Familiarity and liking playing a role on the perception of trained panelists: A cross-cultural study on teas

Young-Kyung Kim [a],[1], Laureen Jombart [b], Dominique Valentin [b], Kwang-Ok Kim [a],*

[a] Department of Food Science and Engineering, Ewha Womans University, Seoul 120-750, Republic of Korea
[b] UMR CSGA 6265 CNRS, INRA, Université de Bourgogne, 21000 Dijon, France

A R T I C L E   I N F O

A B S T R A C T

Consumers cultural background is known to influence their food choice. To better understand the sensory perception across cultures, it is helpful to work with both a descriptive panel and consumers. This study examined how tea products of differing fermentation levels were described and liked by different cultures. Seven tea samples were evaluated by Korean and French trained panels and consumers. The trained panels evaluated the samples on appearance, flavor, and mouthfeel. The consumers rated the samples on acceptability and familiarity. The result indicated that both descriptive panels experienced varying degrees of taste and odor cross-modal interaction. On the unfamiliar samples, French panelists perceived high sweetness, and low bitterness and astringency in the presence of preferred aromas, suggesting that liking influences taste even for trained panels. Consumers generally liked familiar products but even an unfamiliar sample was liked when coupled with more preferred sensory characteristics and less disliked sensory properties. Present findings indicate that even trained panels are influenced by familiarity and liking. In order to better understand the cultural differences in liking, a descriptive sensory test within a culture is recommended—especially when the samples are unfamiliar to that culture.

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1. Introduction

Consumer food choice has generally been known as a complex function of preferences for sensory properties such as taste, and texture combined with the influence of non-sensory factors including food familiarity, experience, food-related attitudes, health claims, and price (Carrillo, Varela, Salvador, & Fiszman, 2011; Prescott, Young, O'Neill, Yau, & Stevens, 2002). These sensory and non-sensory factors are also influenced by consumers' cultural background (James, 2004; Overby, Gardial, & Woodruff, 2004). Therefore, cross-cultural study has gained more attention and plays an increasingly important role in successful product positioning in the global market. Recently a number of researchers have addressed such cultural comparisons. Pagès, Bertrand, Ali, Husson, and Lê (2007) reported that French and Pakistani consumers showed different preference patterns according to their consumption experiences and familiarities on biscuit products. In a study of edible oils, consumers from the UK, Denmark, and France showed different product perception and purchasing motives that relate to cross-cultural differences in product preferences (Nielsen, Bech-Larsen, & Grunert, 1998). Kim, Jombart, Valentin, and Kim

(2013) showed that familiarity affected not only the preference but also the consumers' perception of green tea products.

Contrarily, there have been limited efforts to understand similarities and differences of sensory perceptions through descriptive analysis across cultures. The comparison of sensory profiles from France and Pakistan (Pagès et al., 2007) showed a convergence that showed it was unnecessary to conduct sensory profiling in each country. On the contrary, Mée (2006) observed in a cross-cultural research using descriptive sensory panel in France and China that each trained panel gave different sensory profiles. The two panels evaluated the samples differently on flavors although similarly on appearance, tastes, and textures. In a study on chocolate description, Thamke, Dürrschmid, and Rohm (2009) suggested that flavor attributes might be more culture-dependent than taste or appearance attributes due to differences in the construction of assessors' sensory frames.

Cross-cultural agreements are generally observed for the basic tastants in model solutions (Druz & Baldwin, 1982; Laing et al., 1993). However, disagreements were reported in the acceptance and/or the perception of food items when two cultures evaluate a product of discrepant familiarity, like a traditional food of one culture (Prescott et al., 2002; Tu, Valentin, Husson, & Dacremont, 2010). These findings suggest that the differences observed in the consumers' liking or perceived qualities are mainly due to cultural factors rather than inherent personal variations. Until now, cross-cultural studies have mostly focused on the sensorial sensitivities to simple model food or the hedonic discrepancies of general food products, such as yogurts (Tu et al., 2010),

Table 1
The information of tea samples.

Sample identification	Processing method	Origin
KG	Non-fermented tea (Green tea)	Jeju, Korea
KFL	Semi-fermented tea (Oolong tea)	Jeju, Korea
KFR	Semi-fermented and roasted tea (Oolong tea)	Jeju, Korea
KFH	Heavy-fermented tea (Black tea)	Jeju, Korea
IFB	Heavy-fermented tea (Black tea)	Assam, India
KFM	Microorganism fermented tea	Jeju, Korea
CFM	Microorganism fermented tea	Yunnan, China

beverages (Chung et al., 2012; Labbe, Damevin, Vaccher, Morgenegg, & Martin, 2006), and biscuits (Pagès et al., 2007). Most cultural differences are expected to be more apparent in the traditional food items than in the general ones.

Teas have been commonly categorized based on the degree and the method of fermentation: green tea (non-fermented), oolong tea (partially fermented), black tea (fully fermented), and microorganism-fermented tea (post-fermented). After picking, fresh tea leaves soon begin to break down their chlorophyll and oxidize polyphenols. This oxidation process is known as fermentation in the tea industry. The post-fermented teas are a class of teas that have undergone open-air and/or inoculated microorganism-fermentation. The fermentation process alters much of the tea components so sensory properties of the tea, such as color, flavors, tastes, and mouthfeels are changed markedly. Even though many studies on the physicochemical properties of fermented teas have been reported, only a few on the sensory characteristics of fermented tea products are available. (Bhattacharyya et al., 2007; Chen, Liu, & Chang, 2010; Obanda, Owuor, & Mang'oka, 2001).

Tea market is growing internationally due to consumers' increased awareness of health benefits associated with them (Preedy, 2013). Many kinds of fermented teas have been developed and consumed worldwide for a long time. Western countries consume mostly black tea whereas certain areas in Asia, including Korea, consume mostly green tea and/or other fermented teas such as oolong tea (CBI, 2008; Dufrene, 2012). A recent cross-cultural study on green tea (Kim et al.,

2013) suggests that familiarity might affect consumers' perception of green tea samples. Comparing differences in tea choice between cultures with varying familiarity may have important implications in the global tea market.

Many westerners including French are familiar with black tea but have limited exposure to other tea products; it is likely that both consumers and trained panelists have different perceptions toward tea products based on their fermentation levels. This study examined how various tea products would be described and liked respectively by trained panels and consumers from Korea and France. France was chosen because of dissimilarities between Korean and French tea cultures. Furthermore, if tea products are perceived differently between the two countries, it would be interesting to determine sensory attributes that are affected by cultural differences.

2. Materials and methods

2.1. Tea samples

Seven loose type tea samples of varying fermentation levels and origins were used (Table 1). Five of them were processed in Korea using fresh tea leaves. The fermentation level of the samples ranged from non-fermented to fully-fermented. Non-fermented green tea (KG) was produced by steaming and pan-frying method (Heiss & Heiss, 2007). Semi-fermented tea (KFL) was slightly fermented for 10 h then dried whereas Semi-fermented and roasted tea (KFR) was roasted for 4 h at 100–130 °C after 13 h-fermentation and drying. Heavy-fermented tea (KFH) was black tea. Microorganism-fermented tea (KFM) was processed by inoculating microorganism into green tea. After fermentation, KFM was dried for 5 h then aged in a wooden barrel. The other two fermented tea products, Indian black tea (IFB) and Chinese microorganism-fermented tea (CFM), were added to increase the diversity to the sample set. In particular, IFB was a sample that is more familiar to French consumers, while CFM was an unfamiliar tea to both Korean and French. Table 1 shows the information on the samples. Aliquots (17 g) of each sample were sealed in individual teabags (9 cm × 11 cm, MF-26, Miki Tokushu Paper Mfg. Co., Ltd, Tokyo,

Table 2
Definitions and reference samples of the descriptive attributes of teas from the Korean panel.

Descriptor	Definition	Reference
Appearance		
Brown	Intensity of brown color of green tea	–
Turbidity	Turbidity of green tea	–
Flavor		
Sweet potato	Aromatics associated with steamed sweet potato	50 g sliced sweet potato (local supermarket, Seoul, Korea), add 50 ml of water, cover, microwave for 2 min
Earth	Aromatics associated with earth	50 g soil
Rosemary	Aromatics associated with dried rosemary	5 g dried rosemary (local supermarket, Seoul, Korea)
Mold	Aromatics associated with mold	10 g rice (local supermarket, Seoul) burnt at high heat for 5 min
Cut grass	Aromatics associated with cut grass	cis-3-Hexenal (Bolak Co., Ltd., Gyeonggi, Korea)
Roasted barley	Aromatics associated with roasted barley	60 g roasted barley tea (Dongsuh Borisu, Dongsuh Corpc., Chungbuk, Korea)
Dried straw	Aromatics associated with dried straw	10 g Dried straw
Seaweed	Aromatics associated with seaweed such as dried laver or kelp	5 g dried cut-laver (local supermarket, Seoul, Korea)
Wood	Aromatics associated with wood	20 g sliced dried-wood, add 100 ml of boiling water
Roasted sesame	Aromatics associated with roasted sesame seed	5 g Roasted sesame seed (local supermarket, Seoul, Korea)
Jasmine	Aromatics associated with flower such as Jasmine flower tea	1.5 g Jasmine flower tea (Jasmine flower tea, Osulloc, Seoul, Korea) infused with 200 ml water for 2 min
Burnt wood	Aromatics associated with burnt wood	10 g of burnt wood
Arrowroot	Aromatics associated with arrowroot	5 g of arrowroot extract(JC World, Seoul, Korea), add 100 ml of 80 °C water
Sweet	Fundamental taste sensation of which sucrose is typical	0.8% Sucrose (Duksan Pure Chemical Co. Ltd., Gyeonggi, Korea) solution
Bitter	Fundamental taste sensation of which caffeine and quinine are typical	0.05% Caffeine (Duksan Pure Chemical Co. Ltd., Gyeonggi, Korea) solution
Theanine	Taste sensation of which theanine (main free amino acid in green tea) is typical	0.1 g of theanine (Taiyo Kagaku Co., Ltd, Japan), add 100 ml water
Mouthfeel		
Astringency	The feeling which shrivels the tongue, associated with tannins	0.1% Tannic acid (Duksan Pure Chemical Co. Ltd., Gyeonggi, Korea) solution

The references were presented in brown vials (150 mL).