Analysis of Common Cognition of Impression Among Japanese Fonts and Tea Beverage Packaging

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Abstract: The purpose of the present paper was to investigate the influence of various cognitions regarding package design on consumer behavior. In considering cognitions concerning product preference, we focused on commonalities between impressions of packaging components, especially typeface design and product characteristics. In Study 1, we developed a scale for evaluating the impression of Japanese fonts using the semantic differential method. Exploratory factor analysis indicated that our scale has three subscales: Activity, Aesthetic preference and Legibility. The results revealed that our factor, “Aesthetic preference,” was similar to the “Evaluating” factor in a prior scale. In Study 2, we conducted the principal examination using the scale developed in Study 1. Participants (N = 303) responded to a questionnaire that included 12 pairs of adjectives on a 7-point scale to determine their impressions of four kinds of Japanese fonts and four kinds of tea beverages. Structural equation modeling indicated that there was a partial scalar invariance, with two items having differential item functioning for the evaluation of impressions between Japanese fonts and tea beverages. These findings indicate that people have common cognitions of impressions regarding the shape of typeface design and product characteristics.

Keywords: Typeface Design, Product Characteristics, Semantic Differential Method, Commonality, Simultaneous Analysis of Several Groups.

In our daily life, we often receive a variety of impressions regarding packaging (e.g., “a color which looks warm” or “a logo which looks delicious”). Why do we feel the temperature of a color or sense the taste of a logo? Why do we like it? What is the cause of commonalities regarding cogni- tive interpretations of them? To determine this, we must find commonalities regarding the information derived from the different sensations.

The main aim in the present study is to reveal commonalities regarding components of package design. Bennett (1995) defined packaging as the container used to protect, promote, transport, and

identify a product. Packaging design has been considered an effective tool for marketing strategy (Ampuero & Vila, 2006; Gonzalez, Thornsbury, & Twede, 2007). For instance, it has been indicated that packaging influences consumer decision-making (Butkevičienė, Stravinskienė, & Rūtelionė, 2008; Mishra & Jain, 2012). Moreover, Choi, Koyama, and Hibino (2009) demonstrated that package design influenced the visual attention of consumers. Ishii (2009; 2010; Ishii, Onzo, & Terao, 2008) also determined that the layout of package design was important for the evaluation of products by consumers. Interestingly, Sogn-Grundvåg and Østli (2009) indicated the importance of grocery packaging when consumers buy unbranded products.

Package design includes numerous components, such as logos, pictures, colors, and so on; we specifically focused on typeface design. It has been reported that typeface design in advertisements may evoke a variety of feelings (Henderson, Giese, & Cote, 2004), and an advertisement is remembered better when each component (e.g., picture, copy, and brand name) is related (Schmitt, Tavassoli, & Millard, 1993). Thus, typeface design is regarded as one packaging component, developed to be easily read by consumers and to provide a better impression of the packaging. However, an intention to make typeface designs better does not consistently do well since people's impressions of individual typeface logos differ. We assume that the combination of typeface design and product characteristics is more important in packaging than the independent components of typeface designs.

The semantic differential method (SD), developed by Osgood, Suci, and Tannebaum (1957) to measure commonalities regarding differential stimuli, has been used in many previous studies (Osgood, 1962; Oyama, Takimoto, & Iwasawa, 1993; Oyama, Yamada & Iwasawa, 1998; Suzuki & Gyoba, 2003; Suzuki, Gyoba, Kawahata, Yamaguchi, & Komatsu, 2006). Oyama et al. (1993) revealed a commonality regarding colors, songs, shapes, symbolic words, and projected images using the SD method, and found four factors: "Evaluation," "Activity," "Lightness," and "Dullness.". However, the application of SD to determine the commonalities between typeface design and product characteristics is still unclear. In addition, packaging designers have to depend on their own subjective aesthetic senses or experiences and can use a variety of typefaces in packaging design. However, there seems to be no obvious basis to account for good combinations of typeface design and product characteristics. To fill this gap, we focused on Japanese fonts used in packaging, and developed a scale to evaluate the impression of these fonts (Study 1). Moreover, we investigated the commonalities between typeface designs and product characteristics in Study 2.

1. INITIAL ITEM DEVELOPMENT

We constructed initial items and selected fonts to develop our scale. We conducted a preliminary examination using these items and fonts as follows:

1.1. Constructing initial items

In the first phase of this study, scale development, we used the SD method to review many pairs of adjectives used in evaluating Japanese fonts (Namatame & Ishikawa, 1999), and investigated commonalities in different sensory modalities, such as symbolic words, colors, and sounds (Oyama et al. 1993; Inoue & Kobayashi, 1985). The adjectives were paired to have opposite meanings. In addition to items derived from the review, I added some unique adjectives to our scale (e.g., *Western-style* vs. *Japanese-style*; see also Table 1). As a result, we extracted 46 pairs of adjectives that were likely to be useful in the development of a scale for evaluating the impressions of Japanese fonts. Next, graduate students in psychology removed some pairs of adjectives that were not adequate. Moreover, we omitted adjectives that had similar meanings, so that 36 pairs were selected.

We classified 27 pairs of adjectives into four categories: "Evaluation," "Activity," "Lightness," and

“Dullness” according to Oyama et al. (1993), and the remaining nine pairs of adjectives were based on Ohanian (1990) as “Items added on our own terms” (Table 1).

Table 1: Items and classifications for the exploratory research of study 1

Evaluation	Activity	Lightness	Dullness	Items added on our own terms
Good/Bad	Dynamic/Static	Cheerful/Gloomy	Soft/Hard	Opened/Closed
Like/Dislike	Tough/Tender	Bright/Dark	Relaxed/tense	Creative/Unimaginative
Beautiful/Ugly	Luxuriant/Plain	Light/Heavy	Sharp/Dull	Modern-style /Old-fasioned
Comfortable /Uncomfortable	Lively/Quiet	Pleasant /Unpleasant	Round/Square	Western-style /Japanese-style
Steady/Unsteady	Intense/Calm		Obscure /Well-defined	Luxury/Austere
Warm/Cold	Speedy/Slow			Casual/Formal
Clear/Muddy	Powerful/Pale			City-style/Country-style
Moist/Dry	Active/Passive			Childish/Mature
Rough/Delicate	Complex-shape /Simple-shape			Mannish/Womanish

Notes. We classified 27 pairs of adjectives into four categories according to Oyama et al.(1993) , and added nine pairs of adjectives on our own terms for reference from Ohanian (1990).

1.2. Selecting fonts

In Phase 2, we conducted a preliminary examination using 27 Japanese fonts to extract the fonts to be used in the main examination.

1.3. Materials

We used 14 typeface design fonts sold by the Microsoft Corporation and 13 handwritten fonts produced by anonymous designers, and the use of these 27 typeface designs were permitted for both private and business use. In constructing the questionnaire, we used 46 hiragana (Japanese cursive characters), 46 katakana (square form of hiragana), and 48 kanji (Chinese characters used in Japan). Kanji characters are ideograms, which remind us of meanings or feelings. We adjusted the size of the 140 characters to look like 42-point font. To standardize the perception of character size, the characters were printed with black ink on white A4 paper.

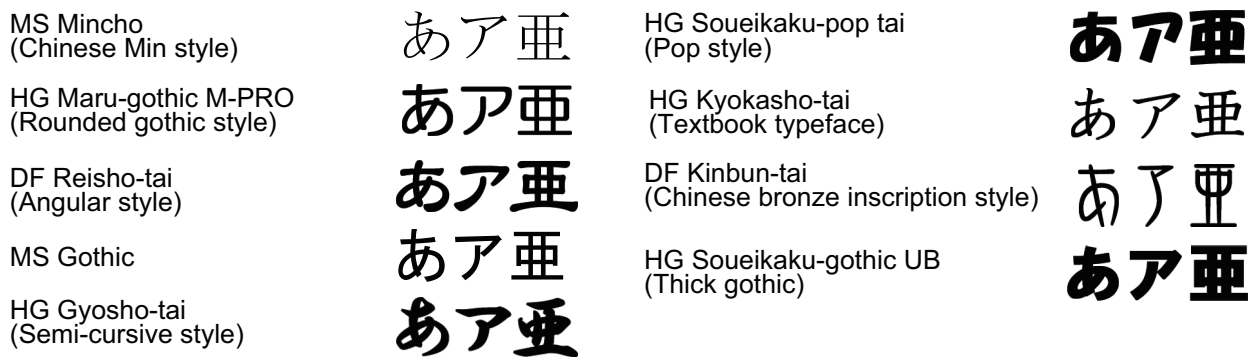

Figure 1. Schematics of Japanese fonts used in our examination.Three kinds of Characters described in this figure indicated the letter of hiragana “a” , katakana “a” , and kanji “a” , from left to right. We call these as “Chinese Min style” , “Rounded gothic style” , “Angular style” ,” MS Gothic” ,” Semi-cursive style” ,” Pop style” ,” Textbook typeface” ,” Chinese bronze inscription style” , and ” Thick gothic” .

1.4. Procedure

The printed papers were placed on a white cloth over the table. We arranged the order of the fonts so that similar fonts were not placed next to each other. (The similarity of each font was defi-

ned by Namatame et al., 2000). Twelve psychology students at Rikkyo University completed the preliminary five-item questionnaire, with items such as, “Please choose your favorite fonts, and rank them from first to fifth.” We selected nine fonts based on the popularity and impressions of the 27 fonts as follows (Figure 1).

2. STUDY 1

The aim of Study 1 was to develop a scale for evaluating the impressions of Japanese fonts. We conducted the principal examination using nine kinds of Japanese fonts and 36 pairs of adjectives, using the SD method based on the reasons described above (see Section 1).

Table 2: Items and Classifications for the Exploratory Research of Study 1

Scale	Activity	Aesthetic preference	Legibility
Cheerful/Gloomy	**.85**	.09	.07
Casual/Formal	**.83**	-.24	.18
Childish/Mature	**.82**	.08	.03
Relaxe/Tense	**.74**	.06	-.10
Western-style/Japanese-style	**.71**	-.24	-.17
Pleasant/Unpleasant	**.70**	.33	-.04
Opened/Closed	**.59**	.07	.05
Luxuriant/Plain	**.56**	-.15	.26
Soft/Hard	**.51**	.00	-.43
Like/Dislike	.00	**.88**	.15
Beautiful/Ugly	.10	**.82**	.09
Rough/Delicate	.15	**.81**	.04
Comfortable/Uncomfortable	-.27	**.74**	-.06
Creative/Unimaginative	.11	.22	**.73**
Obscure/Well-defined	.07	.13	**.67**
Complex-shape/Simple-shape	.30	-.27	**.53**
Active/Passive	-.30	-.13	**.52**
Correlations Among Response Dimention			1
Activity	1		
Aesthetic preference	-.08	1	.71
Legibility	-.32	-.20	
Cronbach’ s alpha	.90	.87	.71

Notes. Factor loadings > .40 are in boldface. We performed the EFA using major factor method with promax rotation. Activity, Aesthetic preference and Legibility explained 62.99% of the variance in nine kinds of Japanese fonts.

2.1. Participants

Written consent was obtained from each participant before the examination was conducted. The local ethics committee at Rikkyo University approved the examination. A total of 124 psychology students (46 male and 78 female, average age: 20.04 years, *SD* = 5.14) participated in this study. Following the recommendation of Cha (2006), none of the participants had technical experience in visual art.

2.2. Materials and Procedure

We divided the participants into three different groups, presenting each group with a different combination of fonts in order to reduce their burden when answering the questionnaire. The fonts presented to Group 1 were MS Mincho, HG, Maru-gothic M-PRO, and DF Kinbun-tai; to Group 2,

they were MS Gothic, HG Gyosho-tai, and HG Soueikaku-pop tai; and the fonts for Group 3 were DF Reisho-tai, HG Kyokasho-tai, and HG Soueikaku-gothic UB. Thus, 40, 44, and 40 participants were assigned to Groups 1, 2, and 3 respectively. We randomized the order of the questionnaires given to the participants to prevent an order effect. The questionnaire comprised 36 items on a 7-point scale indicating the impression of three kinds of fonts. The structure of the questionnaire was the same as in the preliminary examination (see 1.3). The examination lasted approximately 10 min.

2.3. Results and Discussion

We used the data from 119 participants, excluding the data from five participants due to numerous non-responses and errors. Thus, there were 38 participants in Group 1 (13 male and 24 female), 43 participants in Group 2 (16 male and 27 female), and 39 participants in Group 3 (14 male and 25 female). The analysis revealed that there were no ceiling or floor effects for the calculated means and standard deviations of the response scores for the 36 items. We performed an exploratory factor analysis (EFA) using a principal factor solution with promax rotation. EFA indicated that our scale for evaluating the impression of Japanese Fonts (18 items) had a final three- factor solution that accounted for 62.99% of the variance (see Table 2). Our scale for evaluating the impression of Japanese fonts has three subscales: Activity, Aesthetic preference, and Legibility. There was a similarity, as well as some inconsistencies regarding factor structure, found when comparing our scale to a prior scale. Our “Evaluation” factor was similar to one found by Oyama et al. (1993), which had items related to aesthetic preference, for example, Good/Bad, Like/Dislike, Beautiful/Ugly and so on. In contrast, inconsistencies with Oyama et al. (1993) were as follows: first, Rough/Delicate was included in the factor “Activity” in Oyama’s scale, but was included in our factor of “Aesthetic preference.” In the prior scale, Cheerful/Gloomy was included in the factor “Lightness,” but was included in our factor of “Legibility.” Secondly, our results indicate the new “Legibility” factor, presumably because we used characters on our scale. These results indicate that only the “Aesthetic preference” factor has a similar structure subject to other various stimuli (e.g., colors, songs, shapes, symbolic words, and projected images in the prior study). In conclusion, we suggest that the impression of characteristics has a more unique structure than other various stimuli, which we assume is caused by a related ideogram. In addition, the interpretation of results from the present study may be limited because we included only nine kinds of Japanese fonts based on popularity.

However, the evaluation of impressions regarding each font may be biased because we used three different types of characters (hiragana, katakana, and kanji). It might be assumed that people recognize hiragana as having a roundish shape, katakana as having a square shape, and kanji as having a complex shape. We must make three groups of notion. Moreover, future research should investigate impressions based on other characteristics, such as frequency of use in package design.

3. STUDY 2

The aim of Study 2 was to investigate commonalities of impressions and better combinations of Japanese fonts and product characteristics. Using our scale that was developed in Study 1, we also examined the relationship between individual factors and the “Aesthetic preference” of Japanese fonts or product characteristics. Moreover, we considered the cause of cognitive interpretations regarding Japanese fonts and product characteristics.

3.1. Participants

Written consent was obtained from each participant before the examination was conducted. The

Table 2: EFA Factor Loadings of a Scale for Evaluating the Impression of Japanese Fonts

Scale	Activity	Aesthetic preference	Legibility
Cheerful/Gloomy	**.85**	.09	.07
Casual/Formal	**.83**	-.24	.18
Childish/Mature	**.82**	.08	.03
Relaxe/Tense	**.74**	.06	-.10
Western-style/Japanese-style	**.71**	-.24	-.17
Pleasant/Unpleasant	**.70**	.33	-.04
Opened/Closed	**.59**	.07	.05
Luxuriant/Plain	**.56**	-.15	.26
Soft/Hard	**.51**	.00	-.43
Like/Dislike	.00	**.88**	.15
Beautiful/Ugly	.10	**.82**	.09
Rough/Delicate	.15	**.81**	.04
Comfortable/Uncomfortable	-.27	**.74**	-.06
Creative/Unimaginative	.11	.22	**.73**
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Correlations Among Response Dimention			1
Activity	1		
Aesthetic preference	-.08	1	.71
Legibility	-.32	-.20	
Cronbach' s alpha	.90	.87	.71

Notes. Factor loadings > .40 are in boldface. We performed the EFA using major factor method with promax rotation. Activity, Aesthetic preference and Legibility explained 62.99% of the variance in nine kinds of Japanese fonts.

local ethics committee at Rikkyo University approved the examination. A total of 228 psychology students (78 males and 150 females, average age: 19.26 years, *SD* = 1.24) and 75 members of the public (50 males and 25 females, average age: 42.49 years, *SD* = 9.62) participated in this study. In accord with Cha (2006), none of the participants had technical experience in visual art.

3.2. Materials and Procedure

We selected Japanese fonts and items from those used in Study 1 to reduce the burden on participants when answering the questionnaire, following a recommendation to the local ethics committee. We calculated the mean scores for the three factors and performed non-metric multidimensionnal scaling (NMDS) to evaluate similarities between the nine fonts. The results indicated that the nine fonts were mapped into four areas as follows: Area 1 included Pop style; Area 2 included MS Gothic, Thick Gothic, and Chinese Min style; Area 3 included Chinese bronze inscription style and Rounded Gothic style; and Area 4 included Textbook typeface and Semi-cursive style. The Angular style was not mapped anywhere. Since Pop style, MS Gothic, Chinese bronze inscription style, and Textbook typeface could be considered representative fonts of each area, we selected these four fonts for our study. The questionnaire construction method was the same as in the preliminary examination (see 1.3).

Next, to select the items for the questionnaire used in the study, we included items with the top five factor loadings for the "Activity" factor (e.g., Cheerful/Gloomy, Casual/Formal, Childish/Mature, Relaxed/Tense, and Western-style/Japanese-style), the top three items for the "Aesthetic preference" factor (e.g., Like/Disike, Beautiful/Ugly, & Rough/Delicate), and the top three items for the "Legibility" factor (Creative/Unimaginative, Obscure/Well-defined, and Complex-shape/Simple-shape). Accordingly, we used 12 items for our study.

To select the four products used in this study, we focused on five conditions: trade names were written in Japanese font and only the name of raw ingredients was used (e.g., they were not “Sokenbicha” but “Green Tea”) so as not to evoke a variety of feelings in the participants. Products were from a private brand in 500 mL clear plastic PET screw cap drink bottles, and both the shape of bottle and the area of the bottle labels were almost the same. Hence, we selected four kinds of tea beverages sold in Japan: Product 1 (Barley tea), Product 2 (Chinese tea), Product 3 (Japanese green tea), and Product 4 (Japanese green tea with an illustration on the package). A full size picture of each product was printed on white A4 paper. We randomized the order of the questionnaires given to the participants to prevent an order effect. The questionnaire of 12 items using a 7-point scale assessed the impression of four kinds of fonts and four kinds of products. The examination lasted approximately 5 min.

3.3. Results and Discussion

We used the data from 289 participants (118 male and 171 female), excluding the data from 14 participants due to numerous errors and non-responses. The results of the chi-square tests, which were all statistically significant, indicated a poor fit for our model. However, Hoelter (1983) proposed that a model with a sample size of more than 200 respondents is not adequately represented by the results of chi-square tests. Our sample was large (N = 1158; unpaired data), so we used goodness-of-fit indexes (CFI and RMSEA) rather than the chi-square test.

3.3.1. Factor Analysis

We performed an EFA using a principal factor solution with promax rotation to determine common factors between the impressions of Japanese fonts and tea beverages. An EFA of a scale for evaluating the impressions between Japanese fonts and tea beverages (eight items) revealed a final three-factor solution that accounted for 70.52% of the variance. We performed a CFA of our scale with a maximum-likelihood solution using Amos 22.0 (IBM Corporation) to confirm the common factor structure of our scale. The CFA indicated a chi-square = 933.767, *df* = 37 with a *p*-value <.001, Comparative Fit Index (CFI) = .953, Root Mean Square Error of Approximation (RMSEA) = .078, with factor loadings from .44 to .91, and all paths were significant.

3.3.2. Structural Equation Modeling

We conducted SEM to consider differences in evaluations of impressions across Japanese font and tea beverages (see Table 3). To compare the fit indexes of the six models, to begin with we allowed all parameter estimates to be freely estimated across groups to test configural invariance in Model 1, which indicated that there was the equivalence of a less restrictive baseline model across groups. For Model 2, we implemented equality constraints on all paths between groups. The results demonstrated that the model fit well (CFI = .968, RMSEA = .071) with no significant difference in comparison to Model 1, so that metric invariance was established. For Model 3, we implemented equality constraints both on all paths and on all intercepts across groups. However, SEM indicated that the model did not fit well, with significant differences compared to Model 1, so that scalar invariance was not established. In identifying items having DIF across groups in Model 3, we implementttted equality constraints on each intercept for each factor. There were significant group differences in factors 2 and 3, so we conducted equality constraints on each intercept in each factor (Model 3 from (a) to (f)). The results revealed significant group differences for Models 3 (c) and 3 (e). In other words, Items 5 (*Rough/Delicate*) and 7 (*Creative/Unimaginative*) had non-uniform DIF. Finally, we considered the invariance between both factor variance (Model 5) and factor mean variance (Model 6). Therefore, we suggest that Model 4 was the best fitting of the six models (CFI = .956, RMSEA = .068), in which a partial scalar invariance has been established between groups. Table 4

Table 3: Invariance of 8 Items for Evaluating Impressions Across Fonts and Products

Model	X^2	*df*	Comparative Model	ΔX^2	Δdf	CFI	RMSEA
1. Configural invariance	906.563	34				.978	.075
2. Metric invariance	924.558	39	1	17.995	5	.968	.071
3. Scalar invariance	1179.163	39	1	352.519***	5	.874	.089
(a) Equality constraint: item #3	928.131	40	2	2.641	1	.964	.070
(b) Equality constraint: item #4	969.353	40	2	2.641	1	.957	.070
(c) Equality constraint: item #5	1106.519	40	2	139.807***	1	.932	.077
(d) Equality constraint: item #6	916.150	40	2	0.449	1	.966	.070
(e) Equality constraint: item #7	1014.404	40	2	47.692***	1	.946	.073
(f) Equality constraint: item #8	967.162	40	2	0.449	1	.956	.070
4. Partial scalar invariance							
Free intercepts: item #5,7	935.364	42	2	10.806	3	.956	.068
5. Partial Factor variance invariance							
Free variances: item Am, Ch	938.539	43	4	3.175	1	.951	.068
6. Partial Factoral invariance	949.068	46	4	13.704	4	.939	.068

Notes. group identifiers: Am, Ambiguity; Ch, Cheerfulness; CFI, Comparative Fit Index; RMSEA, Root Mean Square Error of Approximation.
***p<.001

Table 4: Estimated Value of Factor Means and Standard Deviations Based on Model 4

Item		Metric Invariance		Japanese Font		Tea Beverage	
		Estimated value	*SD*	Estimated value	*SD*	Estimated value	*SD*
Aesthetic preference							
1. Beautiful/Ugly	Path	1.000 [a]					
	Intercept	0.000 [b]					
2. Like/Dislike	Path	.435	.032				
	Intercept	1.305	.155				
Cheerfulness							
3. Casual/Formal	Path	1.000 [a]					
	Intercept	0.000 [b]					
4. Rough/Delicate	Path	.553	.024				
	Intercept			1.174	.116	1.832	.111
5. Childish/Mature	Path	.878	.029				
	Intercept	.145	.126				
Ambiguity							
6. Relaxed/Tense	Path	1.000 [a]					
	Intercept	0.000 [b]					
7. Creative/Unimaginative	Path	.668	.037				
	Intercept			.634	.234	.045	.220
8. Obscure/Well-defined	Path	.695	.039				
	Intercept	.519	.174				
Factor means							
Aesthetic preference				4.265	.031	4.244	.028
Cheerfulness				3.755	.054	3.925	.037
Ambiguity				3.576	.042	3.296	.033

Notes. a, we fixed path coefficient to 1 so as to identify a model; b, we fixed intercept to 0 in order to identify a model.

presents estimated values of factor means and standard deviations (*SD*) based on Model 4. We named each factor as follows: Factor 1, “Aesthetic preference”; Factor 2, “Cheerfulness”; and Fact- or 3, “Ambiguity.” In addition, the Cronbach’s alpha calculated for each subscale was as follows: .70 for “Aesthetic preference,” .60 for “Cheerfulness,” and .70 for “Ambiguity.”

In conclusion, our scale for evaluating the impression of Japanese fonts and tea beverages has three subscales, and a partial scalar invariance was established by two of eight items in our scale

having non-uniform DIF. In Item 5, participants recognized products with a more *Rough* impression (value = 1.832) than for fonts. In Item 7, participants' impressions of products were more *Unimaginative* (value = .045) than for fonts. It could be assumed that the *Rough* and *Unimaginative* impressions were similar to private brand products. Therefore, we believe that future studies with national brand products would have no DIF.

4. GENERAL DISCUSSION

Recent studies suggest that packaging design could be treated as one of most valuable tools in today's marketing communications (Ampuero et al., 2006; Gonzalez et al., 2007). One study demonstrated that each related component of an advertisement (e.g., picture, copy, and brand name) was remembered better than the unrelated components (Schmitt et al. 1993). However, the exact relationship between components was still unclear, so we focused on commonalities of package design components, specifically typeface design and product characteristics. We assume that the combination of typeface design and product characteristics is more important than the independent component of typeface designs in packaging. However, thus far there has been no obvious basis accounting for good combinations of typeface design and product characteristics. To fill the gap, we must find statistically common cognitions among typeface design and product characteristics.

In Study 1, we developed a scale for evaluating the impression of Japanese fonts. Our scale for evaluating the impression of Japanese fonts has three subscales: "Activity," "Aesthetic preference," and "Legibility." Previous studies reported commonalities among differential stimuli (e.g., Oyama et al., 1993). Concurrently, we found similarities between our scale and a prior scale for two factor structures ("Evaluation" and "Aesthetic preference"). In Study 2, we confirmed that there was a partial scalar invariance for evaluating the impressions between Japanese fonts and tea beverages. Previous studies reported that differential stimuli have a commonality. Suzuki et al. (2003) and Takahashi (1995) also reported the interrelation between words and drawings. In line with these findings, we also found a commonality regarding differential stimuli. Therefore, it could be assumed that people have a common cognition of impressions across the shape of typeface design and product characteristics.

Therefore, we believe that our study helps fill the gap by analyzing evaluations of impressions among Japanese fonts and tea beverages. There may be limitations, however. We used only two aspects of components in package design: four typeface designs and four tea beverage products. Future studies should use various typeface designs and product categories.

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REFERENCES

Ampuero, O., & Natalia, V. (2006). Consumer perceptions of product packaging. *Journal of Consumer Marketing*, *23*(2), 102–114.

Bennett, P. D. (1995). *Dictionary of Marketing Terms, 2nd ed.* Barrons Educational Series Inc.

Buck, R. (1985). Prime theory: An integrated view of motivation and emotion. *Psychological Review*, *92*(3), 389–413.

Buck, R., Anderson, E., Chaudhuri, A., & Ray, I. (2004). Emotion and reason in persuasion: Applying the ARI Model and the CASC Scale. *Journal of Business Research*, *57*(6), 647.

Buck, R., Chaudhuri, A., Georgson, M., & Kowta, S. (1995). Conceptualizing and operationalizing affect, reason, and involvement in persuasion: The ARI Model and the CASC Scale. *Advances in Consumer Research*, *22*(1), 440–447.

Butkevičienė, V., Stravinskienė, J., & Rūtelionė, A. (2008). Impact of consumer package communication on consumer decision making process. *Engineering Economics*, *56*(1), 57–65.

Byrne, B. M., & van de Vijver, F. J. R. (2010). Testing for measurement and structural equivalence in large-scale cross-cultural studies: Addressing the issue of nonequivalence. *International Journal of Testing*, *10*(2), 107–132.

Cha, J. M., & Noguchi, K. (2006). 美術の専門的学習が形態選好に及ぼす影響 [Does technical experience in visual art influence the aesthetic preference for color?] (日本基礎心理学会第25回大会,大会発表要旨). 基礎心理学研究, *25*(1), 140.

Gonzalez, M. P., Thornsbury, S., & Twede, D. (2007). Packaging as a tool for product development: Communicating value to consumers. *Journal of Food Distribution Research*, *38*(1), 61–66.

Gosling, S. D., Rentfrow, P. J., & Swann Jr., W. B. (2003). A very brief measure of the Big-Five personality domains. *Journal of Research in Personality*, *37*(6), 504.

Hair, J. F., Black, W., Babin, B., Anderson, R. E., & Tatham, R. L. (2005). *Multivariate data analysis* (5th ed.). Upper Saddle River, NJ: Prentice Hall.

Henderson, P. W., Giese, J. L., & Cote, J. A. (2004). Impression management using typeface design. *Journal of Marketing*, *68*(4), 60–72.

Hoelter, J. W. (1983). The analysis of covariance structures: Goodness-of-fit indices. *Sociological Methods & Research*, *11*(3), 325.

Inoue, M., & Kobayashi, T. (1985). 日本における SD 法による研究分野とその形容詞対尺度構成の概観 [The research domain and scale construction of adjective-pairs in a semantic differential method] 教育心理学研究, *33*(3), 253–260.

Ishii, H., Onzo, N., & Terao, Y. (2008). パッケージにおける言語的情報と非言語的情報の配置の効果 [The placement of verbal and nonverbal information in designing product packages]. 商品開発・管理研究, *4*(1), 2–16.

Ishii, H. (2009). パッケージ・デザインと消費者反応 [Regulatory focus and package design symmetry]: 制御焦点理論によるシンメトリー性に関する考察. 商学研究科紀要, *69*, 219–231.

Ishii, H. (2010). パッケージ制作における書字方向とレイアウト [Layout and vertically/horizontally arranged words in designing product packages]. 商品開発・管理研究, *6*(1), 23–37.

Kamata, A., & Vaughn, B. K. (2004). An introduction to differential item functioning analysis. *Learning Disabilities: A Contemporary Journal*, *2*(2), 49–69.

Kasumi, T. (1987). Comprehension of synesthetic expressions--Cross-modal modifications of sense adjectives. *Japanese Journal of Psychology*, *58*, 373–380.

Mishra, H. G., & Jain, D. (2012). Impact of packaging in consumer decision making process of Namkeen products. *Journal of Marketing & Communication*, *7*(3), 48–63.

Namatame, M., & Ishikawa, S. (1999). 日本語フォントのイメージ調査のための書体分類. デザイン学研究 [An image research for Japanese fonts: The font database for imagery (2)]. 研究発表大会概要集, (46), 56–57.

Namatame, M., & Ishikawa, S. (2000). 日本語フォントのイメージ評価：発想を支援するフォントデータベース 2 [A Image Research for Japanese Fonts : The Font Data Base for Imagery[2]]. デザイン学研究. 研究発表大会概要集, (47), 228–229.

Noguchi, K. (2003). The relationship between visual illusion and aesthetic preference - An attempt to unify experimental phenomenology and empirical aesthetics. *Axiomathes*, *13*, 261–281.

Ohanian, R. (1990). Construction and validation of a scale to measure celebrity endorsers' perceived expertise, trustworthiness, and attractiveness. *Journal of Advertising*, *19*(3), 39–52.

Osgood, C. E. (1962). Studies on the generality of affective meaning systems. *American Psychologist*, *17*, 10–28.

Osgood, C. E., Suci, G. J., & Tannebaum, P. H. (1957). *The measurement of meaning.* Urbana, IL: University of Illinois Press.

Oyama, T., Takimoto, S., & Iwasawa, H. (1993). セマンティック・ディファレンシャル法を用いた共感覚性の研究—因子構造と因子得点の比較— [A comparative study of synesthesia using semantic differential method: Comparing between factor structure and factor scores]　行動計量学, *20*, 55-64.

Oyama, T., Yamada, H., & Iwasawa, H. (1998). Symbolic meanings of computer-generated abstract forms. 日本大学心理学研究, *19*, 4–9.

Rawlings, D., & Twomey, F. (1998). Personality, creativity, and aesthetic preference: Comparing psychoticism, sensation seeking, schizotypy, and openness to experience. *Empirical Studies of the Arts*, *16*(2), 153–178.

Schmitt, B. H., Tavassoli, N. T., & Millard, R. T. (1993). Memory for print ads: Understanding relations among brand name, copy, and picture. *Journal of Consumer Psychology (Lawrence Erlbaum Associates)*, *2*(1), 55.

So, M. J., Choi, J. S., Koyama, S., & Hibino, H. (2009). パッケージのデザインエレメントが消費者の視覚的注意に及ぼす影響--缶コーヒーのパッケージに対する眼球運動による分析 [The effects of the package design elements on consumers' visual attention: The analysis of eye movements while viewing packages of Japanese canned coffee beverages]. 日本感性工学会論文誌, *8*(2), 407–417.

Sogn-Grundvåg, G., & Østli, J. (2009). Consumer evaluation of unbranded and unlabelled food products: The case of bacalhau. *European Journal of Marketing*, *43*(1/2), 213–228.

Steenkamp, J. B. E. M., & Baumgartner, H. (1998). Assessing measurement invariance in cross-national consumer research. *Journal of Consumer Research*, *25*(1), 78–90.

Suzuki, M., Gyoba, J. (2003). 絵画印象と言語印象の因子構造と感覚関連性の分析 [Analyzing the factor structure and the sensory-relevance of impressions produced by words and drawings]. 心理学研究, *73*(6), 518–523.

Suzuki, M., Gyoba, J., Kawabata, H., Yamaguchi, H., & Komatsu, H. (2006). モダリティ・ディファレンシャル法による形容詞対の感覚関連性の分析 [Analyses of the sensory-relevance of adjective pairs by the modality differential method]. 心理学研究, *77*(5), 464–470.

Takahashi, S. (1995). Aesthetic properties of pictorial perception. *Psychological Review*, *102*(4), 671.

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