

DO HEALTH CLAIMS MATTER FOR CONSUMER PREFERENCE ON TEA BEVERAGE? EXPERIMENTAL EVIDENCE FROM TAIWAN

Sheng-Hung Chen^{*} Hsin-Fan Chen² Hui-Cheng Wang³

¹ Department of Finance, Nan Hua University, Chiayi, Taiwan.

² Department of Marketing and Logistics Management, Chaoyang University of Technology, Taichung, Taiwan.

³ Postdoctoral Fellow, National Chung Hsing University, Taichung, Taiwan.

Corresponding author: Dr. **Sheng-Hung Chen**, E-mail: shenghong@mail.nhu.edu.tw.



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Do Health Claims Matter for Consumer Preference on Tea Beverage?

Experimental Evidence from Taiwan

Sheng-Hung Chen* Hsin-Fan Chen† Hui-Cheng Wang‡

Abstract

This paper aims to identify consumer preference for tea drinking products in Taiwan by applying conjoint analysis and investigate whether health claims as attributes would influence consumer's choice behavior. From 1 July to 31 August 2005, 620 consumers of tea drinking products participated in the choice-based conjoint experiment, which conducted in the city of Taipei, Taichung, Tainan, and Kaohsiung in Taiwan. The data were collected in supermarket using questionnaire for personal interviews. Overall, the estimated individual models fit the data well using Conditional Logit Model. Regarding the result of "Original Tea", consumer's order ranking of tea category is green tea, oolong tea, and black tea. The most importance on the standard that health claims have positive influence on higher likelihood of purchasing tea drinks. In addition, consumer prefers to tea drinks with *Catechins*, processing technology using cold extraction, and paper package. However, it could be seen that as the price increases the utility for the consumer decreases. Also, we report the negative relationship between price and purchasing intention. It is found that respondents preferred to tea drinking products with health claims. This result stands for consumer's concern on their health status by intaking additives like *Catechins*. Our results also suggest that respondents prefer that tea drinks include less sugar that implies that the product is produced "light".

Keywords: Tea Drinking Products, Consumer Preference, Health Claims, Conjoint Analysis, Conditional Logit Model

* Assistant Professor, Department of Finance, Nan Hua University, Chiayi, Taiwan. Mail Address: 32, Chung Kung Li, Dalin, Chiayi, 62248, Taiwan. Phone: +886 5 2721001 ext 56541. Fax: +886 5 2427172. E-mail: shenghong@mail.nhu.edu.tw.

† Assistant Professor, Department of Marketing and Logistics Management, Chaoyang University of Technology, Taichung, Taiwan. Mail Address: 168 Jifong E. Rd., Wufong, Taichung County, 41349, Taiwan. Phone: +886-4-23323000 ext. 7544; Fax: +886-4-23742369. E-mail: hfchen@cyut.edu.tw.

‡ Postdoctoral Fellow, National Chung Hsing University, Taichung, Taiwan. E-mail: peter66110@yahoo.com.tw.

I. Introduction

Tea drinking products in Taiwan has been emerging in recent years as a popular beverage choice composed of a variety of tea favors and extracted additives for consumers. Understanding consumer preference on tea drinking products is crucial for enterprises to evaluate and amend their marketing strategies and production positions. Specifically, drinking tea is acknowledged good for health as a claim for one of extrinsic product attributes. However, whether such health claim influences consumer purchasing behavior for their tea drinking is little known and less addressed in previous literature. Moreover, consumer states that their purchasing intention could be increased by incorporating a health message in term of marketing strategy. Those findings would indicate that survey analysis has to be combined with modern market research methods that are able to access both extrinsic and intrinsic product attributes and possible interactions between them. Therefore, having better understanding of the relative importance of tea drinking product attributes affecting tea choice at the point of sale is helpful for the success of new product development. Hence, this paper aims to identify consumer preference for tea drinking products in Taiwan and investigate whether health claims as attributes tea drinking products influences consumer's purchasing behavior for tea drinking products.

As indicated in Figure 1 for sales of tea drinking products from 2001 to 2008, we witness a variety of tea types as green, milk, black, oolong, and flower tea, while demonstrating the rapid growth prior 2003 but steadily decline from 2004 to 2008 exception for green tea. It is noted that green tea has been dominated the tea drinking market in Taiwan since most people believe the health benefits from such unique essence as *Catechins* which are polyphenolic antioxidant plant metabolites (Yilmaz, 2006; Thielecke and Boschmann, 2009). However, it is observed that some tea beverage not only address the health benefits from

drinking more tea but also supplement additional extracts like *Gymnema Sylvestre* and Hawthorn Fruit into tea products. For advertising orientation to health claims, those elements characterize tea beverage treated as functional drinking for enhancing consumer's health condition. Current research into food advertising highlights two issues in particular. One is that food advertising tends to address healthy alternatives such as fruits and vegetables (e.g., Batada et al., 2008; Warren et al., 2008; Zwier, 2009). Another health claims are related to products' nutritional contents (e.g., fats, fibers) and health effects as strengthening the bones and reducing risk of heart disease (see Lord et al., 1987; Lord et al., 1988; Hickman et al., 1993; Pratt and Pratt, 1995; Parker, 2003; Lohmann and Kant, 1998; Byrd-Bredbenner and Grasso, 2000). Roosen et al. (2007) indicated that health information mainly influences consumer preferences revealed in the choice procedure. Williams and Ghosh (2008) showed that consumers in Australia and New Zealand were interested in health claims but were sceptical about their reliability from manufacturers without strong regulation.

Additionally, experimental studies suggested that the format of claims, and the food on which they were carried, influenced consumer acceptance. Verbeke et al. (2009) found that Belgian consumers are much concerned about calcium-enriched fruit juice, omega-3 enriched spread and fibre-enriched cereals as each with a nutrition claim and showed positive attitudes towards functional foods and familiarity with the concrete functional product category boosted the claim type and product ratings. Such important role of health claims from food nutrition was similar to the finding from Van Trijp and Van der Lans (2007). Tudoran et al. (2009) indicated that fiber and health information in fish products may be less effective while consumers have been shown to be receptive to fibre information in bread, English muffins (Mialon et al., 2002; Poulsen, 1999) and marmalade and honey (Ares and Gámbaro, 2007)

Previous studies identify many factors affecting consumer's food choice. Taste and other sensory properties of foods dominated a key position. Taste has to be fairness in that it strongly influences individual food choices (Arvola et al., 1999), in many cases surpassing health issues (Glanz, et al., 1998; Tepper and Trail, 1998). In addition, Tuorila and Cardello (2002) demonstrated that consumers are not willing to compensate for bad taste with health effects. In many cases, however, product information has influenced the perceived benefit and thereby the willingness to use a product. The name of the product, its price and its nutritional benefit information had a significant effect on the intention to buy a fat spread (Bower et al., 2003). Kähkönen et al. (1996) found that a low-fat spread was better accepted if consumers received nutrition information before using it.

Product information as such may not in all cases be effective in affecting the acceptability for food consumption. Attitudes and personal motivation pose the relevance of the product information to consumers and determine its purchasing. Purchasing attitudes might determine the effect of product information on linkage and the likelihood of buying a product (Shepherd et al., 1991). Nevertheless, the sensory ratings of spread labelled as being reduced-fat were more positive if the respondents' attitudes towards reduced-fat spread were positive (Aaron et al., 1994). In a study of McFarlane and Pliner (1997) focusing on novel foods, general nutrition information enhancing the greater willingness to taste novel foods while nutrition was crucial to the participants. This could also be consistent with health-related motivational factors: a personal need to prevent illness or to pay attention to one's own health may influence their willingness to use a product with a suitable health claims. The likelihood of the concept of functional foods being accepted increases, if the respondent has an ill family member (Verbeke, 2005). Health problems also motivate individuals to search for specific and relevant nutritional information (Bhaskaran and Hardley, 2002), e.g., those with high blood cholesterol level look for cholesterol-free foods. Information about the fibre

content of food increased the likelihood that the elderly intended to purchase the product, as they were concerned about their fibre intake, unlike younger consumers for whom fibre intake was not relevant (Tuorila, et al., 1998). As shown by Urala and Lähteenmäki (2004), the perceived reward in terms of improved performance and health from consuming functional foods was the best predictor for a consumer's willingness to use functional foods. In addition, the carrier product type, which is enriched, has an effect on the reactions towards functional foods. Similar to the study by Bech-Larsen and Grunert (2003), functional, enriched spread was perceived as healthier than enriched yoghurt and juice was as the latter products are perceived to be much healthy

Moreover, price plays an essential role in the decision of consumers to purchase functional foods in Finland (Ollila et al., 2004). The role price played was contradictory to that of Poulsen's (1999) study on functional foods, although he mentioned that a positive attitude towards enriched products would increase the willingness of a consumer to pay a higher price for these products. Besides, conventional demographic factors such as gender and age might affect the willingness to use a product as well. As indicated by Bower et al. (2003), females, older subjects and consumers with a high health concern had a higher purchasing intention for the spread labelled with a proven health benefit. The proportion of users of plant stanol ester margarine had found to increase with age (Anttolainen et al., 2001) and the elderly in Denmark had a more positive attitude towards functional foods than the young did (Poulsen, 1999). Older Australian consumers were likely to take preventative actions concerning dietary changes and, in this way, possibly influence their disease risk (Bhaskaran and Hardley, 2002), which could make them more potential users of functional foods.

II. Methodology

Choice-based conjoint experiments are used and analyzed within a random utility framework assuming an individual, n , maximizes his or her utility while choosing between alternatives, J . The researcher is not completely informed about all elements considered important by respondents; therefore utility observed from a researcher's perspective can be classified into two components, V and ε .

$$U_{in}=(V_{in}+\varepsilon_{in}) \quad (1)$$

where U_{in} is the overall utility of choice i for individual n , ε_{in} is the random utility component that comprises unobserved individual observations, represented as measurement errors and unobserved attributes, V_{in} is the systematic or measurable utility, which is a function of X_{in} and β_i and an unknown parameter vector to be estimated. X_{in} defines: firstly, a matrix of attributes pertaining to choice options; secondly, a matrix of characteristics that pertain to individuals; thirdly, a matrix of interactions of attributes with individual characteristics; fourthly, a vector of interactions of individual characteristics with choice option intercepts. In most practical applications, V_{in} takes a linear-in-parameters additive form. If Ω is defined as the universal choice set of discrete alternatives, and J the number of elements in \mathcal{A} , then individual n will choose alternative i over some other option j if, and only if, $U_i > U_j$, where all $j \neq i \in \Omega$. The probability that individual n chooses i from set Ω is given by

$$P_{in}=P[\{\varepsilon_{jn}-\varepsilon_{in}\}<\{V_{jn}-V_{in}\}] \text{ for all } j \neq i \in \Omega. \quad (2)$$

In order to specify the choice probabilities, assumptions must be made with regard to the distribution of the random components. From the outset of choice-based conjoint

experiments, the independent and identically distributed type I extreme-value distribution proved convenient for computational ease. This distribution leads to the popular Multinomial (Conditional) Logit model (MNL):

$$P_{in} = \frac{e^{V_{in}}}{\sum_{j=1}^J e^{V_{in}}}, j=1, 2, \dots, J, j \neq i. \quad (3)$$

III. Survey and Data

From 1 July to 31 August 2007, we collected purchasing information on tea drinking products from total 620 respondents participated in the choice-based conjoint experiment which was conducted in the city of Taipei, Taichung, Tainan, and Kaohsiung in Taiwan. Those respondents were selected at supermarket using questionnaire for personal interview. Beginning with the experimental choice task, participants were asked to taste tea drinking for “Original Tea” and to choose the most preferred from a specific ‘choice set’ from each experiment as demonstrated at Figure 2. Each choice set is a different combination of several product attributes for “Original Tea”. Therefore, choice tasks were repeated twice by all respondents interviewed at supermarket. After deleting a few outliers from the sample, a total of 3,390 choices were used for empirical analysis.

In addition, the tea drinking products for “Original Tea” provided to respondents are varied systematically with different attributes as tea category (black tea, green tea, and oolong tea), additives (*Catechins*, extracts, and non additives), health claims (yes and no), processing technology (cold extraction and none), package (paper, plastics, and aluminum), sweet (normal sweet, low sweet, and no sugar) and price. We describe the detailed information at Table 1.

VI. Empirical Results

Overall, as shown at Table 2 the estimated individual models fit the data well using Conditional Logit Model based on λ . Regarding the result of “Original Tea” from all respondents, consumers favor green tea while treated black tea as reference choice. Consumers are more likely to choose green tea beverages with extracts, emphasis on favor and health claims, using cold processing technology, and low or no sugar, but price has negative effect on their choice. Both male and female consumers prefer to green tea beverages with emphasis on favor and health claims, using cold processing technology, and lower price. Interesting, female consumers show more likelihood to choose green tea beverages with extracts and lower sugar than male consumers. This implies that female are much concern the health claims while they choose original tea products. Regarding educational level difference, consumers with college or above degree are more likely to choose green tea with emphasis on favor and health claims, using cold processing technology, and lower price than those with high school degree or below. It is noted that well-educated consumers reveal much concern about attributes on extracts, low sugar, and no sugar for their tea beverage products choices. In contrast with well-educated consumers, less-educated consumers prefer to green tea beverage addressed with favor.

Moreover, our findings add insights into the interaction between the health claims and socio-economic status as male, educational years, and age. Firstly, male consumers who are concerned about health claims (Male \times Health) are less likely to choose green tea beverages. Secondly, well-educated consumers concerned about health claims (Education Years \times Health) reveal higher likelihood to purchase tea drinking products in comparison to those less-educated and not concerned about health claims. Finally, young consumers concerned much

about health claims (Age×Health) are more likely to choose the tea drinking products. The interaction effect of health claims and socio-economic status on tea beverages choice is statistically significant at empirical evidence.

V. Conclusions

This paper aims to identify consumer preference for original tea drinking products in Taiwan by applying conjoint analysis and investigate whether health claims as attributes would influence consumer's choice behavior. It is found that respondents preferred to green tea drinking products with health claims compared with oolong and black tea beverage. This result stands for consumer's concern on their health status by intaking additives like *Catechins*. Our results also suggest that respondents prefer tea drinks with less or no sugar. Consumers concerned about health claims are more likely to choose the tea drinking products are those female, well-educated, and the young.

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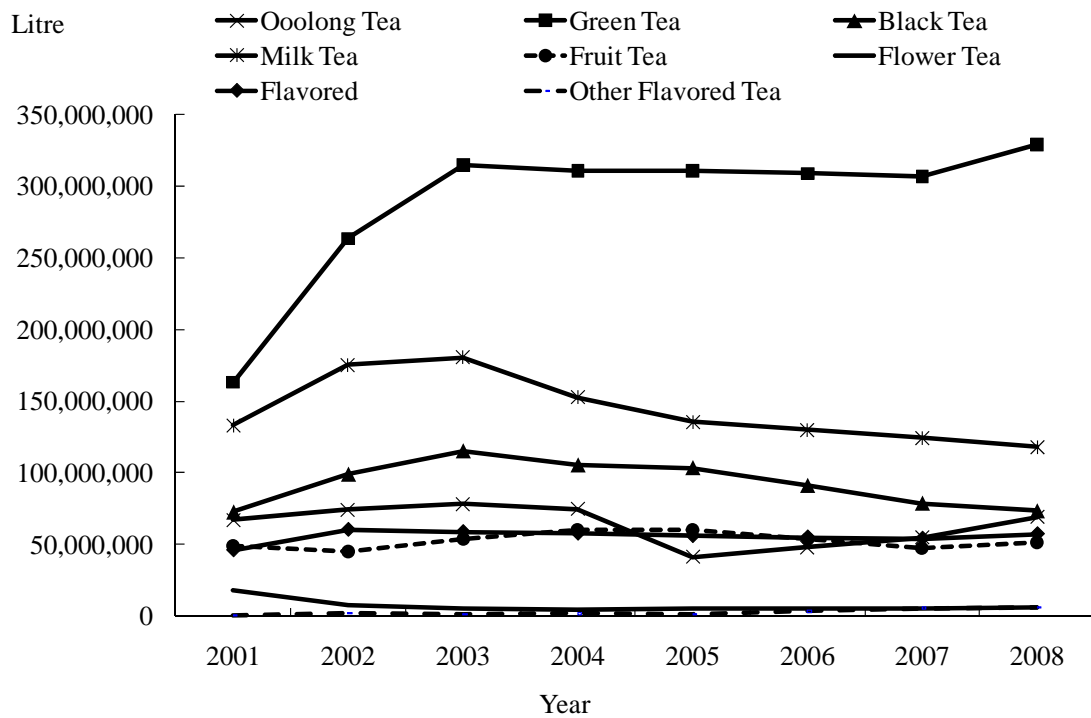


Figure 1 Sales Trend of Tea Drinking Products in Taiwan, 2000-2008

(Source: Taiwan Beverage Industries Association Statistics, 2001-2008)

Product Attribute	Choice A	Choice B	Choice C
Tea Category	Black Tea	Green Tea	Neither A nor B is preferred
Catechins Extracts	No	Yes	
Health Claims	Favor	Healthy	
Technology	No	Yes	
Package	Plastic	Paper	
Sugar	Low sugar	No sugar	
Price	20	25	
Chosen	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Figure 2 A Example of Original Tea Product Choices for Experiment

Table 1 Attribute and Attribute levels used in discrete-choice experiment

Attribute	Level	Description
Tea category	Black Tea	Black Tea
	Green Tea	Green Tea
	Oolong Tea	Oolong Tea
Extracts	Yes	Labeled Catechins as additions
	No	No additions
Health Claims	Healthy	Emphasized that drinking tea is healthy for life.
	Favor	Emphasized that drinking tea is favorable.
	No	No emphasis on health claims
Processing Technology	YES	Addressed usage of the low temperature processing technology
	No	Not addressed the specific processing technology
Package	Paper	Paper container
	Plastic	Plastic bottles
	Aluminum	Aluminum container
Sweet	Normal	Sugar beverage
	Low	Labeled “Low Sugar” beverage
	No	Labeled “No Sugar” beverage
Price	NT\$15, 20, 25	The price of original tea beverage

Note: The total questionnaires is 565 after excluding the age more than 40. Every respondent repeats 6 times for discrete choice comparisons. Final observations for empirical analysis are 3,390(=565*6).

Table 2 Estimated Results from Conditional Logit Model for Different Type of Consumers

Attributes	All Sample		Gender				Education Level				Health Claims Interaction with Socio-Economic Status	
			Male		Female		Under High School		College and above			
No Choice	0.590***	(4.227)	0.280	(1.259)	0.783***	(4.343)	0.285	(1.007)	0.691***	(4.298)	0.565***	(4.038)
Green Tea	0.539***	(9.601)	0.517***	(5.768)	0.559***	(7.732)	0.536***	(4.713)	0.537***	(8.289)	0.538***	(9.574)
Oolong Tea	0.027	(0.449)	-0.111	(-1.123)	0.104	(1.379)	-0.073	(-0.587)	0.061	(0.881)	0.025	(0.421)
Extracts	0.154***	(2.955)	0.042	(0.485)	0.223***	(3.376)	0.033	(0.301)	0.195***	(3.256)	0.170	(0.478)
Favor	0.132**	(1.919)	0.204	(1.864)	0.088	(0.984)	0.307**	(2.152)	0.079	(1.001)	0.135**	(1.964)
Health	0.300***	(4.463)	0.309***	(2.856)	0.301***	(3.477)	0.275**	(2.003)	0.301***	(3.889)	0.309***	(4.591)
Processing	0.150***	(3.523)	0.173***	(2.486)	0.131**	(2.417)	0.173**	(1.985)	0.146***	(2.972)	0.150***	(-3.510)
Alumni	-0.019	(-0.324)	0.003	(0.029)	-0.032	(-0.438)	0.170	(1.458)	-0.074	(-1.112)	-0.021	(-0.371)
Paper	-0.013	(-0.220)	0.069	(0.728)	-0.068	(-0.931)	0.082	(0.688)	-0.044	(-0.673)	-0.014	(-0.238)
Low Sugar	0.226***	(3.560)	0.068	(0.654)	0.320***	(3.971)	-0.178	(-1.366)	0.350***	(4.787)	0.225***	(3.533)
No Sugar	0.111**	(1.762)	0.116	(1.125)	0.108	(1.345)	-0.169	(-1.306)	0.196***	(2.708)	0.113*	(1.787)
Price	-0.041***	(-7.213)	-0.026***	(-2.833)	-0.051***	(-6.917)	-0.031***	(-2.604)	-0.045***	(-6.874)	-0.040***	(-6.988)
MalexHealth											-0.211**	(-2.164)
Education Years xHealth											0.041*	(1.867)
AgexHealth											-0.023***	(-3.07)
Observations	3,390		1,302		2,088		804		2,586		1,390	
Log-Likelihood	-3,573.481		-1,382.780		-2,180.022		-845.0527		-2,716.252		-3,564.566	
λ	301.63		95.23		227.76		76.46		249.52		319.46	

Note: The values in parentheses are t -statistics. *, **, *** are denoted as statistically significant at confidence level of 10%, 5%, and 1%, respectively. $\lambda=2[L(\max)-L(0)]$, $L(\max)$ is the log-likelihood of the chosen model, and $L(0)$ is the log-likelihood of a constrained model where all the slope coefficients are set equal to zero.