

The Effects Of Menu Calorie Labeling On Consumer Food Choice Behavior

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ABSTRACT

Recent federal legislation mandating chain restaurants to disclose the number of calories in menu items was introduced in the hopes of influencing consumers to make more healthful food choices when eating out. However, many studies on the impact of including calorie labeling on restaurant menus and menu boards have relied on questionable methodologies, yielding inconsistent results and leaving unanswered the question of whether calorie information on menus indeed impacts food selection. In an effort to provide more definitive data, the present study employed a controlled posttest-only experimental design with random assignment. Students assigned to the control group ordered a meal from a typical fast-food menu board that did not display any calorie information, while students assigned to the experimental treatment group ordered from an identical menu board, with the exception that calorie information was displayed for each item. The results demonstrated that the display of calorie information did not cause members of the experimental treatment group to order items bearing significantly fewer calories than those ordered by the control group. Thus, contrary to the results of many previous studies, the present study strongly indicated that the presence of calorie labeling does not have a significant impact on consumer choices in fast-food restaurants. While studies have shown that consumers are strongly in favor of the inclusion of calorie information on menus, this study provides evidence that some further or alternative intervention is needed before such calorie information can translate into healthier food choice behavior.

Keywords: Calorie Labeling; Menu Labeling; Calorie Information; Nutrition Labeling

INTRODUCTION

The issue of calorie labeling on menus and menu boards has moved into center stage now that the federal guidelines requiring such labeling, known officially as “Nutrition Labeling of Standard Menu Items in Restaurants and Similar Retail Food Establishments,” were submitted by the FDA in early April of 2014, and are expected to be published by the end of 2014. The publication of these guidelines was originally mandated by a provision of the 2010 Patient Protection and Affordable Care Act (Stein, 2010) in an effort to combat the serious problem of overweight and obesity that is increasingly prevalent in the U.S. population.

This federal legislation requires restaurants that are part of a chain of 20 or more locations doing business under the same trade name to display the number of calories in each serving of food appearing on the menu board. The law was enacted as a public policy initiative designed to help consumers make healthier restaurant food choices. There is, in fact, a great deal of consumer support for the concept of menu calorie labeling. Indeed, in a 2008 study conducted by Caravan Opinion Research Corp., 78% of the respondents agreed with the following statement: “Fast-food and other chain restaurants should list nutritional information, such as calories, fat, sugar, or salt content on menus and menu boards.” In a related context, consumers overwhelmingly report making use of nutritional labeling (including calorie labeling) when purchasing food items (Govindasamy & Italia, 2011). Nevertheless, the existing research leaves many questions unanswered regarding the actual effectiveness of menu calorie labeling in promoting lower-calorie choices.

Even before the federal legislation took effect, many jurisdictions around the U.S. had already mandated calorie labeling of menus and menu boards. A number of important observational studies conducted in the past few

years, which will be reviewed here, relied on samples from such jurisdictions, observed before and after the new regulations were implemented, and sometimes compared with samples from jurisdictions where such legislation had not been introduced. Other studies were carried out in laboratory settings, using experimental and quasi-experimental designs. In the review of these studies which follows, the results and the limitations of the relevant studies will be examined.

As a group, the relevant studies have produced mixed results, with some providing support for, and others against, the notion that menu labeling is an effective initiative for increasing healthier food choices by consumers. Among the studies that found a lack of impact for the display of calorie information were two observational studies conducted by Vadiveloo and Elbel. The authors found that adolescents did not differ in the number of calories purchased before calorie labeling on menu boards was implemented versus after it was implemented in a sample of NYC restaurants (Vadiveloo et al., 2011). A similar lack of change was observed at the same points in time in a comparison group in Newark where calorie labels were not introduced and the number of calories purchased at similar restaurants was tracked. A companion study of adults (Elbel et al., 2011) in NYC and Newark produced analogous results; that is, no differences emerged between pretest and posttest measures, whether or not calorie labeling was introduced. In addition, none of the subgroup comparisons showed any differential impact for calorie labeling.

Another observational study, which also measured mean calories purchased before and then nine months after calorie labeling was introduced to 11 chain restaurants in NYC, found no change in the mean number of calories purchased overall (Dumanovsky et al., 2011). When the data for each chain was examined separately, a significant reduction in calories purchased did emerge for three of the chains (McDonald's, Au Bon Pain, and KFC), but no significant difference was observed for seven other chains (Burger King, Wendy's, Popeye's, Domino's, Pizza Hut, Papa John's, and Taco Bell), and an increase in calories purchased was found for one of the chains (Subway).

In a laboratory study that implemented an experimental design, no significant impact for calorie labeling was found among the four menu labeling conditions (Harnack et al., 2008). Study participants were gathered in a hotel conference room and a church basement, and were randomly assigned to one of four conditions: a menu with calorie labels and value pricing, a menu with calorie labels and no value pricing, a menu without calorie labels and with value pricing, and a menu without calorie labels and no value pricing. Participants ordered from the menu they were given, and calories ordered for each group were calculated. The analysis found no significant differences in calories ordered among the four menu labeling conditions. Some earlier studies found that although consumers welcomed the idea of nutrition information being displayed at fast-food restaurants, they reported they would nevertheless not take nutrition information into account when selecting food (Lando & Labiner-Wolfe, 2007; Mills & Thomas, 2008).

A recent laboratory study in Taiwan used mock restaurant menus to examine the effects among college students of quantitative versus qualitative nutrition information toward the menu and restaurant dining intentions (Sun, 2013). The quantitative information (which included calorie counts and percentage of fat, protein, and carbohydrates) did *not* produce a significant effect on dining choices, and actually trended in the direction of a negative influence. The qualitative information (describing ingredients and important nutrients such as vitamins contained in the menu item) did produce a significant positive impact towards healthier choices. A significant 3-way interactive effect also emerged for quantitative nutrition information with qualitative nutrition information and psychosocial factors (measured by knowledge, motivation, and taste preferences, all with regard to vegetables).

Another recent study, which used random assignment to three different menu conditions, also failed to show a significant impact for the presence of calorie labeling on the caloric content of food ordered or consumed. Interestingly, though, diners that received menus which listed the amount of brisk walking needed to work off each dish (but did not list the calorie counts) ordered and also consumed meals with significantly fewer calories than diners who received menus with calorie information or menus with no health information (James et al., 2014).

In contrast to the studies above, several studies did find some impact for the display of calorie labels. However, most of them had serious methodological shortcomings, calling into question the validity of their results.

In one such study, adolescents were instructed to order a meal from a fast food restaurant menu (Yamamoto et al., 2010). After doing so, they were informed of the number of calories in their selections, and given the chance to change their order. Of the 30% percent of them who changed their order, 80% selected a lower calorie meal.

Similarly, participants in the Balfour et al. study (1996) were asked to place their order (this time in an actual cafeteria), and were then shown the calorie count for their meal selection. When offered the chance to change their order, 16% of participants changed their meal to one with reduced calories. Both the Yamamoto and Balfour studies suffer from similar, serious shortcomings. In both cases, the aim of the experimental treatment was apparent to the study participants, so social desirability bias together with the interactive testing effect likely played strong roles, confounding the experimental treatment and calling into question the validity of the results.

A large observational study examined data from over 7000 participants purchasing food in 167 different chain-type fast food restaurants, and compared their purchasing behavior with purchasers at 47 Subway restaurants, where at that time, calorie counts were prominently displayed on the menu board (Bassett et al., 2008). (While the other chains did make calorie information available publically, such as on placemats, or on the internet, they did not display the information prominently on the menu board.). The Subway patrons purchased meals with significantly fewer calories. Furthermore, the Subway customers that reported seeing the calorie information on the menu purchased 52% fewer calories than those Subway patrons that reported they hadn't noticed the calorie information. However, this study suffers from serious design deficiencies, most notably, that the study participants were not randomly assigned to their groups. That is, the Subway vs. non-Subway patrons formed two self-selected groups that were not randomly equivalent at the outset. Subway tends to attract patrons looking for low-calorie options to begin with, a factor that would introduce a great deal of self-selection bias into the study and could account for the difference between the two groups. Self-selection bias could also account for the difference found among only Subway patrons, since those more interested in restricting their caloric intake would be more likely to take note of the calories displayed on the menu.

Another study that found a significant effect for calorie labeling also suffered from a serious shortcoming. In a randomized controlled trial which took place in a laboratory setting, each participant was randomly assigned to one of three menu-type conditions: a menu with no calorie labels, a menu with calorie labels, and a menu with calorie labels accompanied by a statement that the recommended daily caloric intake is 2000 calories (Roberto et al., 2010). A significant effect was found for menu type. Also, significant differences were found between the label and no label conditions, as well as between the no label condition and the condition of label + daily intake statement. Specifically, the results showed that participants in the two groups with calorie labels ordered 14% fewer calories than the group with no calorie labels. This study was successful in avoiding the self-selection bias which plagued most of the other studies. However, other researchers have noted the unusually high average number of calories ordered when compared with previous studies, and have therefore questioned the validity of the study and the credibility of the methods used (Swartz et al., 2011).

In a study based on sales data provided by a college dining hall, the authors (Chu et al., 2009) calculated the average number of calories per sale before the treatment period, when no calorie labeling was used, versus during the treatment period when calorie labeling was instituted. A statistically significant difference was found. However, the average reduction in calories purchased was a mere 12.4 calories, so the clinical significance of the change could be negligible.

In another study conducted at a cafeteria-style restaurant on a university campus, food purchases were recorded during two time periods of two weeks each (Cranage et al., 2005). In the first time period, no calorie information was presented. In the following two weeks, however, the calorie count and nutrition information was prominently displayed on a laminated card next to each food item. When the calorie counts were displayed, the percentage of higher fat, higher calorie foods selected dropped significantly. This study seemed to offer support for the impact of nutrition (including calorie) labeling in restaurants.

Two studies suggested a possible interaction between gender and calorie labeling. One of the studies (McCullum & Achterberg, 1997) found that females were more likely than males to use nutritional claims when purchasing packaged food, and to report that nutritional information affected their food choices, whereas males

relied more on package appearance and size when selecting food items. Similarly, a 2005 study by Conklin, conducted in a college dining facility, found that females were more likely to use nutrition information labels to identify and select lower calorie and lower fat foods (whereas males used nutrition information to select foods with higher levels of protein).

Given the mixed results of previous studies, the current study was undertaken to examine the impact of calorie labeling on menu boards in fast food restaurants, by using a causal research design that avoided the self-selection bias as well as the confounding factors present in previous studies. Specifically, subjects were randomly assigned to their groups, the purpose of the experimental treatment was concealed from the study participants, and their attention was not artificially drawn to the experimental treatment. Based on some previous studies mentioned above, we expected to find an effect for gender, with females more influenced by the calorie labels than males. In addition, the current study was designed to respond to a call by Swartz et al. (2011) for research examining whether lifestyle variables (e.g., dieters vs. non-dieters) mediate the impact of menu calorie labeling on consumer food choices.

METHODOLOGY

The present study employed a Posttest-only with control group causal design. The subjects were undergraduate students at a small private college located in the state of New York. The sample consisted of 38 male (42.2%) and 52 female (57.8%) students between the ages of 18 and 22 in a mix of undergraduate liberal arts and science classes as well as business classes.

Each student received a questionnaire to complete. The first page of the questionnaire was a consent form, approved by the college institutional review board, which emphasized that participation in the study was both anonymous and voluntary. The second page of the questionnaire presented respondents with a mock generic fast-food restaurant menu board which deliberately excluded any reference to any specific brand of fast-food restaurant. The menu board pictured a variety of typical menu items including but not limited to: hamburgers, double cheeseburgers, chicken sandwiches, salads, French fries, and regular and diet soda. The questionnaire then instructed respondents to record their order for a meal for themselves from the menu board.

There were two versions of the questionnaire. In the control version, the page of the questionnaire picturing the menu board did not include any calorie information. By contrast, the experimental treatment version of the questionnaire displayed the calories of each menu item next to its picture on the menu board, in compliance with New York Health Code 81.50. Students received either the control version or the experimental treatment version on a random basis; they were unaware of the existence of two different versions.

The final two pages asked the respondents about a variety of their attitudes and behaviors, measured on a 5-point Likert Scale with the following categories: strongly agree, agree, uncertain, disagree, and strongly disagree. Several questions were also included about the respondents' exercising, dieting, and typical eating behaviors.

The meals that the respondents selected from the menu board with intent to purchase were entered into a database, and calories for each meal ordered were calculated, taking into account the size ordered, and adjusted based on patrons' requests for extras or customizations. Those respondents who did not specify a size with their particular meal were assigned that category's lowest caloric value.

RESULTS

The overall number of calories ordered by the members of the control group (from a menu board that did not display calorie labels) was compared with the overall number of calories ordered by the experimental treatment group (from a menu board that *did* display calorie information). No significant difference between the two groups emerged in number of calories ordered. Although the mean number of calories ordered by the control group (894.67) exceeded that of the experimental treatment group (862.20), the difference, nevertheless, did not prove to be significant ($F(1,88) = .174, p > .05$).

When gender was examined, no significant effect emerged either. The mean number of calories ordered by men in the control group was 1102.21, and in the experimental treatment group, 1041.84. Among females, the mean number of calories ordered was 743.00 in the control group, versus 730.92 in the experimental treatment group.

Not surprisingly, though, females in general ordered fewer calories than males, with a mean of 736.96 calories ordered, versus a mean of 1072.03 calories ordered by men, suggesting that the measure had external validity. These results also concur with those of the Conklin (2005) study, which reported a significant difference between males and females in the number of calories selected.

In the subgroup analysis of subjects who reported that they were currently on a diet ($n = 17$), no significant difference emerged between the dieters in the control group (who viewed menus that did not include calorie labels) and those in the experimental group (who viewed menu boards with calorie labels). However, not surprisingly, regardless of whether they were in the control group or experimental treatment group, “dieters” ordered significantly fewer calories (mean = 714.41, $n = 17$) than those respondents who reported they were not currently on a diet (mean = 916.63 calories, $n = 73$; $p < .05$), lending more evidence to the external validity of the study.

At the end of the study, when respondents used a Likert scale to rank their agreement with the statement “I am aware of the calorie content of foods that I eat,” 61.5% of females either agreed or strongly agreed, as compared to just 26.3% of males. This finding suggests that as a group, females may already be aware of the high calorie content of fast food, and therefore ordered meals with fewer calories regardless of which experimental group they were in. Furthermore, when respondents were asked to rank their agreement with the statement, “I choose foods low in calories when available,” 67.3% of females either agreed or strongly agreed compared to just 28.9% of males. Further, 55.8% percent of females also agreed or strongly agreed that they were willing to pay more for a food that is lower in calories and fat compared to just 31% of males who were willing to pay more.

DISCUSSION

Providing calorie information on restaurant menu boards did not significantly reduce the number of calories ordered by individuals in this study. That is, the subjects who were part of the experimental group, whose menu board had displayed the calorie information of each menu item, did not order meals significantly lower in calories when compared to the control group members, for whom no calorie information was displayed on their menu board.

No gender effect was observed either. Further, in a subgroup analysis of dieters (albeit with a very small sample), no effect was found for calorie labeling. That is, the mean number of calories in the meals ordered by dieters in the control group did not differ significantly from the mean number of calories ordered by dieters in the experimental group, for whom calorie labeling was displayed.

In summary, the results of this study provide evidence that the displaying of calorie counts on fast food menu boards does not appear to impact the food choices made by consumers. The fact that this study did not observe a significant reduction in the amount of calories ordered by those respondents exposed to menu board calorie labeling has many implications. First, the results in the present study do concur with those found earlier by Vadiavalo et al. (2011), Elbel et al. (2011), Dumanovsky et al. (2011), Harnack et al. (2008), Sun (2013), Lando & Labiner-Wolfe (2007), and Mills & Thomas (2008). Further, despite the health belief model (Strecher & Rosenstock, 1997) which hypothesized that nutrition information can serve as a cue that guides consumers to make more healthful choices, the display of calorie information on menu boards in specific does not appear to have an impact on consumers’ decisions. Indeed, the results of this study strongly suggest that the presence of calorie counts is not a sufficient motivator, if at all, for changing choice behavior in the direction of more healthful food selections from a fast-food menu.

The results of this study have further implications with regard to consumer use of nutritional information required by the recent menu labeling legislation. Advocates of the menu labeling laws have used consumer desire for nutritional information as a driving force in their campaign to pass and implement this regulation, and indeed research has confirmed the widespread existence of a strong desire among consumers for such labeling. However, while consumers may desire nutritional information, the present study suggests that the display of calorie counts on

menu boards does not, at least on its own, translate into intentions and behavior that lead to healthier food selections by consumers.

Several explanations are possible for the lack of an impact for menu board calorie labeling. Consumers may choose to ignore the menu board calorie information when in the presence of other more powerful cues such as pictures of desired, tempting, or calorie-dense foods and the anticipated pleasures associated with them. Indeed, hedonistic and pleasure-seeking desires are thought to be potent drivers of behavior in the food domain (Sabee et al., 2009). It is also possible that although the subjects in the experimental group saw the calorie labels, they may have been unaware that the recommended daily caloric intake for the average American adult is 2000 calories. Indeed, many of the meals ordered were well over half of the recommended total daily calories.

Some of the behavior and attitude questions asked at the end of the questionnaire in the present study can shed light on the differences found in the number of calories ordered by females versus males. The results from the attitude questions form a profile of the female population as calorie conscious consumers, who are also willing to spend more money on healthier food items. Since study participants were asked to choose from a fast food menu, it is likely that females were already aware of the high fat and high calorie content associated with fast food, and therefore ordered fewer calories regardless of whether they were exposed to the calorie labels or not.

Among dieters, there was no significant difference in number of calories ordered between those who were exposed to calorie labels and those who were not. These results contradict the findings of Girz et al. (2012) regarding dieters. This finding among dieters suggests that again, the presence of calorie information on a menu board does not impact choice behavior. As would be expected, however, respondents who reported they were currently on a diet ordered significantly fewer calories compared to those respondents who reported they were not currently on a diet.

Furthermore, when respondents used a Likert scale to indicate their attitudes and behaviors at the end of the study, after the experimental manipulation, 88.2% of those who were on a diet agreed or strongly agreed that they were aware of the calorie content of their food. Furthermore, an astounding 100% of those respondents on a diet agreed or strongly agreed that they choose foods low in calories when available. Indeed, “dieters” ordered a significantly smaller number of calories than their non-dieting counterparts. The responses to the attitude questions of the study show that those individuals who are on a diet may be better educated about healthy and low calorie food options. Further, they may more able to recognize these items on a menu, and to select healthier items regardless of calorie count availability. This does suggest that some form of nutrition education could benefit consumers and enable them to better understand and utilize nutritional information posted on menus and menu boards.

The findings of the present study regarding food selection among college students are subject to some limitations. First, the results reflect a sample of undergraduates between the ages of 18-22, and may not be fully generalizable to other populations. Second, the study was not conducted in a natural setting. It is possible that the meals ordered, and their concomitant calorie count, might differ significantly from what the study participants would likely order in a restaurant, where they could be influenced by aromas, the visual appeal of the food, and the experience of hunger. Indeed, the expectation would be that calorie labeling would be even less likely to mediate and suppress the caloric content of food choices in a natural setting, where temptation and pleasure-seeking cues would be experienced with greater intensity.

While calorie labeling on its own was not shown to influence food selection, it is possible that nutritional labels on menu boards could contribute to more healthful food choices if combined with other interventions, such as descriptive information emphasizing the healthfulness of a menu item (as shown in the Sun, 2013 study), information about the amount of exercising needed to work off each dish (as in the James et al., 2014 study), or information about the recommended daily caloric intake. The results of this study suggest that at the very least, other interventions are needed before menu calorie labeling can truly impact choice behavior in fast-food restaurants.

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