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Effect of familiarity, brand loyalty and food neophobicity on food acceptance: A case study of instant noodles with consumers in Seoul, Beijing, and Shanghai

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ABSTRACT

This study investigated the factors influencing the liking and disliking of regular and spicy Jjajang instant noodles among consumers in Seoul (South Korea), Beijing (China), and Shanghai (China). The research examined the roles of cultural background, regional taste preferences, brand loyalty, and food neophobia.

Four regular Jjajang instant noodles (two Korean and two Chinese brands) and two spicy Korean Jjajang noodles were tasted and evaluated by 312 consumers (Seoul = 106, Beijing = 105, Shanghai = 101) in blind condition using the 9-point hedonic scale and the Check-All-That-Apply method. The participants in Shanghai included both general instant noodle consumers and loyal consumers of a specific instant noodle brand. Additional data, including flavor familiarity and individual's food neophobicity, were collected.

Results showed a positive relationship between flavor familiarity and consumer acceptance, with significant regional variations. Flavor familiarity affected Seoul consumers significantly and preferred products that were produced by Korean companies. Beijing and Shanghai general consumers showed similar liking patterns, preferring one Chinese and one Korean products over the others. Loyal consumers of a specific brand in Shanghai preferred the product of the corresponding brand to others, even under blind conditions. Spicy samples were generally disliked due to excessive spiciness. Food neophobia influenced consumer acceptance, with consumers in some regions, such as Shanghai, showing greater openness to novel flavors.

This study reveals the critical role of cultural background and flavor familiarity in shaping consumer acceptance of instant noodles with Jjajang flavor among Chinese and Korean consumers.

1. Introduction

Globalization has significantly influenced dietary patterns, fostering the rapid spread and acceptance of instant foods across diverse cultures (Singh et al., 2024). Due to the convenience, affordability, and long shelf life, ready-to-eat products have become an essential component of modern food culture (Gulia et al., 2014). Among these, instant noodles represent a good example of convenience foods, achieving widespread popularity. The World Instant Noodles Association (2025) reported that the global consumption of instant noodles surpassed 100 billion servings in 2023. While Asia remains the largest market, regions like Europe and the Americas are also experiencing notable growth. The ability of instant noodles to adapt to regional flavor preferences has been key to their global success (Farrand et al., 2017).

Jjajang (black bean paste-based sauce) noodles, as a classic Asian dish, holds deep cultural significance in both China and Korea. Originating in northern China, traditional Jjajang noodles are characterized by a robust and savory flavor, with its sauce made from fermented bean paste, minced meat, scallions, and garlic (Bai et al., 2013; Li et al., 2018). In the early 20th century, Jjajang noodles were introduced to Korea through cross-cultural exchanges and underwent localization, resulting in the creation of a distinct Korean-style Jjajang noodles. The

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Korean style Jjajang sauce is characterized with sensory properties such as sweetness and thickness compared to the Chinese version (Kim, 2009). Interestingly, instant noodle version of Jjajang noodles has been introduced firstly in South Korea in the 1970's laying the market foundation for Korean-style Jjajang instant noodles (NONGSHIM food, 2020). Meanwhile, Chinese Jjajang instant noodles were introduced later (around 1997) in Mainland China although Jjajang noodles were originally and traditionally consumed among Chinese consumers.

The acceptance of new or unfamiliar foods by consumers is often influenced by multiple psychological factors, among which food neophobia is a prominent and significant concept. Food neophobia, defined as the reluctance or fear of trying unfamiliar foods, is closely tied to cultural context (Pliner and Hobden, 1992b). Studies indicate that higher food neophobia scores (FNS) are associated with lower acceptance of novel foods, whereas familiarity can mitigate this effect by fostering a sense of comfort and trust (Hong et al., 2014; Mascarello et al., 2020). Familiar foods are more likely to be accepted due to cultural and emotional associations, although excessive familiarity can sometimes reduce interest, especially among consumers inclined to explore novelty (Torrico et al., 2019). Repeated exposure plays a vital role in increasing familiarity and cultivating brand loyalty. Through repeated interactions, consumers not only reduce food neophobia but also develop a preference for the brand, enhancing their acceptance of its products (Ushiama et al., 2021).

This study selects two regular Jjajang instant noodles from China and Korea, respectively, and two spicy Jjajang instant noodles from Korea to test the noodle acceptance differences between Chinese and Korean consumers. By focusing on participants in Seoul, Beijing, and Shanghai, this study analyzes the roles of familiarity, brand loyalty, and food neophobicity on the acceptance of Jjajang instant noodles. Although all participants in this study were regular consumers of instant noodles, the rationale for including food neophobicity measured by Food Neophobia Scale (FNS) questions was to examine the role of cultural exposure and openness to unfamiliar flavor variations of a familiar food category. Given the varied market histories of the products selected for this study in both China and South Korea, consumer acceptance is explored from an anthropological perspective.

2. Materials and methods

2.1. Consumer panels

This study was conducted off-line in three regions: Seoul (South Korea), Beijing (China), and Shanghai (China). A total of 312 consumers participated in the study (Table 1): 106 from Seoul, 105 from Beijing, and 101 from Shanghai. The consumer groups in this study were designed to be statistically valid by region, ensuring that meaningful comparisons could be made across Seoul, Beijing, and Shanghai. The sample size determination was based on both prior research and power analysis calculations to achieve statistical reliability. A power analysis was conducted using G*Power 3.1.9.7 (Faul et al., 2007). The power analysis was performed for an ANOVA test with a significance level of $\alpha = 0.05$ and a statistical power of 0.95, indicating a high probability of detecting significant differences if they exist. The results indicated that a minimum of 323 participants was required for meaningful comparisons across consumer groups. For each product sample, a minimum of 100 participants per region was determined based on previous studies (Li and Chung, 2021).

Participants were aged 20 to 40, had consumed instant noodles at least once in the past month, and were familiar with the Jjajang flavor (Heymann and Lawless, 2010). Recruitment was conducted through local social networking services (SNS). In Shanghai, consumers were further divided into two groups: general consumers (SH_GC, n = 50) who consumed instant noodle on a regular basis and loyal consumers (SH_TBL, n = 51) of a specific Korean brand included in the present study (samples KGP1 and SKP1). SH_TBL participants reported that more than 50% of their instant noodle consumption in the past six months came from this specific brand. Participants attended the evaluation in sensory laboratory settings at universities in Beijing and Seoul, as well as a research facility in Shanghai. All experimental procedures were approved by the Institutional Review Board of Ewha Womans University (IRB: ewha-202405-0019-02).

Table 1
Average age and gender distribution of Chinese and Korean consumers.

	Korea	China					Total
	Seoul (n = 106)	Beijing (n = 105)	Shanghai (n = 101)			Total	
			SH_GC	SH_SBE	Total		
Age	24.8 ± 4.2	23.1 ± 2.3	30.1 ± 6.2	27.8 ± 4.5	28.9 ± 5.5	25.9 ± 5.1	25.6 ± 4.8
Female	55%	71%	52%	65%	58%	65%	61%
Male	45%	30%	48%	35%	42%	35%	39%

2.2. Samples

This study evaluated six Jjajang instant noodle samples, categorized into four regular (two products from China and two products South Korea) and two spicy Jjajang instant noodles. The regular Jjajang samples included KGP1 (Jjajjaroni, Samyang Foods Co., Seoul, South Korea); KGP2 (Jjapaghetti, Nongshim Co., Seoul, South Korea); CGP1 (Tongwanfu Jjajang Ramen, Tongfu Enterprises Co., Henan, China); and CGP2 (Old Beijing Jjajang Ramen, Uni-President Enterprises Co., Beijing, China). All four regular Jjajang products are popular in their respective markets, with relatively high sales in the Jjajang instant noodle category. The spicy Jjajang samples consisted of SKP1(Spicy Jjajjaroni, Samyang Foods Co., Seoul, South Korea), and SKP2(Sichuan Jjapaghetti, Nongshim Co., Seoul, South Korea). Spicy Jjajang samples were selected from South Korea, as the Chinese market offers limited options in this category.

2.3. Sample preparation and presentation

The consumer test procedure was standardized to ensure consistency across all regions. All sensory evaluation sessions were held in controlled environments where participants physically attended the tests. Participants were required to taste and evaluate each sample sequentially. Four regular Jjajang samples were presented first in a balanced randomized order, followed by a 10-min rest period, after which two spicy Jjajang samples were evaluated in a counterbalanced order. Each sample was prepared according to the manufacturers' instructions, portioned into 45–55 g servings, and presented in white disposable cups labeled with random three-digit codes. The samples were served at a temperature consistent with normal consumption conditions to ensure that the evaluation accurately reflected real-life eating experiences. To achieve this, all Jjajang instant noodle samples were freshly prepared immediately before evaluation and served at a typical consumption temperature (40–50 °C). To cleanse their palate between samples, participants were provided with biscuits (Carr's Original Table Water) and mineral water (SamDaSoo in South Korea, Nongfu Spring in China). All the sensory tests were conducted in either Korean and Chinese languages to ensure clear communication.

2.4. Sensory taste-test procedure

Two types of questionnaires were developed for regular and spicy Jjajang samples, designed to capture consumers' acceptance and sensory perception of the products. Both questionnaires began with a 9-point hedonic scale (Peryam and Pilgrim, 1957; Chung and Han, 2013) assessing overall liking (OL), appearance liking, odor liking, taste liking, texture liking, and familiarity of the samples. Sensory attributes were

evaluated using a 9-point Just-About-Right (JAR) scale (Rothman and Parker, 2009), where regular Jjajang samples were rated for saltiness, umami, sweetness, and noodle doneness, and spicy Jjajang samples included an additional attribute for spiciness intensity. Reasons for liking or disliking were collected using the Check-All-That-Apply (CATA) method (Dooley et al., 2010; Ares and Jaeger, 2013, Appendix 1.), with sensory and non-sensory attributes categorized separately (Jang and Chung, 2023). The attributes for CATA were selected based on multiple sources of information. Sensory attributes used in a previous study on instant noodles were the first candidates (Li, 2021). Consumer insights were also integrated through Focus Group Interviews (FGI), to capture descriptors that reflect real consumer perceptions. Furthermore, a commercially developed flavor wheel for Jjajang instant noodles was used as an additional reference source to ensure that the attribute list covered industry-relevant sensory characteristics. The Food Neophobia Scale (FNS) was also included (Pliner and Hobden, 1992b), using a 10-item questionnaire on a 9-point Likert scale, with reverse-coded items adjusted to measure consumers' aversion to novel foods. Total FNS scores ranged from 10 to 90, indicating the degree of neophilics, neutrals or neophobics. The questionnaires were presented and evaluated on a paper ballot.

2.5. Statistical analysis

Data analysis was conducted using IBM SPSS Statistics 29 (Chicago, IL, USA) and XLSTAT 2022 (Paris, France). General Linear Models (GLM) in Analysis of Variance (ANOVA) were employed to analyze the effects of sample type, region, and FNS groups on consumer acceptance and intensity ratings. The analysis of regular Jjajang samples and spicy samples were carried out separately. Fixed effects included sample, region, and FNS group, while consumer was treated as a random effect. Tukey's post-hoc tests were performed for significant main effects and interactions concerning the four regular samples. CATA data were analyzed by identifying liking terms selected by more than 25% of consumers and disliking terms chosen by more than 15% through frequency analysis, followed by chi-square and correspondence analysis (CA) to visualize group differences. Frequency analysis was conducted to determine the occurrence of each sensory attribute selected by consumers. Chi-square tests were performed to identify significant differences in attribute selection across different consumer groups and products. CA was applied to visualize relationships between products and sensory attributes, allowing for a better understanding of consumer perceptions. FNS scores were categorized into Neophobics, Neutrals, and Neophilics based on the 33.33% and 66.66% percentiles, and their influence on acceptance was assessed using GLM. These analyses provided insights into regional differences, sensory drivers of liking, and the role of food neophobia in consumer acceptance patterns.

3. Results

3.1. General attitudes for instant noodles

Consumers were surveyed to rate the general liking and consumption frequencies of regular instant noodles and Jjajang instant noodles in their daily life. The findings showed that, with regular instant noodles, consumers in Seoul (OL score 7.5) and Shanghai (OL 7.4) exhibited a higher level of acceptance than those in Beijing (OL 6.8). For Jjajang instant noodles, Korean consumers exhibited a higher acceptance (OL 7.2) than Chinese consumers (OL 6.5). Regarding local brands, Korean consumers assigned a higher rating to Korean brand instant noodles (OL 7.9) than did consumers in Beijing (OL 6.3) and Shanghai (OL 7.0). Chinese consumers rated Chinese brand instant noodles (OL 6.9) higher than Korean consumers (OL 5.3).

A positive correlation was observed between consumption frequency and acceptance. The overall consumption frequency of regular instant noodles was higher in South Korea than in China. In Seoul and Shanghai, the proportion of consumers who consumed regular instant noodles more than once a week was similar, at 67% and 78%, respectively, significantly exceeding that of consumers in Beijing (38%). Regarding the consumption frequency of Jjajang instant noodles, 24% of consumers in Seoul consumed them at least once a week, which was higher than the proportions in Beijing (8%) and Shanghai (21%). For Korean-brand instant noodles, the proportion of consumers who consumed them weekly reached 65% in the Korean market, compared to only 11% in the Chinese market. In contrast, the consumption frequency of Chinese-brand instant noodles was significantly higher in the Chinese market than in the Korean market. The proportion of consumers who consumed them at least once a week was 49% in Shanghai, 31% in Beijing, and 0% in Seoul.

3.2. Cross-cultural comparisons of jjajang instant noodles acceptance

3.2.1. Comparison of jjajang instant noodles acceptance between regions

3.2.1.1. Four regular jjajang instant noodle samples. ANOVA analysis was conducted using GLM to investigate the effects of consumer's region of residence (Seoul, Beijing, Shanghai) and sample types (KGP1, KGP2, CGP1, CGP2) on the acceptance and perceived intensities of sensory attributes of Jjajang instant noodles (Table 2.). The analysis results showed that all acceptance, sensory intensities, and perception exhibited significant differences among different sample types ($p < 0.001$). Similarly, in the case of consumer's region of residence effect, there were significant differences ($p < 0.05$) in all other acceptance and sensory intensities except for umami intensity, sweetness intensity, and familiarity.

The results of 2-way interaction effect of sample types and region of residence revealed that except for sweet intensity and noodles doneness, all the other acceptance liking and taste intensities, and perception were significant ($p < 0.05$). This implies that the perception of Jjajang

Table 2
F-values and p-values for region differences in acceptance liking and taste intensities for four regular Jjajang instant noodle samples.

Factor	Attributes	F-value	P-value
Sample	Overall Liking	50.447	<0.001***
	Appearance Liking	37.471	<0.001***
	Odor Liking	42.426	<0.001***
	Taste Liking	46.964	<0.001***
	Texture Liking	40.446	<0.001***
	Saltiness Intensity	89.814	<0.001***
	Umami Intensity	17.953	<0.001***
	Sweetness Intensity	136.917	<0.001***
	Noodles doneness	71.29	<0.001***
	Familiarity	98.221	<0.001***
Region	Overall Liking	9.968	<0.001***
	Appearance Liking	9.848	<0.001***
	Odor Liking	12.65	<0.001***
	Taste Liking	11.508	<0.001***
	Texture Liking	3.321	0.037*
	Saltiness Intensity	3.682	0.026*
	Umami Intensity	2.257	0.106
	Sweetness Intensity	2.762	0.065
	Noodles doneness	5.162	0.006*
	Familiarity	2.774	0.064
Sample* Region	Overall Liking	32.952	<0.001***
	Appearance Liking	21.299	<0.001***
	Odor Liking	28.364	<0.001***
	Taste Liking	31.304	<0.001***
	Texture Liking	5.291	<0.001***
	Saltiness Intensity	2.783	0.011*
	Umami Intensity	3.29	0.003*
	Sweetness Intensity	1.935	0.072
	Noodles doneness	1.869	0.083
	Familiarity	69.071	<0.001***

[1)] *, **, and *** indicate significance at $p \leq 0.05$, $p \leq 0.01$, and $p < 0.001$, respectively.

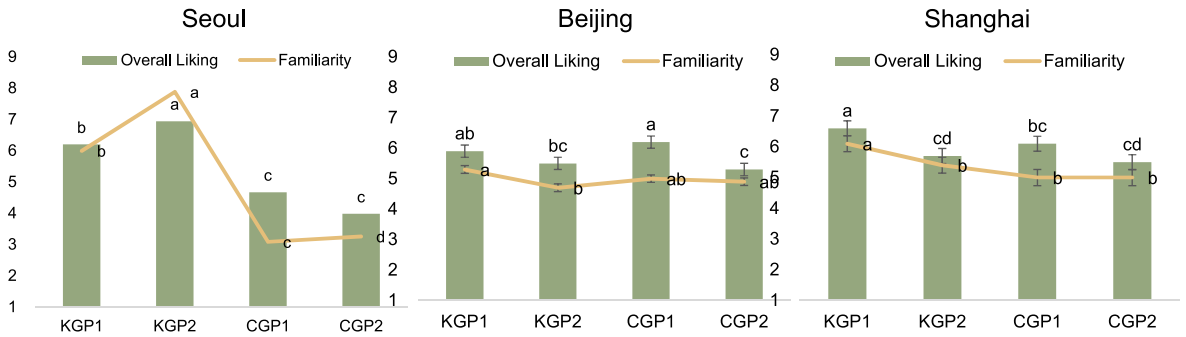


Fig. 1. Overall liking score with degree of familiarity of four regular Jjajang instant noodle samples among Seoul, Beijing and Shanghai consumers.

samples varied depending on the consumer's region of residence.

In overall liking (Fig. 1), Seoul consumers showed higher acceptance for Korean products, with KGP2 receiving the highest score (6.9) and CGP2 the lowest (4.0). Beijing consumers showed highest acceptance for Chinese product CGP1 (6.2), followed by KGP1 (5.9), while CGP2 received the lowest score (5.3). Shanghai consumers exhibited the highest acceptance for KGP1 (6.6) and the lowest for CGP2 (5.5). Although, consumers in all regions differentiated the liking level of the 4 samples, Korean consumers showed wider acceptance range than the Chinese consumers. For familiarity, Seoul consumers reported significantly higher familiarity with Korean products, particularly KGP2 (7.9), whereas CGP1 (3.1) and CGP2 (3.3) had lower familiarity. In Beijing, familiarity scores were more evenly distributed, with KGP1 scoring the highest (5.3). Shanghai consumers showed significantly highest familiarity with KGP1 (6.1) compared to other samples. The sensory attribute acceptance, i.e. odor and taste liking, followed similar trends to overall liking (Fig. 2). However, texture liking of KGP1 received the highest ratings among the four samples across all three regions.

Compared to liking ratings, the ratings of saltiness and sweetness intensities were cross-culturally similar. For saltiness intensity (Fig. 3), consumers in all three locations rated the Chinese product CGP2 as stronger than the two Korean products. Similarly, regarding sweetness intensity, all consumers rated KGP1 as the sweetest sample. The rank order of sweetness intensities among the four samples was identical

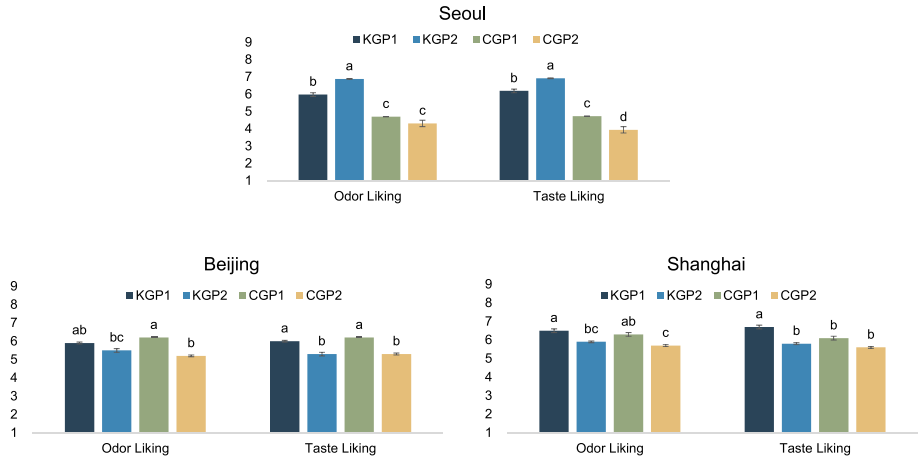


Fig. 2. Liking score of four regular Jjajang instant noodle samples among Seoul, Beijing and Shanghai consumers.

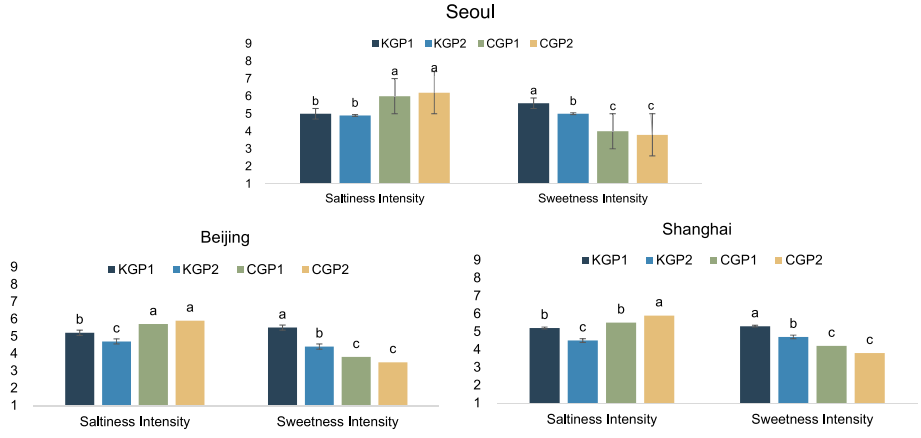


Fig. 3. Intensity score of four regular Jjajang instant noodle samples among Seoul, Beijing and Shanghai consumers.

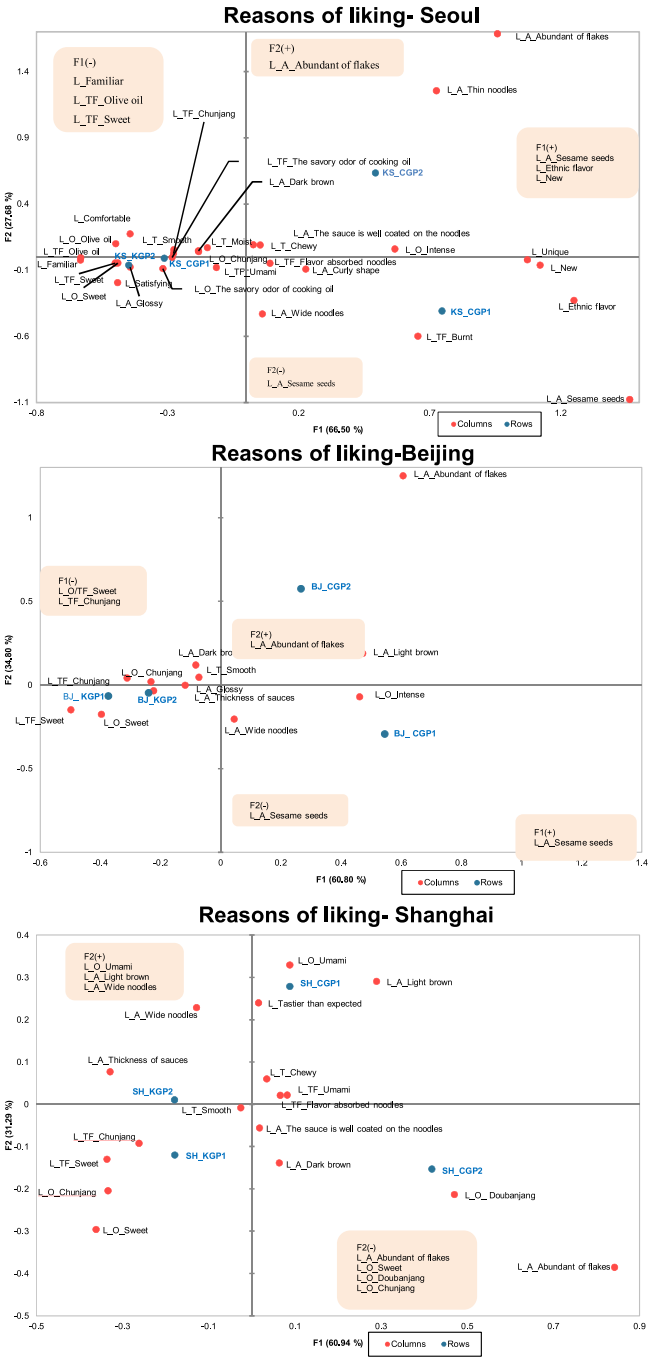


Fig. 4. CATA liking terms for four regular Jjajang instant noodle samples among Seoul, Beijing and Shanghai consumers.

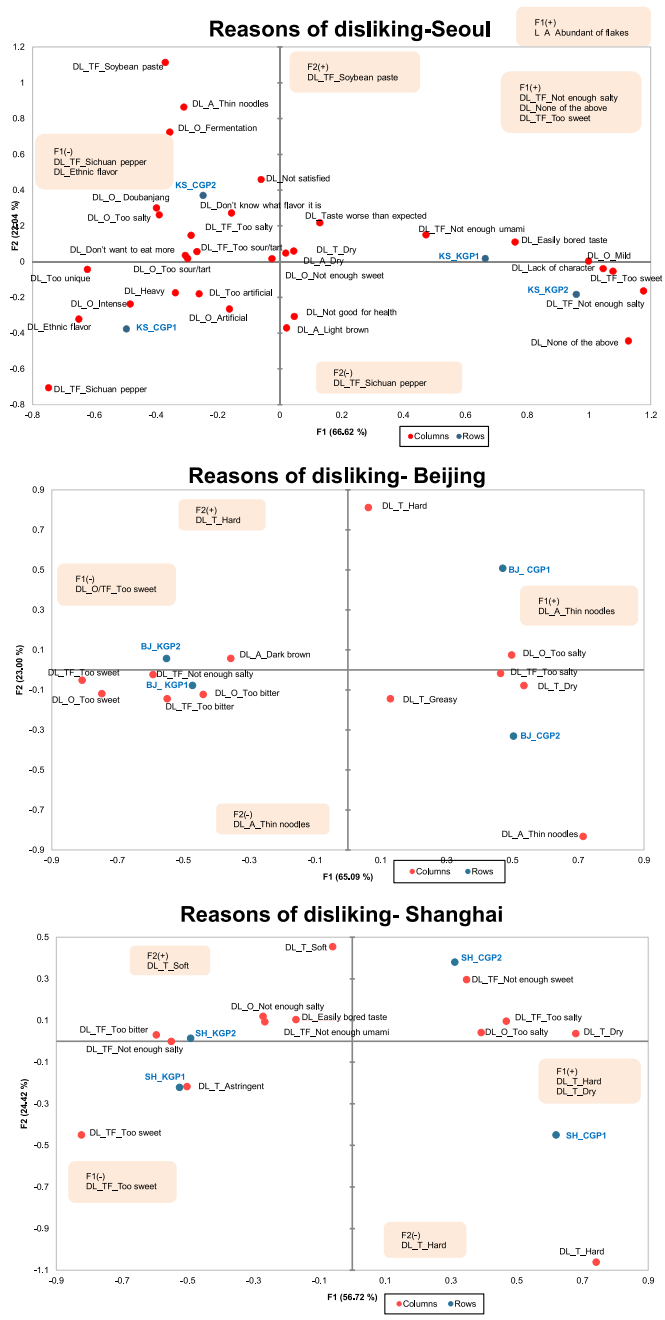


Fig. 5. CATA disliking terms for four regular Jjajang instant noodle samples among Seoul, Beijing and Shanghai consumers.

across the three regions.

For reasons of liking the samples (Fig. 4), Seoul consumers expressed acceptance for KGP2, citing the following characteristics: sauce is well coated on the noodles (62%), Glossy (60%), Chunjang (51%), Umami (49%), Flavor absorbed noodles (49%), and Familiar (76%) as important liking attributes. Beijing consumers had the highest acceptance for CGP1, the favorable attributes included its Light brown (35%), Wide noodles (39%), and Intense odor (50%). KGP1 is preferred due to its **Dark brown** (43%), **Smooth** (55%), **Sweet** (45%), **Wide noodles** (42%), and **Chunjang** (45%). In Shanghai, the higher acceptance for KGP1 and KGP2 is driven by distinct sensory attributes. KGP1 is favored for its deep **Dark brown** (45%), **Smooth** (58%), **Sweet** (48%), **sauce well coated on the noodles** (77%), **Umami** (51%), **Flavor absorbed noodles** (44%), and **Chewy** (68%).

For reasons of disliking (Fig. 5), Seoul consumers expressed dissatisfaction with CGP2 for the following characteristics: Thin noodles (29%), Intense (26%), Too salty (50%), Too sour/tart (29%), Dry (36%), and Ethnic flavor (22%) which collectively led to dissatisfaction with the sample. Beijing consumers disliking CGP2 include Too salty (38%), Greasy (23%), and Dry (23%). Shanghai consumers had a relatively high selection frequency for the characteristics of Not enough sweet (33%), Too salty (46%), Dry (20%), and Easily bored taste (26%) for CGP2 samples.

3.2.1.2. Two spicy jjanjang instant noodle samples. ANOVA analysis using GLM examined the effects of consumers' region of residence and sample types on the acceptance and perceived sensory intensities of spicy Jjajang instant noodles among Seoul, Beijing and Shanghai

Table 3
F-values and p-values for region differences in acceptability and sensory attribute intensities for two spicy Jjajang instant noodle samples.

Factor	Attributes	F-value	P-value
Sample	Overall Liking	21.045	<0.001***[1)]
	Appearance Liking	20.579	<0.001***
	Odor Liking	24.136	<0.001***
	Taste Liking	21.02	<0.001***
	Texture Liking	1.88	0.171
	Spiciness intensity	378.659	<0.001***
	Saltiness Intensity	11.704	<0.001***
	Umami Intensity	2.536	0.112
	Noodles doneness	3.657	0.057
	Familiarity	1.093	0.297
Region	Overall Liking	2.225	0.11
	Appearance Liking	5.981	0.003*
	Odor Liking	5.06	0.007*
	Taste Liking	2.942	0.054
	Texture Liking	5.65	0.004*
	Spiciness intensity	2.661	0.071
	Saltiness Intensity	1.551	0.214
	Umami Intensity	1.993	0.138
	Noodles doneness	0.389	0.678
	Familiarity	3.518	0.031*
Sample* Region	Overall Liking	13.741	<0.001***
	Appearance Liking	23.155	<0.001***
	Odor Liking	5.776	0.003*
	Taste Liking	15.459	<0.001***
	Texture Liking	7.577	<0.001***
	Spiciness intensity	7.316	<0.001***
	Saltiness Intensity	2.294	0.103
	Umami Intensity	0.078	0.925
	Noodles doneness	0.902	0.407
	Familiarity	35.83	<0.001***

[1)] *, **, and *** indicate significance at $p \leq 0.05$, $p \leq 0.01$, and $p < 0.001$, respectively.

consumers (Table 3). The results showed significant differences in acceptance and sensory intensities across sample types ($p < 0.05$). Consumer region significantly affected attributes such as appearance liking, odor liking, texture liking, and familiarity ($p < 0.05$). Interaction effects between sample types and regions were significant for all acceptance and taste intensities except sweetness intensity and noodle doneness ($p < 0.05$).

For overall liking (Table 4), Seoul consumers showed the highest acceptance for SKP2 (6.4), which was significantly higher than SKP1 (5.0). Shanghai consumers provided higher ratings for both samples compared to Beijing consumers, with SKP1 scoring 6.0 and SKP2 scoring 6.1 in Shanghai, compared to 5.6 and 5.8, respectively, in Beijing. Regarding familiarity, Seoul consumers reported significantly higher familiarity with SKP2 (5.8) compared to SKP1 (4.1). In Beijing, familiarity scores showed significant differences between the two samples, with SKP1 rated higher (5.7). In Shanghai, familiarity scores were similar.

Concerning sensory intensity perception, consumers in Seoul and Beijing exhibited greater variability in their spiciness intensity ratings for the two samples compared to Shanghai consumers. Across all three regions, SKP1 was rated significantly higher than the JAR value for spiciness intensity (Seoul: 7.4, Beijing: 7.2, Shanghai: 6.6), indicating an overly intense perception. SKP2 was rated closer to the JAR value in all regions (Seoul: 5.2, Beijing: 5.0, Shanghai: 5.3) suggesting that its spiciness intensity was perceived as just about right.

3.2.2. Comparison of jjajang instant noodles acceptance with Shanghai consumer categories

3.2.2.1. Four regular jjajang instant noodle samples. Consumer categories exhibited significant differences (Table 5) in overall liking, appearance, odor, taste, texture, and noodle doneness ($p < 0.05$). The interaction effect between sample types and consumer categories was significant for overall liking, taste liking, sweetness intensity, and familiarity ($p < 0.05$).

In overall liking (Fig. 6), SH_GC consumers rated all samples slightly higher than SH_TBL consumers, with KGP1 and CGP1 receiving the highest scores (SH_GC: 6.8; SH_TBL: 6.5). For familiarity, SH_GC consumers showed minimal variation. In contrast, SH_TBL consumers rated KGP1 the highest (6.1) and CGP1 and CGP2 the lowest (4.4). The odor and taste liking rating patterns were similar to that of the overall liking rating (Fig. 7).

In saltiness intensity, CGP2 was perceived as the saltiest sample (5.9), while KGP2 was rated the least salty (SH_GC: 4.4; SH_TBL: 4.6). KGP1's saltiness intensity (5.2) was closest to the "Just-About-Right" level. For sweetness intensity, KGP1 received the highest score (5.3), indicating it was close to "Just-About-Right," while CGP2 received the lowest ratings (SH_GC: 3.9; SH_TBL: 3.7), reflecting insufficient sweetness.

In the CATA analysis of regular Jjajang instant noodles among

Table 4
Mean liking scores and sensory intensities for two spicy Jjajang instant noodle samples among Seoul. Beijing and shanghai consumers.

Country	Sample	Overall Liking	Appearance Liking	Odor Liking	Taste Liking	Texture Liking	Spiciness Intensity	Saltiness Intensity	Umami Intensity	Noodles doneness	Familiarity
Seoul	**SKP1**	5.0 ± 1.8	5.5 ± 1.8	4.9 ± 1.6	5.0 ± 1.8	6.2 ± 1.2	7.4 ± 1.2	5.4 ± 1.2	5.1 ± 1.3	5.0 ± 0.7	4.1 ± 2.0
	SKP2	6.4 ± 1.7	6.9 ± 1.2	5.9 ± 1.6	6.4 ± 1.5	6.8 ± 1.2	5.2 ± 1.4	5.4 ± 0.8	5.1 ± 1.0	5.0 ± 0.6	5.8 ± 2.0
Beijing	**SKP1**	5.6 ± 1.8	5.8 ± 1.3	5.3 ± 1.6	5.6 ± 1.7	6.2 ± 1.2	7.2 ± 1.1	5.0 ± 0.8	4.8 ± 1.1	5.0 ± 0.6	5.7 ± 2.2
	SKP2	5.8 ± 1.5	5.7 ± 1.3	5.6 ± 1.5	5.6 ± 1.5	6.0 ± 1.3	5.0 ± 1.9	5.5 ± 1.1	5.0 ± 1.2	4.9 ± 0.7	4.6 ± 1.9
Shanghai	**SKP1**	6.0 ± 1.9	6.3 ± 1.7	5.8 ± 1.8	6.0 ± 2.0	6.5 ± 1.5	6.6 ± 1.7	5.1 ± 0.9	4.8 ± 1.0	5.0 ± 0.6	5.6 ± 2.0
	SKP2	6.1 ± 1.7	6.3 ± 1.5	6.0 ± 1.6	6.1 ± 1.7	6.5 ± 1.4	5.3 ± 1.7	5.3 ± 1.1	4.9 ± 1.0	4.9 ± 0.6	5.4 ± 2.2

Table 5
F-values and p-values for consumer category differences in acceptance and sensory intensities for four regular Jjajang instant noodle samples.

Factor	Attributes	F-value	P-value
Samples	Overall Liking	17.144	<0.001***[1)]
	Appearance Liking	7.835	<0.001***
	Odor Liking	16.268	<0.001***
	Taste Liking	17.996	<0.001***
	Texture Liking	17.14	<0.001***
	Saltiness Intensity	54.375	<0.001***
	Umami Intensity	13.074	<0.001***
	Sweetness Intensity	66.392	<0.001***
	Noodles doneness	57.313	<0.001***
	Familiarity	12.216	<0.001***
Consumer categories	Overall Liking	7.923	<0.001***
	Appearance Liking	16.242	<0.001***
	Odor Liking	14.494	<0.001***
	Taste Liking	9.887	<0.001***
	Texture Liking	8.845	<0.001***
	Saltiness Intensity	0.596	0.552
	Umami Intensity	0.487	0.615
	Sweetness Intensity	1.472	0.232
	Noodles doneness	3.484	0.033*
	Familiarity	4.078	0.018
Samples*Consumer categories	Overall Liking	2.941	0.008*
	Appearance Liking	1.794	0.098
	Odor Liking	1.306	0.252
	Taste Liking	3.362	0.003*
	Texture Liking	0.693	0.656
	Saltiness Intensity	0.457	0.84
	Umami Intensity	1.449	0.193
	Sweetness Intensity	2.217	0.04*
	Noodles doneness	0.936	0.469
	Familiarity	4.234	<0.001***

[1)] *, **, and *** indicate significance at $p \leq 0.05$, $p \leq 0.01$, and $p < 0.001$, respectively.

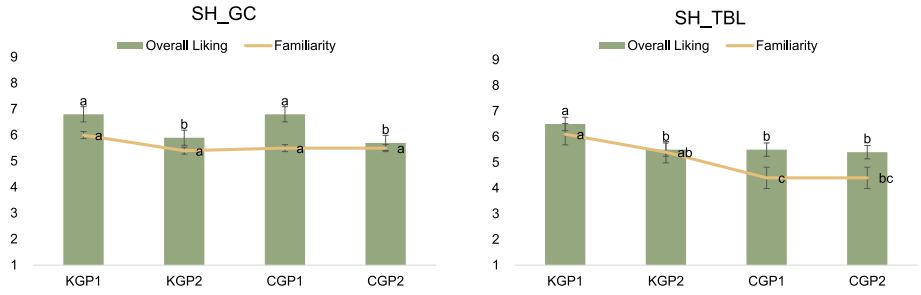


Fig. 6. Overall liking score with degree of sweetness and umami intensity of four regular Jjajang instant noodle samples among SH_GC and SH_TBL consumers.

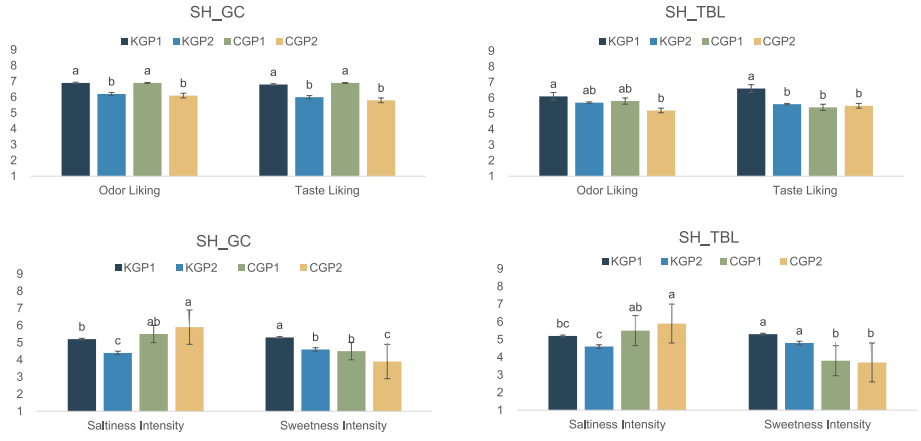
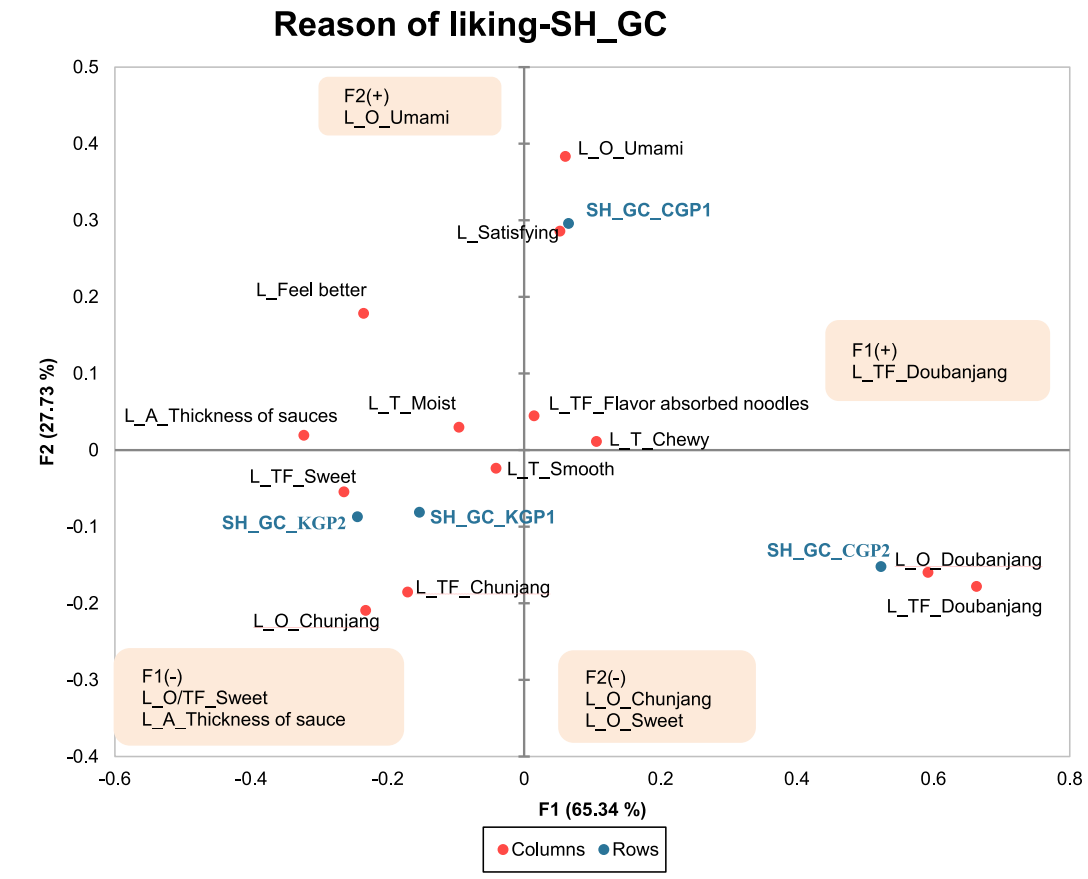


Fig. 7. Liking score and intensity score of four regular Jjajang instant noodle samples among SH_GC and SH_TBL consumer.



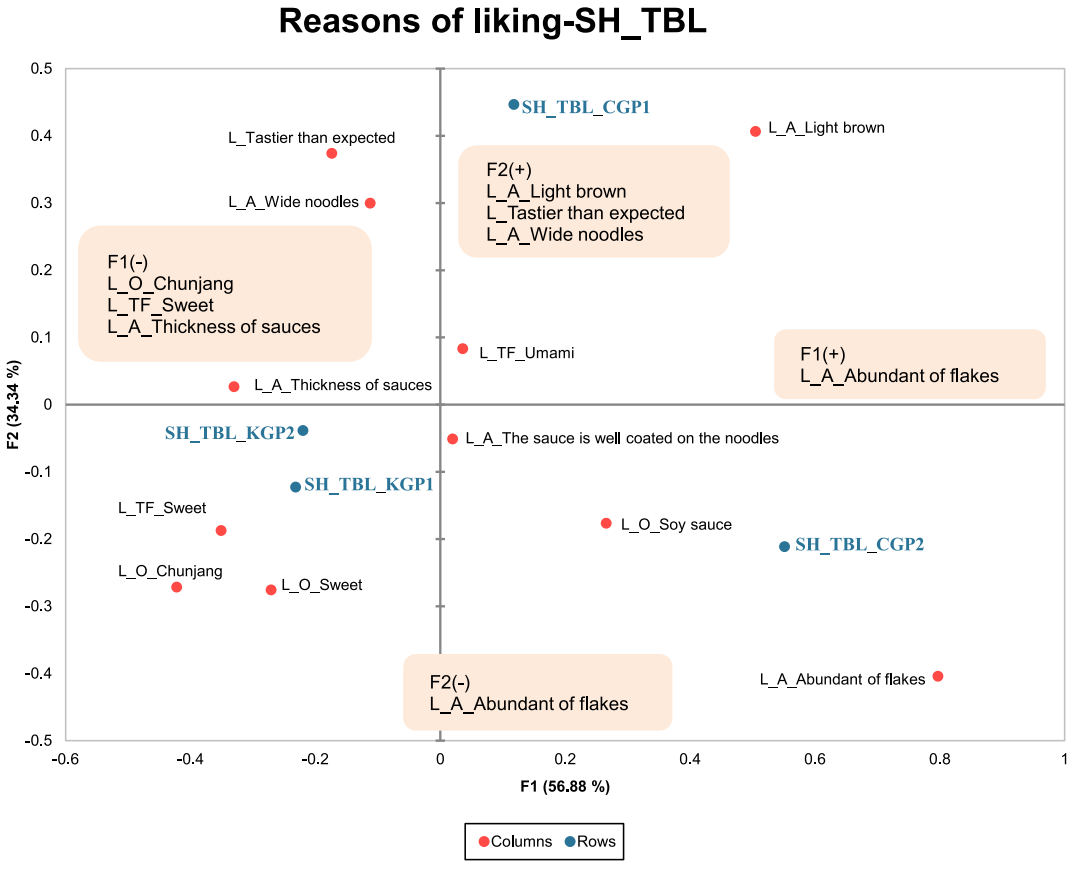
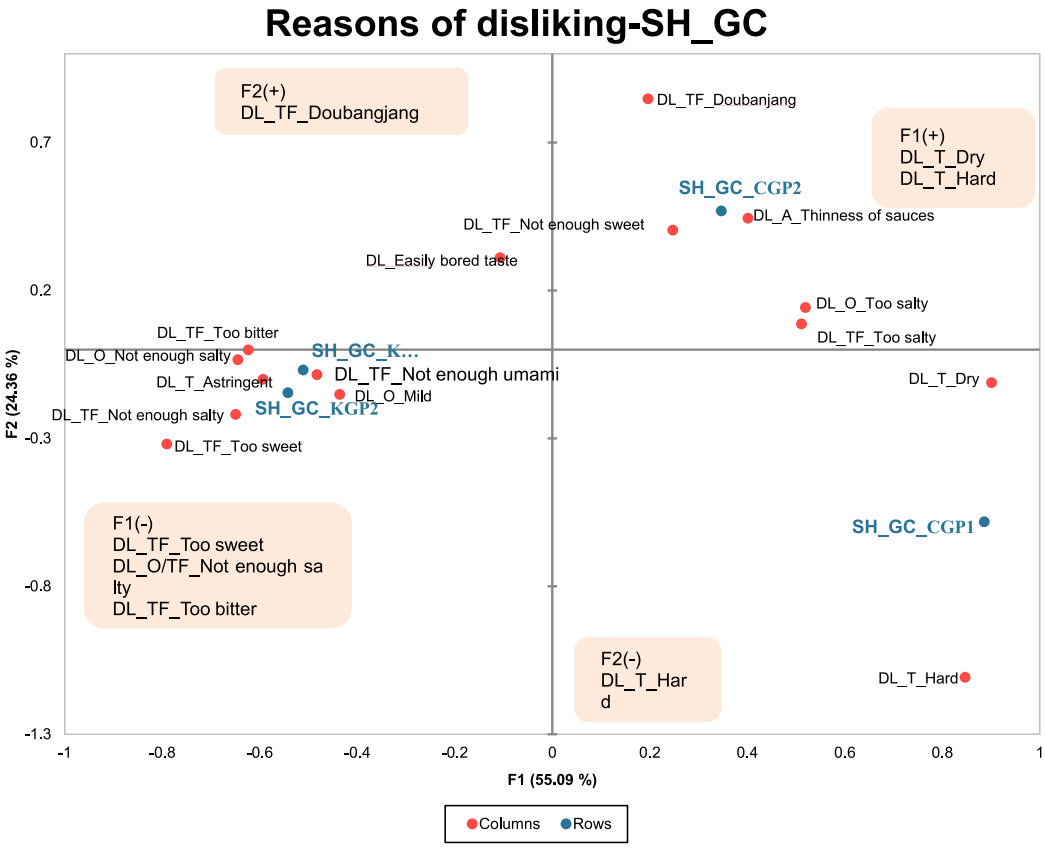


Fig. 8. CATA liking terms for four regular Jjajang instant noodle samples among SH_GC and SH_TBL consumers.



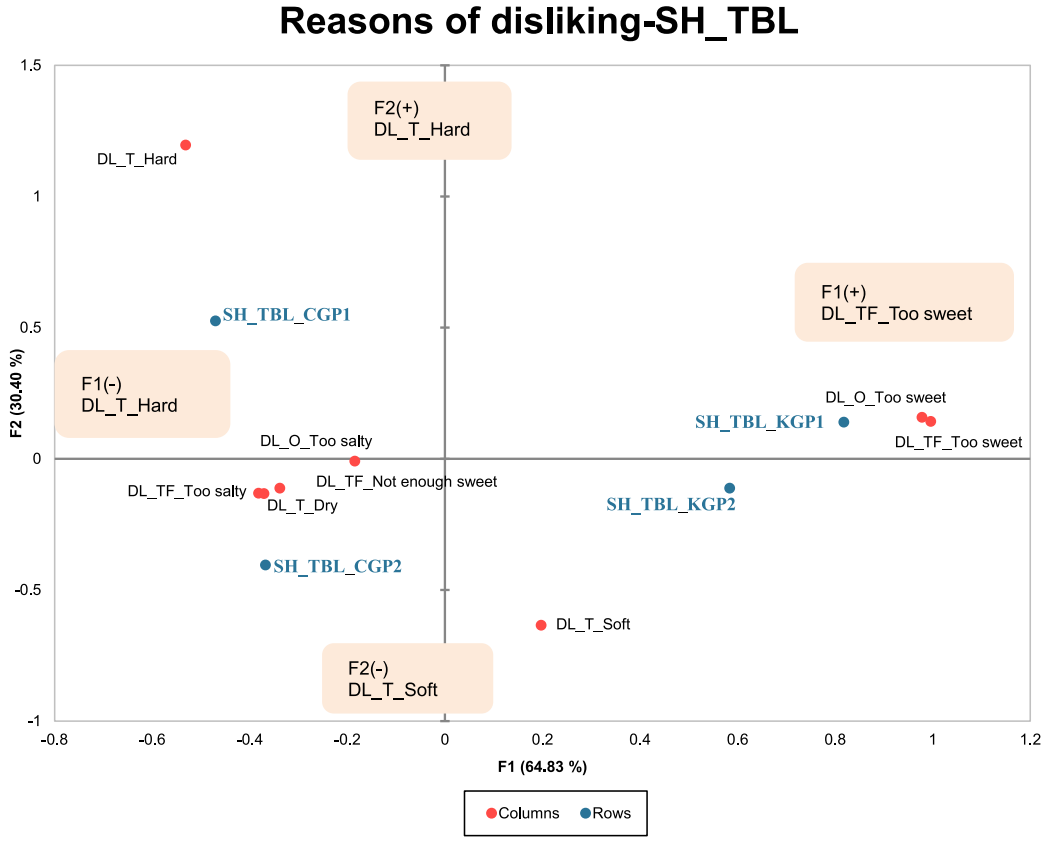


Fig. 9. CATA disliking terms for four regular Jjajang instant noodle samples among SH_GC and SH_TBL consumers.

Table 6
F-values and p-values for consumer category differences in acceptability and sensory attribute intensities for two spicy jjajang instant noodle samples.

Factor	Attributes	F-value	P-value
Sample	Overall Liking	0.347	0.556
	Appearance Liking	0.001	0.980
	Odor Liking	3.705	0.056
	Taste Liking	0.356	0.552
	Texture Liking	0.513	0.474
	Spiciness intensity	147.047	<0.001***
	Saltiness Intensity	9.42	0.002**
	Umami Intensity	2.095	0.149
	Noodles doneness	1.385	0.241
	Familiarity	6.703	0.010*
Consumer categories	Overall Liking	3.506	0.032
	Appearance Liking	6.969	0.001**
	Odor Liking	7.734	<0.001***
	Taste Liking	5.52	0.005**
	Texture Liking	7.818	<0.001***
	Spiciness intensity	1.307	0.273
	Saltiness Intensity	1.116	0.330
	Umami Intensity	1.199	0.304
	Noodles doneness	0.068	0.935
	Familiarity	1.932	0.147
Samples*Consumer categories	Overall Liking	0.052	0.950
	Appearance Liking	0.448	0.640
	Odor Liking	0.835	0.436
	Taste Liking	0.303	0.739
	Texture Liking	1.147	0.320
	Spiciness intensity	7.262	<0.001***
	Saltiness Intensity	1.097	0.336
	Umami Intensity	0.189	0.828
	Noodles doneness	1.165	0.314
	Familiarity	3.199	0.043*

[1)] *, **, and *** indicate significance at $p \leq 0.05$, $p \leq 0.01$, and $p < 0.001$, respectively.

Shanghai consumer categories (Fig. 8). SH_GC consumers liked KGP1 sample due to its attributes such as Flavor absorbed noodles (56%), Chunjang (46%), Smooth (66%), Chewy (74%), and Satisfying (38%). Additionally, they liked the CGP1 sample for its Umami (48%), Flavor absorbed noodles (44%), and Chewy (60%). SH_TBL consumers particularly enjoyed the KGP1 sample, mainly because of its sauce well coated on the noodles (75%), Soy sauce (45%), and Umami (49%).

In disliking attributes (Fig. 9), SH_GC consumers expressed significant dissatisfaction with the CGP2 sample due to its Not enough sweet (36%), Too salty (50%), Dry (22%), and Easily bored taste (30%). SH_TBL consumers also expressed discontent with CGP2, citing Not enough sweet (29%) and Too salty (41%) as their main issues.

3.2.2.2. Two spicy jjajang instant noodle samples. The analysis results showed that only spiciness intensity exhibited a significant difference among different sample types ($p < 0.05$, Table 6), while other acceptance and sensory intensities did not show significant differences. In the case of consumer categories, significant differences were found only in attributes such as appearance liking, odor liking, taste liking, and texture liking ($p < 0.05$). The 2-way interaction effect between sample types and consumer categories revealed significant differences only in spiciness intensity and familiarity ($p < 0.05$).

In overall liking (Table 7.), SH_GC consumers showed higher acceptance for two samples (SH_GC: 6.3; SH_TBL: 5.8), with SH_GC consumers consistently rating each sensory aspect higher than SH_TBL consumers. For spiciness intensity, two groups rated SKP1 (SH_GC: 6.7; SH_TBL: 6.6) significantly spicier than SKP2 (SH_GC: 4.9; SH_TBL: 5.7). However, consumer effect was present on the spicy perception of SKP2. SH_GC perceived its spicy level to be Just-About-Right while SH_TBL perceived it to be above this level.

3.3. Impact of food neophobia on instant noodles acceptance

The mean FNS scores for consumers in Seoul, Beijing, and Shanghai were 38.8, 40.0, and 30.4, respectively, with the scores for consumers in Shanghai being significantly lower than those in the other two regions. Based on FNS scores, consumers were classified into three groups: "Neophobics," "Neutrals," and "Neophilics." Among the FNS groups in different regions, the scores for consumers in Shanghai were generally lower than those in Seoul and Beijing, particularly among the "Neophilics" group, where the mean scores of consumers in Shanghai were significantly lower than those in the other regions (Table 8). ANOVA analysis conducted using GLM revealed significant differences ($p < 0.001$) in the acceptance and perceived intensities of sensory attributes for Jjajang instant noodle samples among different FNS groups of Chinese and Korean consumers. Among Seoul consumers, the "Neutral" group demonstrated higher product acceptance compared to the "Neophobics" and "Neophilics" groups, particularly for the Korean sample KGP2 (7.3), which was significantly higher than the other groups. Among Shanghai SH_GC consumers, significant differences in sample acceptance were also observed across FNS groups. The "Neophilics" group exhibited the highest overall acceptance, especially for the Chinese sample CGP1 (7.3), which was significantly higher than other groups. The "Neutral" group showed notable differences in the acceptance of the four samples, with the highest acceptance for the Korean sample KGP1 (7.1) and the lowest for CGP2 (4.7). The

Table 7
Mean liking scores and sensory intensities for two spicy Jjajang instant noodle samples among SH_GC and SH_TBL consumers.

Consumer categories	Sample	Overall Liking	Appearance Liking	Odor Liking	Taste Liking	Texture Liking	Spiciness Intensity	Saltiness Intensity	Umami Intensity	Noodles doneness	Familiarity
SH_GC	**SKP1**	6.3 ± 1.9	6.6 ± 1.7	6.3 ± 1.6	6.4 ± 1.7	6.9 ± 1.4	6.7 ± 1.2	5.0 ± 0.6	5.0 ± 0.8	5.0 ± 0.3	5.8 ± 1.8
	SKP2	6.3 ± 1.7	6.5 ± 1.4	6.3 ± 1.5	6.3 ± 1.6	6.7 ± 1.4	4.9 ± 1.3	5.2 ± 1.0	5.0 ± 0.9	4.9 ± 0.6	5.5 ± 1.9
SH_TBL	**SKP1**	5.8 ± 2.0	6.0 ± 1.7	5.3 ± 1.8	5.6 ± 2.1	6.1 ± 1.6	6.6 ± 2.0	5.3 ± 1.2	4.6 ± 1.2	4.9 ± 0.8	5.5 ± 2.1
	SKP2	5.8 ± 1.7	6.1 ± 1.5	5.8 ± 1.6	5.8 ± 1.8	6.3 ± 1.4	5.7 ± 1.9	5.4 ± 1.1	4.8 ± 1.1	5.0 ± 0.6	5.3 ± 2.4

Table 8
Mean food neophobia scores (FNS) and standard deviations for Neophobics, Neutrals, and Neophilics among Seoul. Beijing and shanghai consumers.

FNS groups	Korea	China				Total
	Seoul	Beijing	Shanghai			
			SH_GC	SH_TBL	Total	
Neophobics	53.4 ± 8.1[a1)2)]	53.8 ± 5.0[a]	38.9 ± 5.8[a]	44.9 ± 7.7[a]	42.6 ± 7.5[a]	48.0 ± 8.5[a]
Neutrals	37.4 ± 3.6[b]	40.5 ± 3.5[b]	28.4 ± 3.3[b]	29.7 ± 3.0[b]	29.1 ± 3.1[b]	35.0 ± 6.6[b]
Neophilics	25.2 ± 4.3[c]	27.3 ± 4.9[c]	17.5 ± 4.8[c]	20.2 ± 3.6[c]	18.3 ± 4.6[c]	23.1 ± 6.6[c]
Total	38.8 ± 12.8	40.0 ± 11.6	26.3 ± 10.1	34.3 ± 11.0	30.4 ± 11.2	35.3 ± 12.4

[1)] Different letters indicate significant differences between the mean values of different FNS Groups ($p < 0.05$).

"Neophobics" group had the lowest overall acceptance but rated CGP1 relatively higher (6.5).

4. Discussions

This study aims to explore, through cross-cultural comparison approach, the differences in the acceptance of regular and spicy Jjajang instant noodles among consumers in Seoul, Beijing, and Shanghai, as well as the factors (such as familiarity, brand loyalty, and food neophobia, etc.) that drive consumers' taste preferences and sample acceptance.

Seoul consumers exhibited high acceptance of both regular and spicy Jjajang instant noodles, demonstrating a strong preference for familiar Korean samples. Moreover, KGP2 was significantly more preferred than KGP1. This higher acceptance was closely linked to the consumers' high consumption frequency and familiarity with Korean instant noodles (Hong et al., 2014; Lee, 2011; Sousa et al., 2018), particularly KGP2. Given that this product holds an 80% market share in South Korea, its strong presence is further reflected in its high flavor familiarity rating of 7.9 out of 9. Korean consumers also exhibited wider scale usage to evaluated the liking of the samples which was similarly observed in study by Li and Chung (2021). KGP2 received significantly higher liking ratings driven by sensory attributes such as sauce well coated on the noodles, Glossy, and Flavor absorbed to noodles. According to the CATA analysis, Seoul consumers strongly favored visual appeal, texture balance, and familiar flavors, while dissatisfaction with CGP2 stemmed mainly from attributes like Too salty and Dry. For spicy Jjajang noodles, SKP2 was preferred for its moderate spiciness, balanced texture, and flavor harmony, while SKP1 was rejected for excessive spiciness. These findings highlight that familiarity, brand effects, and flavor balance are key factors influencing the acceptance of Seoul consumers.

Beijing consumers demonstrated moderate acceptance of Jjajang instant noodles, with CGP1 (6.2) and KGP1 (5.9) receiving the highest scores. Their preferences were primarily driven by sensory attributes such as Light brown, Thickness of sauces, and Intense (CGP1), and Smooth, Sweet, and Chunjang (KGP1). These preferences reflect Northern Chinese dietary habits, which emphasize texture and rich flavors. For spicy Jjajang noodles, SKP2 was favored for its moderate spiciness, while SKP1 was rejected for its excessive spiciness. The relatively low familiarity ratings for the samples indicate that increasing familiarity could enhance acceptance. These results further suggest the importance of aligning sensory attributes with local cultural and dietary preferences to achieve market success (Feldmann and Hamm, 2015).

Shanghai consumers exhibited the highest overall acceptance of Jjajang instant noodles among Chinese regions, particularly favoring Korean samples KGP1. Their preferences were primarily driven by sensory attributes such as Dark brown, Smooth, Sweet, and Umami, reflecting their preference for balanced and rich flavors. KGP1 received the highest familiarity score (6.1), further demonstrating the critical role of familiarity in shaping consumer preferences. In contrast, CGP2 received lower ratings due to attributes like Not enough sweet, Too salty, and Dry, emphasizing that sensory balance is essential for influencing consumer acceptance. Shanghai consumers' acceptance was positively correlated with consumption frequency, consistent with previous research suggesting that repeated exposure enhances preference (Montoya et al., 2017; Zajonc, 1968). As an international metropolis, Shanghai's open culinary environment and diverse cultural background fostered higher acceptance of international brands and samples (Cheng, 2012). Furthermore, Shanghai's status as a primary market for Korean food in China facilitated frequent exposure to Korean samples, further reinforcing their openness to diverse culinary cultures (Zhang, 2003; Li and Ma, 2022). Overall, these findings demonstrate the critical roles of familiarity, cultural background, and sensory appeal in shaping consumer preferences in Shanghai.

Overall, Chinese consumers not only liked CGP1, a sample produced in China, but also KGP1, a Korean product. They rated KGP1 as having higher flavor familiarity and frequently cited its sweetness as the main reason for their preference. While flavor familiarity ratings among Chinese consumers varied depending on the sample, the overall range (between 5 and 6 points) was not as pronounced as that observed among Korean consumers. Previous studies have reported that sweetness or familiar flavors can enhance the liking of novel foods (Stallberg-White and Pliner, 1999; Prescott, 2004; Chung et al., 2010). Although Chinese consumers are more accustomed to salty rather than sweet traditional Jjajang noodles, when this flavor is adapted into an instant noodle matrix, sweetness can serve as a positive driver of liking among Chinese consumers.

SH_GC consumers displayed significantly higher overall acceptance of Jjajang instant noodles than SH_TBL consumers, particularly for KGP1 and CGP1. These preference patterns were almost identical to that of Beijing consumers. SH_TBL consumers exhibited lower sensory ratings across all samples but showed a higher preference for KGP1 which was produced by the company to which the consumers expressed loyalty. SH_TBL consumers also tended to associate positive sensory attributes more strongly with Korean samples, reflecting a higher preference for the sensory characteristics of Korean Jjajang noodles. Familiarity had a particularly significant impact on SH_TBL consumers' acceptance, as their sustained preference for KGP1 may be attributed to trust and identification formed through repeated exposure to the brand (Montoya et al., 2017; Zajonc, 1968).

This study also utilized the Food Neophobia Scale (FNS) (Pliner and Hobden, 1992b) to analyze its impact on consumer acceptance in Seoul, Beijing, and Shanghai. By incorporating the FNS into the questionnaire, we aimed to analyze whether individual differences in food neophobia influenced consumer acceptance of cross-cultural Jjajang instant noodles, even within a broadly familiar food category. This approach allowed us to assess the potential impact of cultural background and openness to new flavor profiles on product preference. The mean FNS scores for Seoul, Beijing, and Shanghai consumers were 38.8, 40, and 30.4, respectively, with Shanghai consumers demonstrating significantly lower scores, indicating greater openness to new foods. These differences reflect the strong cultural conservatism in Seoul and Beijing and the influence of Shanghai's international and multicultural environment (Cheng, 2012). While the tested products were all Jjajang instant noodles, there are notable flavor differences between traditional Chinese and Korean Jjajang noodles due to variations in seasoning, ingredient composition, and cooking methods. Additionally, the selected samples included products from both China and Korea, meaning that certain products may be perceived as more novel or foreign depending on the consumer's cultural background. FNS group analysis showed that the "Neutral" group in Seoul exhibited the highest acceptance, particularly for KGP2 (7.3), significantly outperforming other groups. Among Shanghai SH_GC consumers, the "Neophilic" group exhibited the highest acceptance, especially for CGP1 (7.3). Familiarity played a crucial role in moderating acceptance differences, as SH_TBL consumers displayed higher acceptance of familiar samples like KGP1 despite their lower overall sensory ratings. These results suggest that FNS levels and regional cultural backgrounds significantly influence consumer preferences, and familiarity can mitigate resistance to new foods among high FNS groups.

5. Conclusion

This study examined consumer acceptance of regular and spicy Jjajang instant noodles among Seoul, Beijing, and Shanghai, focusing on cultural background, regional taste preferences, sample familiarity, and Food Neophobia Scale (FNS). The results indicate that consumer acceptance is generally positively correlated with familiarity, with significant regional differences observed. Seoul consumers valued familiarity and visual appeal, Beijing consumers preferred rich soy sauce aroma and full-bodied mouthfeel, while Shanghai consumers favored strong umami flavors, driven by globalization.

The primary scope of this research was to analyze consumer perception and acceptance of Korean Jjajang instant noodles in the Chinese market, with a focus on Korean brands. However, the research

has certain limitations. First, the study primarily focused on Korean brand products, which may limit the generalization of the findings to other international brands. Second, consumer recruitment in Beijing and Seoul was conducted within a university setting, meaning the sample may not fully represent the broader consumer population in terms of demographic diversity. Despite these limitations, the findings provide valuable insights into the potential for Korean instant noodles in the Chinese market and the role of cultural differences, flavor familiarity, and brand loyalty in shaping consumer preferences.

CRediT authorship contribution statement

Kaixin Xiao: Methodology, Software, Formal analysis, Investigation, Data curation, Writing – original draft, Visualization, Project administration. **Seo-Jin Chung:** Conceptualization, Validation, Resources, Writing – review & editing, Supervision, Project administration, Funding acquisition. **Runrou Wong:** Methodology, Formal analysis, Investigation. **Byunghoon Lee:** Resources, Funding acquisition. **Haeun Kim:** Investigation, Resources, Funding acquisition. **Baoqing Zhu:** Resources, All authors have read and agreed to the published version of the manuscript.

Ethical statement

The authors declare that this study was conducted with ethical standards. Ethical approval was obtained from the Ewha Womans University Institutional Review Board (IRB) (approval ID ewha-202405-0019-02).). All participants provided written informed consent before participating in the study. The study design, data collection, and analysis were performed in a manner that ensured the privacy and confidentiality of participants. No personal identifying information was collected or used. The research adhered to all relevant national guidelines for research in food science and technology.

"Effect of familiarity, brand loyalty and food neophobicity on food acceptance: A case study of instant noodles with consumers in Seoul, Beijing, and Shanghai".

Kaixin Xiao, Seo-Jin Chung* , Runrou Wong, Byunghoon Lee, Haeun Kim, Zhu Baoqingconfirm that the manuscript has been read and approved by all named authors and that there are no other persons who satisfied the criteria for authorship but are not listed. We further confirm that the order of authors listed in the manuscript has been approved by all of us.

We confirm that any aspect of the work covered in this manuscript that has involved human subjects has been conducted with the ethical approval of all relevant bodies and that such approvals are acknowledged within the manuscript.

The authors verify that all authors accept full responsibility for all aspects of to the work described. We also verify that the manuscriptis not under review elsewhere and can provide all original data for review when necessary.

We understand that the Corresponding Author is the sole contact for the Editorial process (including Editorial Manager and direct communications with the office). She is responsible for communicating with the other authors about progress, submissions of revisions and final approval of proofs. We confirm that we have provided a current, correct email address which is accessible by the Corresponding Author and which has been configured to accept email from sc79d@ewha.ac.kr.

Declaration of generative AI and AI-assisted technologies in the writing process

During the preparation of this work the authors used Youdao for translating Korean and Chinese language to English and ChatGPT to correct grammatical errors and improve readability in English. After using this tool/service, the authors reviewed and edited the content as needed and take full responsibility for the content of the publication.

Declaration of competing interest

The authors declare the following potential conflicts of interest: Two co-authors of this manuscript are employees of Samyang Foods Co, which provided funding for this research. Additionally, the experimental design included products produced by this company. However, all samples were tested under blind conditions to minimize potential bias, and the authors affirm that the outcomes of the experiment were not influenced by any external factors. The remaining authors declare no conflicts of interest related to this study.

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Appendix

Appendix 1
CATA list of liking and disliking terms for instand noodles sample

Liking terms (n = 120 or n = 131[1)]) **Disliking terms (n = 139 or n = 142)**	**Appearance**	Light brown, Dark brown, Black, Red, Glossy, Dry, Wide noodles, Thin noodles, The round shape, Curly shape, Thinness of sauces, Thickness of sauces, The sauce is well coated on the noodles, The sauce is not well coated on the noodles, Abundant of flakes, Sesame seeds, Chili flake, Particle meat
	Odor	Intense, Mild, Sweet, Salty, Bitter, Sour/Tart, Spicy[1)], Soy sauce Chunjang[2)], Doubanjang[3)], Umami, Fermentation, Caramel, Chili powder[1)], Sichuan pepper, Chinese liquorice, Burnt, Roasted bean, Roasted sesame, Roasted scallions, Roasted korean welsh onion, Roasted onion, Wheat flour, Carrot, Garlic, Potato, Cabbage, Grassy, Roasted pork, Lard, Beef The savory odor of cooking oil, Fatty, Peanut oil, Chili oil[1)], Olive oil, Sesame oil, Dairy cream, Seasoned laver/Dry seaweed, Artificial
	Taste	Sweet, Umami, Salty, Bitter, Spicy[1)], Sour/Tart, Flavor absorbed noodles, Flavor unabsorbed noodles, Soy sauce, Fermentation, Soybean paste, Chunjang[2)], Doubanjang[3)], Caramel, Chili powder[1)], Sichuan pepper, Chinese liquorice, Burnt, Roasted bean, Roasted sesame, Roasted scallions, Roasted korean welsh onion, Roasted onion, Wheat flour, Carrot, Garlic, Potato, Cabbage, Grassy, Stir fried pork, Lard Beef, Savory odor of cooking oil, Greasy, Peanut oil, Chili oil[1)], Olive oil, Sesame oil, Dairy cream, Seasoned laver/Dry seaweed, Artificial
	Texture	Greasy, Mouth feels on fire[1)], Throat burning[1)], Tongue numb[1)], Smooth, Rough, Moist, Dry, Chewy, Soft, Hard, Sticky, Astringent, Clean after taste, Powdery

(*continued on next page*)

Appendix 1 (*continued*)

	Non-sensory attributes	Like for no particular reason, Feel better, Familiar, New, Unique, Ethnic flavor, Gourmet, Addictive, Satisfying, Natural, Traditional, Comfortable, Mouth-watering, Good for health, Tastier than expected, Want to eat more, None of the above
	Appearance	Light brown, Dark brown, Black, Red, Glossy, Dry, Wide noodles, Thin noodles, The round shape, Curly shape, Thinness of sauces, Thickness of sauces, The sauce is well coated on the noodles, The sauce is not well coated on the noodles, Abundant of flakes, Sesame seeds, Chili flake, Particle meat
	Odor	Intense, Mild, Too sweet, Not enough sweet, Too salty, Not enough salty, Too bitter, Not enough bitter, Too sour/tart, Not enough sour/tart, Too spicy[1)], Not enough spicy[1)], Soy sauce, Chunjang[2)], Doubanjang[3)], Umami, Fermentation, Caramel, Chili powder[1)], Sichuan pepper, Chinese liquorice, Burnt, Roasted bean, Roasted sesame, Roasted scallions, Roasted korean welsh onion, Roasted onion, Wheat flour, Carrot, Garlic, Potato, Cabbage, Grassy, Roasted pork, Lard, Beef, The savory odor of cooking oil, Fatty, Peanut oil, Chili oil[1)], Olive oil, Sesame oil, Dairy cream, Seasoned laver/Dry seaweed, Artificial
	Taste	Too sweet, Not enough sweet, Too umami, Not enough umami, Too salty, Not enough salty, Too bitter, Not enough bitter, Too spicy[1)], Not enough spicy[1)], Too sour/tart, Not enough sour/tart, Flavor absorbed noodles, Flavor unabsorbed noodles, Soy sauce, Fermentation, Soybean paste, Chunjang, Doubanjang, Caramel, Chili powder[1)], Sichuan pepper, Chinese liquorice, Burnt, Roasted bean, Roasted sesame, Roasted scallions, Roasted korean welsh onion, Roasted onion, Wheat flour, Carrot, Garlic, Potato, Cabbage, Grassy, Stir fried pork, Lard, Beef, The savory odor of cooking oil, Greasy, Peanut oil, Chili oil[1)], Olive oil, Sesame oil, Dairy cream, Seasoned laver/Dry seaweed, Artificial
	Texture	Greasy, Mouth feels on fire[1)], Throat burning[1)], Tongue numb[1)], Smooth, Rough, Moist, Dry, Chewy, Soft, Hard, Sticky, Astringent, Clean after taste, Powdery
	Non-sensory attributes	Dislike for no particular reason, Feel worse, Unfamiliar/Too new, Too unique, Ethnic flavor, Cheap taste, Easily bored taste, Not satisfied, Too artificial, Disgusting/Sick, Heavy, Lack of character, Not good for health, Don't know what flavor it is, Taste worse than expected, Don't want to eat more, None of the above

[1)] Only applicable to the evaluation of spicy jjajang instant noodles.
[2)] Chunjang is Korean black bean paste.
[3)] Doubanjang is Chinese fermented chili bean paste.

Data availability

Data will be made available on request.

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