitude than the *China* variable and is statistically significant ($\alpha < 1\%$), suggesting that respondents liked California almonds the best, followed by Chinese almonds, and they least preferred almonds from other parts of the world (the base level of zero). Specifically, if the probability of almonds from other parts of the world being chosen was zero, then the probability of Chinese almonds being chosen was 22% and California almonds being selected was 46%.

Table 5. Mixed Logit model results

Variables	All cities (n=4304)		Beijing (n=1728)		Shanghai (n=560)		Guangzhou (n=864)		Kunming (n=288)		Wuhan (n=864)	
	Estimate	P> z	Estimate	P> z	Estimate	P> z	Estimate	P> z	Estimate	P> z	Estimate	P> z
China	0.22**	0.02	0.09	0.57	0.16	0.57	1.00***	0.00	-0.16	0.67	-0.06	0.80
California	0.46***	0.00	0.06	0.68	0.56	0.68	1.00***	0.00	0.33	0.36	0.76***	0.00
Price	0.00	0.17	0.00	0.45	0.00	0.45	0.00	0.26	0.01	0.16	0.01*	0.06
Organic	0.03	0.69	0.07	0.60	-0.14	0.60	0.02	0.91	0.22	0.47	0.03	0.86
Branded	0.13*	0.09	0.08	0.51	0.62	0.51	0.02	0.89	-0.42	0.17	0.25	0.16
New crops	0.09	0.27	0.13	0.30	0.02	0.30	0.13	0.48	0.22	0.48	0.00	0.98
Taste	0.16**	0.04	0.28**	0.03	-0.15**	0.03	0.04	0.82	0.70**	0.02	0.09	0.61
Education	-0.02	0.84	0.00	1.00	0.07	1.00	-0.09	0.73	0.03	0.95	-0.03	0.90
Food expense	-0.05	0.75	0.00	0.98	-0.04	0.98	-0.54	0.25	0.02	0.97	-0.01	0.96
Education*food expense	0.05	0.77	0.00	0.99	0.05	0.99	0.47	0.36	0.04	0.95	0.02	0.97
Log likelihood	-2360.73		-967.07		-305.86		-437.83		-152.13		464.08	
LR chi2(10)	79.17		9.28		18.09		54.46		19.65		43.54	
Prob>chi2	0		0.51		0.05		0		0.03		0	

Brand was considered when purchased almonds: a brand-name product was 13% more likely to be chosen than its generic option. Taste matters: almonds with good mouth-feel were 16% more likely to be selected. This mouth-feel attribute was also found to affect Chinese consumption of certified fresh apples (Wang & Huo, 2016). Notice that the food expense variable shows a negative impact on almond choice meaning that respondents with a lower monthly food expense of \$286 or less tended to be 5% more likely to purchase almonds than those with a higher food expense. In this overall estimation based on the entire sample, price was not found statistically significant indicating that when purchase almonds, Chinese respondents were unlikely to be price sensitive. Neither would their purchase decision tended to be affected by organic, crop freshness and the consumers' educational background.

To further explore purchase behavioral heterogeneities across cities, individual sample from each city was used. The *Beijing* and *Shanghai* estimations show that respondents from these two cities considered the taste of almonds ($\alpha < 5\%$) as an important purchasing factor. However, the direction of impact is opposite in the two cities: Beijing respondents preferred almonds that had good mouthfeel. Differently, Shanghai respondents tended to choose almonds that did not have a good mouthfeel. This result agrees with a recent news report suggesting that China is experiencing a national shift in eating habit such that health conscious consumers want less fat, sugar, and salt in their diet (Reuters, 2017). Our result reveals that Shanghai consumers desired healthy almonds and were willing to sacrifice good taste to exchange for the health attribute. None of the other variables were found statistically significant on almond choice from Beijing and Shanghai.

Guangzhou consumers liked California almonds the same as the Chinese almonds. The high coefficients indicate that almonds from other places were not considered ($\alpha < 1\%$). In the southern coastal city of Kunming, consumers chose almonds based on the taste only ($\alpha < 5\%$). In the large mid-east inland city of Wuhan, respondents considered country-of-origin ($\alpha < 1\%$) and price ($\alpha < 10\%$) as the two major purchase factors. California almonds ($\alpha < 1\%$) were clearly desired. The price impact conflicts with basic economic theory as we found the higher the price, the more likely to purchase. Perhaps Wuhan consumers used price as an indicator of quality such that they believed the higher price was associated with better almonds.

Table 6 presents estimated willingness to pay (WTP) from the mixed logit model. Even though none of the estimated willingness to pay factors were statistically significant, these factors were securitized because they provided preliminary findings about variations in consumer valuation for each selected attribute. In regards to country-of-origin, in the *five cities* estimation, WTP from *China* to *other parts of worlds* was -114.82, meaning that respondents demanded a compensation of 114.82 Yuan (about \$17.66) if being switched from Chinese almonds to an alternative product from other parts of the world (excluding California). These respondents demanded 238.51 Yuan (\$36.69) if being switched from California almonds to any other almonds (excluding Chinese almonds). Thus, California almonds were related to a higher WTP valuation than Chinese almonds. This high valuation of California almonds was more significant in the Shanghai sample: their respondents demanded a 411.5 Yuan (\$63.31) compensation if being switched from California almonds to almonds produced in other

regions (excluding China). Guangzhou consumers liked Chinese and California almonds the same and showed positive WTP for almonds produced in these two places. Consumers from Beijing, Kunming and Wuhan demonstrated positive valuations for almonds from other parts of the world. Specifically, Beijing consumers were willing to pay 52.73 Yuan (\$8.11) to be switched from Chinese almonds to the alternatives.

Table 6. Estimated WTP

	Five cities (n=3228)	Beijing (n=1296)	Shanghai (n=420)	Guangzhou (n=648)	Kunming (n=216)	Wuhan (n=864)
WTP China to other	-114.82	52.73	-116.33	-260.53	20.71	20.71
Confidence interval	(-330.69, 101.05)	(-136.02, 241.49)	(-983.04, 750.37)	(-763.41, 242.34)	(-70.59, 112.00)	(-70.59, 112.00)
WTP California to other	-238.51	38.09	-411.5	-260.56	-42.07	-42.07
Confidence interval	(-618.84, 141.82)	(-139.30, 215.49)	(-2877.05, 2054.06)	(-763.60, 242.48)	(-163.04, 78.91)	(-163.04, 78.91)
Organic to nonorganic	-16.48	39.81	102.01	-5.36	-28.18	-28.18
Confidence interval	(-104.61, 71.65)	(-118.48, 198.12)	(-485.25, 689.27)	(-98.55, 87.83)	(-121.76, 65.40)	(-121.76, 65.40)
Branded to unbranded	-69.61	50.17	-457.75	-6.24	54.14	54.14
Confidence interval	(-210.88, 71.67)	(-120.20, 220.54)	(-3137.23, 2221.73)	(-100.15, 87.67)	(-41.16, 149.45)	(-41.16, 149.45)
New to old	-45.19	79.11	-13.99	-33.08	-27.94	-27.94
Confidence interval	(-158.68, 68.29)	(-140.46, 298.68)	(-360.22, 332.25)	(-150.56, 84.39)	(-122.23, 66.35)	(-122.23, 66.34)
Tasty to not tasty	-84.43	168.17	112.63	-10.55	-89.27	-89.27
Confidence interval	(-243.56, 74.69)	(-250.92, 587.26)	(-527.17, 752.43)	(-107.00, 85.91)	(-249.95, 71.41)	(-249.95, 71.41)
Education to low education	12.67	-0.84	-53.87	24.12	-3.38	-3.38
Confidence interval	(-109.88, 135.22)	(-249.66, 247.98)	(-634.51, 526.78)	(-120.28, 168.52)	(-100.72, 93.96)	(-100.72, 93.97)
Food expense high to low	24.34	-2.93	32.48	139.75	-2.6	-2.6
Confidence interval	(-132.25, 180.93)	(-290.23, 284.38)	(-732.81, 797.78)	(-208.04, 487.54)	(-118.35, 113.16)	(-118.36, 113.16)
Food expense and education interaction	-26.01	2.59	-34.8	-121.32	-4.69	-4.69
Confidence interval	(-203.81, 151.79)	(-323.28, 328.47)	(-864.47, 794.86)	(-462.86, 220.22)	(-152.03, 142.64)	(-152.03, 142.64)

As to the organic attribute, respondents liked organic almonds and in general were willing to pay 16.48 Yuan (\$2.53) more for the organic compared to non-organic nuts. However, consumers from Beijing and Shanghai liked non-organic almonds better and would pay a premium for regular almonds. The brand attribute had different WTP estimations: Shanghai consumers demonstrated a high WTP for name-brand almonds (457.75 Yuan, \$70.42), but Beijing, Kunming and Wuhan consumers showed greater preference for generic almonds.

Education as a consumer-specific attribute displayed a positive WTP of 12.67 Yuan (\$2) in the *five cities* model, suggesting that respondents with a higher educational background were reluctant to pay a premium for almonds. This education impact was especially significant in the Guangzhou sample where respondents demanded a compensation of 24.12 Yuan (\$3.8) if were asked to purchase almonds. Those from Shanghai, Kunming, Wuhan and Beijing were willing to pay a small premium if they had a stronger educational background. In regards to food expense, the *five cities* model showed that a lower food expense was linked with a higher almonds WTP

(24.34 Yuan, \$3.74). The Food expense and education interaction had a negative WTP, indicating that respondents with a low food expense and high educational background would demand a compensation for almonds purchase. Similarly, respondents with a high food expense and low educational background would also request a compensation for almonds purchase. In contrast, respondents with a high food expense and high educational background or those with a low food expense and low educational background were more likely to pay extra for almonds.

4. Conclusion

Because modern Chinese food consumption choice is evolving across time and geographical locations, previous revealed food patterns cannot be used to predict new trends. It is appropriate to utilize new data gathered in different places to explore the transition and propose effective theoretical framework for marketing and policy interventions and for the advisory of marketing tactics. This study provides an understanding about the on-going food trends by analyzing the demand of a healthful almond snack either imported or produced in China. We believe the food trends may differ in China depending on where consumers live and the level of globalization they have experienced, thus we utilized a wide-scaled data collection and gathered data from three metropolitan regions of Beijing, Shanghai, and Guangzhou and two large inland cities of Kunming and Wuhan. Since China is a vast country where regional differences abound, our results may only represent food trends from the related regions and is not representative of the less globalized areas. Our study confirms our hypothesis that consumer attitudes towards imported California almonds differ across regions. We found that consumers from the coastal Guangzhou revealed the strongest demand for imported nuts, and this consumption trend is also presented in the inland Wuhan city. On the opposite, in the capital city of Beijing, China's believed most globalized city of Shanghai, and the southern capital city of Kunming the pattern is not shown. Despite the difference across cities, the five-city results did exhibit a general positive purchase attitude towards imported nuts. Also, our four tested cities illustrate a less significant demand for domestic grown almonds than imported almonds. In fact, except Beijing that depicted positive attitudes towards Chinese almonds, respondents from all other cities ranked Chinese almonds as no better than almonds from California. Kunming and Wuhan consumers even ranked Chinese almonds as no better than any imported almonds. Thus, all surveyed respondents would consider country-of-origin when making almond snack purchase. In general, our results pointed out positive purchase attitudes towards imported almond as a healthy snack. For instance, Shanghai respondents showed a positive and high price willingness to pay for imported California almonds. People from Beijing, Kunming and Wuhan were willing to accept a higher price if the almonds were imported from other countries besides the United States. One possible explanation of this consumption preference for imported nuts is the growing middle- and high- income classes in our tested regions who are increasingly converted into the material intensive lifestyles commonly seen in the developed world (Thøgersen et al., 2016). It is expected that this consumption growth for healthy food in the foreseeable future will be even faster in developing than developed economies (EIA, 2013) such that Chinese younger generations will be more motivated to consume the expensive healthy snack foods such as imported almonds.

Our analyses also revealed some impact of taste on almonds consumption. It is not a surprise to see the rapid economic transformation currently occurring in China is accompanied by changes in food taste and that imported almonds as a novel food is associated with a better taste than the domestic alternative. It is also important to be aware that taste and mouthfeel plays a strong impact on food choice so that almond marketers should examine taste preference of targeted segments in order to generate a bigger demand. Interestingly, Shanghai consumers seem to have developed different taste preference such that they desire almonds with a negative mouthfeel. Some Chinese consumers believed tasty food is mostly unhealthy and that, for instance, the bitter taste of walnut skin is beneficial to human health (Fan, 2009), and the same logic was applied to the selection of almonds. Understanding drivers behind food trends and linking the food patterns to not only product-specific but also consumer-related reasons would be appropriate for the expanding of market share for imported almonds.

Whereas imported almonds may be inexpensive in the product origin country, they are considered a high-priced snack by most Chinese consumers. Indeed, the literature has demonstrated that average Chinese citizens are price sensitive on their food choice (Wu, Li, and Samuel, 1995). Our results do not agree with the literature. The price sensitivity estimation is only significant in the Wuhan sample whereas consumers from other four cities tended to pay less attention on price but cared more about product origin and taste. The almond snack food purchase is a pursuant of a healthy lifestyle and is rooted in the value base same as their western country counterparts such that price is less of an influence than health concerns. This fading price sensitivity influence makes it more likely that Chinese consumers will adopt almond snacks when additional health benefits information is offered. The managerial implications from our results suggest the need for the almond marketers to conduct a pre-entrance

price willingness to pay estimation for their specific products and create an in-depth pricing and planning strategies. Specifically, the marketers may appraise their product attributes and introduce a price estimation system to better understand their target segments and factors impacting price acceptance. In addition, the marketers may need to provide sufficient product information for the purpose of product differentiation and making their product more attractive to the Chinese consumers.

Whether Chinese consumers will choose imported California or Chinese almonds depends on a wide range of factors; some of which reside in the society's overall valuation and yet others in the individual consumer. Hence, there are factors that are missed in this study and future research should integrate them to better understand this consumption choice in a broader, more holistic framework.

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