

Consumer preferences for three dimensions of country of origin of a processed food product

Three
dimensions
of country
of origin

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Abstract

Purpose – The production process of processed food products may involve several countries. This multi-dimensionality of the country of origin (COO) may affect consumer preferences for the products. We apply Case 2 best–worst scaling to measure Japanese consumers' preferences for three dimensions of the COO of a vegetable juice product.

Design/methodology/approach – The three dimensions of the COO include these: the country where the raw materials of the product were grown (the country of growing), the country where the raw materials were processed (the country of processing) and the country where the food company producing the product is headquartered (the country of the company). Japan, Australia, Thailand and China are the countries considered for the three COO-related attributes. Sixteen juice products (profiles) were created from the three four-level attributes. A survey queried 416 consumers to select the best and worst ones from among the three attribute levels shown in each profile.

Findings – The average utility of the country of growing is the highest among those of the three COO-related attributes. However, consumers evaluate the country of growing as the least preferred among the three attributes with respect to a country with a negative food quality reputation.

Originality/value – This is the first Case 2 best–worst scaling study to measure consumer preferences for the three dimensions of the COO of processed food products. It suggests marketing strategies for domestic and international juice companies.

Keywords Country of origin, Best worst scaling, Consumer valuation, Country of growing, Country of processing, Country of the company

Paper type Research paper

1. Introduction

Processed food products help reduce the time spent preparing meals and enable proper and long-term food storage. International trade in processed food products has progressed, and the share of processed food exports in total world food exports has increased (Jongwanich, 2009). One characteristic of processed food products is that the production process may involve several countries; the raw materials, such as crops, vegetables, fruits and livestock, may be grown/reared in one country, and then exported to and processed in another country. Furthermore, the nationality of the company that produces the processed food products may be different from the countries in which the raw materials are grown and/or processed. Thus, the country of origin (COO) of a processed food product is not necessarily one-dimensional, and this multi-dimensionality of the COO of processed food products may affect consumer

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preferences thereof. Consumer valuation studies on the COO of processed food products should therefore carefully consider the dimensionality of the COO that is targeted.

The multi-dimensionality of the COO has mainly been investigated for manufactured products. The multi-dimensionality comprises the country where the headquarters of the company producing the product is located, the country where the product is assembled or manufactured, the country of origin of parts used for manufacturing or assembling the products, and the country where the product is designed (e.g. [Johansson et al., 1985](#); [Chao, 1993, 2001](#); [Samiee, 1994](#); [Aichner, 2014](#)). Recent studies have focused on brand origin, referring to where the headquarters of the company owning a brand is perceived to be located or the country perceived to be associated with a brand (e.g. [Thakor, 1996](#); [Samiee et al., 2005](#); [Samiee, 2011](#); [Usunier, 2011](#)). As a representative example, a Japanese company's branded product that is made in China is perceived as a Japanese product. Various studies have examined the effect of these COO-related concepts on consumer valuations of products (the COO effect), while sales strategies for products have also been considered from the perspective of the COO effect (e.g. [Aichner, 2014](#) and the references therein). Sales strategies include foreign branding in a language that is different from the one used in the actual COO of the products used to express the products' brand name (e.g. [Leclerc et al., 1994](#); [Aichner et al., 2017](#)).

Although many studies have measured consumer value of the COO of food products, almost no study has examined the multi-dimensionality of the COO for food products. Recent stated preference studies measuring consumer preferences for the COO of food products have focused on consumer preferences for local food products compared with preferences for non-local products (e.g. [Mugera et al., 2017](#); [Escobar et al., 2018](#); [Meyerding et al., 2019](#)), or those for domestic food products compared with those for imported ones (e.g. [Yin et al., 2017](#); [Grunert et al., 2018](#); [Meyerding et al., 2019](#)). Although individual countries (e.g. the US, Canada and Mexico) are generally used as the levels of the COO attribute, a combination of two countries (e.g. "Canada and the US"), a combination of three countries (e.g. "Canada, Mexico and the US"), or a zone that includes two or more countries (e.g. North America) can also be used (e.g. [Tonsor et al., 2013](#); [Klain et al., 2014](#); [Lusk et al., 2014](#)). Some studies define the COO in detail. For example, [Lagerkvist et al. \(2014\)](#) defines the COO of beef as the country where the cattle was born, fattened, slaughtered and packaged, whereas [Balcombe et al. \(2016\)](#) define the COO of meat as the country where the livestock was reared and slaughtered. A detailed definition of the COO is vital for some categories of food products, such as processed food products, because consumers have concerns about various aspects of the production processes of food products (e.g. [Jin and Zhou, 2014](#); [Miller et al., 2017](#); [de-Magistris et al., 2017](#); [Bazzani et al., 2018](#)). However, to the best of our knowledge, [Bienenfeld et al. \(2016\)](#) focused on the multi-dimensionality of the COO for processed food products. [Bienenfeld et al. \(2016\)](#) conduct a discrete choice experiment (DCE) study to measure consumer preferences for two dimensions of the COO of a packaged cereal product in the US. The two dimensions correspond to the locations of the two stages of the product's production process: the country where the grain in the product was grown (the country of growing or COG) and the country where the grain was processed and packaged (the country of processing or COP) [1].

Although [Bienenfeld et al. \(2016\)](#) provide significant findings and implications regarding consumer preferences for the COO of processed food products, their study has two limitations. First, their findings are derived from a consumer survey conducted in the US, and the countries used as the levels of the COO-related attributes are the US, England and China. The general applicability of their results should be examined by conducting additional surveys in other countries and by using other countries as the levels of the COO-related attributes. Our study conducts a consumer survey in Japan and uses Japan, Australia, Thailand and China as the levels of the COO-related attributes. The other limitation is that they exclude the country where the company producing the processed food product is headquartered (the country of the company or COC) from their COO-related attributes. For

some industrial products, the COC is important information for consumers [2]. From the viewpoint of consumers' perceptions, the phrase "Made in country X" may mean both "the product is made in country X" and "the product is made by a company founded in country X." Although processed food products are a type of agricultural and/or livestock product, they are also partly similar to industrial products because the processing stage of processed food products is similar to the manufacturing stage of industrial products. The processing of raw materials of processed food products may occur in a factory and may be entirely mechanized. Therefore, consumers may consider the COC of processed food products when purchasing the products. Our study uses the COC as a COO-related attribute as well as the two dimensions of the COO in [Bienenfeld et al. \(2016\)](#), and then examines whether consumers evaluate the COC of processed food products or not.

To accomplish our objective considering the two improvements mentioned above, we use profile case (Case 2) best–worst scaling (BWS). Case 2 BWS uses profiles in the questions, similar to the DCE approach. A profile is expressed as a combination of attribute-levels: the profile has two or more attributes and each attribute has two or more levels. The DCE approach requires respondents to select the best profile (alternative) out of two or more profiles in each choice task, whereas the Case 2 BWS approach requires respondents to select the best and worst levels from a profile in each choice task. Case 2 BWS has both advantages and disadvantages over the DCE approach ([Flynn et al., 2007, 2008](#); [Louviere et al., 2015](#)). Case 2 BWS enables us to estimate the utilities of levels in each attribute and the average utility of each attribute across the levels, whereas the DCE approach can estimate only the utilities of levels. However, the DCE approach can estimate the unconditional demand for profiles (i.e. respondents can select none of profiles in each choice task), whereas Case 2 BWS cannot. Fortunately, this disadvantage is not problematic for our study, because our objective is to measure consumer preferences for the COO-related attribute-levels and not to estimate the demand for food products. Although consumer food valuation studies often use Case 1 BWS (e.g. [Lusk and Briggeman, 2009](#); [de-Magistris et al., 2017](#); [Bazzani et al., 2018](#)), few such studies employ Case 2 BWS.

The processed food product we focus on is a vegetable (vegetable-fruit mix) juice package (hereafter, vegetable juice package). To measure consumer preferences for COO-related attributes and their levels clearly, we assume that the target product was made from raw materials that can be grown in a single country. Vegetable juice packages meet this condition because the number of raw materials (i.e. vegetables, such as tomato and spinach) is limited and the vegetables can be grown in a single country.

2. Material and methods

2.1 Web survey

In March 2016, we conducted a web survey that was designed specifically to collect responses to Case 2 BWS questions on consumer preferences for the three dimensions of the COO of vegetable juice products [3]. Four hundred and sixteen consumers were randomly recruited from a large panel of the public managed by MACROMILL, a major web survey company in Japan. The respondents were limited to those who consumed vegetable juice packages and lived in Tokyo and the neighboring prefectures (i.e. Saitama, Kanagawa, and Chiba prefectures). The population of the survey area is about 36 million, which is about 30% of the total population of Japan as of October 1, 2016 ([Statistics Bureau, Ministry of Internal Affairs and Communications of Japan, 2017](#)).

Previous studies have found that consumers' genders and ages affect their preferences for the safety and quality of various food products in Japan and other countries. To strictly examine the effects of respondents' genders and ages on their preferences for the three dimensions of the COO, the sample was restricted so that half of the respondents were male

and half were female and equal numbers of respondents were in their 20s, 30s, 40s and 50s. Because the survey was conducted through the web and the respondents were assigned evenly according to gender and age categories, our sample may not be representative of consumers of vegetable juice packages in the survey area. However, if the survey was conducted without this assignment, the proportions of respondents in the gender and age categories could be substantially unbalanced, and some categories could have a small number of the respondents. In this case, we might not be able to accurately examine the effects of respondents' genders and ages on their preferences for COO-related attributes and their levels. We believe that the gain from being able to examine gender and age effects outweighs the loss suffered by the possibility of biasing the representativeness of our sample.

2.2 Profile design

Generally, each Case 2 BWS question shows a respondent a profile that has $K (\geq 3)$ attributes, each of which has $L_k (\geq 2)$ levels. A level is selected for each attribute according to an orthogonal main-effect design, a combination of the selected levels corresponds to a profile, the combinations of levels differ among profiles, and respondents are requested to select the levels that they think are the best and worst shown in each profile (Flynn *et al.*, 2007, 2008; Louviere *et al.*, 2015; Aizaki and Fogarty, 2019).

In our survey, each profile corresponds to a vegetable juice product and has three attributes regarding COO-related labeling: the COG, the COP and the COC. Each attribute can have one of four countries: Japan, Australia, Thailand and China. Japan is the country where our respondents live and, thus, must be included as a level of the COO-related attributes. The remaining three countries are the main countries from which Japan imports agricultural products. According to the annual values of Japan's imports of agricultural products in 2015 (Ministry of Agriculture, Forestry, and Fisheries of Japan, 2017), imports from Thailand have the fourth highest value, those from Australia have the third highest value, and those from China have the highest value. Although the United States has the second highest value of agricultural imports to Japan, Australia was selected as one of the levels of the COO-related attributes because it is an important economic partner to Japan in food trade. The Japan–Australia Economic Partnership Agreement (JA-EPA) came into effect on January 15, 2015, and although Japan has 18 entered into force or signed economic partnership agreements (EPAs) as of February 2019, the JA-EPA is Japan's first EPA that includes a chapter on food supply (Ministry of Foreign Affairs of Japan, 2017).

Sixteen profiles were created using a four-level orthogonal main-effect design. Respondents were asked to select the best and worst characteristics in each Case 2 BWS question (Figure 1). This style of question was repeated 16 times for each respondent until all 16 profiles were evaluated. The orders (indication position) of the three attributes in each profile and the orders of the profiles shown to respondents were both randomized. Note that the main-effect design approach in our study assumes that there are no interaction effects among the three COO-related attributes.

There is a vegetable juice package with three characteristics as follows. Please select the best characteristic and the worst characteristic from the following three:

	Best	Worst
Country of growing: Thailand	<input type="checkbox"/>	<input type="checkbox"/>
Country of processing: Japan	<input type="checkbox"/>	<input type="checkbox"/>
Country of the company: Thailand	<input type="checkbox"/>	<input type="checkbox"/>

Figure 1.
An example Case 2
BWS question in the
survey

2.3 Preference measures

Our study uses the counting and modeling approaches (Flynn *et al.*, 2007, 2008; Louviere *et al.*, 2015; Aizaki and Fogarty, 2019) to measure consumer preferences for the three dimensions of the COO of the vegetable juice packages.

The counting approach measures respondents' preferences for the levels of each attribute using best-minus-worst (BW) scores. A BW score of level i for respondent n is defined as follows:

$$BW_{in} = B_{in} - W_{in}, \quad (1)$$

where B_{in} and W_{in} denote the number of times level i is selected by respondent n as the best and the worst, respectively, across all Case 2 BWS questions. BW scores enable us to directly and visually understand the distribution of BW scores across the countries in each COO-related attribute because they are calculated for individual respondents. Each level appears four times among all 16 Case 2 BWS questions, and, thus, the minimum and maximum values of the BW score are -4 and 4 , respectively.

The modeling approach uses a discrete choice model to measure preferences. Our study uses a conditional logit model to measure the attribute impacts of the three COO-related attributes and to statistically examine the effects of respondents' genders and ages on their preferences for the COO-related attributes and the levels of those attributes. Although several model specifications are available for Case 2 BWS, we selected a paired model with attribute and level variables. The model assumes that respondents select a pair of levels i and j ($i \neq j$) from $K \times (K - 1)$ possible pairs in a question because the difference in utility between these two levels is the largest among all the $K \times (K - 1)$ utility differences. In our case, a profile has three attributes ($K = 3$), and, thus, there are six possible pairs per question. The probability of selecting level i as the best and level j as the worst from a choice set (C) based on our model assumption is expressed as:

$$\Pr(\text{best} = i, \text{Worst} = j) = \exp(v_i - v_j) / \sum_{p, q \in C, p \neq q} \exp(v_p - v_q), \quad (2)$$

where v_i is the systematic component of the utility of selecting alternative i . The systematic component of the utility consists of two kinds of variables: attribute variables and level variables.

We assume that the systematic component of the utility can be written as follows:

$$v_i = \beta_1 COG + \beta_2 COC + \beta_3 COG_{CN} + \beta_4 COG_{AU} + \beta_5 COG_{JP} + \beta_6 COP_{CN} + \beta_7 COP_{AU} \\ + \beta_8 COP_{JP} + \beta_9 COC_{CN} + \beta_{10} COC_{AU} + \beta_{11} COC_{JP}, \quad (3)$$

where COG and COC are attribute variables related to the COG and COC , respectively; COG_l , COP_l and COC_l are effect-coded level variables related to the COG , COP , and COC respectively, for each country (l indicates the country, with JP for Japan, CN for China and AU for Australia); and β_s are coefficients to be estimated. An attribute variable is an attribute-specific constant that takes the value of 1 if any level associated with the attribute is chosen as the best in a possible pair, -1 if any level associated with the attribute is chosen as the worst in a possible pair, and 0 otherwise. When estimating the model, an arbitrary attribute variable is omitted, and the coefficient on the omitted attribute variable is normalized to be zero—that is, the coefficients on the remaining attribute variables are estimated relative to the omitted variable (i.e. the omitted attribute is the base category among all the attributes). Table 1 shows the definitions of the dummy-coded attribute variables in our model. The variable COG takes the value of 1 (-1) if any country associated with the COG is selected as the best (the worst) and 0 otherwise; the variable COC takes the value of 1 (-1) if any country associated with the COC is selected as the best (the worst) and 0 otherwise. Our model assumes that the

COP is the base attribute, and, thus, the attribute variable associated with the COP is omitted. The coefficient on an attribute variable indicates the attribute impact or the average utility of the attribute across the levels.

Level variables are created as effect-coded variables; whereas dummy-coded variables take the value of 0 to indicate the base category, effect-coded variables take the value of -1 to indicate the base category. The signs of the effect-coded level variables are also reversed when the levels are chosen as the worst in a possible pair. In the case in which level i in attribute k is chosen as the best in a possible pair, the level variable takes the value of 1 and the other level variables associated with attribute k take the value of 0 if level i in attribute k is not the base level in attribute k , and all the level variables associated with attribute k take the value of -1 if level i in attribute k is the base level in attribute k . In the case in which level i in attribute k is chosen as the worst in a possible pair, the level variable takes the value of -1 and the other level variables associated with attribute k take the value of 0 if level i in attribute k is not the base level in attribute k , and all the level variables associated with attribute k take the value of 1 if level i in attribute k is the base level in attribute k . In both cases, all the level variables that are not associated with attribute k take the value of 0.

Table 2 shows the definitions of the effect-coded level variables in our model. We assume that Thailand (TH) is the base level in each COO-related attribute, and, thus, the level variables associated with Thailand are omitted [see Eq. (3) mentioned above and the variables in Table 2]. For example, let us look at the first four rows and the first three columns of Table 2, which show possible cases where China, Thailand, Australia, and Japan are selected as the best COG from the first row to the fourth row, respectively. The variable COG_{CN} takes the value of 1 and the remaining two variables related to the COG (i.e. COG_{AU} and COG_{JP}) take the value of 0 if China as the COG is selected as the best (the case shown in the first row); the variable COG_{AU} takes the value of 1 and the remaining two variables related to COG (COG_{CN} and COG_{JP}) take the value of 0 if Australia as the COG is selected as the best (the case shown in the third row); the variable COG_{JP} takes the value of 1 and the remaining two variables related to COG (COG_{CN} and COG_{AU}) take the value of 0 if Japan as the COG is selected as the best (the case shown in the fourth row); and all the level variables related to COG (COG_{CN} , COG_{AU} , and COG_{JP}) take the value of -1 if Thailand as the COG is selected as the best (the case shown in the second row). Because the level variables are defined in effect-coding, the level scale values corresponding to the COG, COP, and COC for Thailand (i.e. the base level in each attribute) are calculated as $-(\beta_3 + \beta_4 + \beta_5)$, $-(\beta_6 + \beta_7 + \beta_8)$, and $-(\beta_9 + \beta_{10} + \beta_{11})$, respectively.

The coefficients of the attribute variables and level variables indicate consumer utility regarding the attributes and their levels. Therefore, a (systematic component of) utility of a specific juice product can be calculated by summing up the coefficients of attribute variables and level variables corresponding to the product [see Eq. (3)]. For example, the utility of a juice product that is made of vegetables grown in Japan, processed in Japan, and produced by a

	COG	COC
<i>Selected as the best</i>		
Country of growing (COG)	1	0
Country of processing (COP)	0	0
Country of the company (COC)	0	1
<i>Selected as the worst</i>		
Country of growing (COG)	-1	0
Country of processing (COP)	0	0
Country of the company (COC)	0	-1

Table 1.
Definitions of dummy-
coded attribute
variables

Table 2.
Definitions of effect-
coded level variables

	COG_{CN}	COG_{AU}	COG_{JP}	COP_{CN}	COP_{AU}	COP_{JP}	COC_{CN}	COC_{AU}	COC_{JP}
<i>Selected as the best</i>									
Country of growing									
China	1	0	0	0	0	0	0	0	0
Thailand	-1	-1	-1	0	0	0	0	0	0
Australia	0	1	0	0	0	0	0	0	0
Japan	0	0	1	0	0	0	0	0	0
Country of processing									
China	0	0	0	1	0	0	0	0	0
Thailand	0	0	0	-1	-1	-1	0	0	0
Australia	0	0	0	0	1	0	0	0	0
Japan	0	0	0	0	0	1	0	0	0
Country of the company									
China	0	0	0	0	0	0	1	0	0
Thailand	0	0	0	0	0	0	-1	-1	-1
Australia	0	0	0	0	0	0	0	1	0
Japan	0	0	0	0	0	0	0	0	1
<i>Selected as the worst</i>									
Country of growing									
China	-1	0	0	0	0	0	0	0	0
Thailand	1	1	1	0	0	0	0	0	0
Australia	0	-1	0	0	0	0	0	0	0
Japan	0	0	-1	0	0	0	0	0	0
Country of processing									
China	0	0	0	-1	0	0	0	0	0
Thailand	0	0	0	1	1	1	0	0	0
Australia	0	0	0	0	-1	0	0	0	0
Japan	0	0	0	0	0	-1	0	0	0
Country of the company									
China	0	0	0	0	0	0	-1	0	0
Thailand	0	0	0	0	0	0	1	1	1
Australia	0	0	0	0	0	0	0	-1	0
Japan	0	0	0	0	0	0	0	0	-1

Japanese company is derived from $\beta_1 + \beta_2 + \beta_5 + \beta_8 + \beta_{11}$. Accordingly, 64 juice products (= 4 levels in the COG \times 4 levels in the COP \times 4 level in the COP) can be ranked based on their utilities.

Furthermore, we estimate a model with interactions between attribute and level variables and variables for respondents' genders and ages. The gender and age variables are defined such that *age30m*, *age40m*, and *age50m* take the value of 1 if the respondents are men in their 30, 40, and 50s, respectively, and 0 otherwise; and *age20f*, *age30f*, *age40f*, and *age50f* take the value of 1 if the respondents are women in their 20, 30, 40, and 50s, respectively, and 0 otherwise. The respondent category of men in their 20s is the base level among these dummy-coded variables regarding respondents' genders and ages.

The preparation of the dataset and the analyses were conducted using R (R Core Team, 2019) and its add-on packages support.BWS2 (Aizaki, 2019; Aizaki and Fogarty, 2019) and apollo (Hess and Palma, 2019a, b).

3. Results and discussion

3.1 Results

Figure 2 displays the distributions of the BW scores for each level. The rows correspond to the attributes (i.e. the COG, COP, and COC in order from the first row to the last row), and the

columns correspond to the levels (i.e. China, Thailand, Australia, and Japan in order from the first column to the last column). Among the three COO-related attributes, on average, China is the first least preferred, Thailand is the second least preferred, Australia is the second most preferred, and Japan is the first most preferred. The shapes of the distributions of the BW scores also differ across the three COO-related attributes within a country. For example, the modes of the BW scores of the COG, COP, and COC for China are -4 , -3 , and -3 , respectively, whereas the modes of the BW scores of the COG, COP, and COC for Japan are 4 , 2 and 3 , respectively.

Table 3 compares the means of the BW scores for each level according to respondents' genders and ages. The preference order of the four countries is similar across COO-related attributes; Japan, Australia, Thailand, and China are the first, second, third, and fourth most preferred, respectively. Furthermore, the BW score of the COG is the first lowest

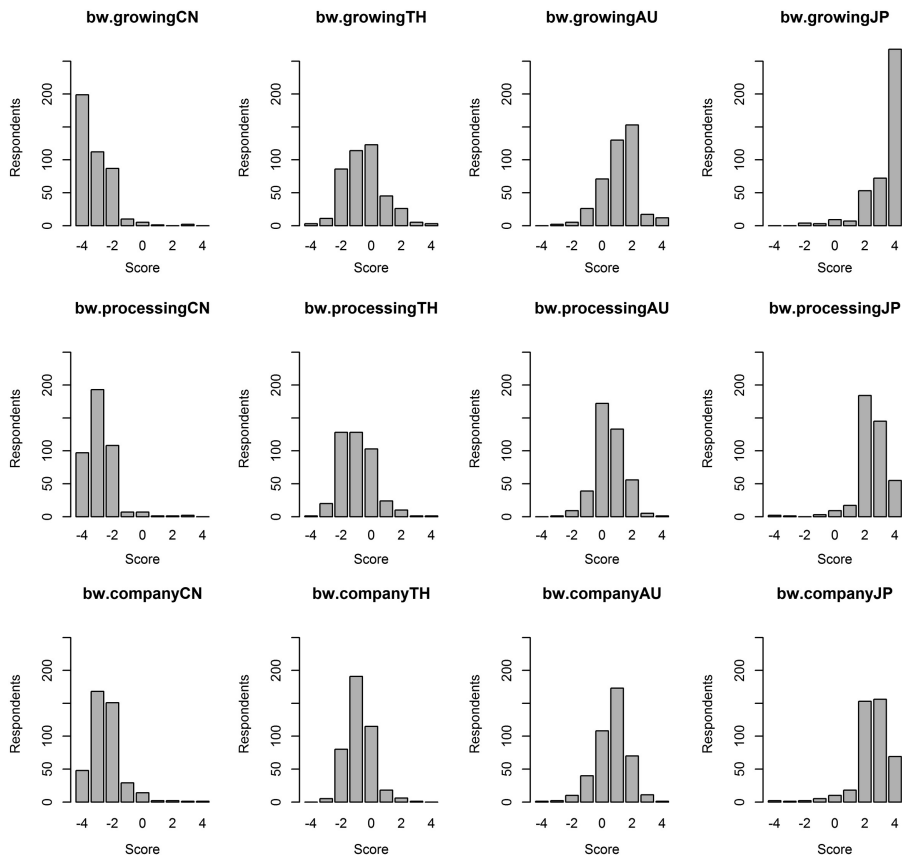


Figure 2.
Distributions of best-
minus-worst (BW)
scores for 12 levels

Note(s): The first row to the third row indicates whether the category of the country of origin is the growing, processing, or company category, respectively. The first column to the fourth column indicates whether the country is China (CN), Thailand (TH), Australia (AU), or Japan (JP), respectively. In each histogram, the vertical axis indicates the number of respondents, and the horizontal axis indicates the BW score

among the three COO-related attributes within China for all the respondent categories except men in their 50s and women in their 50s. For example, the BW scores of the COG, COP, and COC within China are -3.173 , -2.481 , and -2.154 , respectively, for men in the 20s, whereas same scores for women in their 40s are -3.250 , -2.808 , and -2.423 , respectively.

Table 4 shows the estimated coefficients of a conditional logit paired model without respondents' gender and age variables (a simple model) and the model with those variables (a full model). All the coefficients in the simple model are significantly different from zero at the 1% level. According to the coefficients on the attribute variables, the COG has the first highest average utility (attribute impact), the COC has the second highest average utility, and the COP, which is normalized to zero, has the third highest average utility. The preference order of countries for each COO-related attribute is the same as that calculated from the BW scores; Japan, Australia, Thailand and China place first, second, third and fourth, respectively, for all the attributes (the level scale values corresponding to the COG, COP, and COC for Thailand are -0.582 , -0.603 and -0.697 , respectively).

Figure 3 shows utilities of 64 juice products calculated from estimated coefficients in the simple model and arranged in ascending order. Juice products with Japan and/or Australia in two of the three COO-related attributes have relatively higher utilities, whereas those with China and/or Thailand in two of the three COO-related attributes have relatively lower utilities. The juice made of raw materials grown in Japan, processed in Japan, and produced by a Japanese company has the highest utility (8.54), whereas one with China in all the three COO-related attributes has the lowest utility (-8.11). See the tables in the appendix for utilities of juice products classified by the COG, COP and COC.

Table 5 represents the ranks of selected juice products among the possible 64 juice products in Figure 3. The second to fifth rows indicate the ranks of four base line juice products: namely, the pure Japanese, Australian, Thai, and Chinese juice products, where the term "pure" means that the COG, COP and COC are the same country for each product. The pure Japanese juice product is ranked as the first place, whereas the pure Chinese one is at the last place. The pure Australian and Thai ones are at relatively higher (19th) and lower (44th) places, respectively. The seventh to ninth rows indicate the Japanese company's juice products made from raw material grown in and processed in foreign countries. These products are at largely lower places compared with the pure Japanese one: the Japanese company's juice products with "Australia" in the COG and COP is at the 10th place, the one with "Thailand" in the COG and COP is at the 24th place, and the one with "China" in the COG and COP is at the 54th place. The last three rows indicate foreign companies' juice products made from raw materials grown in and processed in Japan. Compared with each pure juice product, these products are at higher places, respectively: the Australian company's juice product with "Japan" in the COG and COP is at the 2nd place (the pure Australian one is at the 10th place); the Thai company's one is at the 5th place (the pure Thai one is at 24th); and the Chinese company's one is at the 11th place (the pure Chinese one is in the last place).

Next, we focus on the full model that examines effects of respondents' gender and age on the difference in (average) utility between the base attribute (the COP)/the base level (Thailand) and the remaining two attributes (the COC and COG)/the remaining three levels (Japan, Australia, and China). Although all the coefficients on the attribute variable COC and its interaction terms with respondents' gender and age dummy variables from $COC \times age30m$ to $COC \times age50f$ are not significantly different from zero at the 10% level, all the coefficients related to the attribute variable COG, except for the attribute variable COG and its interaction term $COG \times age40f$, are positive and significantly different from zero at the 10% level or below. The results indicate that statistically significant effects of respondents' gender and age on the attribute impacts regarding COG

Table 3.
Mean best-minus-
worst (BW) scores for
12 levels by respondent
category

All	Male				Female			
	20s	30s	40s	50s	20s	30s	40s	50s
Country of growing								
China	-3.147 (4)[3]	-3.173 (4)[3]	-3.385 (4)[3]	-2.962 (4)[2]	-3.231 (4)[3]	-2.981 (4)[3]	-3.250 (4)[3]	-2.942 (4)[2]
Thailand	-0.498 (3)[1]	-0.250 (3)[1]	-0.385 (3)[1]	-0.385 (3)[1]	-0.327 (3)[1]	-0.673 (3)[1]	-0.615 (3)[1]	-0.615 (3)[1]
Australia	1.185 (2)[1]	1.038 (2)[1]	0.846 (2)[1]	1.212 (2)[1]	1.308 (2)[1]	1.327 (2)[1]	1.115 (2)[1]	1.212 (2)[1]
Japan	3.341 (1)[1]	2.885 (1)[1]	3.827 (1)[1]	3.173 (1)[1]	3.135 (1)[1]	3.577 (1)[1]	3.288 (1)[1]	3.327 (1)[1]
Country of processing								
China	-2.839 (4)[2]	-2.481 (4)[2]	-2.827 (4)[2]	-3.038 (4)[3]	-2.923 (4)[2]	-2.865 (4)[2]	-2.808 (4)[2]	-3.000 (4)[3]
Thailand	-0.954 (3)[3]	-0.519 (3)[2]	-0.750 (3)[3]	-0.865 (3)[2]	-1.096 (3)[3]	-1.154 (3)[3]	-1.019 (3)[3]	-1.154 (3)[3]
Australia	0.490 (2)[3]	0.442 (2)[2]	0.423 (2)[3]	0.365 (2)[3]	0.385 (2)[3]	0.481 (2)[3]	0.519 (2)[3]	0.654 (2)[3]
Japan	2.466 (1)[3]	2.019 (1)[3]	2.442 (1)[3]	2.673 (1)[2]	2.692 (1)[3]	2.327 (1)[3]	2.365 (1)[3]	2.731 (1)[2]
Country of the company								
China	-2.438 (4)[1]	-2.154 (4)[1]	-2.462 (4)[1]	-2.481 (4)[1]	-2.462 (4)[1]	-2.615 (4)[1]	-2.423 (4)[1]	-2.654 (4)[1]
Thailand	-0.800 (3)[2]	-0.596 (3)[3]	-0.712 (3)[2]	-0.885 (3)[3]	-0.962 (3)[2]	-0.769 (3)[2]	-0.712 (3)[2]	-0.962 (3)[2]
Australia	0.673 (2)[2]	0.423 (2)[3]	0.519 (2)[2]	0.808 (2)[2]	0.769 (2)[2]	0.750 (2)[2]	0.865 (2)[2]	0.769 (2)[2]
Japan	2.519 (1)[2]	2.365 (1)[2]	2.462 (1)[2]	2.385 (1)[3]	2.712 (1)[2]	2.596 (1)[2]	2.673 (1)[2]	2.635 (1)[3]
<i>n</i>	416	52	52	52	52	52	52	52

Note(s): Values in parentheses indicate the preference order of the four countries for each COO-related attribute and for each respondent category. Values in square brackets indicate the preference order of the three COO-related attributes for each country and for each respondent category

Note(s): Values in parentheses indicate the preference order of the four countries for each COO-related attribute and for each respondent category. Values in square brackets indicate the preference order of the three COO-related attributes for each country and for each respondent category

	Coef.	Simple model S.E.	p-value	Coef.	Full model S.E.	p-value
<i>Attribute impacts</i>						
COG	0.268	0.031	0.000	0.054	0.075	0.470
COG × age30m				0.223	0.119	0.061
COG × age40m				0.378	0.139	0.007
COG × age50m				0.256	0.115	0.026
COG × age20f				0.240	0.120	0.045
COG × age30f				0.448	0.122	0.000
COG × age40f				0.161	0.117	0.171
COG × age50f				0.314	0.121	0.010
COC	0.160	0.030	0.000	0.094	0.070	0.180
COC × age30m				0.008	0.110	0.945
COC × age40m				0.039	0.117	0.738
COC × age50m				0.059	0.110	0.591
COC × age20f				0.130	0.115	0.258
COC × age30f				0.141	0.114	0.214
COC × age40f				0.165	0.111	0.139
COC × age50f				0.039	0.117	0.738
<i>Level scale values</i>						
COG _{JP}	3.068	0.065	0.000	1.923	0.127	0.000
COG _{JP} × age30m				1.429	0.236	0.000
COG _{JP} × age40m				2.760	0.339	0.000
COG _{JP} × age50m				0.867	0.212	0.000
COG _{JP} × age20f				1.393	0.238	0.000
COG _{JP} × age30f				1.739	0.255	0.000
COG _{JP} × age40f				1.234	0.223	0.000
COG _{JP} × age50f				1.906	0.269	0.000
COG _{AU}	0.875	0.047	0.000	0.627	0.104	0.000
COG _{AU} × age30m				0.383	0.172	0.026
COG _{AU} × age40m				−0.206	0.195	0.292
COG _{AU} × age50m				0.271	0.167	0.103
COG _{AU} × age20f				0.571	0.181	0.002
COG _{AU} × age30f				0.319	0.179	0.074
COG _{AU} × age40f				0.357	0.172	0.038
COG _{AU} × age50f				0.494	0.190	0.009
COG _{CN}	−3.361	0.070	0.000	−2.416	0.153	0.000
COG _{CN} × age30m				−1.094	0.250	0.000
COG _{CN} × age40m				−1.957	0.298	0.000
COG _{CN} × age50m				−0.778	0.248	0.002
COG _{CN} × age20f				−1.587	0.279	0.000
COG _{CN} × age30f				−1.179	0.258	0.000
COG _{CN} × age40f				−1.145	0.259	0.000
COG _{CN} × age50f				−1.527	0.278	0.000
COP _{JP}	2.586	0.059	0.000	1.448	0.112	0.000
COP _{JP} × age30m				1.198	0.205	0.000
COP _{JP} × age40m				1.711	0.258	0.000
COP _{JP} × age50m				1.268	0.198	0.000
COP _{JP} × age20f				1.812	0.229	0.000
COP _{JP} × age30f				1.456	0.221	0.000
COP _{JP} × age40f				1.147	0.201	0.000
COP _{JP} × age50f				2.191	0.258	0.000
COP _{AU}	0.736	0.047	0.000	0.434	0.102	0.000
COP _{AU} × age30m				0.388	0.168	0.021

(continued)

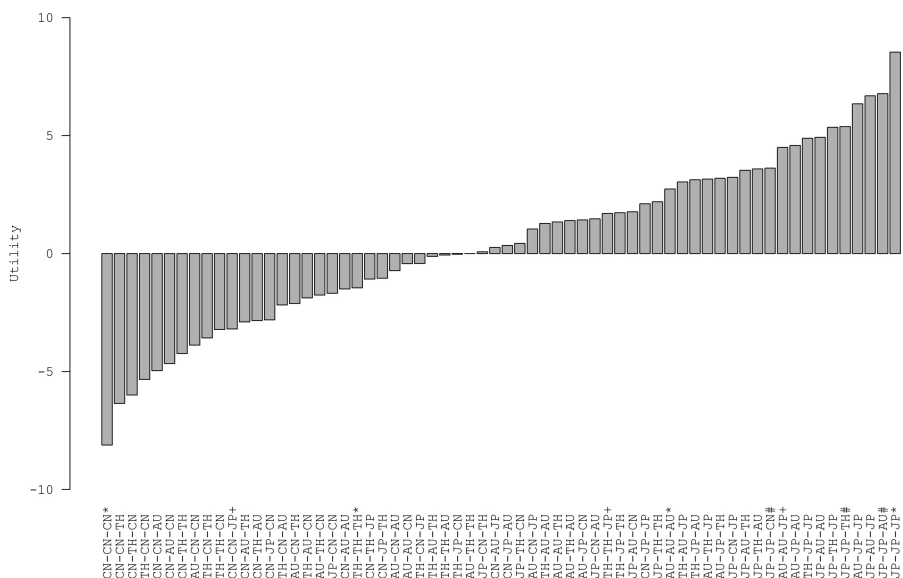
Table 4.
Conditional logit paired
model estimates

	Simple model			Full model		
	Coef.	S.E.	<i>p</i> -value	Coef.	S.E.	<i>p</i> -value
$COP_{AU} \times age40m$				0.163	0.182	0.369
$COP_{AU} \times age50m$				0.252	0.167	0.130
$COP_{AU} \times age20f$				0.398	0.181	0.028
$COP_{AU} \times age30f$				0.442	0.177	0.013
$COP_{AU} \times age40f$				0.418	0.170	0.014
$COP_{AU} \times age50f$				0.625	0.192	0.001
COP_{CN}	-2.719	0.066	0.000	-1.686	0.131	0.000
$COP_{CN} \times age30m$				-0.974	0.222	0.000
$COP_{CN} \times age40m$				-1.520	0.263	0.000
$COP_{CN} \times age50m$				-1.267	0.235	0.000
$COP_{CN} \times age20f$				-1.613	0.257	0.000
$COP_{CN} \times age30f$				-1.249	0.237	0.000
$COP_{CN} \times age40f$				-1.112	0.234	0.000
$COP_{CN} \times age50f$				-1.929	0.263	0.000
COC_{JP}	2.458	0.058	0.000	1.567	0.115	0.000
$COC_{JP} \times age30m$				0.850	0.203	0.000
$COC_{JP} \times age40m$				1.479	0.259	0.000
$COC_{JP} \times age50m$				0.744	0.195	0.000
$COC_{JP} \times age20f$				1.473	0.228	0.000
$COC_{JP} \times age30f$				1.342	0.225	0.000
$COC_{JP} \times age40f$				1.002	0.204	0.000
$COC_{JP} \times age50f$				1.846	0.256	0.000
COC_{AU}	0.698	0.046	0.000	0.309	0.101	0.002
$COC_{AU} \times age30m$				0.260	0.167	0.119
$COC_{AU} \times age40m$				0.231	0.180	0.199
$COC_{AU} \times age50m$				0.566	0.164	0.001
$COC_{AU} \times age20f$				0.608	0.178	0.001
$COC_{AU} \times age30f$				0.512	0.175	0.003
$COC_{AU} \times age40f$				0.504	0.167	0.003
$COC_{AU} \times age50f$				0.712	0.190	0.000
COC_{CN}	-2.459	0.063	0.000	-1.509	0.124	0.000
$COC_{CN} \times age30m$				-0.744	0.209	0.000
$COC_{CN} \times age40m$				-1.386	0.252	0.000
$COC_{CN} \times age50m$				-0.971	0.221	0.000
$COC_{CN} \times age20f$				-1.474	0.246	0.000
$COC_{CN} \times age30f$				-1.420	0.231	0.000
$COC_{CN} \times age40f$				-1.147	0.224	0.000
$COC_{CN} \times age50f$				-1.852	0.254	0.000
Respondents			416			416
Observations			6,656			6,656
Log likelihood at zero			-11,925.95			-11,925.95
Log likelihood at convergence			-6,017.25			-5,860.94
Adjusted Pseudo R^2			0.495			0.501

Table 4.

are observed, while such effects regarding COC are not observed. All but six of the coefficients on the level variables (i.e. all coefficients except those on $COG_{AU} \times age40m$, $COG_{AU} \times age50m$, $COP_{AU} \times age40m$, $COP_{AU} \times age50m$, $COC_{AU} \times age30m$, and $COC_{AU} \times age40m$) are significantly different from zero at the 10% level or below. The results reveal that statistically significant differences in utility for the three dimensions of the COO among the four countries exist and further the differences are affected by the respondents' gender and age.

Table 6 indicates the attribute impacts and level scale values, including those corresponding to the omitted attribute and level variables in the full model, by respondent



Three
dimensions
of country
of origin

3373

Note(s): The horizontal axis indicates juice products, which are expressed as the combinations of the COG, COP, and COC with dash marks and abbreviations: CN, TH, AU, and JP stand for China, Thailand, Australia, and Japan, respectively. For example, a combination “AU-TH-JP” means a juice product made from raw materials grown in Australia, processed in Thailand, and produced by a Japanese company. The vertical axis indicates the utility. The utility values of the juice products are calculated from the estimated coefficients in the simple model. Products with symbols (+, *, and #) are mentioned in Table 5

Figure 3.
Utilities of 64 juice
products in
ascending order

Product (COG–COP–COC)	Rank
Baseline juice products, corresponding to ones with * in Figure 3	
Japan–Japan–Japan	1
Australia–Australia–Australia	19
Thailand–Thailand–Thailand	44
China–China–China	64
Japanese company's juice products, corresponding to ones with + in Figure 3	
Australia–Australia–Japan	10
Thailand–Thailand–Japan	24
China–China–Japan	54
Foreign companies' juice products made from raw materials grown in and processed in Japan, corresponding to ones with # in Figure 3	
Japan–Japan–Australia	2
Japan–Japan–Thailand	5
Japan–Japan–China	11

Table 5.
Ranks of several juice
products selected from
Figure 3

category. These values were calculated from the estimates in Table 4. For any COO-related attribute and for any respondent category, Japan has the first highest level scale value, Australia has the second highest level scale value, Thailand has the second lowest level scale value, and China has the first lowest level scale value. Furthermore, the preference orders of

the three COO-related attributes with China indicate that the COG is the first least preferred for all the respondent categories except men in their 50s and women in their 50s. These preference orders are consistent with those found in the analysis using BW scores shown in Table 3, except for the COP and COC within Thailand for men in their 40s.

3.2 Discussion

Our results provide four significant findings. First, the average utilities of the COG are the first highest among those of the three COO-related attributes in the simple model. This result also applies to all the respondent categories, except men in their 20s and women in their 40s in the full model. We yield this finding possible because Japanese consumers believe that the qualities of processed food products heavily depend on the raw materials used; the processing stage cannot improve the perceived quality of the product and/or the food safety of the product if the quality of the raw materials is very poor. Consumers may also consider that growing the raw materials, such as vegetables and fruits on farmlands, is more difficult to monitor than processing the raw materials in a factory plant.

This finding is similar to that of Jin and Zhou (2014), who find that Japanese consumers have greater interest in the harvest date, production method, and production method certification among 11 kinds of food safety and quality information regarding fresh produce, excluding beef. However, this result is inconsistent with the finding of Erdem *et al.* (2012), who find that UK consumers allocated a higher share of the relative responsibility for ensuring the food safety of chicken products to the processor (18.6%) than to the farmer (12.1%) and allocated a similar share of responsibility for the food safety of beef products to the farmer (14.5%) and the processor (14.7%). The difference in the degree of mechanization of the processing stage between vegetable juice packages (this study) and meat products (Erdem *et al.*, 2012) may cause this inconsistency. The processing stage of vegetable juice products extracts juice from the raw materials and bottles the juice into containers. This stage is implemented in a factory and may be mechanized entirely—that is, few workers touch the raw materials and the resulting products directly. The processing stage of beef and chicken products (i.e. slaughter) is also implemented inside of a building, but it is not necessarily mechanized entirely, as certain steps in the slaughter process require workers to handle the raw materials (carcass/meat). Through the process of slaughter, meats could be contaminated with pathogenic microorganisms.

Second, Japan and China are evaluated as the most and the least preferred countries, respectively, for all the three COO-related attributes and for all the respondent categories. The finding for Japan is consistent with previous studies showing that Japanese consumers tend to prefer domestic food products to imported ones (e.g. Oura *et al.*, 2002; Aoki *et al.*, 2017), which seems to be partly reflected by the so-called domestic or home country bias (e.g. Balabanis and Diamantopoulos, 2004; Verlegh, 2007) [4]. The finding for China is similar to that of a previous DCE study that reveals that Japanese consumers' willingness to pay (WTP) for a long variety of Welsh onion grown in China is discounted at about 40% compared with such onions grown in Japan (Oura *et al.*, 2002). Similar to the situation in the US mentioned by Bienenfeld *et al.* (2016), food safety issues in China have been reported widely by the mass media in Japan, and, thus, its food safety may have a negative reputation among Japanese consumers.

Third, almost all the respondent categories evaluated the COG as the least preferred among the three COO-related attributes with respect to China. This finding differs from the finding of Bienenfeld *et al.* (2016)—that is, US consumers prefer products processed in England and made of grain grown in China to those processed in China and made of grain grown in England. Although consumers' perceptions of food risks in each step of food production and distribution from farmland to household may differ among US consumers and Japanese

	Male				Female			
	20s	30s	40s	50s	20s	30s	40s	50s
<i>Attribute impacts</i>								
Country of growing	0.054	0.277	0.432	0.310	0.294	0.502	0.215	0.368
Country of processing	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Country of the company	0.094	0.102	0.133	0.153	0.224	0.235	0.259	0.133
<i>Level scale values</i>								
Country of growing								
China	-2.416 (4)[3]	-3.510 (4)[3]	-4.373 (4)[3]	-3.194 (4)[2]	-4.003 (4)[3]	-3.594 (4)[3]	-3.561 (4)[3]	-3.943 (4)[2]
Thailand	-0.135 (3)[1]	-0.852 (3)[1]	-0.732 (3)[1]	-0.495 (3)[1]	-0.511 (3)[1]	-1.014 (3)[1]	-0.581 (3)[1]	-1.008 (3)[1]
Australia	0.627 (2)[1]	1.010 (2)[1]	0.421 (2)[1]	0.898 (2)[1]	1.198 (2)[1]	0.946 (2)[1]	0.984 (2)[1]	1.121 (2)[1]
Japan	1.923 (1)[1]	3.352 (1)[1]	4.684 (1)[1]	2.791 (1)[1]	3.316 (1)[1]	3.662 (1)[1]	3.158 (1)[1]	3.830 (1)[1]
Country of processing								
China	-1.686 (4)[2]	-2.660 (4)[2]	-3.205 (4)[2]	-2.953 (4)[3]	-3.299 (4)[2]	-2.935 (4)[2]	-2.798 (4)[2]	-3.614 (4)[3]
Thailand	-0.196 (3)[2]	-0.808 (3)[3]	-0.551 (3)[2]	-0.449 (3)[2]	-0.792 (3)[3]	-0.845 (3)[3]	-0.649 (3)[3]	-1.083 (3)[3]
Australia	0.434 (2)[2]	0.822 (2)[2]	0.597 (2)[3]	0.686 (2)[3]	0.832 (2)[3]	0.875 (2)[3]	0.852 (2)[3]	1.058 (2)[3]
Japan	1.448 (1)[3]	2.646 (1)[2]	3.160 (1)[3]	2.716 (1)[2]	3.260 (1)[3]	2.904 (1)[3]	2.595 (1)[3]	3.639 (1)[2]
Country of the company								
China	-1.509 (4)[1]	-2.253 (4)[1]	-2.895 (4)[1]	-2.479 (4)[1]	-2.983 (4)[1]	-2.929 (4)[1]	-2.656 (4)[1]	-3.361 (4)[1]
Thailand	-0.367 (3)[3]	-0.733 (3)[2]	-0.691 (3)[3]	-0.705 (3)[3]	-0.974 (3)[2]	-0.801 (3)[2]	-0.726 (3)[2]	-1.073 (3)[2]
Australia	0.309 (2)[3]	0.569 (2)[3]	0.540 (2)[2]	0.874 (2)[2]	0.917 (2)[2]	0.822 (2)[2]	0.813 (2)[2]	1.021 (2)[2]
Japan	1.567 (1)[2]	2.417 (1)[3]	3.046 (1)[2]	2.310 (1)[3]	3.040 (1)[2]	2.908 (1)[2]	2.569 (1)[2]	3.413 (1)[3]
Note(s): Values in parentheses indicate the preference order of the four countries for each COO-related attribute and for each respondent category. Values in square brackets indicate the preference order of the three COO-related attributes for each country and for each respondent category, which is calculated from the estimated attribute impacts and level scale values								

Table 6.
Attribute impacts and
level scale values
calculated from [Table 4](#)
by respondent
category

consumers, we do not have enough information to determine the exact mechanism driving this difference. Further investigations regarding consumer perceptions of food risks according to the food chains by food category across many countries, including the US and Japan, are needed.

Lastly, consumers' genders and ages affect their preferences for the three COO-related attributes and their levels, but the preference order of the four countries (i.e. Japan > Australia > Thailand > China) within each COO-related attribute is similar across respondent categories.

4. Conclusion

This study revealed consumer preferences for three dimensions of the COO of a vegetable juice package using a Case 2 BWS approach. The three dimensions consist of the country where the raw materials of the product were grown, the country where the raw materials were processed, and the country where the food company producing the product is headquartered. We found that all consumers, with the exception of men in their 20s and women in their 40s, obtain the first, second, and third highest average utility from the COG, COC and COP and that consumers evaluate Japan, Australia, Thailand and China as the first, second, third, and fourth most preferred countries for each of the three COO-related attributes, respectively. The results suggest that an important selling strategy for vegetable juice packages in Japan is making sure that the COG appeals to consumers. The strategy could be more effective when the COG of the juice product is Japan. Although we need additional information on the production costs of raw materials in each country to obtain an exact and comprehensive implication, Thailand and Australia might have an advantage in growing raw materials over China from the viewpoint of Japanese consumer preferences. Simulated ranks of 64 juice products reveals that the pure Japanese juice product receives consumers' first highest rank, whereas pure Australian, Thai, and Chinese ones are at lower places. However, juice products produced by Australian, Thai, and Chinese companies using raw materials grown in and processed in Japan increase their ranks compared with ranks of their pure ones. Accordingly, this suggests that a strategy suitable for Australian, Thai, and Chinese juice companies that hope to enter newly into Japanese vegetable juice market may be not to sell their "pure" juice products, but to sell juice products made from raw materials grown in and processed in Japan.

Our study has some limitations. First, the survey area is limited to Tokyo and the neighboring prefectures and the sample size is relatively small. The population of our survey area is about 30% of the total population of Japan, so we should conduct an additional survey targeting the whole of Japan to obtain more general results that can apply to Japanese consumers. Second, the consumer preference measures used in our study are not monetary-based such as consumers' WTP. For example, consumers' WTP is vital to conduct a cost-benefit analysis to determine the appropriate investment strategy for food product companies to develop new food process chains. Third, our design approach assumes that there are no interaction effects among the three COO-related attributes. We should thus examine whether interaction effects exist using a less-restrictive design approach. Fourth, consumers' socio-economic characteristics are limited to their genders and ages. We should thus consider other characteristics that may affect preferences for COO-related attributes and their levels. In addition to conducting further studies considering these limitations, we should conduct an international study aiming to compare the average utilities of COO-related attributes using Case 2 BWS. Such a study would progress our understanding of the consumer valuation of detailed COO-related attributes and would also be valuable for food companies and/or governments to construct strategies for investing in food chains and/or food labeling policies. Nevertheless, our results

are meaningful because this is the first Case 2 BWS study to measure consumer preferences for the COG, COP and COC of processed food products, and it reveals new findings and suggests marketing implications for domestic and international juice companies through this application.

Notes

1. The COG corresponds to the country of parts used for manufacturing the products.
2. The COC is similar to the country of brand (COB). However, the COB indicates where the headquarters of the company owning a brand is perceived to be located (Samiee *et al.*, 2005), while the COC in the study is the country where the headquarters of the company that produces the product is located. Furthermore, although our respondents may think of the COC as a brand of the product, we do not have additional information available to examine whether the COC is used as the brand of the product. Therefore, we use the term COC instead of COB.
3. The web survey was developed in Japanese. Descriptions regarding the survey, including the questions and profile shown below, were translated into English.
4. Domestic or home country bias refers to consumers' tendency to prefer domestic products to foreign ones and is linked with consumer ethnocentrism (e.g., Balabanis and Diamantopoulos, 2004; Verlegh, 2007). Further studies should examine the bias for processed food products with multi-dimensional COO.

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Table A1.
Utilities of 64 juice
products classified
by COG

Appendix.
Utilities of 64 juice products classified by COG, COP and COC.

COG	COG = Japan			COG = Australia			COG = Thailand			COG = China		
	COP	COC	Utility	COP	COC	Utility	COP	COC	Utility	COP	COC	Utility
JP	AU	AU	4.93	AU	AU	2.74	AU	AU	1.28	AU	AU	-1.50
JP	AU	CN	1.77	AU	CN	-0.42	AU	CN	-1.88	AU	CN	-4.66
JP	AU	JP	6.69	AU	JP	4.50	AU	JP	3.04	AU	JP	0.26
JP	AU	TH	3.53	AU	TH	1.34	AU	TH	-0.12	AU	TH	-2.89
JP	CN	AU	1.47	CN	AU	-0.72	CN	AU	-2.18	CN	AU	-4.95
JP	CN	CN	-1.68	CN	CN	-3.88	CN	CN	-5.33	CN	CN	-8.11
JP	CN	JP	3.23	AU	JP	1.04	CN	JP	-0.42	CN	JP	-3.19
JP	CN	TH	0.08	AU	TH	-2.11	CN	TH	-3.57	CN	TH	-6.35
JP	JP	AU	6.78	AU	AU	4.59	AU	AU	3.13	AU	AU	0.35
JP	JP	CN	3.62	AU	CN	1.43	JP	CN	-0.03	JP	CN	-2.81
JP	JP	JP	8.54	AU	JP	6.35	JP	JP	4.89	JP	JP	2.11
JP	JP	TH	5.38	AU	TH	3.19	JP	TH	1.74	JP	TH	-1.04
JP	TH	AU	3.59	TH	AU	1.40	TH	AU	-0.06	TH	AU	-2.84
JP	TH	CN	0.43	AU	CN	-1.76	TH	CN	-3.21	TH	CN	-5.99
JP	TH	JP	5.35	AU	JP	3.16	TH	JP	1.70	TH	JP	-1.08
JP	TH	TH	2.20	AU	TH	0.00	TH	TH	-1.45	TH	TH	-4.23

COG	COP = Japan			COP = Australia			COP = Thailand			COP = China		
	COP	COG	Utility	COP	COG	Utility	COP	COG	Utility	COP	COG	Utility
AU	JP	AU	4.59	AU	AU	2.74	TH	AU	1.40	CN	AU	-0.72
AU	JP	CN	1.43	AU	AU	-0.42	TH	CN	-1.76	CN	CN	-3.88
AU	JP	JP	6.35	AU	AU	4.50	TH	JP	3.16	CN	JP	1.04
AU	JP	TH	3.19	AU	TH	1.34	TH	TH	0.00	CN	TH	-2.11
CN	JP	AU	0.35	AU	AU	-1.50	TH	AU	-2.84	CN	AU	-4.95
CN	JP	CN	-2.81	AU	CN	-4.66	TH	CN	-5.99	CN	CN	-8.11
CN	JP	JP	2.11	AU	CN	0.26	TH	JP	-1.08	CN	JP	-3.19
CN	JP	TH	-1.04	AU	TH	-2.89	TH	TH	-4.23	CN	TH	-6.35
JP	JP	AU	6.78	AU	AU	4.93	TH	AU	3.59	CN	AU	1.47
JP	JP	CN	3.62	AU	CN	1.77	TH	CN	0.43	CN	CN	-1.68
JP	JP	JP	8.54	AU	JP	6.69	TH	JP	5.35	CN	JP	3.23
JP	JP	TH	5.38	AU	TH	3.53	TH	TH	2.20	CN	TH	0.08
TH	JP	AU	3.13	AU	TH	1.28	TH	AU	-0.06	CN	AU	-2.18
TH	JP	CN	-0.03	AU	TH	-1.88	TH	CN	-3.21	CN	CN	-5.33
TH	JP	JP	4.89	AU	TH	3.04	TH	JP	1.70	CN	JP	-0.42
TH	JP	TH	1.74	AU	TH	-0.12	TH	TH	-1.45	CN	TH	-3.57

Table A2.
Utilities of 64 juice
products classified
by COP

Table A3.
Utilities of 64 juice
products classified
by COC

COC	COC = Japan			COC = Australia			COC = Thailand			COC = China		
	COP	COG	Utility	COP	COG	Utility	COP	COG	Utility	COP	COG	Utility
AU	AU		4.50	AU	AU	2.74	AU	AU	1.34	AU	AU	-0.42
AU	CN		1.04	AU	AU	-0.72	CN	AU	-2.11	CN	AU	-3.88
AU	JP		6.35	AU	AU	4.59	JP	AU	3.19	JP	AU	1.43
AU	TH		3.16	AU	AU	1.40	TH	AU	0.00	TH	AU	-1.76
CN	AU		0.26	AU	CN	-1.50	AU	TH	-2.89	AU	CN	-4.66
CN	CN		-3.19	CN	CN	-4.95	CN	CN	-6.35	CN	CN	-8.11
CN	JP		2.11	AU	CN	0.35	JP	TH	-1.04	JP	CN	-2.81
CN	TH		-1.08	AU	CN	-2.84	TH	TH	-4.23	TH	TH	-5.99
JP	AU		6.69	AU	JP	4.93	AU	JP	3.53	AU	AU	1.77
JP	CN		3.23	AU	CN	1.47	CN	JP	0.08	CN	CN	-1.68
JP	JP		8.54	AU	JP	6.78	JP	JP	5.38	JP	JP	3.62
JP	TH		5.35	JP	TH	3.59	TH	JP	2.20	TH	TH	0.43
TH	AU		3.04	AU	TH	1.28	AU	TH	-0.12	AU	AU	-1.88
TH	CN		-0.42	CN	TH	-2.18	CN	TH	-3.57	CN	CN	-5.33
TH	JP		4.89	JP	TH	3.13	JP	TH	1.74	JP	JP	-0.03
TH	TH		1.70	TH	TH	-0.06	TH	TH	-1.45	TH	TH	-3.21