

Original Research



Customers' perception of the attributes of different formats of menu labeling: a comparison between Korea and the U.S.

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ABSTRACT

BACKGROUND/OBJECTIVES: This study compared the perception of customers from Korea and the U.S. on the attributes of different formats of menu labeling. The specific objectives were 1) to compare the customers' perceived usefulness, ease-of-understanding, clarity, and attractiveness of different formats of menu labeling between Korea and the U.S.; and 2) to compare the customers' use intention to different formats of menu labeling between Korea and the U.S.

SUBJECTS/METHODS: A survey was conducted in Korea and the U.S. The participants were allocated randomly to view 1 of the 7 restaurant menus that varied according to the following types of menu labeling formats: (type 1) kcal format, (type 2) traffic-light format, (type 3) percent daily intake (%DI) format, (type 4) kcal + traffic-light format, (type 5) kcal + %DI format, (type 6) traffic-light + %DI format, and (type 7) kcal + traffic-light + %DI format. A total of 279 Koreans and 347 Americans were entered in the analysis. An independent t-test and 1-way analysis of variance were performed.

RESULTS: Koreans rated type 4 format (kcal + traffic light) the highest for usefulness and attractiveness. In contrast, Americans rated type 7 (kcal + traffic light + %DI) the highest for usefulness, ease-of-understanding, attractiveness, and clarity. Significant differences were found in the customers' perceived attributes to menu labeling between Korea and the U.S. Americans perceived higher for all the 4 attributes of menu labeling than Koreans.

CONCLUSIONS: The study is unique in identifying the differences in the attributes of different formats of menu labeling between Korea and the U.S. Americans rated the most complicated type of menu labeling as the highest perception for the attributes, and showed a higher use intention of menu labeling than Koreans. This study contributes to academia and industry for practicing menu labeling in different countries using different formats.

Keywords: Restaurants; food labeling; perception; health behavior

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Conflict of Interest

The authors declare no potential conflicts of interests.

Author Contributions

Conceptualization: Bosselman R, Choi HM, Lee KS, Jo M, Ham S; Data curation: Bosselman R, Kim E, Ham S; Formal analysis: Cha J; Funding acquisition: Bosselman R, Choi HM, Lee KS, Ham S; Investigation: Kim E, Jeong JY, Jo M; Methodology: Choi HM, Lee KS; Supervision: Bosselman R, Ham S; Writing - original draft: Kim E, Cha J, Jeong JY, Jo M, Ham S; Writing - review & editing: Bosselman R, Choi HM, Kim E, Cha J, Jeong JY, Jo M, Ham S.

INTRODUCTION

Obesity is a significant health issue in the world. The Organization for Economic Cooperation and Development countries reported that more than 50% of adults are overweight or obese [1]. As obesity has become a serious health problem worldwide, there have been significant changes in food choices and consumption. Consumers are becoming increasingly interested in nutrition and health for food consumption [2]. Thus, as Chen's study states, the motives in food choice are strongly linked to health [3].

Regarding health concerns, consumers are increasingly demanding nutritional information for food products [2]. The provision of nutrition information for foods has improved the consumers' abilities to judge the nutritional quality and can assist in the healthy eating choices of consumers [4,5]. Several countries have enacted regulations for the provision of nutrition information for menus sold in restaurants and enforced the arrangements to make it easier for consumers to understand [4,5].

In 2010, the menu labeling law in Korea was mandated by the Ministry of Food and Drug Safety (MFDS) administration according to the Special Act on Children's Food Safety and Nutrition to safeguard children's eating environment. In particular, restaurants with 100 or more chains are required to provide nutritional information of the items sold on the menus [4]. A recent announcement by the MFDS reported that the labeling of nutritional and allergens had been appropriately implemented at 10,630 restaurant franchises.

In the United States, the Nutrition Labeling and Education Act (NLEA), which was first issued in 1993, came into effect in 1994 through the U.S. Food and Drug Administration (FDA) [5]. The regulation requires nutritional labeling on packaged foods [6]. On the other hand, the extent to which the NLEA should include restaurants has been a matter of considerable debate in Congress. After several attempts on menu labeling registration, the Menu Education and Labeling Act of 2003, which is an extension of the NLEA, proposed that chain restaurants should provide nutritional labeling for all foods and beverages sold. Affected by the NLEA, local and state governments have similarly introduced local and state provisions for menu labeling.

The Patient Protection and Affordable Care Act (also known as Obamacare) of 2010 was proposed as federal law in 2010. Section 4,205 indicates that food establishments with 20 or more chains are required to provide customers with nutritional information, which is known as the Menu Labeling Act (MLA). After several court challenges, the MLA became mandatory 8 years after the proposal. The final implementation occurred on May 7, 2018. The U.S. FDA reported that approximately 231,200 establishments under 1,070 chains are subject to the federal MLA [7].

Several studies reported that nutrition labeling at restaurants helped customers make lower-calorie choices [8-14]. Nutrition labeling positively affected the customers' selection of healthy foods [8,15] and purchasing food products that contain less harmful nutrients [16,17].

In addition, the formats of menu labeling have been studied in relation to the perception and behaviors of customers. The modified rank-ordered formats and the colored-calories formats increased the menu labeling effectiveness further, compared to when no calorie information was provided [18]. Among the 3 formats on menu labeling, including numeric, color-coded, and physical activity-based format, the physical activity-based format was the most effective in terms of healthy food choices [19]. After adding a Health Star Rating to kilojoule labeling

on menu boards, customers tended to select healthier evening meals [20]. For Americans, more visual aids and more information on the menu labeling formats helped them to select healthier menu choices.

Among the menu labeling attributes, 'usefulness', 'ease of understanding', and 'accuracy' were decisive factors for behavioral intentions [21]. Apple and leaflet formats were rated the most attractive and the clearest. In contrast, the colored dot format received the overall lowest score for attractiveness, ease of use, clarity, and overall preference in a restaurant [22]. Dual coding theory demonstrates that an understanding and transfer of knowledge is more effective when language and image information is presented via a visual and audio sensory mechanism [23,24]. That is, combinations of words, numbers, images, and graphics are more effective than using one type of code while information is transferred. The use of kcal and traffic lights is effective in the healthy menu selection of customers [25].

Menu labeling is an attempt to minimize the diseases or obesity caused by unhealthy food consumption [26]. The goal of menu labeling policies can be achieved only when the public utilize nutritional information at restaurants. To this end, the formats of menu labeling would be well accepted by customers. Therefore, there is a need to examine the customers' perceived attributes on different formats of menu labeling. Although there are differences between Korea and the U.S. in terms of the menu-labeling environment, including implementation periods, a comparison between countries would be meaningful, and may offer practical implications to the industry.

The study purpose was to compare the customers' perception on the attributes of different formats of menu labeling between Korea and the U.S. The specific objectives were 1) to compare the customers' perceived usefulness, ease-of-understanding, clarity, and attractiveness of different formats of menu labeling between Korea and the U.S.; and 2) to compare the customers' use intention to different formats of menu labeling between Korea and the U.S. The results of the study will be applied to formulating strategies in developing the menu formats customers prefer to use.

SUBJECTS AND METHODS

Data collection

The study population consisted of adult customers at casual-dining restaurants. The participants were eligible if they had dined at casual-dining restaurants within the last 6 months at the time of the survey, and they were at least 18 years of age. Those who had been employed in food-service or health-related industries were excluded. An invitation was sent to potential participants and those who were eligible participants by clicking a link to the survey. The survey was conducted at the same time in the United States and Korea in June 2016.

In Korea, the survey was distributed through the social networking services, including Facebook, Twitter, and KakaoStory which have more than 10 million users. Two hundred and ninety two responses were received. After excluding incomplete surveys, 279 responses were analyzed. For the U.S., a URL of the survey was distributed to potential participants through the mass email system of a primary university in the Midwestern United States; 133,425 alumni of the university reached out. The returned responses totaled 802, of which 331 did not meet the criteria, and 124 were incomplete surveys. After eliminating those, 347 usable responses were analyzed.

Menu label conditions

All menus came from popular and well-known casual-dining restaurant chains. Because the items were typically sold at casual-dining restaurants in Korea and the U.S., the menus were categorized into appetizers, soups and salads, entrees, side dishes, beverages, drinks, and desserts. All menus had the same content and design, except for the format of caloric information. The calorie information on the menus was obtained from the websites of representative casual-dining restaurants. The percentage of the daily intake values represent the proportion of nutrients in a serving of food from a menu based on the Recommended Daily Allowance for adults. For the traffic-light label, the colors were determined according to the criteria of healthy dining, a restaurant-industry marketing and consulting company (“Nutrition Criteria”, n.d.) [27]. The participants were allocated randomly to view 1 of the 7 restaurant menus that varied according to the following types of menu labeling formats: (type 1) kcal format, (type 2) traffic-light format, (type 3) percent daily intake (%DI) format, (type 4) kcal + traffic-light format, (type 5) kcal + %DI format, (type 6) traffic-light + %DI format, and (type 7) kcal + traffic-light + %DI format [18-22]. **Fig. 1** presents a graphical presentation of the 7 formats of menu labeling.

Research instrument

The questions in the survey were derived from the literature and modified to meet the study context of menu labeling at restaurants. The survey consisted of 3 parts. Part 1 examined the respondents' perceived attributes for usefulness, ease-of-understanding, clarity, and attractiveness toward the different formats of menu labeling. The items of the 4 constructs came from previous studies [21,22,25]. Part 2 of the survey measured the customers' use intention toward different formats of menu labeling. The construct of the use intention was derived from the literature [28-30]. Those constructs were measured on a 5-point Likert scale (1 = strongly disagree, 5 = strongly agree). Part 3 gathered the respondents' demographic information, including gender, age, education, and family monthly income. **Table 1** lists the

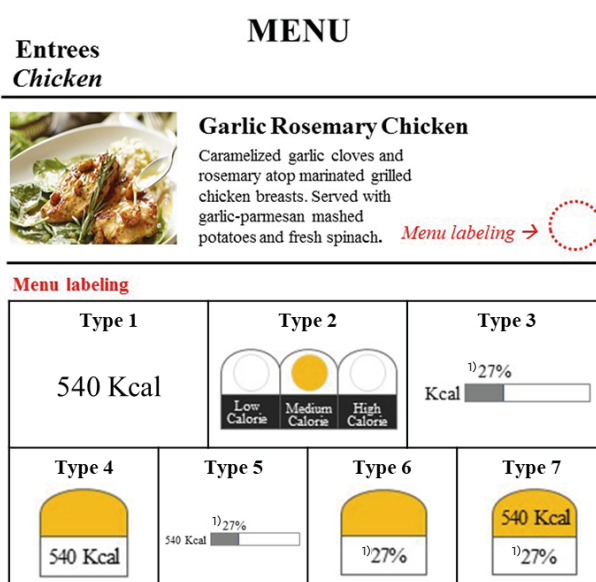


Fig. 1. Types of menu-labeling formats.

Type 1, kcal menu labeling; Type 2, traffic-light menu labeling; Type 3, %DI menu labeling; Type 4, kcal + traffic-light menu labeling; Type 5, kcal + %DI menu labeling; Type 6, traffic-light + %DI menu labeling; Type 7, kcal + traffic-light + %DI menu labeling. (%DI, percent daily intake).

¹⁾Number (%): percent of Recommended Dietary Allowance.

Table 1. Description of measures

Construct/questionnaire items	
Usefulness (Cronbach's $\alpha = 0.892$)	
U1	Using the nutrition information on this menu board improved my health.
U2	Using the nutrition information on this menu board enhanced my efficacy on the healthy menu selection.
U3	Using the nutrition information on this menu board enabled me to keep or to decrease my body weight.
U4	Using the nutrition information on this menu board enabled me to select healthier food.
Ease-of-understanding (Cronbach's $\alpha = 0.891$)	
EU1	It is easy to become skillful at using nutrition information on the menu board.
EU2	This menu board enables me to select a healthy menu faster.
EU3	The nutrition information on this menu board is easy to understand.
Attractiveness (Cronbach's $\alpha = 0.874$)	
A1	I like the format of the nutrition information on the menu board.
A2	The format of the menu board looks good.
A3	The format of the menu board is a suitable communication tool for nutrition information.
Clarity (Cronbach's $\alpha = 0.864$)	
C1	The nutrition information on the menu board is clear to understand.
C2	The nutrition information on the menu board is noticeable.
C3	The nutrition information on the menu board is salient.
Future use intention (Cronbach's $\alpha = 0.937$)	
F1	I will make an effort to use nutrition information in a restaurant before placing my order.
F2	I plan to use the nutrition information in a restaurant before placing my order.
F3	I want to use the nutrition information in a restaurant before placing my order.

questionnaire items of the survey. The survey was approved by the Institutional Review Board (7001988-201710-SB-226-04) at a university in Seoul, Korea, and a Mid-Western University, U.S.

Statistical analysis

The collected data was analyzed using SPSS 24.0 for Windows (IBM Corp., Armonk, NY, USA). Descriptive statistics were conducted on all the variables. First, an independent t-test was performed to compare the customers' perceived usefulness, ease-of-understanding, clarity, and attractiveness of different formats of menu labeling between the Korean and U.S. customers. One-way analysis of variance (ANOVA) was conducted to determine the differences in the perceived attributes among the 7 different formats of menu labeling. All statistical analysis was performed with a significance level at $P < 0.05$.

RESULTS

General characteristics of the respondents in Korea and the U.S.

After excluding the incomplete responses, 279 Koreans and 347 Americans were entered in the analysis. **Table 2** lists the demographic information of the sample from Korea and the U.S. In terms of gender, 152 responses (54.5%) of the Korean respondents were female, whereas 127 (45.5%) came from the male respondents. For the U.S. sample, 186 (53.6%) and 161 (46.4%) of the respondents were females and males, respectively. Of the Korean respondents, 205 (73.5%), 59 (21.1%), 9 (3.2%), and 6 (2.2%) were in their 20s, 30s, 40s, and 50s or over, respectively. Of the American respondents, 31 (8.9%), 61 (17.6%), 45 (13.0%), and 210 (60.5%) were in their 20s, 30s, 40s, and 50s or over, respectively.

Regarding education, Koreans reported the highest percentage of currently attending college ($n = 149$, 53.4%); the U.S. had the highest number of Bachelor's degrees ($n = 195$, 56.2%). In addition, 40.9% ($n = 114$) of the Korean respondents had a monthly household income of \$60,000 or above, whereas 85.6% ($n = 297$) of the U.S. respondents came from the families

Table 2. General characteristics of the respondents in Korea and the U.S.

Classification	Korean (n = 279)	U.S. (n = 347)
Sex		
Male	127 (45.5)	161 (46.4)
Female	152 (54.5)	186 (53.6)
Age		
20s	205 (73.5)	31 (8.9)
30s	59 (21.1)	61 (17.6)
40s	9 (3.2)	45 (13.0)
50s	6 (2.2)	210 (60.5)
Education		
Less than high school	3 (1.1)	0 (0.0)
Currently attending college	149 (53.4)	2 (0.5)
Bachelor's degree	84 (30.1)	195 (56.2)
Currently attending graduate school	31 (11.1)	3 (0.9)
Graduate degree(s)	12 (4.3)	147 (42.4)
Household monthly income¹⁾		
Less than \$20,000	56 (20.1)	4 (1.2)
\$20,000 to \$29,999	27 (9.7)	4 (1.2)
\$30,000 to \$39,999	30 (10.8)	8 (2.3)
\$40,000 to \$49,999	28 (10.0)	18 (5.1)
\$50,000 to \$59,999	24 (8.6)	16 (4.6)
\$60,000 or above	114 (40.9)	297 (85.6)

Values are presented as number (%).

¹⁾U.S. \$1 = 1,150 Korean won.

with a monthly household income of \$60,000 or above.

Perception of the attributes of different formats of menu labeling in Korea and the U.S.

The Cronbach's alpha was calculated for the attributes of menu labeling formats. The Cronbach's alpha of each construct for usefulness, ease-of-understanding, attractiveness, and clarity was 0.892, 0.891, 0.874, and 0.864, respectively. The results ensured the reliability of each construct [31].

For the perceived attributes of the different formats of menu labeling, 1-way ANOVA showed that the Korean respondents evaluated perceived usefulness, ease-of-understanding, attractiveness, and clarity toward the 7 formats of menu labeling (**Table 3**). Koreans showed significant differences in usefulness ($F = 2.467, P = 0.025$) and attractiveness ($F = 2.807, P = 0.012$) among the 7 menu labeling formats. In particular, Duncan's test revealed that Koreans rated type 4 (kcal + traffic light) the highest and type 1 (kcal) the lowest in terms of usefulness and attractiveness.

The U.S. respondents showed significant differences in the attributes of the 7 formats of menu labeling ($P < 0.01$), as listed in **Table 4**. The perceived usefulness of American customers toward the different formats of menu labeling was significantly different ($F = 3.717, P = 0.001$). The Duncan's test showed that American customers perceived types 7, 2, and 4 as the most useful formats, and type 1 as the least useful format. The American customers perceived ease-of-understanding ($F = 7.148, P = 0.000$) the highest for types 7 and 2, and the lowest for type 3. Attractiveness ($F = 5.542, P = 0.000$) was rated the highest for type 7 and lowest for types 3, 6, and 5. Clarity ($F = 8.559, P = 0.000$) was highest in types 7 and 1,

Table 3. Korean customers' perception of the attributes of different formats of menu labeling (n = 279)

Attributes	Menu labeling format ¹⁾	F	P	Duncan test	
Usefulness	Type 1	2.72 ± 0.88	2.467	0.025*	1,7,3 < 2,5,6,4
	Type 2	2.97 ± 0.89			
	Type 3	2.78 ± 0.86			
	Type 4	3.33 ± 0.92			
	Type 5	3.11 ± 0.84			
	Type 6	3.16 ± 0.84			
	Type 7	2.76 ± 0.81			
Ease-of-understanding	Type 1	2.74 ± 0.89	1.644	0.136	-
	Type 2	3.00 ± 0.89			
	Type 3	2.64 ± 0.83			
	Type 4	3.08 ± 0.91			
	Type 5	3.10 ± 0.90			
	Type 6	3.11 ± 0.85			
	Type 7	2.95 ± 0.77			
Attractiveness	Type 1	2.64 ± 1.00	2.807	0.012*	1,3 < 5,7,2 < 6,4
	Type 2	3.04 ± 0.83			
	Type 3	2.86 ± 0.83			
	Type 4	3.35 ± 0.81			
	Type 5	3.01 ± 1.01			
	Type 6	3.35 ± 0.73			
	Type 7	3.03 ± 0.83			
Clarity	Type 1	2.43 ± 0.80	2.031	0.062	-
	Type 2	2.74 ± 0.86			
	Type 3	2.69 ± 0.74			
	Type 4	3.12 ± 0.86			
	Type 5	2.89 ± 0.88			
	Type 6	2.87 ± 0.91			
	Type 7	2.71 ± 0.86			

Data are shown as mean ± SD.

¹⁾5-point Likert scale (1 = strongly disagree, 5 = strongly agree).

* $P < 0.05$.

whereas type 3 was rated the lowest. For all the 4 attributes, American customers rated type 7 (kcal + traffic light + %DI) the highest, and type 3 (%DI) the lowest.

Comparison of the customers' perceived attributes of menu labeling between Korea and the U.S.

The perceived attributes of Korea and U.S. customers toward menu labeling were compared.

Table 5 lists significant differences in the usefulness, easy-of-understanding, attractiveness, and clarity ($P < 0.001$) between Korea and the U.S. All 4 menu-labeling attributes were significantly higher for Americans than Koreans. Usefulness was significantly higher for Americans (3.34) than Koreans (2.98) ($t = -4.335$, $P = 0.000$). Ease-of-understanding was significantly higher for Americans (3.62) than Koreans (2.95) ($t = -8.002$, $P = 0.000$). Attractiveness was significantly higher for Americans (3.55) than Koreans (3.05) ($t = -6.055$, $P = 0.000$). Clarity was significantly higher for Americans (3.51) than Koreans (2.78) ($t = -8.873$, $P = 0.000$).

Customers' future use intention toward different formats of menu labeling in Korea and the U.S.

Although the construct of future use intention was comprised of 3 items, the Cronbach's alpha of the future use intention was 0.937, which ensured the reliability of each construct [31]. For Koreans, there was no significant difference in the future use intention toward different formats of menu labeling ($F = 1.943$, $P = 0.075$). **Table 6** lists the results.

For Americans, there was a significant difference in the future use intention toward the different formats of menu labeling ($F = 3.374$, $P = 0.022$). The Duncan's test revealed the future use intention to be highest in the following order: types 7, 2, 4, 5, 6, and 1. Type 3

Table 4. American customers' perception of the attributes of different formats of menu labeling (n = 347)

Attributes	Menu labeling format ¹⁾	F	P	Duncan test	
Usefulness	Type 1	2.99 ± 1.14	3.717	0.001**	1 < 3,6,5 < 4,2,7
	Type 2	3.54 ± 1.02			
	Type 3	3.06 ± 0.99			
	Type 4	3.47 ± 1.07			
	Type 5	3.19 ± 1.03			
	Type 6	3.15 ± 1.18			
	Type 7	3.86 ± 0.92			
Easy-of-understanding	Type 1	3.56 ± 1.11	7.148	0.000***	3 < 6,5 < 1,4 < 2,7
	Type 2	4.01 ± 1.00			
	Type 3	3.01 ± 0.97			
	Type 4	3.78 ± 1.10			
	Type 5	3.33 ± 1.18			
	Type 6	3.31 ± 1.13			
	Type 7	4.18 ± 0.72			
Attractiveness	Type 1	3.70 ± 0.88	5.542	0.000***	3,6,5 < 4,1,2 < 7
	Type 2	3.82 ± 1.04			
	Type 3	3.03 ± 1.01			
	Type 4	3.67 ± 1.07			
	Type 5	3.31 ± 1.25			
	Type 6	3.22 ± 1.13			
	Type 7	4.05 ± 0.68			
Clarity	Type 1	3.91 ± 0.87	8.559	0.000***	3 < 6,5 < 2,4 < 1,7
	Type 2	3.65 ± 1.01			
	Type 3	2.73 ± 1.03			
	Type 4	3.74 ± 1.12			
	Type 5	3.42 ± 1.12			
	Type 6	3.13 ± 1.08			
	Type 7	4.02 ± 0.71			

Data are shown as mean ± SD.

¹⁾5-point Likert scale (1 = strongly disagree, 5 = strongly agree).

** $P < 0.01$, *** $P < 0.001$.

Table 5. Comparison of the customers' perception of the attributes of menu labeling between Korea and the U.S.

Attributes ¹⁾	Korean (n = 279)	U.S. (n = 347)	t	P
Usefulness	2.98 ± 0.88	3.34 ± 1.08	-4.335	0.000***
Ease-of-understanding	2.95 ± 0.87	3.62 ± 1.10	-8.002	0.000***
Attractiveness	3.05 ± 0.88	3.55 ± 1.07	-6.055	0.000***
Clarity	2.78 ± 0.86	3.51 ± 1.08	-8.873	0.000***

Data are shown as mean ± SD.

¹⁾5-point Likert scale (1 = strongly disagree, 5 = strongly agree).

*** $P < 0.001$.

Table 6. Korean customers' future use intention toward different formats of menu labeling (n = 279)

Variable	Menu labeling format ¹⁾	F	P	
Future use intention	Type 1	2.54 ± 0.94	1.943	0.075
	Type 2	2.98 ± 1.03		
	Type 3	2.91 ± 0.88		
	Type 4	3.20 ± 0.86		
	Type 5	2.96 ± 0.95		
	Type 6	3.04 ± 0.88		
	Type 7	2.68 ± 0.75		

Data are shown as mean ± SD.

¹⁾5-point Likert scale (1 = strongly disagree, 5 = strongly agree).

Table 7. U.S. customers' future use intention toward the different formats of menu labeling (n = 347)

Variable	Menu labeling format ¹⁾	F	P	Duncan test	
Future use intention	Type 1	3.30 ± 1.23	3.374	0.022*	3 < 1,6,5,4 < 2,7
	Type 2	3.75 ± 1.23			
	Type 3	3.07 ± 1.25			
	Type 4	3.74 ± 1.10			
	Type 5	3.59 ± 1.08			
	Type 6	3.56 ± 1.20			
	Type 7	3.90 ± 1.03			

Data are shown as mean ± SD.

¹⁾5-point Likert scale (1 = strongly disagree, 5 = strongly agree).

*P < 0.05.

Table 8. Comparison of the customers' future use intention toward menu labeling between Korea and the U.S.

Variable ¹⁾	Korean (n = 279)	U.S. (n = 347)	t	P
Future use intention	2.91 ± 0.92	3.58 ± 1.18	-7.515	0.000***

Data are shown as mean ± SD.

¹⁾5-point Likert scale (1 = strongly disagree, 5 = strongly agree).

***P < 0.001.

was the lowest. For Americans, type 3 (%DI) was rated the lowest in the future use intention toward menu labeling. **Table 7** lists these results.

Comparison of the customers' future use intention toward menu labeling between Korea and the U.S.

A comparison was made regarding the customers' future use intention toward menu labeling between Korea and the U.S., as shown in **Table 8**. Americans' future use intention to menu labeling (3.58) was significantly higher than Koreans (2.91) (t = -7.515, P = 0.000).

DISCUSSION

This study examined how customers perceive the attributes of menu labeling in terms of usefulness, ease-of-understanding, attractiveness, and clarity toward different formats of menu labeling. This study compared the differences in the attributes perceived by Koreans and Americans.

The major findings of the study are summarized below.

1. Korean customers had different perceptions toward different formats of menu labeling for usefulness and attractiveness. Koreans rated the type 4 (kcal + traffic light) format as highest for usefulness and attractiveness, while the type 1 (kcal) format was rated lowest for usefulness and attractiveness by Koreans.
2. American customers perceived the different formats of menu labeling for usefulness, ease-of-understanding, attractiveness, and clarity differently. Americans perceived type 7 (kcal + traffic light + %DI) to be the highest for usefulness, ease-of-understanding, attractiveness, and clarity. On the other hand, the type 3 (%DI) format was rated the lowest for usefulness, ease-of-understanding, attractiveness, and clarity by Americans.
3. Significant differences in the customers' perceived attributes to menu labeling were found between Korea, and the U.S. Americans perceived higher usefulness, ease-of-understanding, attractiveness, and clarity toward menu labeling than Koreans.
4. Koreans did not show a significant difference in the future use intention toward the different formats of menu labeling.
5. The Americans showed a significant difference in the future use intention toward

different formats of menu labeling. They revealed the type 3 (%DI) format to be the lowest in the future use intention toward menu labeling.

6. Americans showed a significantly higher future use intention toward menu labeling than Koreans.

The findings of the study render academic and industrial implications. Koreans perceived type 4 (kcal + traffic light) to be the highest for usefulness and attractiveness, which corroborated the previous study [25]. This indicates that the dual-coding theory was verified [23,24]. Korean customers perceived the menu labeling formats that hold both numbers and graphics to be more useful and attractive.

The findings indicated that American customers rated menu labeling to be more useful, easier to understand, more attractive, and clearer than Koreans. American customers have been exposed to menu labeling for more extended periods of time, and they have a higher comprehension of menu labeling.

The study is unique in that it compared the different formats of menu labeling as to how customers perceive the attributes. Moreover, this study is the first to compare the differences between Korea and the U.S. As a result, this study offers knowledge for the industry to develop a menu-labeling format that the users may want to utilize for menu selection. This study found that Koreans rated kcal + traffic light the highest for the attributes, but Americans rated the kcal + traffic light + %DI format the highest. This indicates that Koreans showed higher perceived attributes for simpler menu labeling formats than Americans. In addition, Americans showed a higher use intention of menu labeling than Koreans. The differences can be attributed to the differences in the environments, including restaurants, education, and media. These findings extend the literature on the menu labeling toward the differences among the segments of customers, mainly according to locations, nationalities, or cultures.

While this is the first study to compare the customer perception on menu labeling formats between Korea and the U.S., there were some limitations. Although this study was conducted using menus from casual-dining restaurants, such a study can be applied to a variety of restaurant segments. Data collection for a comparative study was challenging in many aspects. The greatest difficulty was in data collection from more than 2 different regions. Despite all efforts, making an even composition for the samples from the 2 countries was challenging. In a future study, continuous efforts would be needed to have the most reasonable sampling for a comparative study. In addition, such a study should be conducted in other countries, including European countries and Australia, which practice menu labeling actively.

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