

Communication through Restaurant Menus: Labeling and Psychology

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Objectives: As different types of nutritional information could result in different perceptions, it is necessary to evaluate how the presence of menu labeling affects consumers' feeling of conflict as this feeling may trigger more conscious food selection. The main purpose of this study is to examine if psychology matters in the evaluation of nutritional information of menu items.

Methods: Participants were randomly assigned to one of four menus with different nutritional information (no calorie information, calorie information, calorie+fat information, and calorie+exercise information). Three hypotheses were tested using ANOVA (Analysis of Variance): (1) Effect of labeling types, (2) Moderating effect of consumers' self-control, and (3) Moderating effect of consumers' health consciousness.

Results: Results show that menu labeling with calorie and fat information induced a reduction in the calories selected, a more favorable attitude toward the product (source credibility), and an increase in consumers' feeling of conflict. Regarding self-control and health consciousness, the high self-control participants were more responsive to the provision of nutritional information than were the low self-control participants. The low health-conscious participants were also influenced when only calorie information was provided, while high health-conscious consumers were more responsive to calorie, fat and exercise information.

Conclusions: The display of different types of nutritional information on the menu could benefit both high self-control and high health-conscious consumers as well as low self-control and low health-conscious consumers.

Key Words: Menu Labeling, Food Selection, Consumer Psychology, Health Consciousness, Self-Control

Introduction

Obesity could potentially cause several diseases such as di-

abetes, high blood pressure, and heart attacks, all of which increase medical expenditures (Wyatt, Winters, & Dubbert, 2006). One of the most influential factors that cause obesity is the consumption of foods outside the home, as this food contains a higher amount of calories, fat, and cholesterol than home-cooked meals (Jeffery, Baxter, McGuire, & Linde, 2006). Menu labeling at restaurants is a policy that has received increasing attention because it informs consumers of the nutritional content of the restaurant meals (Olstad, Vermeer, McCargar, Prowse, & Raine, 2015). A systematic review indicated that menu labeling was related to a reduction of 18.13 calories in the selected meal; nonetheless, it was also associated with a non-significant calorie reduction (Long, Tobias, Cradock,

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Batchelder, & Gortmaker, 2015). Due to these mixed findings, it is still questionable whether the provision of information influences consumer behavior.

Scholars have suggested that people will be more successful in controlling their food intake if relevant information is accessible and if they are conscious of the costs of consumption when making decisions (Trudel, Murray, Kim, & Chen, 2015). Different types of nutritional information could result in different perceptions; fat information may be a stronger determinant of the evaluation of the healthiness of a product than calorie information (Ebner, Latner, & Nigg, 2013).

Besides the impact of menu labeling on calorie intake, previous literature has indicated that the provision of calorie information may not only help consumers make healthier food choices but may also affect consumers' perceptions and evaluations of the menu and the restaurant (Yang et al., 2015). Findings have revealed that posting nutritional information induces a more favorable attitude toward a product such as higher purchase intentions and a higher nutrition attitude (Hwang & Cranage, 2011). Nevertheless, these studies have only focused on the attitude toward a product rather than the consumers' psychological response such as feeling of conflict. Thus, it is necessary to evaluate how the presence of menu labeling affects consumers' feeling of conflicts as this feeling may trigger more conscious food selection by consumers.

In designing menu labeling, it is important to determine who the target consumers are because they might respond differently to the same nutritional information due to psychographic factors. The disclosure of nutritional information and the type of information people process could influence consumers' ability to control their food intake and even increase their self-control to prevent making inadequate food choices (Trudel & Murray, 2011). Moreover, consumers' health consciousness may also influence how consumers respond to menu labeling and how it influences their food selection.

Based on the above, the following questions should be asked: Which type of labeling will have more influence on consumers' food selection and their feeling of conflict? And who is more responsive to different types of menu labeling? Even though nutritional information can affect consumers' food selection and evaluation, few studies have evaluated the influence of non-nutritional information (e.g., exercise information) on food selection. It is necessary to consider the influence of psychographic factors with the display of different types of information on consumers' food behavior. The objectives of the present research are: (1) to identify what type of nutritional information has more influence on consumers' food selection, feeling of conflict, and attitude toward product, and (2) to

investigate who is more responsive to nutritional information based on psychographic factors.

Literature Review

Effect of Menu Labeling with Different Types of Information on Consumers' Food Choices

One of the limitations of menu labeling may be that consumers do not understand what calorie values mean, suggesting that indicating the amount of calories contained in a restaurant meal is not the best way to convey nutritional information. Therefore, adding other information such the amount of calories an adult should consume per day or adding an interpretation of the menu item (e.g., traffic light symbols and exercise information) may be better methods to convey the nutritional information on restaurant menus (Sinclair, Cooper, & Mansfield, 2014). The exercise information conveys the energy contained in foods as the minutes of exercise needed to burn off that energy (James, Adams-Huet, & Shah, 2015).

Previous studies have evaluated the influence of other types of nutritional information on food selections by consumers. For example, Conklin, Lambert, and Cranage (2005) indicated that the inclusion of nutritional information resulted in the selection of healthier food choices. Roseman, Joung, Choi, and Kim (2017) also showed that menu information about calories had a significantly positive impact on students' intention to select lower-calorie foods. In addition to evaluating the influence of calorie information on food selections by consumers, recent studies have also evaluated the effect of exercise information on calorie intakes by consumers. Dowray, Swartz, Braxton, and Viera (2013) found that participants selected an entrée with fewer calories (826 calories) when using a menu with exercise information compared to the participants using a menu without that information (1,020 calories).

Impact of Menu Labeling on Consumers' Feeling of Conflict

Conflict can be represented as a competition between the desire for indulgence (e.g., eating a hamburger) and the negative consequences of that action (e.g., weight gain). For consumers, if the amount of calories and sugar is higher than the amounts to which they are accustomed, the perception of health consequences will be higher and the benefit-to-cost ratio will decrease. As a result, the motivation of consumers to consume will also decrease (Hassan, Shiu, & Michaelidou, 2010).

Wei and Miao (2013) evaluated consumers' reactions to the display of calorie information in different types of restaurants. They suggested that when calorie information is absent, consumers estimate the calorie counts of the menu items based on

their perception of a restaurant. Among participants who perceived a restaurant as healthy, the exposure to calorie information increased their feeling of conflict. On the contrary, when participants considered a restaurant unhealthy, the display of calorie counts decreased their feeling of conflict.

Influence of Menu Labeling with Different Types of Information on Consumers' Attitude toward Product

For many consumers, when they are making food choices, calories, fat, and sodium content are highly searched attributes because of their relation to various disorders such as obesity, high blood pressure and heart attack (Burton, Howlett, & Tangari, 2009). In a study conducted by Hwang and Lorenzen (2008), participants considered menus with calorie, macronutrient, and fat information as more effective and credible compared to the menus without this information or with only calorie information. Moreover, if participants perceived the menu item as healthy, they showed more favorable product attitudes and a higher intention to buy the product regardless of the price.

Hwang and Cranage (2011) also revealed that disclosing nutritional information and nutrient content could assist consumers in choosing healthier menu items. For restaurant operators, displaying nutritional information could induce more favorable attitudes toward a product.

Impact of Consumer Psychology on Information Processing

Consumers respond differently to information depending on their individual characteristics. This is supported by persuasion theories that provide the knowledge to understand individuals' thoughts, emotions, and actions while responding to persuasive communication (Jones & Richardson, 2007).

One of the popular persuasion theories is the Elaboration Likelihood Model (ELM) of persuasion effects by Petty, Cacioppo, and Goldman (1981). The ELM proposes that persuasion may proceed via the central or peripheral route and that individual characteristics define the effectiveness of these procedures. The ELM suggests that when individuals have are highly motivated to consider the information presented, persuasion may occur as a result of a cautious evaluation of the information given (central route). When individuals have a low motivation to consider the information presented, however, they prefer to conserve cognitive energy and rely on simple cues such as source attributes (peripheral route). This theory is related to food selection in which a consumer's level of self-control and health consciousness may influence how they respond to the presence of nutritional information. Consumers with high self-control or health-consciousness may be willing to process and consider information when making food choices. However,

consumers with low self-control or health consciousness may have low motivation or may not be willing to dedicate a lot of cognitive energy to the information; therefore, they rely on peripheral cues when making food choices.

Influence of Consumers' Self-Control on Food Choices

According to Baumeister, Vohs, and Tice (2007), self-control indicates people's ability to change their responses with the aim of accomplishing certain goals.

Past research has evaluated how consumers' self-control moderates the influence that the display of nutritional information has on their food selections. Hassan et al. (2010) indicated that consumers' level of self-control had an impact on food choices when Guideline Daily Amount (GDA) labeling was provided. When the GDA labeling included a high amount of calories and sugar, low self-control participants selected the food product (e.g., cake) while the high self-control participants reduced their desire to choose it. Therefore, the presence of nutritional information can trigger consumers' self-control to choose the healthier food option. Contrary to these results, Koenigstorfer, Groeppel-Klein, and Kamm (2014) observed that traffic light symbols on the front of food packages helped consumers with low self-control to choose low-calorie products. The traffic light labeling can guide low self-control consumers because the colors prime associations that assist them in controlling their eating behavior (Mehta & Zhu, 2009).

Influence of Consumers' Health Consciousness on Food Selection

Health consciousness could be defined as the degree of which people undertake actions with the objective of maintaining or enhancing their health (Gould, 1988). Previous research has examined which type of consumers respond better to menu labeling (Ellison, Lusk, & Davis, 2013). They examined the relationship between calorie intake, the format of menu labeling, health conscious, and demographic factors. Participants in the menu with calorie and traffic light symbols selected fewer calories compared to the participants in the menu without or only calorie information. Moreover, the relationship between the type of labeling and health consciousness was significant. In the low health-conscious group, the menu with calorie information resulted in higher calorie reductions. Nonetheless, as health conscious incremented, the inclusion of traffic light symbols on the menu was more efficient in decreasing the number of calories.

Furthermore, previous literature has examined how health and taste conscious consumers evaluate a product with different types of labeling (Hwang, Lee, & Lin, 2016). Findings showed that when fiber labeling and fiber labeling + claim were provided, the health-conscious consumers indicated higher purchase

intentions and more favorable perceptions toward the product compared to the taste-conscious consumers. Ran, Yue, and Rihn (2016) recently pointed out that nutrition information affects consumers' purchasing decisions differently depending on the product. In general, consumers would pay less for fat and mineral information, but would pay more for the salad mix than for detailed nutritional information such as ingredient, protein, sodium, and carbohydrate.

Hypothesis

Based on previous literature, the following hypotheses are proposed:

- Hypothesis 1: Types of labeling (no calorie information, calorie information, fat information, and exercise information) influence product selection (H1-1), consumers' feeling of conflict (H1-2), and attitude toward product (H1-3), respectively.
- Hypothesis 2: Consumers' self-control moderates the relationship of the type of labeling with product selection (H2-1), consumers' feeling of conflict (H2-2), and attitude toward product (H2-3), respectively.
- Hypothesis 3: Consumers' health consciousness moderates the relationship of the type of labeling with product selection (H3-1), consumers' feeling of conflict (H3-2), and attitude toward product (H3-3), respectively.

Methods

Research Design of the Study

This study examined which type of nutritional information of menu labeling had more influence on consumers' fast food selection, evaluation, and feeling of conflict. A research model covering the hypotheses proposed is displayed in Figure 1. To evaluate the proposed hypotheses, a between-group design was conducted. Four menus with different types of information were evaluated: (1) no calorie information (control group) (Labno, hereafter), (2) only calorie information (Labcal, hereafter), (3) calorie+fat information (fat, saturated fat, and cholesterol) (Labcalfat, hereafter) and, (4) calorie + exercise information (minutes to run) (Labcalexe, hereafter).

The food choices were from a hamburger chain restaurant that is well known by consumers and the nutritional information of the items was obtained from the restaurant's website. All menus contained the same burger choices that were listed in alphabetical order (Big Mac, Cheeseburger, Chicken Burger, and Double Quarter Pounder with cheese) and photographs of the hamburgers. Among the list, Big Mac is representative of a regular item with a medium level of calories and fat content (REG, hereafter). The Cheeseburger is representative of an item with low fat and calorie content (LFLC, hereafter). The fried Chicken Burger is representative of an item with high fat and low-calorie content (HFLC, hereafter). The Double Quarter Pounder with cheese is representative of an item of high fat and calorie

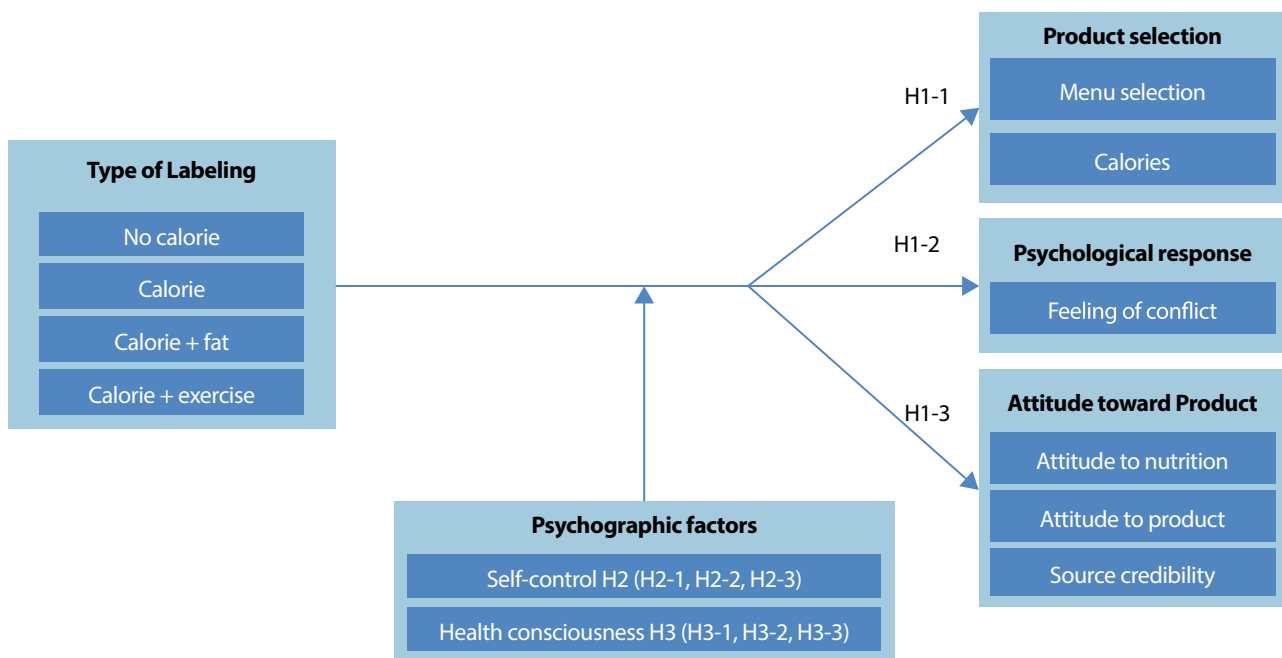


Figure 1. Research model of the study .

content (HFHC, hereafter). The exercise information was calculated based on a calorie burn rate of 12.8 kcal per minute while running (Dowray et al., 2013). The menus used in this study are presented in Appendix 1.

Participants and Procedure

The sample selection was a convenience sample from which the respondents were randomly selected. Participants were college students from a university in South Korea. College students were selected as a sample because it has been reported that they consume fast food meals 1 to 3 times weekly, which means they are more frequent consumers compared to the other groups (Morse & Driskell, 2009) and a number of Korean university students have been conducted on the state of fast food consumption and eating habits (Jang & Oh, 2013; Kim, Kim, & Choi, 2015). The sample size consisted of 120 participants and each group of the study included 30 participants.

The survey included two parts: (1) one of the four menus and the participants were asked to imagine they are going to dine out for lunch and check the food item they would like to order and (2) questions to measure consumers' feeling of conflict and attitude toward product related to the selected menu item. Moreover, it included questions regarding consumers' self-control, health consciousness, demographic information, fast food consumption, and frequency of reading calorie information in fast food restaurants.

Measures

Dependent Variables

The following variables were measured in this study: hamburger selected, calories selected, feeling of conflict, nutrition attitude, attitude toward the product, and source credibility.

Hamburger selected was measured by the hamburger item selected by the participants. The options were the Big Mac, Cheeseburger, Chicken Burger, and Double Quarter Pounder with cheese. Calories selected were assessed by the calories contained in the hamburger selected by the participants from the menu. The energy content of the hamburgers range from 300 to 780 calories.

Feeling of conflict was measured with two items: "When making food choices at this time, I feel a lot of conflict between favoring the healthy food items and taking pleasure in foods and eating" and "When making food choices at this time, I feel a lot of tension between favoring the healthy food items and taking pleasure in foods and eating."

Attitude to nutrition was evaluated with three items: "I think the nutrition level of the selected menu items is (not nutritious/nutritious, unhealthy/healthy, poor/good)".

Attitude to product was measured with three items: "Based on the information shown on the menu, what is your overall attitude toward the selected menu item? (unfavorable/favorable, bad/good, negative/positive)".

Source credibility was examined with three items: "Based on the information provided, I believe the restaurant selling these food products is (untrustworthy/trustworthy, not dependable/dependable, dishonest/honest)". The scales used in both feeling of conflict (Wei & Miao, 2013) and attitude toward product (Burton & Creyer, 2004) consisted of a five-point scale (1 = strongly disagree to 5 = strongly agree).

Moderator Variables

Two moderator variables were evaluated in the study: self-control and health consciousness. Self-control was evaluated with two items: "I am able to easily ignore the short-term rewards of tasty food" and "I tend to indulge more than I should". Health consciousness was measured with four items: "I am very self-conscious about my health," "I am alert to changes in my health," "I am constantly examining my health," and "I am very involved with my health." The scales used in both self-control (Koenigstorfer et al., 2014) and health consciousness (Gould, 1988) consisted of a five-point scale (1 = strongly disagree to 5 = strongly agree) to rate the statements.

Reliability and Validity Analysis

Results obtained from a principal-component analysis using varimax rotation indicated the measure of attitude toward product, feeling of conflict, self-control, and health consciousness captured six distinctive constructs. The analysis produced a six-factor solution (with eigenvalues greater than 1.00) with 72.3% of the total variance in the items (Table 1). Most of the variables' coefficient α exceeded 0.7, which is the minimum standard for reliability.

Statistical Analysis Methods

One-way ANOVA (Analysis of Variance) was carried out to verify the Hypothesis 1. The type of labeling (no calorie information, calorie information, calorie+fat information, and calorie+exercise information) was included as an independent variable. Participants' calories selected, feeling of conflict, attitude toward product (attitude to nutrition, attitude to product, and source credibility) were dependent variables. Two-way ANOVA was carried out to evaluate the Hypotheses 2 and 3; interaction effects between the type of labeling and the moderator variables (self-control and health consciousness).

To test moderating effects of self-control and health consciousness, the participants were divided into two groups using

Table 1. Validity and reliability analysis of the measurement items

Construct Item	Factor						Cronbach alpha
	1	2	3	4	5	6	
Nutrition attitude							
Not nutritious-nutritious				.84			.70
Unhealthy-healthy				.75			
Poor-good				.66			
Attitude toward the product							
Unfavorable-favorable			.79				.82
Bad-good			.85				
Negative-positive			.84				
Source credibility							
Untrustworthy-trustworthy		.91					.90
Not dependable-dependable		.91					
Dishonest-honest		.84					
Feeling of conflict							
Conflict ^a					.88		.89
Tension ^b					.90		
Self-control							
I am able to easily ignore the short-term rewards of tasty food. ^c						.63	.90
I tend to indulge more than I should.						.64	
Health consciousness							
I am very self-conscious about my health.	.81						.81
I am alert to changes in my health.	.79						
I am constantly examining my health.	.69						
I am very involved with my health.	.82						

Note. Items with loadings of less than 0.40 not shown.

^a When making food choices at this time, I feel a lot of conflict between favoring the healthy food items and taking pleasure in foods and eating.

^b When making food choices at this time, I feel a lot of tension between favoring the healthy food items and taking pleasure in foods and eating.

^c Items reverse scored.

median split, respectively. The high (59 participants) and low (61 participants) self-control groups were split by the median value of 2.5, and the high (56 participants) and low (64 participants) health consciousness groups were split by the median value of 3.0.

Results

Characteristics of the Sample

The gender composition of the sample was 50.8% male and 49.2% female (mean age = 22.6 ± 2.2 years). The majority of the participants indicated eating once a month in fast food restaurants (35.0%), 69.2% eat lunch when they dine out, and 65.0% usually order a hamburger. Around 76.7% of the participants indicated that taste has a great influence when selecting fast food meals and 40.0% seldom read the calorie counts posted on the menus.

Additional analysis was carried out to evaluate demographic information across the four groups. There were not significant

differences as determined by Pearson's chi-square in gender ($\chi^2(3) = 0.90, p = .82$), frequency of eating fast food ($\chi^2(9) = 9.98, p = .35$), and the meal often done in fast food restaurants ($\chi^2(6) = 5.07, p = .53$). Moreover, there were not statistically significant differences in the often selected food item ($\chi^2(9) = 7.00, p = .63$), the most important factor when selecting fast food ($\chi^2(12) = 12.76, p = .38$), and the frequency of reading calorie information ($\chi^2(9) = 3.14, p = .95$). Additionally, there were not significant differences in age as determined by ANOVA test ($F(3,116) = 10.29, p = .58$).

Effect of Type of Labeling

On Product Selection

A Pearson's chi-square test was performed to examine the relation between the type of labeling and hamburger selected. The relation between these variables was statistically significant ($\chi^2(9, N = 120) = 18.97, p = .02$). The participants selected HFLC item (36%) given Labcalexe while selecting REG item given the

rest of information, Labno (50%), Labcal (50%), and Labcalfat (66%). The hamburger selected (percentage) by type of labeling is shown in Figure 2.

There were statistically significant differences in calories selected across type of labeling ($F(3, 116) = 3.67, p = .01$) (Table 2). As determined by Tukey post hoc, the number of calories were lower in Labcal (489.00 ± 134.89 calories), and Labcalfat (506.00

± 112.82 calories) compared to the Labno (603.00 ± 150.72 calories). There were no significant differences in the other groups. Based on the findings, hypothesis 1-1 was supported. The calories selected (mean) by type of labeling is shown in Figure 2.

On Feeling of Conflict

There were statistically significant differences in feeling of conflict

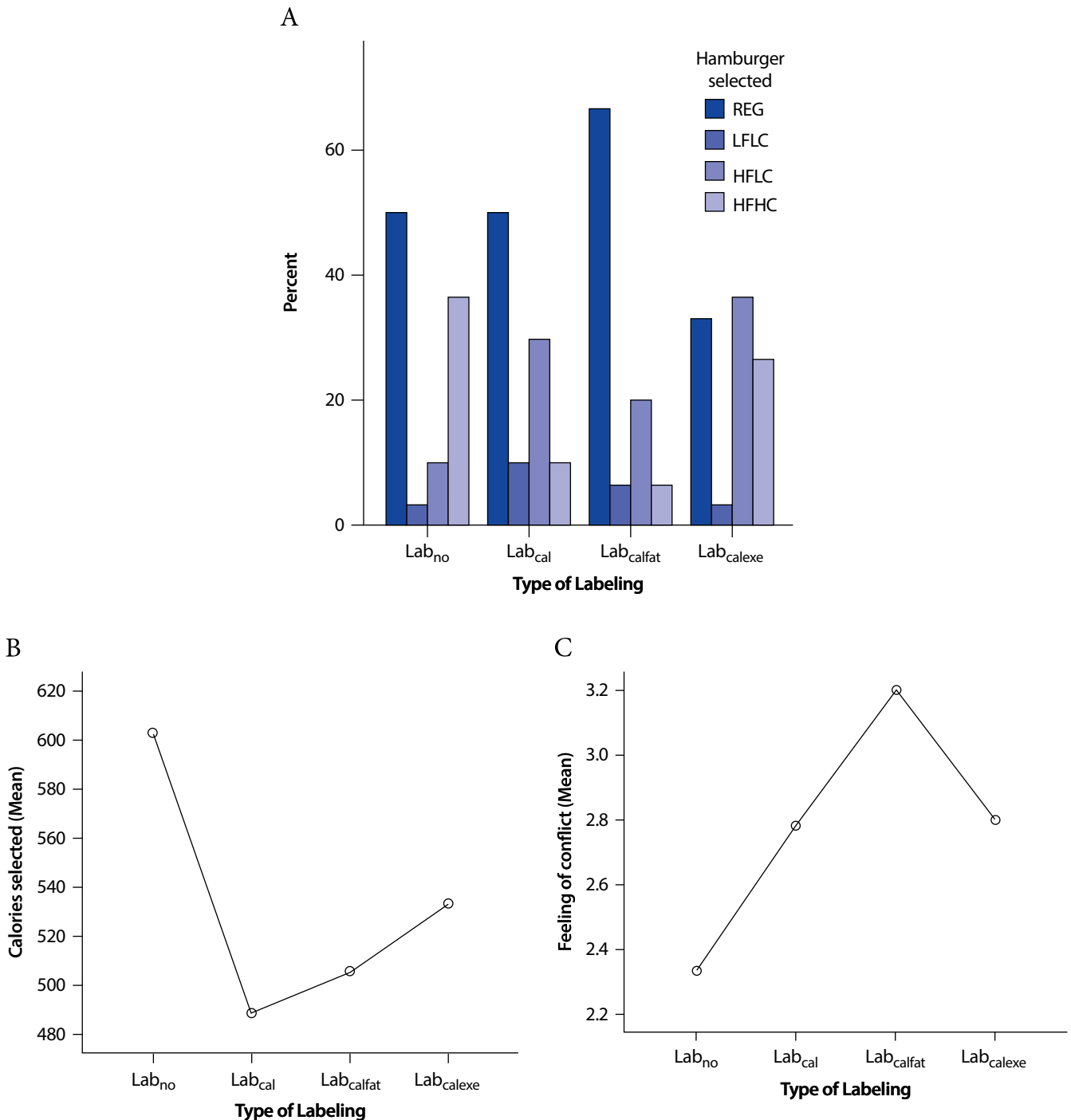


Figure 2. Hamburger selected (A), calories selected (B), and feeling of conflict (C) across labeling groups.

Table 2. Mean values of calories selected and feeling of conflict among different labeling groups

Type of labeling	N	Calories		Feeling of conflict	
		Mean	SD	Mean	SD
No calorie information	30	603.00 ^a	150.72	2.33 ^{bcd}	1.01
Calorie information	30	489.00 ^{bcd}	134.89	2.78 ^{abc}	1.20
Calorie + fat information	30	506.00 ^c	112.82	3.20 ^a	1.04
Calorie + exercise information	30	533.67 ^{abc}	169.69	2.80 ^{ab}	1.11

Note. Means with different letters differ significantly at $p < 0.05$ as measured by Tukey post hoc tests ($a > b > c > d$). SD, standard deviation.

scores across type of labeling ($F(3, 116) = 3.12, p = .02$) (Table 2). As determined by Tukey post hoc, feeling of conflict was higher in Labcalfat (3.20 ± 1.04) compared to Labno (2.33 ± 1.01). There were no statistically significant differences in the other groups. The feeling of conflict (mean) by type of labeling is shown in Figure 2. Based on the findings, hypothesis 1-2 was supported.

On Attitude toward Product

There were no statistically significant differences in attitude to nutrition ($F(3, 116) = .71, p = .54$), attitude to product ($F(3, 116) = 1.15, p = .32$), and source credibility ($F(3, 116) = 0.64, p = .59$) across type of labeling. Therefore, hypothesis 1-3 was not supported.

Moderating Influence of Self-Control

On the Relationship between Type of Labeling and Product Selection

The impact of the type of labeling on product selection varied by the level of self-control. For the high self-control group there was a difference on hamburger selected ($\chi^2(9) = 36.80, p < .001$) while for the low self-control group, the type of labeling did not make any difference ($\chi^2(9) = 8.76, p = .45$). The high self-control group selected HFLC item given Labcal (50%) and Labcalexe (47%) while selecting REG item given Labcalfat (81%). However, the HFHC item was most selected in Labno (66.6%). There were not differences in low self-control group. The hamburger selected by type of labeling and self-control group is shown in Figure 3.

There was a statistically significant interaction on calories selected ($F(3, 112) = 4.52, p < .001$). The high self-control group selected fewer calories than the low self-control group in all the types of labeling except in the Labno. The greatest difference on calories selected was observed in Labno, where low self-control selected fewer calories (538.33 ± 136.56 calories) compared to the high self-control group (700.00 ± 118.16 calories). Regarding low self-control group, they selected fewer calories when given Labcalfat. The calories selected by type of labeling and self-control group are shown in Figure 4. Based on the findings,

hypothesis 2-1 was supported.

On the Relationship between Type of Labeling and Feeling of Conflict

There was no statistically significant interaction on feeling of conflict ($F(3, 112) = 1.29, p = .28$). Therefore, hypothesis 2-2 was not supported.

On the Relationship between Type of Labeling and Attitude toward Product

There were no statistically significant differences in attitude to nutrition ($F(3, 112) = 0.52, p = .66$), attitude to product ($F(3, 112) = 2.46, p = .06$), and source credibility ($F(3, 112) = 0.39, p = .76$) across type of labeling. Therefore, hypothesis 2-3 was not supported.

Moderating Influence of Health Consciousness

On the Relationship between Type of Labeling and On Product Selection

There was no significant interaction on hamburger selected by high health consciousness group ($\chi^2(9, N = 56) = 10.24, p = .33$) and low health consciousness group ($\chi^2(9, N = 64) = 13.92, p = .12$). As for calories selected, there was no statistically significant interaction ($F(3, 112) = 1.85, p = .14$). Based on the results, hypothesis 3-1 was not supported.

On the Relationship between Type of Labeling and On Feeling of Conflict

There was no statistically significant interaction on feeling of conflict ($F(3, 112) = 0.62, p = .59$). Based on the results, hypothesis 3-2 was not supported.

On the Relationship between Type of Labeling and On Attitude toward Product

There was a statistically significant interaction on source credibility ($F(3, 112) = 3.05, p = .03$). The high health consciousness group had a higher perceived source credibility given Labno ($3.36 \pm .79$), Labcalfat ($3.68 \pm .96$), and Labcalexe ($3.47 \pm .77$) compared to the low health consciousness group. On the other

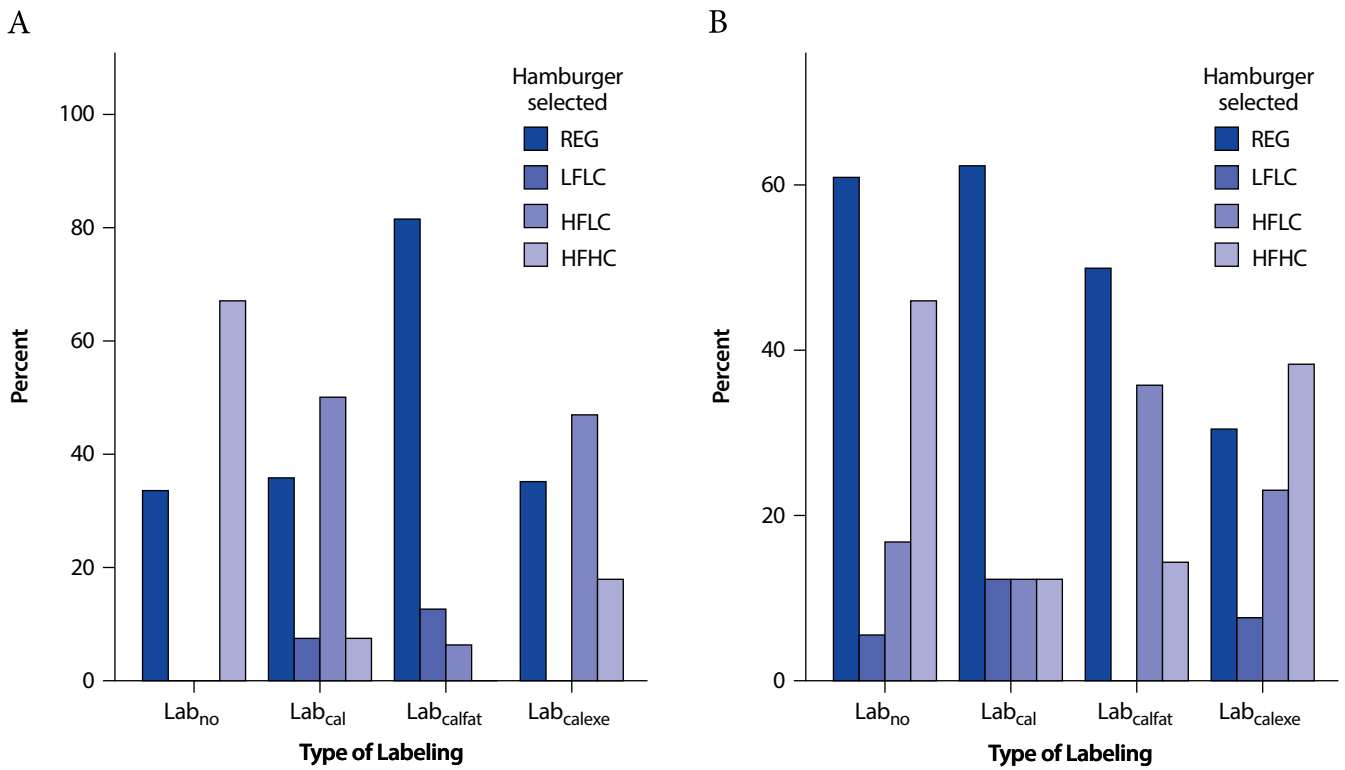


Figure 3. Relationship between high self-control (A), low self-control (B) and type of labeling on hamburger selected (percentage).

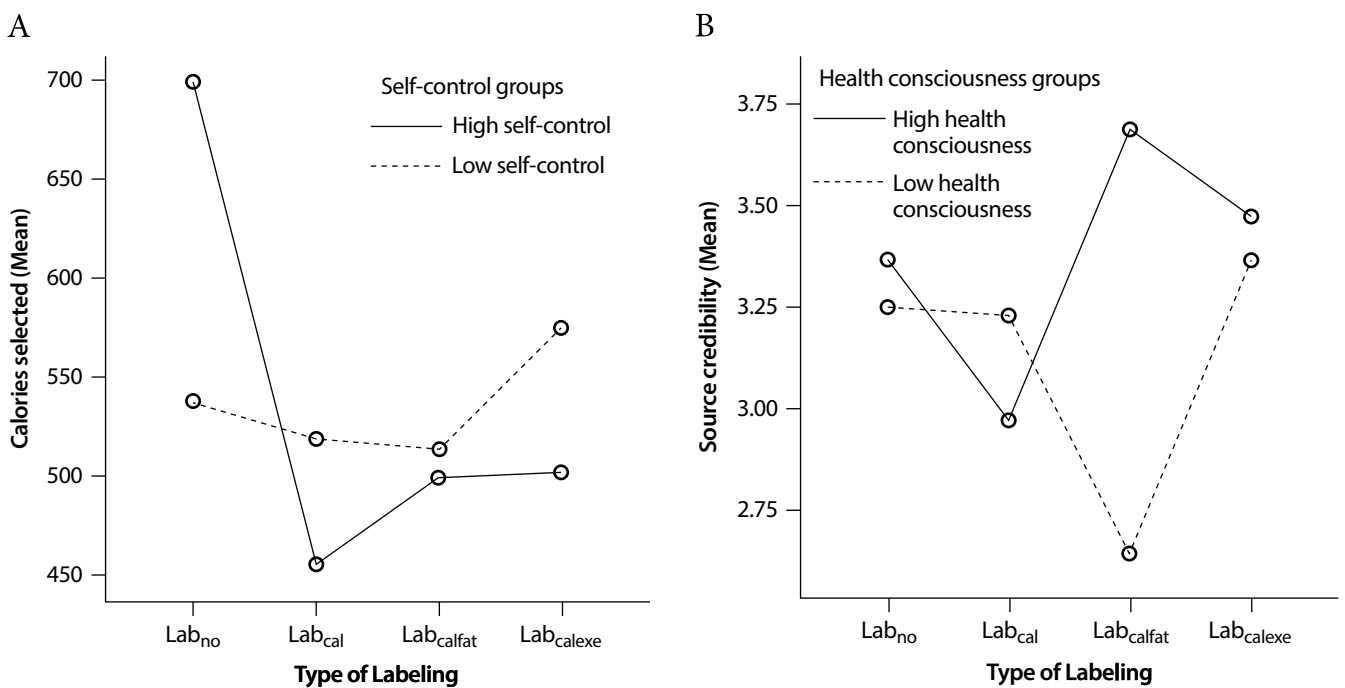


Figure 4. Relationship between self-control (A), health consciousness (B) and type of labeling on hamburger selected (percentage).

hand, low health consciousness group had higher source credibility given Lab_{cal} ($3.22 \pm .88$) compared to the high health consciousness group. The greatest difference observed between

health consciousness groups was in Lab_{calfat} where high health-consciousness group had a higher perceived source credibility ($3.68 \pm .95$) compared to the low health consciousness

group ($2.64 \pm .91$). The source credibility by type of labeling and health consciousness group is shown in Figure 4. There were no statistically significant differences in attitude to nutrition ($F(3, 112) = 0.62, p = .59$) and attitude to product ($F(3, 112) = 1.28, p = .28$). Based on the findings, the hypothesis 3-3 was partially supported.

Discussion

Influence of Different Types of Menu Labeling on Consumers' Food Selection

The findings support the proposition about the impact of different types of menu labeling on consumers' food selection. More specifically, the display of calorie and fat information resulted in the selection of a REG item and decreased the selection of HFHC item compared to the no information labeling. Nonetheless, when exercise information was presented, more participants selected the HFLC item. Furthermore, an impact on calories selected was also observed. In particular, when calorie and fat information was provided, participants selected fewer calories than when no information was displayed. An explanation of these findings is that consumers without nutritional information are poor estimators of the actual calorie and fat content of food, resulting in less optimal food choices (Burton, Creyer, Kees, & Huggins, 2006). Therefore, the display of the nutritional information helped them to make an informed choice and reduced the selection of high-calorie hamburgers. These findings are consistent with those observed by Stran et al. (2016) where college students ordered fewer calories of fast food meals when were exposed to a menu with calorie information compared to a menu without information. Moreover, Regarding exercise information, the presented results are opposite to those observed by Antonelli and Viera (2015) where participants selected fewer calories when were given a menu with calorie and minutes to walk compared to the menu with no calorie or only calorie information.

Influence of Different Types of Menu Labeling on Consumers' Feeling of Conflict

Participants experienced a higher feeling of conflict when they were given a menu with calorie and fat information. Based on the expectancy disconfirmation theory, participants exposed to this type of information had a negative disconfirmation of the calorie and fat levels of the product; that is to say, the display of calorie and fat content was less favorable than consumers' expectations. This disconfirmation resulted in a competition between the desire to eat the hamburger and the perceived negative outcomes (e.g., gain weight). These findings contradict the ones showed by Wei and Miao (2013), where participants

exposed to calorie information, experienced a lower feeling of conflict in a perceived unhealthful restaurant (e.g., McDonald's) compared to the participants without calorie information.

Moderating Effect of Self-control on the Relationship between Type of Menu Labeling and Consumers' Food Selection and Attitude toward Product

Self-control and health consciousness moderated the relationship between the type of labeling and consumers' food selection and attitude toward product. In relation to the item selected, high self-control participants were more responsive to the display of nutritional information, specifically, calorie and exercise information. The display of this type of information resulted in the selection of HFLC item compared to the other types of labeling with nutritional information, where the REG item was selected more often. This type of labeling helped them select low-calorie items but no low fat items. However, when no information was given, the HFHC item was selected more. Likewise, there was a significant difference in calories selected by self-control groups. The high self-control participants were more responsive to the provision of nutritional information. When they were given information, they selected fewer calories than the low self-control participants did. Nonetheless, when they did not receive information, they selected a greater number of calories than the low-self-control participants did. In the low self-control group, the type of labeling that helped them select a lower number of calories was the calorie and fat information. Previous research has indicated that high self-control people are associated with healthy eating habits like having breakfast and avoiding sweets compared to the low self-control people (Junger & Van Kampen, 2010). This is because this type of consumers may be more willing to process and use the nutritional information when it is presented. Consequently, when fat or exercise information with calorie was provided, the participants selected low-calorie menu items.

Moderating Effect of Health Consciousness on the Relationship between Type of Menu Labeling and Consumers' Food Selection and Attitude toward Product

As for health consciousness, the different types of menu labeling influenced both high and low health-conscious participants but in a different way. As mentioned previously, health-conscious consumers engage in healthy behaviors, such as consuming healthy food, controlling their calorie and fat intake as well as spending time reading nutrition labels (Ellison et al., 2013). Mai and Hoffmann (2012) indicated that health-conscious consumers make their food choices based on health-related features (e.g., fat content and nutrition labeling), while those who

are less health-conscious are mainly guided by other attributes that are unrelated to health (e.g., taste and price). The findings showed that low health-conscious participants were more responsive to only calorie information because when this type of labeling was provided, a higher perceived source credibility was observed. In contrast, the provision of calorie, fat and exercise information increased the perception of source credibility in high health-conscious consumers. Based on the ELM, we can deduce that high health-conscious consumers use the central route to process the nutritional information. They are engaged in a careful and systematic thinking of the information. Since this type of consumers has high involvement, they preferred the detailed information. Therefore, fat content may be relevant information when evaluating a product and exercise information may be a familiar term for them because usually, they have a healthy lifestyle that includes physical activities. For this reason, the labeling with fat and exercise information resulted in a more positive attitude toward product. On the other hand, the low health-conscious consumers may have low motivation to process the nutritional information, so they use the peripheral route to process the information. Because of their low involvement, they preferred clear or easy information. Therefore, the display of only calorie information resulted in a more favorable attitude toward product by this type of consumers. Nonetheless, the provision of exercise information did not influence their evaluation. This could be because exercise information requires the ability or knowledge to convert the energy value of the menu item to exercise.

As for source credibility, the reliability toward the information source influences the acceptance of the message. If source credibility is low, the consumer will not consider the presented information (Grewal, Gotlieb, & Marmostein, 1994; McCarthy, de Boer, O'Reilly, & Cotter, 2003). The findings of this study implied that high health-conscious participants rated higher the source credibility in the menu with fat information than the low health-conscious participants because health-conscious consumers feel more appeal toward health-related information when they are selecting food, as mentioned previously. The findings of the present research were consistent with those observed by Hwang and Lorenzen (2008). In the study, participants perceived menus with calorie, macronutrient, and fat information as more effective and more credible to the source.

Implications

Findings of this research contribute to new theoretical insights about the influence of menu labeling on consumers' behavior. Previous studies of menu labeling only focused on the comparison between calorie and another type of information, such as fat

or exercise, independently. However, the current study provides a more inclusive approach to compare the calorie information and its combination with different types of information. The findings support the idea that integrating calorie information with the other types of information on the menu could help consumers in selecting low-calorie items. Moreover, the impact of including the other types of information is not only limited to food selection, but also to attitude toward product and consumers' psychological response (i.e., feeling of conflict). Importantly, this study also contributes to the literature about how the provision of different types of information varies depending on certain psychographic factors (i.e., self-control and health consciousness). As suggested by the ELM, consumers respond differently to information depending on their individuals' characteristics. There are consumers who are willing to dedicate a great cognitive energy to information while others do not have the personal involvement or motivation to consider that information. The research findings indicate that consumers' level of self-control and health-consciousness are related to the motivation or ability of the consumers to process and consider information when making food choices. These results are meaningful because they can help to understand how consumers' psychology may determine the effectiveness of menu labeling on people's behavior.

This study also provides several practical implications. For public policy makers, these findings imply that the display of calories with other types of information results in low-calorie food selection. Moreover, the display of different types of nutritional information or formats of menu labeling may lead to the selection of not only low-calorie items but also low-fat items. The consumers' low-calorie or low-fat food selection may help in reducing the incidence of obesity in the population. Furthermore, the feeling of conflict is higher when nutritional information is included on the menu, especially fat information. This increase of conflict could make consumers more conscious and take into account nutritional information when making food choices. In addition, it is also important to differentiate the type of consumers in terms of self-control and health-consciousness because the effect of menu labeling may be different for each type of consumers. The findings suggested that menu labeling should include calorie with fat and exercise information in order to influence the various types of population. Therefore, it is important to customize the information targeting different segments of people.

For consumers, the display of different types of nutritional information on the menu could benefit both high self-control and high health-conscious consumers as well as low self-control and low health-conscious consumers. High self-control and

high health-conscious consumers are more likely to monitor their calorie/fat intake and read the nutritional information so the addition of fat and exercise information on the menu could help them choose low-calorie and low-fat items. For low self-control and low health-conscious consumers, the display of nutritional information, specifically calorie and fat information, could help them to take into account this information when selecting a menu item. Consequently, this may result in a more conscious and healthier food choice. Additionally, the disclosure of nutritional information, especially fat information, could help consumers to be aware of the nutritional composition of the menu items and make more informed food choices because of their association with health conditions like obesity, heart disease, and diabetes (Burton et al., 2009).

For restaurant managers, the findings suggest that adding calorie with other types of information on the menu results in higher purchase intentions and perceived source credibility, even in the low health-conscious consumers. These findings are important for restaurateurs because customer confidence in an establishment could lead to positive outcomes (e.g., favorable attitude toward product). Therefore, the disclosure of nutritional information on the menus could attract more consumers, especially those who care about their health. Furthermore, restaurant managers need to identify the different type of consumers (e.g., health-conscious consumers) in order to meet their demands. For example, they could offer low-calorie and low-fat menu items by elaborating better marketing strategies that emphasize healthy food alternatives through menu labeling as a balance between healthy and unhealthy foods.

For policy makers, the presentation of food nutrition information as a guide for people to choose healthy foods in the future is very important, and it is believed that this could ultimately serve as an important basis for establishing food policies in terms of improving national health.

Limitations

Although the research provides several implications, it also has some limitations. The first limitation is that the study measured hypothetical rather than real food choices. Secondly, despite consumers' familiarity with the chain restaurant, the study used only one type of restaurant menu to evaluate the relation between type of labeling and food selection. Therefore, the results cannot be generalized to other types of restaurants. Third, although college students were appropriate as a sample because they eat regularly fast food, the generalizability of these findings to other age groups is limited. Therefore, future research may use another type of sample to test the influence of different types of labeling on food selection. For instance, future research

can include teenagers who are more important as a target market for fast food business. Also future studies can include other critical nutrient elements for health.

In addition, future studies should include the measure of exercise behavior. This measure could examine if there is a relationship between the use of exercise information and exercise behavior. Also, different types of menu labeling should be evaluated using other kinds of restaurants (e.g., cafeterias and fine dining restaurants) in real-world settings. Finally, more research is also necessary to evaluate how the display of nutritional information on the menu might affect the restaurant profitability.

Conclusion

In conclusion, the provision of different types of information on the menu is necessary for both consumers and restaurant managers. In the case of consumers, the disclosure of nutritional information could help them select healthier restaurant meals based on critical evaluations. For restaurant managers, proving nutritional information could draw favorable consumers' attitude toward product. As suggested by Fernandes et al. (2015), menu labeling is a potential method to educate consumers about the nutritional content of foods and it could also help consumers who already consider calories in their food intake because it may encourage consumers to select healthier away-from-home food choices. However, the display of calorie information alone on the menu may not be enough to influence food selection and evaluation. Therefore, the inclusion of more types of nutritional information on the menu or change the way the information is presented may have a greater influence in food selection and evaluation. In particular, this may depend on the customer's psychological factors such as self-regulation capability or health awareness, so it will be necessary to identify the correct target customer base and make different menu presentation methods accordingly.

Furthermore, it is important to provide nutrition education to the population, especially to children, teenagers, and young adults because the food habits that are developed during these life stages will persist into adulthood. Nutrition education may increase consumers' motivation to incorporate healthy eating habits into their life and consequently increase the use of menu labeling, which could result in healthier food choices.

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Appendix

Appendix 1. Different types of menu

Menu A: no calorie information			
	Photo	Name	
1. <input type="checkbox"/>		Big Mac	
2. <input type="checkbox"/>		Cheeseburger	
3. <input type="checkbox"/>		Chicken Burger	
4. <input type="checkbox"/>		Double Quarter Pounder with Cheese	

Menu B: calorie information			
	Photo	Name	Calories
1. <input type="checkbox"/>		Big Mac	540 calories
2. <input type="checkbox"/>		Cheeseburger	300 calories
3. <input type="checkbox"/>		Chicken Burger	370 calories
4. <input type="checkbox"/>		Double Quarter Pounder with Cheese	780 calories

Menu C: calorie and fat information			
	Photo	Name	Calories and fat information
1. <input type="checkbox"/>		Big Mac	540 calories Fat 28 g Sat Fat 10 g CHOL 80 mg
2. <input type="checkbox"/>		Cheeseburger	300 calories Fat 12 g Sat Fat 6 g CHOL 40 mg
3. <input type="checkbox"/>		Chicken Burger	370 calories Fat 17 g Sat Fat 3.5 g CHOL 40 mg
4. <input type="checkbox"/>		Double Quarter Pounder with Cheese	780 calories Fat 45 g Sat Fat 21 g CHOL 175 mg

Menu D: calorie and exercise information			
	Photo	Name	Calories and running information
1. <input type="checkbox"/>		Big Mac	540 calories 42 min running
2. <input type="checkbox"/>		Cheeseburger	300 calories 23 min running
3. <input type="checkbox"/>		Chicken Burger	370 calories 28 min running
4. <input type="checkbox"/>		Double Quarter Pounder with Cheese	780 calories 60 min running