



Short communication

Gendered information on sensory, hedonic and familiarity ratings of green tea by female Japanese students

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ABSTRACT

The purpose of the present study was to examine the effects of gendered information (masculine and feminine) on sensory, hedonic, and familiarity ratings by Japanese female undergraduate students. Japanese green tea, Chinese sweet tea, and Chinese bitter tea were used. After listening to gendered information, participants tasted samples and scored them. The results showed that participants scored the samples of Japanese green tea as more aromatic, sweet, pleasant, and familiar when they were subjected to feminine rather than masculine information. Gendered information may influence on sensory, hedonic, and familiarity ratings.

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Introduction

Information on foods and beverages, such as from advertisements, plays an important role in consumption and the taste experience. Familiarity with a specific food is also an important factor for a consumer's liking or accepting that food (Birch, 1979). Several studies have reported that information can modify willingness to try unfamiliar foods (Tuorila, Meiselman, Bell, Cardello, & Johnson, 1994). Emotional appeal such as "refreshing" was more influential on food and beverage liking than informational appeals such as "healthy," which was influential on consumption (Dubé & Cantin, 2000). Sensory and hedonic ratings on a food interacted with consumer's attitudes, beliefs, and familiarity (Aaron, Mela, & Evans, 1994). In a study by Stein, Nagai, Nakagawa, and Beauchamp (2003), health-related information had no effect on differences in taste intensity, pleasantness, and familiarity, of an unfamiliar bitter beverage, but did increase consumption. Furthermore, in that study, personality traits were not predictive of specific hedonic responses to bitterness.

A study by Morrison and Shaffer (2003) revealed that gender-stereotypical individuals (i.e., masculine men and feminine women) evaluated products more favorably and had more favorable purchase intentions when the products were endorsed by traditional (i.e., gender-stereotyped) rather than by nontraditional advertise-

ments. However, few studies have been conducted to examine the effect of gendered information on sensory and hedonic ratings and whether the effect is related to individuals' gender-related traits.

The purpose of the present study was to examine the effects of gendered information on ratings of quality of green tea beverages, and on pleasantness, and familiarity. In addition, whether differences in those ratings after receiving gendered information are associated with the individuals' gender-related traits is also examined. The following questions were addressed: (a) Are individuals' ratings of the same tea changed by gendered information; for example, "this tea has a feminine smoothness or a masculine dynamism"? (b) Are individuals' gender-related traits, such as masculinity, femininity, and gender-stereotyping, associated with differences in those ratings? We hypothesized that since Japanese green tea is a familiar taste for the participants, they would score it higher in the ratings than they did unfamiliar Chinese teas. In particular, receiving gendered information may cause differentiation in various participants' ratings, even though they tasted the same tea. Stronger masculinity, femininity, and gender-stereotyping in individuals may be associated with significant change in ratings after receiving gendered information.

Methods

Participants

The participants were 97 female undergraduate students (mean age = 21.3 years, S.D. = 7.9) enrolled in a dietetics course; 20 were

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smokers (20.8%). They all volunteered to participate in the study; the professor of their course announced a recruitment call for volunteer participants in the study and the students who were interested in the outline of the study then volunteered. Before starting the experiment, all participants signed an informed consent form. Participants were free to withdraw from the study at any time, without penalty. After the experiment was finished, they were provided with more detailed information on the purpose of the study. Regarding ethical considerations, since there was no ethical committee at the college, the present study followed the guidelines announced in 2001 by the Japanese Ministry of Education, Culture, Sports, Science and Technology and the Japanese Ministry of Health, Labour and Welfare.

Questionnaire

Sensory, hedonic, and familiarity ratings

Ikeda, Nagai, and Sagara (2004) designed a sensory questionnaire to measure participants' perceived quality of green tea beverages using 15 items of four factors, "fragrance," "sweetness," "thickness," and "smoothness." Since the five items of "smoothness" were not directly related to perceived quality of the aroma or taste: e.g., appropriate to consume with food, we selected 10 items when tasting samples in the present study; "green" fragrance, floral fragrance, roasted fragrance, which constituted "fragrance"; "umami", sweet, soft, leaving a clear impression, which constituted "sweetness"; astringency/acerbity, intensely flavored, and after-taste, which constituted "thickness." We confirmed that these three factors were obtained from the present study. Participants were asked how strongly they felt about the tasting sample for each item, on a scale ranging from 1 ("I do not perceive this at all") to 7 ("I strongly perceive this"). The same questionnaire was used to assess participants' sensory ratings. The internal consistencies by Cronbach's alpha coefficient were 0.75 and 0.63 for the rating of "fragrance" (three items), 0.80 and 0.82 for the rating of "sweetness" (four items), and 0.62 and 0.58 for the rating of "thickness" (three items) for Japanese green tea with masculine and feminine information, respectively.

Taste pleasantness and familiarity were assessed using seven-point labeled category scales. Anchors in the hedonic scale for taste pleasantness ranged from 1 = "extremely unpleasant" to 7 = "extremely pleasant," with four labeled "neither unpleasant nor pleasant," and for familiarity, from 1 = "extremely unfamiliar" to 7 = "extremely familiar," with four labeled "neither unfamiliar nor familiar."

Gender-related traits

The masculinity–humanity–femininity (MHF) scale (Ito, 1978) was administered to measure gender identity. The MHF scale consists of 20 items, including those measuring masculinity (10 items, $\alpha = 0.87$) and femininity (10 items, $\alpha = 0.81$). The scale is similar to that designed by Bem (1974), but Ito (1978) adapted it to apply to Japanese society. Sample items for masculinity are "assertiveness" and "toughness," and those for femininity are "submissiveness" and "delicacy." Participants rated each item in terms of how well it described their personality, using a 1–5 scale ranging from 1 = "never true" to 5 = "always true."

The gender-stereotyping score was designed by Dohi (1999), based on Bem (1981) gender schema theory, a theoretical cognitive structure of gender-stereotyping, to evaluate an individual's cognitive acceptance of gender stereotypes. A higher gender-stereotyping score indicates a stronger gender schema, in which the person mentally applies gender categorization more frequently. Participants were asked how desirable are traits such as "assertiveness" and "submissiveness" in men, on a scale ranging

from 1 = "very undesirable" to 5 = "very desirable," and they were asked again to rate the desirability of the same traits in women. The gender-stereotyping score consists of 20 items and the results were calculated as a summation of the absolute values of differences between each item's rating for men and for women (gender-stereotyping score = $\sum |\text{rating for men} - \text{rating for women}|$). In the present study, Cronbach's internal consistency for gender-stereotyping was 0.81.

Procedure

Samples of three kinds of tea (Japanese green tea, Chinese bitter tea, and Chinese sweet tea) were supplied to each participant twice—once accompanied by masculine information and once with feminine information. The teas were kept at about 40 °C during the sampling. The Japanese green tea was made from 6 g of tea leaves in 600 mL of distilled water (at 85 °C), steeped for 1.5 min. The Chinese bitter tea was made from 1.6 g of Kuding tea leaves in 600 mL of distilled water, steeped for 5.0 min. The Chinese sweet tea was made from 6 g of Tian tea leaves in 600 mL of distilled water, steeped for 1.0 min.

The participants were divided into groups of five and were presented two servings of each of the three samples, in a different order for each group. They were instructed to taste the samples numbered from 1 to 6. The order of tea types for each set of numbered samples was the same within each group. The participants listened to audio recordings of taste-related information about each tea before tasting it. There were six different tea descriptions. Three descriptions included masculine information, for example, "This tea is very popular among Chinese men. This tea's characteristics are of a strong and wild taste. Working men like this tea." Three descriptions included feminine information, for example, "This tea is very popular among Chinese women. This tea will give you a round and soft feeling." The order of the descriptions was fixed as masculine, feminine, feminine, masculine, masculine, and feminine information.

After listening to one description, participants were asked to put 10 mL of a sample into their mouth, taste it well, spit it out, and then fill out the questionnaire, assessing taste intensity, pleasantness, and familiarity. Before starting the next sample, participants were asked to rinse their mouth with water at least three times. Then they listened to the next description. This process was repeated a total of six times.

Results

To examine the effects of gendered information (masculine vs. feminine) and the type of tea (Japanese green vs. Chinese bitter vs. Chinese sweet), 2×3 repeated-measures analysis of variance (ANOVA) were performed. The main effect of the type of tea was significant for the ratings of "fragrance," "sweetness," and "thickness", $F(2, 192) = 331.56, p < 0.01$; $F(1, 192) = 516.93, p < 0.01$; and $F(1, 192) = 155.62, p < 0.01$, respectively. The main effects of gendered information was significant for the rating of "sweetness", $F(1, 96) = 7.84, p < 0.01$. The interaction effect of gendered information and type of tea was significant for the ratings of "fragrance" and "sweetness", $F(2, 192) = 9.80, p < 0.01$; $F(2, 192) = 7.56, p < 0.01$, respectively.

Using Tukey's HSD test, it was found that Japanese tea was rated higher in "fragrance" and "sweetness" than Chinese bitter tea, whereas Chinese bitter tea ($M = 17.9, S.D. = 2.9$) was rated higher in "thickness" than other teas (Japanese tea $M = 13.6, S.D. = 2.3$; Chinese sweet tea $M = 11.4, S.D. = 2.5$) ($p < 0.05$). Japanese green tea was rated significantly higher in "fragrance" and "sweetness" and Chinese sweet tea was rated higher in "sweetness" when it

Table 1
Sensory ratings by gendered information

	Masculine ^a		Feminine ^a		All assessors ^a		Masculine ^b		Feminine ^b		All assessors ^b	
	M	S.D.	M	S.D.	M	S.D.	M	S.D.	M	S.D.	M	S.D.
Japanese green tea	15.0 ^e	2.9	16.4 ^d	2.2	15.7 ^a	2.0	17.8 ^e	4.1	19.1 ^d	0.1	18.5 ^a	3.3
Chinese sweet tea	11.4	3.4	11.9	3.5	11.6 ^b	2.8	17.8 ^e	4.0	19.0 ^d	3.3	18.4 ^a	3.2
Chinese bitter tea	7.9	4.1	7.0	3.7	7.4 ^c	3.3	7.5	3.9	7.0	3.2	7.2 ^b	3.0
All assessors	11.4	2.6	11.8	2.1			14.4 ^b	2.7	15.1 ^a	2.3		

Where superscript letters differ that pair of means differs reliably ($a > b > c$, $p < 0.05$) in post hoc comparisons of a reliable interaction effect ($d > e$, $p < 0.05$) in gendered information X type of tea two-way ANOVA on that rating.

^a Fragrance.

^b Sweetness.

was presented with feminine information than when it was presented with masculine information (Table 1).

For pleasantness and familiarity, the main effect of gendered information, $F(1, 93) = 7.37$, $p < 0.01$; and $F(1, 92) = 15.92$, $p < 0.001$, respectively, and the main effects of the type of tea, $F(2, 92) = 544.21$, $p < 0.001$; and $F(2, 91) = 584.55$, $p < 0.001$ were significant. There was an interaction effect of gendered information and type of tea in ratings of pleasantness and familiarity, $F(2, 92) = 6.77$, $p < 0.01$; and $F(2, 91) = 14.91$, $p < 0.001$. Using Tukey's HSD test, it was found that the participants scored the samples as tasting more pleasant and familiar when they were subjected to the feminine (pleasantness: $M = 3.3$, $S.D. = 0.7$; familiarity: $M = 3.4$, $S.D. = 0.8$, respectively) compared to the masculine information ($M = 3.1$, $S.D. = 0.8$; $M = 3.1$, $S.D. = 0.9$). Japanese green tea was rated higher for pleasantness and familiarity ($M = 5.0$, $S.D. = 0.9$; $M = 5.4$, $S.D. = 1.0$) than the other teas, while Chinese sweet tea ($M = 3.3$, $S.D. = 1.4$; $M = 3.1$, $S.D. = 1.4$) was rated higher than Chinese bitter tea ($M = 1.4$, $S.D. = 0.7$; $M = 1.3$, $S.D. = 0.7$). Japanese green tea was rated higher when it was presented with feminine information ($M = 5.2$, $S.D. = 1.0$; $M = 5.6$, $S.D. = 1.1$) than when it was presented with masculine information ($M = 4.8$, $S.D. = 1.2$; $M = 5.1$, $S.D. = 1.4$).

The absolute values of the differences between rating scores after receiving feminine or masculine information were calculated, where higher differences indicate a more strongly gender-biased rating. To examine associations between these differences of ratings for the sample teas and the individuals' scores for gender-related traits (masculinity, femininity, and gender-stereotyping), Pearson's correlation coefficients were calculated. The ratings of pleasantness and familiarity of the teas were found to not be associated with gender-related traits, except for pleasantness for Japanese green tea, which was positively correlated with gender-stereotyping ($r = 0.24$, $p < 0.05$). Gender-stereotyping was positively correlated with the rating of "fragrance" for Japanese green tea and Chinese sweet tea ($r = 0.31$ and 0.37), with the rating of "sweetness" for Japanese green tea and Chinese bitter tea ($r = 0.21$ and 0.34), and with the rating of "thickness" for Chinese sweet tea ($r = 0.34$) ($p < 0.05$). Masculinity and femininity were positively correlated with the rating of "fragrance" for Chinese bitter tea ($r = 0.23$ and 0.20) and femininity was negatively correlated with the rating of "thickness" for Chinese sweet tea and Chinese bitter tea ($r = -0.24$ and -0.32) ($p < 0.05$).

Discussion

Japanese green tea was assessed by the participants as being greater in the ratings of "fragrance" and "sweetness," as well as for pleasantness and familiarity than Chinese bitter tea. This tendency was significant when participants were subjected to feminine rather than masculine information. Chinese sweet tea was also given a higher in those ratings than Chinese bitter tea, while it showed the highest rating in "thickness."

In the present study, emotional appeal was used as gendered information. Therefore, the results showed that gendered information may be influential on ratings of sensory and hedonic ratings (Dubé & Cantin, 2000). Since information interacted with an individual's attitudes, beliefs, and familiarity (Aaron et al., 1994), these particular results may have arisen because the present study was conducted in Japan, where commercials often use stereotypical gender roles (Suzuki, 1995; Sengupta, 1995). Since all the participants were women, this may also have affected the results. The reason feminine information intensified the participants' ratings of sweetness may be because the feminine information included descriptions of a weak, delicate, or soft taste. Therefore, the participants may have scored sweetness as stronger than their psychological pre-set. However, these trends were not only indicated in sensory ratings, but also in pleasantness and familiarity for Japanese green tea. Hirokawa, Yamazawa, and Shimizu (under review) reported that Japanese tea was assessed as having feminine images (e.g., soft, delicate, and fragile). Thus, congruence of information and image for green tea may intensify the sensory, hedonic, and familiarity ratings.

Gender-related traits may also influence on sensory and hedonic ratings. Masculinity and femininity showed no or less gender-biased ratings, except for aroma for Chinese bitter tea. On the other hand, gender-stereotyping scores showed several moderate and positive correlations; for example, in the changes in ratings of "fragrance," "sweetness," and pleasantness for Japanese green tea. The gender-stereotyping score was designed to evaluate an individual's tendency toward gender-biased judgment (Dohi, 1999). These results suggested the possibility that different types of information about taste are influential in coordination with individual psychological traits having an affinity to the given information. However, personality traits were not predictive for identifying hedonic responses in a preceding study (Stein et al., 2003); thus further investigation is necessary.

There are several limitations to the present study. First, the audio recordings of gendered images used in this study were taken from our previous study (Hirokawa et al., under review). Whether such gendered information is valid and appropriate for this kind of experiment needs to be examined. Second, the internal consistency of "thickness" was lower than the recommended value. The perceived quality of "thickness" needs to be examined for its validation. Third, the potential effect of participants' frequency of consumption of teas in their daily life was not considered in the present study. Other lifestyle factors, including smoking behavior, may also have an effect on taste judgments. Fourth, as the participants were all female students, equivalent male data should be evaluated and compared in future studies.

In conclusion, the results from the present study show for how strongly gendered information can influence sensory, hedonic, and familiarity ratings on beverage. Gendered information would also be influential in diet behavior. For example, individuals, depending on their gender-related traits, may have more favorable purchase

intentions when the products are endorsed by gender-stereotypical information rather than by non-gender-stereotypical information (Morrison & Shaffer, 2003). However, as the present study was conducted in Japan and gender-related traits are a product of culture, the results of the present study were inevitably affected by Japanese culture, which have highly stereotypical gender roles (Hofstede, 2001). If the same study had been conducted among individuals from other cultures, the results might have been different, depending on the strength and prevalence of stereotypical gender roles. Further studies are necessary to clarify the effects of cultural differences on sensory and hedonic ratings in relation to individuals' gender-related traits.

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