

AN EVALUATION OF THE INTENTION OF COLLEGE STUDENTS TO UTILIZE
CALORIE LABELING IN FAST FOOD AND FULL-SERVICE RESTAURANTS:
APPLICATION OF THE THEORY OF PLANNED BEHAVIOR

by

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A DISSERTATION

Submitted in partial fulfillment of the requirements
for the degree of Doctor of Philosophy
in the Department of Health Science
in the Graduate School of
The University of Alabama

TUSCALOOSA, ALABAMA

2013

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ABSTRACT

The Restaurant Nutrition Menu Labeling Requirement of the Affordable Care Act will require chain restaurants to provide calorie information on menus. The Theory of Planned Behavior (TPB) includes attitudes, subjective norms, and perceived behavioral control constructs, and explains attributes that lead to behavior intention and use of menu labeling in meal selection. Studies on characteristics of college students who use menu labeling in restaurants are limited. The purposes of this study were to determine predictors of intention to use calorie information, whether students changed meal choices after viewing calorie information, and describe groups of students most likely to change meal selections in fast food and full-service restaurants. Two hundred undergraduate students, 19 years or older, participated in this quasi-experimental study. Students participated in the full-service (n=100) or fast food (n=100) portion of the study. Participants selected a meal from a menu without calories, selected a meal from the same menu with calorie information, and completed a survey that addressed TPB constructs, intention, and potential barriers. Backward elimination was used to determine significant predictors of intention to use labels and changes in calories of meals ordered. Students ordered significantly fewer calories with posted calorie information on both fast food (909 versus 838 calories, $p=0.02$) and full-service (1370 versus 1203 calories, $p<0.01$) menus. Subjective norms ($p<0.01$) and perceived behavioral control ($p=0.03$) were predictive of greater intention to use calorie information on fast food menus but not of a change in caloric intake. Barriers such as cost ($p=0.07$) and perceived ease of label use ($p=0.01$) were associated with

fewer calories ordered while lack of time ($p=0.05$) and hunger ($p=0.02$) were associated with an increase in calories ordered with posted information on fast food menus. Attitudes ($p=0.04$), subjective norms ($p<0.01$), and perceived behavioral control ($p<0.01$) predicted greater intention to use calorie information on full-service menus. Lack of time ($p=0.08$), frequent Nutrition Facts panel use ($p=0.05$), and positive attitudes ($p<0.01$) towards menu labeling predicted decreases in calories ordered with posted information on full-service menus. Menu labeling could provide information that college students need to select lower calorie items at both fast food and full-service restaurants.

DEDICATION

This dissertation is dedicated to my husband, Dave, who was a constant motivator and source of encouragement throughout this entire project.

LIST OF ABBREVIATIONS

<i>BMI</i>	Body mass index
<i>CDC</i>	Centers for Disease Control and Prevention
<i>CSFII</i>	Continuing Survey of Food Intakes by Individuals
<i>CSPI</i>	Center for Science in the Public Interest
<i>NCHS</i>	National Center for Health Statistics
<i>NHANES</i>	National Health and Nutrition Examination Survey
<i>NLEA</i>	Nutrition Labeling and Education Act
<i>NRA</i>	National Restaurant Association
<i>PPACA</i>	Patient Protection and Affordable Care Act
<i>TPB</i>	Theory of Planned Behavior
<i>TRA</i>	Theory of Reasoned Action
<i>UA</i>	The University of Alabama
<i>U.S.</i>	United States

ACKNOWLEDGEMENTS

I am grateful to have this opportunity to thank all of my committee members, Dr. Linda Knol, Dr. Lori Turner, Dr. Kimberly Severt, Dr. Jeannine Lawrence, and Dr. Debra McCallum for their expertise, positive feedback, and encouragement throughout this dissertation. I would especially like to thank my co-chairs, Dr. Linda Knol and Dr. Lori Turner for their unwavering support and guidance throughout the entire process. I would also like to thank the UA Coordinated Program students who participated in subject recruitment and data collection. The process could have been much longer without their assistance.

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CHAPTER 1

INTRODUCTION

Obesity continues to be an epidemic in the United States (U.S.) and around the world. Sixty-eight percent of American adults are either overweight or obese (Flegal, Carroll, Kit, & Ogden, 2012) and the World Health Organization (2012) estimates that nearly 2 billion adults in the world are overweight or obese. Multiple health ailments can be directly correlated to this problem, including cardiovascular disease (Centers for Disease Control and Prevention [CDC], 2011), type II diabetes (National Institute of Diabetes and Digestive and Kidney Diseases [NIDDK], 2010), and premature death (Flegal, Graubard, Williamson, & Gail, 2005). Many factors, including diet, lifestyle choices, and genetics impact the development of obesity and the associated consequences.

Over the last 20 years, the number of meals eaten in restaurants and fast food establishments has increased significantly. A portion of the obesity epidemic can be attributed to the combination of the increased number of people eating in restaurants in addition to the poor nutritional quality of the foods served in these establishments (Lin, Frazão, & Guthrie, 1999; Nielsen & Popkin, 2003). Foods in full-service restaurants and fast food establishments are often high in total fat and calories but lacking in good sources of fiber and calcium (Lin et al., 1999; Scourboutakos & L'Abbe, 2012).

In order to better inform their citizens of the nutritional quality of restaurant foods, numerous cities and counties in the U.S. have passed menu labeling laws for chain restaurants.

Several years after New York City and King County, WA implemented menu labeling laws, the Restaurant Nutrition Menu Labeling Requirement in the Patient Protection and Affordable Care Act (2010) was passed. This national law requires chain restaurants with 20 or more locations to provide calorie information on their menus, menu boards, and drive-thru menus. While this law is not yet enforced, preliminary studies from New York City report that consumers who used the posted information to make decisions ordered significantly fewer calories than those who did not use the information ($p < 0.001$) (Dumanovsky et al., 2011).

One segment of the population that could benefit from restaurant menu labeling is university students. The college years represent a time where young individuals make many decisions on their own for the first time, including where to regularly eat and what to order. Several studies highlight that college students are receptive to calorie information posted on menus or in dining halls (Freedman & Connors, 2010; Gerend, 2009). A full review of the current literature can be found in Appendix A1. However, additional research is required to determine the factors that impact a student's decision to use a calorie label to make a meal choice at a restaurant. Once these factors are known, researchers and health educators will be better equipped to develop nutrition education messages targeted towards college students.

Purpose of the Study

The purpose of this study was to investigate the a) attitudes, b) subjective norms, and c) perceived behavioral control of college students to use calorie labels posted on fast food and full-service restaurant menus. The researcher investigated how these factors predicted intention to use the calorie information and whether viewing calorie information on a restaurant menu changed meal choice.

Theoretical Framework

The Theory of Planned Behavior (TPB) was used to explain the relationship between the constructs of the model and intention to use calorie labels. The TPB was proposed by Ajzen and Driver in 1991. This theory evolved from the Theory of Reasoned Action (TRA) (Fishbein, 1967) and has the added construct of perceived behavioral control. This construct states that a person is less likely to engage in the target behavior, such as using a calorie label to make a healthy choice in a restaurant, if the individual does not believe that they have control over the behavior. The TPB suggests that attitudes toward the behavior, subjective norms, and perceived behavioral control of the behavior each predict intention to perform the behavior (Ajzen & Driver, 1991). Intention is then the direct precursor to performing the behavior.

The TPB is an applicable model that addresses several predictors of intention and subsequent behavior. This theory may be used to examine the reasoning behind label use or non-use by examining the motivation and intention to use calorie information to make a healthy meal choice. The TPB was chosen as a framework for this study because the constructs can be directly applied to, and can help explain the behavior of, reading a calorie label in a restaurant. Once the predictors of college students who use the labels are discovered, researchers can then design interventions to target the pertinent attitudes, subjective norms, or perceived behavioral control.

Specific Aims

This study addressed the following research questions:

1. Which socio-demographic information, current health status indicators, and Theory of Planned Behavior constructs are associated with intention of college students to use calorie labels in fast food restaurants?

2. Is there a significant difference in total calories ordered by college students before viewing calorie information and after viewing calorie information on a fast food restaurant menu?
3. If a difference exists, which socio-demographic information and health status indicators are associated with the significant changes in the calorie content of meals ordered from fast food restaurant menus without calorie information versus with calorie information?
4. Which socio-demographic information, current health status indicators, and Theory of Planned Behavior constructs are associated with intention of college students to use calorie labels in full-service restaurants?
5. Is there a significant difference in total calories ordered by college students before viewing calorie information and after viewing calorie information on a full-service restaurant menu?
6. If a difference exists, which socio-demographic information and health status indicators are associated with the significant changes in the calorie content of meals ordered from full-service restaurant menus without calorie information versus with calorie information?

Significance of the Study

This study used survey data collected from The University of Alabama (UA) college students ages 19 and over (see Appendix A2 for the full methodology of the study and Appendix A3 for the IRB approval letter). The study helped identify the characteristics and qualities of college students who used restaurant menu labels to make a meal choice. It also examined the differences between the students who used a calorie label in a fast food restaurant versus a full-service restaurant. The TPB was used as a framework to assess attitudes and intention of college

students to utilize this calorie information. Obesity continues to be a problem in the U.S., and college represents a time when many students are making their own meal choices for the first time. These new behaviors may initiate weight gain over time and lead to chronic disease in the future. Several studies highlight the fact that many college students gain weight during their first year on campus (Gropper et al., 2009; Mihalopoulos, Auinger, & Klein, 2008). While the ‘freshman 15’ may not be an accurate portrayal of true weight gain, studies do show that first year college students gain, on average, 2.6 (Gropper et al., 2009) and 2.7 pounds (Mihalopoulos et al., 2008). Results of this study add to the current knowledge base of this timely topic, as the national menu labeling law is expected to be enforced within the next year. The results of this study can be used to determine where further education efforts for college students should be directed in order to assist them in making healthy food choices while dining out.

There are several assumptions to this research, including that the college students who served as participants for the study responded honestly to the menu choices and surveys. In addition, it was assumed that the surveys would be adequate to elicit the appropriate information from the sample and the administration methods did not exclude any potential participants. This research was limited by the fact that participants placed a fictitious meal order and did not receive an actual meal. The researcher was unable to measure how many calories would be consumed. Also, prices were not included on neither full-service nor fast food restaurant menus. Students with food allergies or intolerances were also excluded from this study as their dietary restrictions could have limited the foods they could consume at these restaurants or required them to inquire further about the preparation methods. Finally, the delimitations to this research included that this study was restricted to one campus within The University of Alabama system.

Additionally, the menus containing calorie information were presented within a very short time frame to the menus without calorie information.

Definitions of Terms

Attitudes:

The positive or negative beliefs a person has towards performing a behavior (Ajzen, 1991).

Body mass index:

The relationship of a person's weight to his or her height. BMI is often used to determine risk of health problems and is reported in kilograms per meters squared (kg/m^2).

College students:

Students who have graduated from high school or earned a GED and are currently enrolled at The University of Alabama.

Fast food restaurant:

This type of restaurant features a common menu above the counter. Customers order at the counter, pay before eating, and choose and clear their own tables. No wait staff is provided.

Full-service restaurant:

This restaurant has a wait staff where food services are provided to customers who are sitting down at tables. Patrons pay after eating their meal.

Obesity:

A body mass index of $30 \text{ kg}/\text{m}^2$ or greater.

Overweight:

A body mass index between $25 \text{ kg}/\text{m}^2$ and $29.9 \text{ kg}/\text{m}^2$.

Perceived behavioral control:

A person's perception of the ease or difficulty of performing a behavior (Ajzen, 1991).

Portion distortion:

The perception that the large portion sizes of meals and side dishes served in restaurants are the appropriate amounts to consume in one sitting.

Subjective norms:

The perceived social pressure to perform or not perform a behavior (Ajzen, 1991).

Theory of Planned Behavior:

A theory designed to predict and explain behavior in specific contexts. Constructs of the Theory of Planned Behavior include attitudes, subjective norms, perceived behavioral control, and behavioral intention. This theory was formed from the Theory of Reasoned Action (Ajzen, 1991).

Theory of Reasoned Action:

A theory that posits that behavioral intention is a function of attitudes toward the behavior and the perceived social norms to perform the behavior (Fishbein, 1967).

CHAPTER 2

COLLEGE STUDENTS MUST OVERCOME BARRIERS IN ORDER TO USE CALORIE LABELS IN FAST FOOD RESTAURANTS

Americans eat away from home now more than ever. The National Restaurant Association (NRA) (2012) reports Americans were projected to spend \$632 billion in restaurants in 2012, a 50% increase from 2000. This can be partially attributed to the estimated 970,000 restaurants in the U.S. (NRA, 2012), providing a multitude of dining choices for consumers. Consumption of frequent fast food meals may lead to weight gain and obesity (Burton, Creyer, Kees, & Huggins, 2006). Foods served in restaurants and fast food establishments are typically high in total fat and calories but lacking in good sources of other important nutrients, such as fiber and calcium (Lin, Guthrie, & Frazão, 1999; Scourboutakos & L'Abbe, 2012). Portion sizes at many fast food restaurants continue to increase and these excess calories can contribute to weight gain (Young & Nestle, 2012). In 2010 the Patient Protection and Affordable Care Act (PPACA) (2010) was passed in Congress. One provision of the law is the Restaurant Nutrition Menu Labeling Requirement, Section 4205 the PPACA (Public Law 111-148), which requires chain restaurants with 20 or more locations to provide calorie information on their menus, menu boards, and drive-thru menus. In addition to the calorie postings, restaurants will also be mandated to post a statement about the suggested daily caloric intake for the majority of American adults (PPACA, 2010). This statement is designed to give consumers a point of reference and assess the nutritional significance of the available food.

The college environment can create changes in the dietary habits of students, especially for those who are living on their own for the first time. Many college students eat in campus dining halls and fast food restaurants, which can lead to weight gain over time (Racette, Deusinger, Strube, Highstein, & Deusinger, 2005). The effects of calorie labeling in fast food restaurants among adults have been widely studied (Bassett et al., 2008; Dumanovsky et al., 2011; Farley, Caffarelli, Bassett, Silver, & Frieden, 2009; Finkelstein et al., 2011; Lando & Labiner-Wolfe, 2007; Piron, Smith, Simon, Cummings, & Kuo, 2009; Technomic Inc., 2009; Vadiveloo, Dixon, & Elbel, 2011; Wisdom, Downs, & Loewenstein, 2010). However, there are a limited number of studies that examine college students' use of posted calorie information in restaurants and campus dining halls.

Two studies on the effects of menu labeling in dining halls have been reported in the literature. Chu, Frongillo, Jones, and Kaye (2009) found that posting calorie information in dining halls on a college campus led to an instant decline in calories purchased that was maintained throughout the treatment period. However, once the labels were removed, the caloric content of entrees purchased slowly increased. Driskell, Schake, and Detter (2008) demonstrated that when labels similar to the Nutrition Facts panel were posted in college dining halls, more than half of the 205 students surveyed reported using the posted nutrition information. Two studies also showed that 80% (Driskell et al., 2008) and 88% (Martinez, Roberto, Kim, Schwartz, & Brownell, 2012) of students surveyed noted that they sometimes changed their food choices after reading the nutrition labels in dining halls. It appears as though college students will utilize posted calorie information, if available, when making meal selections in university dining halls.

To date, two studies have explored college students' use of posted calorie information in fast food restaurants (Bates, Burton, Howlett, & Huggins, 2009; Gerend, 2009). Both studies found that women were more likely to use the calorie information to make a meal decision than men. The posting of calorie information did not have a significant effect on the calories ordered by men. In contrast, women who made meal selections from menus with calorie information ordered fewer calories than women with a standard fast food menu (Gerend, 2009). Overall, college women are more likely than men to utilize calorie information in fast food restaurants.

Previous research is lacking a theoretical framework to guide the choice of potential determinants of college students to use calorie information in a fast food restaurant. Therefore, the Theory of Planned Behavior (TPB) was used as a framework to help explain the relationship between the constructs of the model and intention to use calorie labels. The TPB was proposed by Icek Ajzen in 1991. The theory posits that a person is more likely to engage in the target behavior, such as using a calorie label to make a healthy choice in a restaurant, if the individual has intention to participate in the behavior. The TPB states that attitudes toward the behavior, subjective norms, and perceived behavioral control of the behavior each predict intention to perform the behavior. Attitudes are an individual's beliefs toward the performance of a behavior. Subjective norms refer to whether the individual feels that important people in his or her life approve of the behavior. The feeling of control as well as perceived power over the behavior refers to the individual's perceived behavioral control and is similar to self-efficacy. Finally, intention to perform a behavior is dependent upon on the attitudes, subjective norms, and perceived control of the behavior (Ajzen, 1991).

The purpose of this study was to further investigate which socio-demographic information, current health status indicators, and TPB constructs were associated with intention

of college students to use calorie labels in fast food restaurants. Another goal of this research was to determine whether college students changed their meal choice after viewing calorie information and describe the groups of college students who were more likely to change.

Methods

Participant Recruitment

Recruitment for this study was completed in conjunction with a similar study examining college students' use of calorie information in full-service restaurants. Sixty-five professors within various departments at a southeastern university were contacted and twenty-two professors (33.8%) agreed to allow class time for recruitment purposes. Approximately 1595 students were present in these classes on the days the researcher recruited participants. Among the 525 students (32.9%) who asked for further details, 200 (12.5%) participated in the overall study and 100 students participated in the fast food portion of this study. Power calculations were completed to determine adequate sample size. Based on Pawlak, Cerutti, and Quinton's (2009) study of 53 students showing a change of 263 calories following provision of nutrition information, 90% power could be achieved with 87 students. Therefore, 100 students were recruited to participate in the fast food portion of this study. Students were offered a \$5 cash incentive for their participation. Students who majored in nutrition or restaurant hospitality management were excluded from participating in the study. In addition, potential study participants under 19 years of age and those who followed specific or restricted diets due to food allergies or intolerances, and therefore may need to limit the types of foods they eat at fast food restaurants, were also excluded. This study was approved by the university's Institutional Review Board.

Data Collection

Data collection took place over the course of five weeks in March and April 2013. A conference room on campus served as a simulated dining room. After the study purpose was explained and informed consents were signed, a fast food menu was distributed to participants. Each participant then wrote down their desired meal order and beverage. After ordering from this menu without calorie labels, participants were given a worksheet with 10 short math problems and asked to complete as many problems as they could in five minutes. This step was added to the protocol to distract participants. Next, participants received a fast food menu with calorie information and were asked to order a meal and beverage from this menu. After making the second meal choice, participants completed a 41-item survey that assessed constructs from the TPB, health status, and demographic information. Finally, the participants' height and weight were measured and recorded by trained research assistants. A Seca stadiometer was used to measure each participant's height to the nearest centimeter and a Tanita digital scale was used to measure each participant's weight to the nearest 0.1 kg. To ensure the privacy of each participant, the scale and stadiometer were positioned in a private room adjacent to the conference room.

Survey Instrument

A survey was developed to address socio-demographic information, general health status, food label use, and constructs in the TPB (see Appendix B1). The demographic section of the survey inquired about gender, age, rank in school, race/ethnicity, and housing location during the school year. Additional questions addressed the participant's overall health status, current weight perceptions, diet quality, current weight control practices, and concerns about their weight (Centers for Disease Control and Prevention [CDC], National Center for Health Statistics

[NCHS], 2012). These items have been previously validated and used in NHANES (CDC, NCHS, 2011). Lastly, participants were asked to indicate the frequency in which they dine out in fast food restaurants.

Questions developed to assess attitudes, subjective norms, perceived behavioral control, and intention constructs of the TPB were developed using a manual for health researchers (Francis et al., 2004). Seven questions were developed to address the college students' attitudes toward restaurants having posted calorie information and their use of this information. The following questions were used: "Using calorie information posted on a fast food menu to make a meal decision is harmful/beneficial, difficult/easy, worthless/useful, and inconvenient/convenient" and "Having calorie information posted on menus at fast food restaurants is harmful/beneficial, bad/good, worthless/useful." A scale of 1 to 7 was used, with anchors of 1 (harmful) and 7 (beneficial). Three questions were developed to assess the subjective norms surrounding using calorie information to make a meal decision in a fast food restaurant ("My parents/friends/close friends think I should/should not use posted calorie information to make a meal decision at fast food restaurants") and participants responded on a scale of 1 (should not use) to 7 (should use).

Four questions were also designed to elicit each participant's intention to use this information to make a meal choice ("I expect/intend/want to use posted calorie information to make a meal decision in a fast food restaurant" and "If calorie labels were readily available in fast food restaurants, with what frequency would you use them?"). Participants responded on a scale of 1 (strongly disagree) to 7 (strongly agree) and never (1) to often (7), respectively. A single question ("I am confident that I could use calorie information in a fast food restaurant to

make a healthy choice”) was used to assess the participant’s perceived behavioral control and potential responses ranged from 1 (strongly disagree) to 7 (strongly agree).

Four questions were also formulated to address the potential barriers to using posted calorie information (“The decision to use calorie information in a fast food restaurant is based on the amount of time/how hungry I am/cost.”) and participants responded on a scale of 1 (strongly disagree) to 7 (strongly agree). For the fourth barrier question, “for me to use calorie information in a fast food restaurant is easy/difficult,” participants responded on a scale of 1 (difficult) to 7 (easy). In addition to posting the caloric content of each menu item, the national menu labeling law will require a calorie statement (i.e. A 2,000 calorie diet is used as the basis for general nutrition advice; however, individual calorie needs may vary) to be posted on each menu (PPACA, 2010). Therefore, questions were also asked to determine if the participant noticed and used the posted calorie information and the calorie statement when making meal selections.

Restaurant Menus

Two fast food menus were developed for this study. The first menu was developed to mimic the top three fast food chain restaurants in sales in the U.S. (see Appendix B2). A menu from a nationally recognized restaurant was not used in order to increase the generalizability of this study. The menu was designed to be generic so that participants would not select an item based on their preference for the item at a specific restaurant. The menu contained 32 typical items found in a fast food restaurant, including burgers, chicken and fish sandwiches, salads, side items such as French fries and fruit cups, and beverage choices. The second fast food menu was identical to the first menu, but contained calorie information next to the name of each food/beverage item (see Appendix B3). The second menu also had a different restaurant name,

order of items, and color scheme to make it appear like a different restaurant, as the time between each menu presentation was short. Calorie information was obtained from the websites of these fast food restaurants and an average calorie level for each menu item was computed so that the information was realistic and similar to what would be posted on a restaurant menu board.

Data Analyses

All data analyses were conducted using Statistical Analysis Software (SAS version 9.3, 2012, SAS Institute Inc., Cary, NC) with alpha set at 0.1 level. All data were entered into an Excel spreadsheet and imported into SAS. Descriptive statistics, including frequencies, were used to examine the socio-demographic data. Factor analysis with varimax rotation and eigenvalue greater than 1 was completed for three of the four constructs from TPB: attitudes, subjective norms, and intentions (Table 1). The eigenvalue scree plots were also examined and factor loadings greater than 0.40 were included. Internal consistencies of scale responses for each construct were assessed using Cronbach's alpha. Seven questions related to attitudes toward posting and using calorie information in full-service restaurants were analyzed. Two questions did not load onto any factor and were removed from the analysis (Using calorie information posted on fast food menus to make a meal decision is (1) easy/difficult (2) convenient/inconvenient). This yielded one factor with a Cronbach's α of 0.89 (Table 2). The three subjective norms questions also fell upon one factor with a Cronbach's alpha of 0.74. The four-question intention scale had a Cronbach's alpha of 0.89 and yielded one factor. A Cronbach's alpha of 0.7 is considered acceptable (Nunnally, 1978) therefore, each TPB scale was deemed appropriate for use in this study.

Table 1

Descriptive Statistics and Factor Loadings for Three TPB Construct Scales (N=100)

Factors	Mean (SD)	Range	Loading
<i>Attitudes</i>			
Using posted calorie information to make a meal decision is:			
Harmful (1) – Beneficial (7)	6.09 (1.04)	1-7	0.84
Worthless (1) – Useful (7)	5.83 (1.40)	1-7	0.83
Having calorie information posted at fast food restaurants is:			
Harmful (1) – Beneficial (7)	6.37 (1.03)	1-7	0.88
Bad (1) – Good (7)	6.27 (1.32)	1-7	0.76
Worthless (1) – Useful (7)	6.21 (1.10)	1-7	0.88
<i>Subjective Norms</i>			
My parents think I should not (1)/should(7) use posted calorie information	4.67 (1.32)	1-7	0.63
My friends think I should not (1)/should(7) use posted calorie information	3.93 (1.20)	1-7	0.88
My close friends think I should not (1)/should(7) use posted calorie information	4.02 (1.39)	1-7	0.91
<i>Intention</i>			
I expect to use posted calorie information to make a meal decision (strongly disagree (1) – strongly agree (7))	4.14 (1.76)	1-7	0.83
I want to use posted calorie information to make a meal decision (strongly disagree (1) – strongly agree (7))	4.87 (1.88)	1-7	0.93
I intend to use posted calorie information to make a meal decision (strongly disagree (1) – strongly agree (7))	4.57 (1.84)	1-7	0.95
If calorie information were readily available in fast food restaurant, with what frequency would you use it (never (1) – often (7))	5.13 (1.59)	1-7	0.77

Table 2

Descriptive Statistics and Reliability Estimates of TPB Construct Scales (N=100)

	No. of items	Mean (SD)	Range	Cronbach's α
Attitudes	5	30.8 (4.9)	5-35	0.89
Subjective Norms	3	12.6 (3.2)	3-21	0.74
Perceived Behavioral Control	1	5.9 (1.5)	1-7	NA
Intention	4	18.7 (6.2)	4-28	0.89

The participants' attitudes towards calorie labeling in fast food restaurants were assessed by their attitudes score. This scale was constructed by summing the responses of the five attitudes questions and had a range of 5-35. Positive attitudes were represented by higher numbers. Subjective norms scores were calculated using three questions and had a range of 3-21, where a higher number represented greater feelings of social pressure to use calorie labels. Perceived behavioral control was measured by one question and had a range of 1-7. Higher numbers represented greater perceived control to use calorie information to make a healthy choice at a fast food restaurant. The sum of the four questions that measured intention to use calorie labels had a range of 4-28. Higher numbers represented greater intention to use calorie information if posted on fast food menus.

The housing location variable was recoded into on-campus (dorm, on-campus apartment, fraternity/sorority) and off-campus (off-campus apartment, house, live with parents) students. Body mass indexes were also calculated for each participant using measured height and weight. Results were then categorized into normal weight ($<25 \text{ kg/m}^2$), overweight ($25\text{-}29.9 \text{ kg/m}^2$), and obese ($\geq 30 \text{ kg/m}^2$) classes (National Institutes of Health, 2000). Self-reported weight status was also dichotomized into underweight/about the right weight and overweight. Two questions assessed the students' general health and overall diet perceptions. Responses were each

dichotomized into an excellent/very good/good category and a fair/poor category for each of the two questions. This variable manipulation is consistent with other research and provides a clear positive or negative view of current dietary practices and health status (Goodwin et al., 2006).

To determine the factors associated with intention to use menu labels in a fast food restaurant, backwards elimination with intention to use calorie labels as the dependent variable was conducted. The following independent variables were tested in the model: socio-demographic information, current health status, dieting habits, food label use, frequency of dining out, potential barriers, attitudes scale, subjective norms scale, and perceived behavioral control. All variables retained in the model were significant at the 0.1 level.

Total calories ordered from each of the two fast food menus were calculated for each participant using the calorie information posted on the second menu. A paired t-test was conducted to determine if a significant difference existed in the number of calories ordered without posted calorie information versus with posted calorie information. In order to assess the change in calories ordered, the difference in the calorie content of the meal ordered with calorie information was subtracted from the calorie content of the meal ordered without posted calorie information. Backward elimination, with the change in the caloric content of meals ordered as the dependent variable, was conducted with the following independent variables: socio-demographic information, current health status, dieting habits, label use, frequency of dining out, potential barriers, attitudes scale, subjective norms scale, and perceived behavioral control. All variables retained in the model were significant at the 0.1 level.

Results

Demographics

Participants were mostly women (63%), non-Hispanic White (74%), and lower classmen (67%) (Table 3). An equal number of students lived in on campus housing versus off campus housing. All participants were single and the majority were between the ages of 19 and 22 (95%). The mean BMI was 24.54 kg/m² (*SD*=4.42) with a range of 17.06-44.18 kg/m² and 59% of participants perceived themselves to be underweight or just about the right weight. While nearly half of the participants reported they were worried about their weight (48%), only 16% were dieting and 58.6% reported their diet quality to be good, very good, or excellent. Seventy-nine percent of participants reported using the calorie information on a label at least sometimes while 65% reported using the Nutrition Facts panel at least sometimes when deciding to buy a food product. On average, respondents visited fast food restaurants 2.61 times per week (*SD*=3.24) with only 5% reporting a frequency of greater than six times per week.

Table 3

Socio-Demographic Characteristics, Health Status Indicators, Dietary Habits, Mean Intention Scores, and Mean Differences in Calories Ordered by 100 College Students

	n	%	Mean intention score (SD) ^a	Mean difference in calories ordered (SD) ^a
Gender (N=100)				
Male	37	37	17.5 (6.1)	3.4 (296.5)*
Female	63	63	19.4 (6.1)	-114.0 (291.9)*
Race (N=100)				
Non-Hispanic White	74	74	18.8 (6.1)	-80.9 (301.3)
Non-Hispanic Black	18	18	17.5 (7.2)	28.1 (259.7)
Other	8	8	20.9 (3.6)	-196.3 (313.1)
Class rank (N=100)				
Freshman	30	30	17.3 (6.8)	-80.0 (302.3)
Sophomore	37	37	19.8 (6.0)	-38.0 (323.7)
Junior	24	24	18.5 (5.5)	-60.2 (289.9)
Senior	9	9	19.4 (6.3)	-200.6 (164.0)
Housing (N=100)				
On campus	49	49	17.9 (6.5)	-42.4 (291.2)
Off campus	51	51	19.5 (5.8)	-97.5 (304.1)
Perceived health status (N=99)				
Excellent, very good, or good	95	96	18.8 (6.2)	-70.9 (304.7)
Fair or poor	4	4	16.0 (7.1)	-78.8 (112.7)
Perceived diet quality (N=99)				
Excellent, very good, or good	58	58.6	19.7 (6.4)*	-84.0 (268.3)
Fair or poor	41	41.4	17.3 (5.6)*	-51.2 (337.9)
Weight perception (N=100)				
Underweight or about the right weight	59	59	21.6 (3.5)**	-126.8 (195.3)
Overweight	41	41	17.7 (6.4)**	-73.9 (291.4)
BMI (N=100)				
<25 kg/m ²	62	62	18.3 (6.8)	-94.4 (308.6)
25 to <30 kg/m ²	29	29	19.3 (4.5)	-29.1 (272.4)
≥30 kg/m ²	9	9	19.4 (5.5)	-39.4 (313.6)

Dieting (N=100)				
Yes	16	16	20.9 (6.6)	-53.1 (337.9)
No	84	84	18.3 (6.0)	-73.9 (291.4)
Worried about weight (N=100)				
Yes	48	48	20.5 (5.4)**	-105.5 (261.4)
No	52	52	17.1 (6.4)**	-38.3 (326.7)
Nutrition Facts panel use (N=100)				
Always	10	10	25.2 (3.6)**	-23.5 (220.4)*
Most of the time	23	23	22.6 (3.3)**	-144.1 (341.0)*
Sometimes	32	32	18.6 (4.4)**	-152.0 (272.6)*
Rarely	18	18	17.2 (6.6)**	-0.8 (221.7)*
Never	17	17	11.5 (4.8)**	80.9 (332.1)*
Use of calorie information (N=100)				
Always	34	34	22.0 (4.4)**	-144.0 (312.3)
Most of the time	21	21	22.5 (4.2)**	-147.6 (247.4)
Sometimes	24	24	16.1 (5.4)**	61.9 (255.9)
Rarely	11	11	14.6 (5.2)**	-6.4 (310.3)
Never	10	10	10.3 (3.5)**	47.5 (345.9)
Typical fast food visits (N=100)				
None	16	16	20.8 (7.0)	-21.6 (209.4)
1 to 3 times per week	68	68	19.5 (5.7)	-72.1 (317.5)
4 to 6 times per week	11	11	13.5 (3.8)	-121.8 (313.4)
7 times per week	2	2	9.0 (7.1)	57.5 (81.3)
14 times per week	1	1	14.0 (0.0)	0.0 (0.0)
21 times per week	2	2	18.0 (5.7)	-290.0 (410.1)
Typical full-service visits (N=100)				
None	32	32	19.2 (6.8)	-35.5 (282.1)
1 to 3 times per week	64	64	18.4 (6.0)	-91.4 (309.2)
4 to 6 times per week	2	2	20.0 (5.7)	-175.0 (247.5)
7 times per week	1	1	22.0 (0.0)	280.0 (0.0)
14 times per week	1	1	14.0 (0.0)	0.0 (0.0)
Calories needed in one day				
500-1000 calories	4	4	19.3 (5.3)	25.0 (316.4)
1001-1500 calories	24	24	19.3 (5.7)	-108.3 (264.6)
1501-2000 calories	31	31	19.4 (6.5)	-121.6 (312.9)
2001-2500 calories	28	28	18.0 (5.6)	-71.3 (298.6)
>2500 calories	7	7	19.7 (5.5)	227.9 (307.9)
Don't know	6	6	15.0 (10.3)	-64.2 (184.2)

^aT-tests and analysis of variances were used to determine differences in mean intention scores and mean differences in calories ordered.

* $p < 0.05$

** $p < 0.01$

TPB Constructs

Mean scores were computed for each TPB construct in the model. The average attitudes score toward posted calorie information in fast food restaurants was 30.8 ($SD=4.9$, range 5-35) (Table 2). The mean subjective norms score was 12.6 ($SD=3.2$, range 3-21) and the mean perceived behavioral control score was 5.8 ($SD=1.5$, range 1-7). The average intention score to use posted calorie information in a fast food restaurant was 18.7 ($SD=6.2$, range 4-28).

Intention

Table 3 depicts the mean intention scores by socio-demographic characteristics, health status indicators, and dietary habits. Significant differences in mean intention scores were found for use of the Nutrition Facts panel ($F=19.6$, $p < 0.01$) and worry over weight ($t=2.89$, $p < 0.01$).

Table 4 presents the backwards elimination results of predictors of intention to use calorie information in a fast food restaurant. Results indicated that subjective norms, perceived behavioral control, use of Nutrition Facts panel, dieting, and worried about weight variables explained 61.2% of the variance in intention scores ($R^2=0.61$, $F=28.3$, $p < 0.01$). Subjective norms and perceived behavioral control were predictive of intent to use posted calorie information, but the attitudes scale did not remain in the model after backwards elimination was completed. For each unit increase in the subjective norms score, the intention score is expected to increase by 0.66 ($F=23.19$, $p < 0.01$). Similarly, for each unit increase in the perceived behavioral control score, the intention score is expected to increase by 0.67 ($F=5.15$, $p=0.03$).

Students not dieting had intention scores 2.28 units higher than those who were dieting ($F=3.26$, $p=0.07$). Respondents content with their current weight had intention scores 2.50 units

lower than students who were worried about their weight ($F=8.50, p<0.01$). As the frequency of use of the Nutrition Facts panel increases, the intention score is also predicted to increase by 2.54 ($F=44.41, p<0.01$).

Table 4

Significant Predictors of Intention to Use Posted Calorie Information in Fast Food Restaurants (N=100)

	Parameter Estimate	SE	F Value	P value*
Subjective norms	0.66	0.14	23.19	<0.01
Perceived behavioral control	0.67	0.30	5.15	0.03
Use of Nutrition Facts panel	2.54	0.38	44.41	<0.01
Dieting	2.28	1.26	3.26	0.07
Worried about weight	-2.50	0.86	8.50	<0.01

*Backwards elimination yielded this reduced model with variables significant at the 0.1 level. In addition to the above predictors, the following variables were part of the full model: attitudes, gender, race, class rank, housing status, general health, overall diet, use of calories on Nutrition Facts panel, weight status, BMI, time barrier, hunger barrier, cost barrier, ease of use barrier, frequency of dining at fast food restaurants, and frequency of dining at full-service restaurants.

**Subjective norms, perceived behavioral control, use of Nutrition Facts panel, dieting, and worried about weight explained 61.2% of the variance in intention scores.

Change in Calories Ordered

Participants in this study ordered significantly fewer calories (mean=70.6, $SD=298$) when selecting from the menu with labels versus the one without labels ($t=-2.37, p=0.02$). The average caloric intake for an order without labels was 908.9 calories ($SD=290.1$) versus 838.3 calories ($SD=341.5$) when menu labels were present. Table 3 presents the mean differences in calories ordered by socio-demographic characteristics, health status indicators, and dietary habits.

Significant differences in the change in calories ordered were found between gender ($t=1.93, p<0.01$) and use of the Nutrition Facts panel ($F=2.50, p=0.04$). Table 5 depicts the final model after completion of backwards elimination and the significant predictors of a change in the calorie content of meals ordered. Results indicated that the ease barrier, time barrier, hunger barrier, cost barrier, gender, noticed calories, used calories, and used statement variables

explained 39% of the variance in changes in calorie content of meals ordered ($R^2=0.39$, $F=6.96$, $p<0.01$). The four potential barriers to using calorie information were predictive in this model: ease of use, time to complete the task, level of hunger and cost of the items. When asked to rate agreement to statements about the use of menu labels when time was limited or they were very hungry, an increase of one unit in the agreement scores was associated with an order that included 30.6 ($F=3.87$, $p=0.05$) and 34.8 ($F=5.70$, $p=0.02$) calories more on the labeled menus, respectively, than the menu that was not labeled. As agreement scores to the statement, “the decision to use calorie information in a fast food restaurant is based on the cost of the menu items” increased by one unit, participants ordered 29.9 ($F=3.43$, $p=0.07$) fewer calories from the labeled menu versus the menu that was not labeled. The ease of using the calorie information was also predictive of a change in calories ordered, in that as the perception of ease to use calorie information increases by each unit, college students ordered 45.8 ($F=6.34$, $p=0.01$) fewer calories when information was posted.

Gender was also predictive in this model. Women ordered 128 calories fewer than men when calorie information was present. Participants who noticed the calorie information and those who used the calorie information to make a meal decision ordered 252 ($F= 5.56$, $p=0.02$) and 307 ($F=22.82$, $p<0.01$) calories more, respectively, than those who did not see or use the calorie information. Compared to those who did not use the label, college students who used the calorie statement ordered 110 ($F=2.86$, $p=0.09$) fewer calories using the labeled menu than the unlabeled menu.

Table 5

Significant Predictors of a Change in Calorie Content of a Meal Ordered from a Fast Food Restaurant Menu (N=100)

	Parameter Estimate	SE	F Value	P value*
Ease barrier	-45.75	18.16	6.34	0.01
Time barrier	30.62	15.56	3.87	0.05
Hunger barrier	34.80	14.57	5.70	0.02
Cost barrier	-29.93	16.17	3.43	0.07
Gender	-128.31	53.80	5.69	0.02
Noticed calories on 2 nd menu	251.77	106.79	5.56	0.02
Used calories on 2 nd menu	307.40	64.35	22.82	<0.01
Used statement on 2 nd menu	-109.82	64.92	2.86	0.09

*Backwards elimination yielded this reduced model with variables significant at the 0.1 level. In addition to the above predictors, the following variables were part of the full model: attitudes, subjective norms, perceived behavioral control, race, class rank, housing status, general health, overall diet, use of calories on Nutrition Facts panel, use of Nutrition Facts panel, weight status, dieting habits, worried about weight, BMI, frequency of dining at fast food restaurants, frequency of dining at full-service restaurants, and noticed calorie statement.

**Ease barrier, time barrier, hunger barrier, cost barrier, gender, noticed calories, used calories, and used statement explained 39% of the variance in changes in calorie content of meals ordered.

Table 6 depicts a correlation matrix of TPB constructs, intention, and the differences in calories ordered from a fast food restaurant menu. Intention is significantly correlated with attitudes ($r=0.45, p<0.01$), subjective norms ($r=0.49, p<0.01$), and perceived behavioral control ($r=0.35, p<0.01$). Additionally, intention is significantly correlated with the change in calories ordered by college students ($r= -0.21, p=0.04$). Attitudes are also correlated with subjective norms ($r=0.23, p=0.02$) and perceived behavioral control ($r=0.20, p=0.04$).

Table 6

Correlation Matrix of TPB Constructs, Intention, and Differences in Calories Ordered from a Fast Food Menu by College Students (N=100)

	Attitudes	Subjective norms	Perceived behavioral control	Intention	Change in calories ordered
Attitudes	---				
Subjective norms	0.23*	---			
Perceived behavioral control	0.20*	0.05	---		
Intention	0.45**	0.49**	0.35**	---	
Change in calories ordered	-0.13	-0.14	-0.09	-0.21*	---

* $p < 0.05$

** $p < 0.01$

Discussion

The results of this study suggest that college students need to overcome a variety of barriers in order to utilize calorie information in a fast food restaurant to make healthier meal choices. Results of this study suggest that lack of time and hunger are two commonly perceived barriers to using menu labels in a fast food restaurant, which may lead to ordering more calories when the items are labeled. Previous studies found lack of time to be a barrier to healthful eating for college students (King, Mohl, Bernard, & Vidourek, 2007; LaCaille, Dauner, Krambeer, & Pedersen, 2011; Silliman, Rodas-Fortier, & Neyman, 2004). The choice to eat in a fast food restaurant may be made spontaneously and based on time constraints and hunger. In addition, an individual may not be given ample time to fully assess the menu and calorie labels prior to placing his or her order. Fast food menus tend to have a shorter list of options, which may limit orders to a few preferred items that are predetermined when the decision is made to go to a particular restaurant.

Additionally, students ordered more calories when they reported that the decision to use calorie information could be based on how hungry they are. If a student is very hungry, they

may forgo the use of calorie information and order whatever is appealing at the moment.

Another explanation may be that the student views the calorie information for an item he or she intended to order but does not perceive this to be sufficient calories to satiate his or her hunger.

The findings of this study are consistent with previous research that showed college students cited hunger as a reason for considering ordering larger portions at a fast food restaurant (Driskell, Meckna, & Scales, 2006). Although intention to use menu labels in a fast food restaurant is rated highly by students, busy students may not be able to overcome barriers and use the labels to make a meal choice.

Overall, students in this study ordered fewer calories when the calorie information was posted on the menus versus when calories were not posted. This is consistent with previous studies that demonstrated posting calorie information could contribute to the selection of fewer calories among college students (Chu et al, 2009; Driskell et al., 2008; Freedman & Connors, 2010). Students who noticed and subsequently used the calorie information to make their meal decisions ordered more calories from the labeled menu than those who did not see or use the calories. A possible explanation for this could be that the students were not concerned about lowering their caloric intake for that meal or that since they were ordering from a restaurant the calorie content of the meal was not important. These students may have ordered more after learning the caloric content of the items because they did not understand their energy needs. Participants who used the calorie statement when making their meal choice ordered fewer calories, which suggests that students were able to utilize this piece of information to make a healthier meal decision. These healthy college students may have thought they should eat more or had a higher budget for calories, but this notion changed when they viewed the 2000 calorie

statement. These results lend support to the addition of the calorie statement on fast food menus to provide customers with a frame of reference when choosing a meal.

Results also indicated that cost and ease of use were possible predictors of college students ordering fewer calories at a fast food restaurant. Although the price of the items did not appear on the menus in this research project, participants ordered fewer calories from the labeled menus when they reported that cost could play a role in whether or not they use the calorie information. A previous study indicated that convenience and fast foods were perceived to be less expensive than healthier foods, such as fruits and vegetables, by university students (Garcia, Sykes, Matthews, Martin, & Leipert, 2010). Students may have thought that they could order foods that were perceived to be healthier since there were no prices indicated on either fast food menu or they may be used to ordering smaller amounts due to their budget. College students who reported it was easy to use the calorie information also ordered fewer calories when the calories were posted on the menu. These students may have had the necessary nutrition knowledge to use the calorie information to make a healthier meal choice. At the time of this study, the menu labeling law was not fully implemented. Thus, students may not have the opportunity to practice and develop skill in ordering menu items while considering the caloric content of the items against other known attributes of the food such as taste or personal preferences.

Two of the three TPB constructs examined in this study were predictive of intention to use calorie information in a fast food restaurant. In the current study, attitudes were not predictive of intention to use or the use of the posted calorie information, although the mean score for the attitudes scale was toward the high range indicating positive attitudes. Only one previous study demonstrated a positive correlation between positive attitudes and purchase

intentions for healthier menu items among college students in fast food restaurants (Bates et al., 2009). However, in this study subjective norms and perceived behavioral control were predictive of intention. Students who perceived that their parents and friends thought they should use posted calorie information had higher intentions than those with opposite perceptions. Those who believed they could use the posted calorie information in a fast food restaurant also had higher intentions to use calorie information than those who did not have a high degree of perceived control. Unfortunately, intention to use the menu labels in a fast food restaurant did not translate to lower calories ordered when labels were present. However, intention was moderately correlated with the attitudes, subjective norms, and perceived behavioral control constructs. It is possible that when all the other variables that predict intention were in the model, intention fell out due to multicollinearity. At the time of the study, menu labeling was not mandated, thus, students may not have the opportunity to practice translating their intention to the behavior in front of friends and family members and building self-efficacy toward the behavior. This is the first study to date that examined these constructs in relation to use of calorie information on fast food menus.

Consistent with previous literature, the current study indicated that college women ordered fewer calories when the information was posted on menus (Conklin, Cranage, & Lambert, 2005; Driskell et al., 2008; Gerend, 2009). While women ordered fewer calories, they also likely have lower calorie needs than men. Neither college students' weight status nor weight concerns were predictive of use of calorie information in a fast food restaurant. However, dieting habits and worries about weight were predictors of intention, but not use, of the calorie information. It is possible that college students who are currently dieting or worried about their weight have sought out more nutritional knowledge and do not need to use the posted

calorie information to make a healthy meal choice. Additionally, college students who regularly use the Nutrition Facts panel had higher intentions to use posted calorie information than students who do not regularly use the panel. This could suggest that students already in the habit of using nutrition information to make other food decisions may also have intentions to use calorie information in fast food restaurants.

The scope and interpretation of this study are not without limitations. Participants in this study examined a generic fast food restaurant menu and ordered items they would most likely consume. An actual meal was not served, and this fictitious order may have created bias as this study was unable to capture and measure the amount of calories consumed during the meal. Cost has been shown to be a determining factor in the foods college students consume (Driskell, Kim, & Goebel, 2005; Driskell et al, 2006), but prices were not included on the menus used in this study. Without prices on the menus, students could have ordered more items than usual or different foods perceived to be more expensive if cost was not a factor. However, the decision to leave price off the menu was made in an effort to understand the direct result of weighing only the caloric information and food preferences in the selections. The timing of the survey presentation was also a limitation of this study. The two menus were presented within a very short timeframe and the surveys were completed after the change in calories ordered was assessed. Therefore, intention to use the calorie information was assessed after the behavior change. Time was limited in this study but could be avoided in future research by assessing intention before measuring the change in calories ordered between the two menus.

An additional limitation was that students recruited to participate in this study were from one large southeastern university. The results of this study may not be generalizable or applicable to college students from other parts of the U.S. Young adults who do not attend

college may have different views related to calorie labeling in restaurants and this study did capture that segment of the population (Nelson, Larson, Barr-Anderson, Neumark-Sztainer, & Story, 2009). Students who follow a specific diet due to a food allergy or intolerance (i.e. Celiac disease) were excluded from participating in this study. While some restaurants have made strides to offer foods that are gluten- or wheat-free, the menus used in this study would significantly reduce the number of available meal choices for those potential participants. It would be difficult for the researchers to ascertain whether the participant made a particular choice because it was the only available option that was safe for their diet or if it was an option they truly desired. These individuals may need to consider more aspects of their health than just their weight and more specific nutrition information than just calories. Finally, this study was unable to mimic the fast-paced ordering procedures that are associated with visiting a fast food counter or drive through. Overall, participants made their meal choices fairly quickly; however, the study environment was not comparable to a fast food restaurant.

Conclusions

College life represents a time when many students are living independently for the first time. Food and meal decisions that were previously made by parents or guardians are now made solely by the student. Students make choices about what to eat, how much to eat, and at what times. This study suggests that students weigh cost, lack of time, and hunger into their decisions and these barriers to healthy eating habits are also barriers to the use of menu labels in fast food restaurants. For menu labels to be used by students they need to be easy to use and provide information on how many calories are needed daily. Restaurant menu labeling in fast food restaurants could provide the information college students need to select lower calorie items, which may translate to lower intake. Once the Restaurant Nutrition Menu Labeling Requirement

of the PPACA is fully implemented, students may learn how to navigate the decision of what to order while negotiating the caloric content. Additionally, dietitians and health educators may need to consider time management skills as a potential barrier to using the calorie information in a fast food restaurant.

References

- Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, 50, 179-211.
- Bassett, M. T., Dumanovsky, T., Huang, C., Silver, L., Young, C., Nonas, C., . . . Frieden, T. R. (2008). Purchasing behavior and calorie information at fast-food chains in New York City, 2007. *American Journal of Public Health*, 98, 1457-1459. doi:10.2105/AJPH.2008.135020
- Bates, K., Burton, S., Howlett, E., & Huggins, K. (2009). The roles of gender and motivation as moderators of the effects of calorie and nutrition information provision on away-from-home foods. *The Journal of Consumer Affairs*, 43, 249-273. doi:10.1111/j.1745-6606.2009.01139.x
- Burton, S., Creyer, E. H., Kees, J., & Huggins, K. (2006). Attacking the obesity epidemic: The potential health benefits of providing nutrition information in restaurants. *American Journal of Public Health*, 96, 1669-1675. doi:10.2105/AJPH.2004.054973
- Centers for Disease Control and Prevention. National Center for Health Statistics (NCHS). (2011). National Health and Nutrition Examination Survey Data. NHANES 2009-2010. Hyattsville, MD: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention. Available at http://www.cdc.gov/nchs/nhanes/nhanes2009-2010/nhanes09_10.htm. Accessed October 1, 2012.
- Centers for Disease Control and Prevention. National Center for Health Statistics (NCHS). (2012b). National Health and Nutrition Examination Survey Data. NHANES 2007-2008. Hyattsville, MD: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention. Available at http://www.cdc.gov/nchs/nhanes/nhanes2007-2008/nhanes07_08.htm. Accessed October 1, 2012.
- Chu, Y. H., Frongillo, E. A., Jones, S. J., & Kaye, G. L. (2009). Improving patrons' meal selections through use of point-of-selection nutrition labels. *American Journal of Public Health*, 99, 2001-2005. doi:10.2105/AJPH.2008.153205
- Conklin, M. T., Cranage, D. A., & Lambert, C. U. (2005). College students' use of point of selection nutrition information. *Topics in Clinical Nutrition*, 20, 97-108. Retrieved from <http://journals.lww.com/topicsinclinicalnutrition>
- Driskell, J. A., Kim, Y., & Goebel, K. (2005). Few differences found in the typical eating and physical activity habits of lower-level and upper-level university students. *Journal of the American Dietetic Association*, 105, 798-801. doi:10.1016/j.jada.2005.02.004
- Driskell, J. A., Meckna, B. R., & Scales, N. E. (2006). Differences exist in the eating habits of university men and women at fast food restaurants. *Nutrition Research*, 26, 524-530. doi:10.1016/j.nutres.2006.09.003

- Driskell, J. A., Schake, M. C., & Detter, H. A. (2008). Using nutrition labeling as a potential tool for changing eating habits of university dining hall patrons. *Journal of the American Dietetic Association, 108*, 2071-2076. doi:10.1016/j.jada.2008.09.009
- Dumanovsky, T., Huang, C. Y., Nonas, C. A., Matte, T. D., Bassett, M. T., & Silver, L. D. (2011). Changes in energy content of lunchtime purchases from fast food restaurants after introduction of calorie labelling: Cross sectional customer surveys. *BMJ, 343*, d4464. doi:10.1136/bmj.d4464
- Elbel, B., Kersh, R., Brescoll, V. L., & Dixon, L. B. (2009). Calorie labeling and food choices: A first look at the effects on low-income people in New York City. *Health Affairs, 28*, w1110-w1121. doi:10.1377/hlthaff.28.6.w1110
- Farley, T. A., Caffarelli, A., Bassett, M. T., Silver, L., & Frieden, T. R. (2009). New York City's fight over calorie labeling: A two year struggle ultimately proves that innovation in food regulation is entirely possible at the local level. *Health Affairs, 28*, w1098-w1109. doi:10.1377/hlthaff.28.6.w1098
- Finkelstein, E. A., Strombotne, K. L., Chan, N. L., & Krieger, J. (2011). Mandatory menu labeling in one fast-food chain in King County, Washington. *American Journal of Preventive Medicine, 40*, 122-127. doi:10.1016/j.amepre.2010.10.019
- Francis, J. J., Eccles, M. P., Johnston, M., Walker, A., Grimshaw, J., Foy, R. . . . Bonetti, D. (2004). Constructing questionnaires based on the theory of planned behavior: A manual for health services researchers. Newcastle-upon-Tyne: University of Newcastle.
- Freedman, M. R., & Connors, R. (2010). Point-of-purchase nutrition information influences food-purchasing behaviors of college students: A pilot study. *Journal of the American Dietetic Association, 110*, 1222-1226. doi:10.1016/j.jada.2010.05.002
- Garcia, A. C., Sykes, L., Matthews, J., Martin, N., & Leipert, B. (2010). Perceived facilitators of and barriers to healthful eating among university students. *Canadian Journal of Dietetic Practice and Research, 71*(2), e28-e33. doi: 10.3148/71.2.2010.XX
- Gerend, M. A. (2009). Does calorie information promote lower calorie fast food choices among college students? *Journal of Adolescent Health, 44*, 84-86. doi:10.1016/j.jadohealth.2008.06.014
- Goodwin, D. K., Knol, L. K., Eddy, J. M., Fitzhugh, E. C., Kendrick, O. W., & Donahue, R. E. (2006). The relationship between self-rated health status and the overall quality of dietary intake of US adolescents. *Journal of the American Dietetic Association, 106*(9), 1450-1453. doi:10.1016/j.jada.2006.06.011

- King, K. A., Mohl, K., Bernard, A. L., & Vidourek, R. A. (2007). Does involvement in healthy eating among university students differ based on exercise status and reasons for exercise? *Californian Journal of Health Promotion*, 5(3), 106-119. Retrieved from http://cjhp.fullerton.edu/Volume5_2007/Issue3/106-119-king.pdf. Accessed on May 8, 2013
- Lando, A. M., & Labiner-Wolfe, J. (2007). Helping consumers make more healthful food choices: Consumer views on modifying food labels and providing point-of-purchase nutrition information at quick-service restaurants. *Journal of Nutrition Education and Behavior*, 39, 157-163. doi:10.1016/j.jneb.2006.12.010
- LaCaille, L. J., Dauner, K. N., Krambeer, R. J., & Pedersen, J. (2011). Psychosocial and environmental determinants of eating behaviors, physical activity, and weight change among college students: A qualitative analysis. *Journal of American College Health*, 59(6), 531-538. doi: 10.1080/07448481.2010.523855
- Lin, B. H., Guthrie, J., & Frazão, E. (1999). Nutrient contribution of food away from home. In: E. Frazão, (Ed.), *American's Eating Habits: Changes and Consequences* (pp. 213-242). Washington, DC: US Department of Agriculture.
- Martinez, O. D., Roberto, C. A., Kim, J. H., Schwartz, M. B., & Brownell, K. D. (2012). A survey of undergraduate student perceptions and use of nutrition information labels in a university dining hall. *Health Education Journal*, 72(3), 319-325. doi:10.1177/0017896912443120
- National Institutes of Health. (2000). The practical guide: Identification, evaluation, and treatment of overweight and obesity in adults (NIH Publication No. 00-4084). Retrieved from http://www.nhlbi.nih.gov/guidelines/obesity/prctgd_c.pdf. Accessed on May 20, 2013
- National Restaurant Association. (2012). *2012 restaurant industry pocket factbook*. Retrieved from http://www.restaurant.org/pdfs/research/PocketFactbook_2012.pdf. Accessed on September 4, 2012
- Nelson, M. C., Larson, N. I., Barr-Anderson, D., Neumark-Sztainer, D., & Story, M. (2009). Disparities in dietary intake, meal patterning, and home food environments among young adult nonstudents and 2- and 4-year college students. *American Journal of Public Health*, 99, 1216-1219. doi:10.2105/AJPH.2008.147454
- Nunnally, J. C. (1978). *Psychometric theory* (2nd ed.). New York: McGraw-Hill.
- Patient Protection and Affordable Care Act, Pub. L. No. 111-148, §2702, 124 Stat. 119, 318-319 (2010).

- Pawlak, R., Cerutti, C. S., & Quinton, R. (2009). Taking an undergraduate nutrition course results in favorable attitudes toward a healthful diet and improved intake of several key nutrients. *Family & Consumer Sciences Research Journal*, 38(1), 3-10. doi:10.1111/j.1552-3934.2009.00001.x
- Piron, J., Smith, L. V., Simon, P., Cummings, P. L., & Kuo, T. (2009). Knowledge, attitudes and potential response to menu labelling in an urban public health clinic population. *Public Health Nutrition*, 13, 550-555. doi:10.1017/S1368980009991303
- Racette, S. B., Deusinger, S. S., Strube, M. J., Highstein, G. R., & Deusinger, R. H. (2005). Weight changes, exercise, and dietary patterns during freshman and sophomore years of college. *Journal of American College Health*, 53(6), 245-251. doi:10.3200/JACH.53.6.245-251
- Scourboutakous, M. J., & L'Abbe, M. R. (2012). Restaurant menus: Calories, calorie density, and serving size. *American Journal of Preventive Medicine*, 43(3), 249-255. doi:10.1016/j.amepre.2012.05.018
- Silliman, K., Rodas-Fortier, K., & Neyman, M. (2004). A survey of dietary and exercise habits and perceived barriers to following a healthy lifestyle in a college population. *Californian Journal of Health Promotion*, 2(2), 10-19. Retrieved from http://www.hawaii.edu/hivandaids/Survey_of_Diet_and_Exercise_Habits_in_a_College_Population.pdf. Accessed on May 7, 2013
- Technomic Inc. (2009). *Executive summary: Update: Consumer reaction to calorie disclosure on menus/menu boards in New York City*. Retrieved from <http://www.edhoman.com/public/files/HB783-3.pdf>. Accessed on August 29, 2012
- Vadiveloo, M. K., Dixon, L. B., & Elbel, B. (2011). Consumer purchasing patterns in response to calorie labeling legislation in New York City. *International Journal of Behavioral Nutrition and Physical Activity*, 8, 51. doi:10.1186/1479-5868-8-51
- Wisdom, J., Downs, J., & Loewenstein, G. (2010). Promoting healthy choices: Information vs. convenience. *American Economic Journal: Applied Economics*, 2(2), 164-178. doi:10.1257/app.2.2.164
- Young, L. R. & Nestle, M. (2012). Reducing portion sizes to prevent obesity: A call to action. *American Journal of Preventive Medicine*, 43, 565-568. doi:10.1016/j.amepre.2012.07.024

APPENDIX B1

FAST FOOD SURVEY

Group _____ **Seat Number** _____

Instructions: Circle the appropriate response and fill in the blanks for the following questions.

1. What is your gender?
 - a. Male
 - b. Female

2. How old are you? _____ years

3. What is your race/ethnicity?
 - a. Mexican American
 - b. Other Hispanic
 - c. Non-Hispanic White
 - d. Non-Hispanic Black
 - e. Other. Please specify _____

4. What is your marital status?
 - a. Single
 - b. Married
 - c. Widowed
 - d. Divorced
 - e. Separated
 - f. Living with Partner

5. What is your class rank?
 - a. Freshman
 - b. Sophomore
 - c. Junior
 - d. Senior
 - e. Graduate

6. What is your major? _____

7. Where do you live during the school year?
 - a. Dorm
 - b. Apartment on campus
 - c. Apartment off campus
 - d. Off-campus house
 - e. Fraternity/Sorority House
 - f. Live with parent(s)
 - g. Other. Please specify _____

8. Do you have any children under the age of 19 living with you?
 - a. No
 - b. Yes. If so, how many? _____

9. Would you say that your general health is:
- Excellent
 - Very good
 - Good
 - Fair
 - Poor
 - Don't know
10. In general, how healthy is your overall diet?
- Excellent
 - Very good
 - Good
 - Fair
 - Poor
 - Don't know
11. Do you consider yourself to be a vegetarian?
- Yes
 - No
 - Don't know
12. Do you follow a specific or restricted diet because of a food allergy or intolerance (such as lactose intolerance)?
- Yes
 - No
 - I don't know
13. About how many calories do you think a man/woman of your age and physical activity needs to consume a day to maintain your current weight?
- Less than 500
 - 500-1000 calories
 - 1001-1500 calories
 - 1501-2000 calories
 - 2001-2500 calories
 - 2501-3000 calories
 - More than 3000 calories
 - Don't know
14. How often do you use the Nutrition Facts panel when deciding to buy a food product?
- Always
 - Most of the time
 - Sometimes
 - Rarely
 - Never

15. When you use the food label to decide about a food product, how often do you look for information about calories?
- Always
 - Most of the time
 - Sometimes
 - Rarely
 - Never
16. Do you consider yourself now to be:
- Overweight
 - Underweight
 - About the right weight
 - Don't know
17. Are you currently dieting?
- Yes
 - No
 - Don't know
18. Are you currently worried about your weight?
- Yes
 - No
 - Don't know
19. In a typical week, how many times do you buy food from fast food places?
- I do not typically buy food from fast food places.
 - 1 to 3 times per week
 - 4 to 6 times per week
 - 1 time per day
 - 2 times per day
 - 3 times per day
 - 4 or more times per day
20. In a typical week, how many times do you eat at a full-service restaurant with waiter or waitress service?
- I do not typically eat in full-service restaurants with waiter or waitress service.
 - 1 to 3 times per week
 - 4 to 6 times per week
 - 1 time per day
 - 2 times per day
 - 3 times per day
 - 4 or more times per day

21. Using calorie information posted on fast food restaurant menus to make a meal decision is:

Harmful	1	2	3	4	5	6	7	Beneficial
Easy	1	2	3	4	5	6	7	Difficult
Worthless	1	2	3	4	5	6	7	Useful
Convenient	1	2	3	4	5	6	7	Inconvenient

22. Having calorie information posted on menus at fast food restaurants is:

Harmful	1	2	3	4	5	6	7	Beneficial
Good	1	2	3	4	5	6	7	Bad
Worthless	1	2	3	4	5	6	7	Useful

23. Rank the top 3 reasons (1 being the top reason) why you dine in fast food restaurants.

- _____ Taste
- _____ Convenience
- _____ I do not know how to cook
- _____ Offer healthy/nutritious foods
- _____ Inexpensive
- _____ Offers time to socialize with friends/family
- _____ I do not like to cook at home
- _____ I am too busy to cook at home
- _____ It is a 'treat' to dine out
- _____ My friends/family likes them

24. My parents think that

I should 1 2 3 4 5 6 7 I should not

use posted calorie information to make a meal decision at fast food restaurants.

25. My friends think that

I should 1 2 3 4 5 6 7 I should not

use posted calorie information to make a meal decision at fast food restaurants.

26. My close friends think that

I should 1 2 3 4 5 6 7 I should not

use posted calorie information to make a meal decision at fast food restaurants.

27. It is expected of me that I use posted calorie information in fast food restaurants.

Strongly disagree 1 2 3 4 5 6 7 Strongly agree

28. I feel under social pressure to use posted calorie information in fast food restaurants to make a meal choice.

Strongly disagree 1 2 3 4 5 6 7 Strongly agree

29. I am confident that I could use calorie information in a fast food restaurant to make a healthy choice.

Strongly disagree 1 2 3 4 5 6 7 Strongly agree

30. For me to use calorie information in a fast food restaurant to make a healthy choice is

Easy 1 2 3 4 5 6 7 Difficult

31. The decision to use calorie information in a fast food restaurant is based on the amount of time I have.

Strongly disagree 1 2 3 4 5 6 7 Strongly agree

32. The decision to use calorie information in a fast food restaurant depends on how hungry I am.

Strongly disagree 1 2 3 4 5 6 7 Strongly agree

33. The decision to use calorie information in a fast food restaurant is based on the cost of the menu items.

Strongly disagree 1 2 3 4 5 6 7 Strongly agree

34. I expect to use posted calorie information to make a meal decision in a fast food restaurant.

Strongly disagree 1 2 3 4 5 6 7 Strongly agree

35. I want to use posted calorie information to make a meal decision in a fast food restaurant.

Strongly disagree 1 2 3 4 5 6 7 Strongly agree

36. I intend to use posted calorie information to make a meal decision in a fast food restaurant.

Strongly disagree 1 2 3 4 5 6 7 Strongly agree

37. If nutrition or health information were readily available in fast food restaurants, with what frequency would you use it in deciding what to order?

Often 1 2 3 4 5 6 7 Never

38. Did you notice the calorie information posted on the second menu you saw in this study?

- a. Yes
- b. No

39. Did you use this calorie information when making your meal decision?

- a. Yes
- b. No

40. Did you notice the calorie statement posted on the second menu you saw in this study?

- a. Yes
- b. No

41. Did you use this calorie statement when making your meal decision?

- a. Yes
- b. No

APPENDIX B2

FAST FOOD MENU WITHOUT CALORIE INFORMATION

Burgers

All our Angus beef burgers are served with ketchup, mustard, lettuce, tomato, onion, and pickle.

¼ lb Deluxe Cheeseburger

¼ lb Deluxe Hamburger

½ lb Deluxe Cheeseburger

½ lb Deluxe Hamburger

Double Decker Cheeseburger

Bacon Cheeseburger

Classic Hamburger

Classic Cheeseburger

Fish

Served with tartar sauce and pickles

Fried Cod Sandwich

Grilled Cod Sandwich

Chicken

All sandwiches are served with mayonnaise, lettuce, tomato, onion, and pickle. Honey Mustard, Ranch, and Southwest Ranch available for dipping.

Chargrilled Chicken Sandwich

Fried Chicken Sandwich

Chargrilled Chicken Club Sandwich

Fried Chicken Club Sandwich

Chicken Strips (5 pc)

Chicken Nuggets (6 pc)

Sides

French Fries

- Small
- Medium
- Large

Small salad with dressing choice

Sliced Apples

Salads

Salads are served on a bed of crisp romaine lettuce with your choice of chicken and dressing (Ranch, Southwest Ranch, Caesar, Honey Mustard, Reduced Fat Italian, or Balsamic Vinaigrette).

Crunchy Southwestern Salad

- Fried Chicken
- Grilled Chicken

Traditional Caesar Salad

- Fried Chicken
- Grilled Chicken

Beverages

Available in small, medium, and large

Coca Cola, Diet Coke, Sprite,
Barq's Root Beer

Hi-C Fruit Punch

1% Milk or Fat Free Chocolate Milk (8 oz)

Bottled Water

Sweet Tea

Quincy's Quick Stop

APPENDIX B3

FAST FOOD MENU WITH CALORIE INFORMATION

Salads

Salads are served on a bed of crisp romaine lettuce with your choice of chicken and dressing (Ranch (170 cal.), Southwest Ranch (150 cal.), Caesar (190 cal.), Honey Mustard (150 cal.), Reduced Fat Italian (50 cal.), Balsamic Vinaigrette (120 cal.)).

Caesar Salad	375 cal.
Grilled Chicken	455 cal.
Crispy Chicken	625 cal.
Southwest Salad	400 cal.
Grilled Chicken	470 cal.
Crispy Chicken	650 cal.

Chicken

All sandwiches are served with mayonnaise, lettuce, tomato, onion, and pickle. Honey Mustard (150 cal.), Ranch (170 cal.), or Southwest Ranch (150 cal) available for dipping.

Chicken Nuggets (6 pc)	275 cal.
Chicken Strips (5 pc)	625 cal.
Grilled Chicken Sandwich	475 cal.
Crispy Chicken Sandwich	670 cal.
Grilled Chicken Club Sandwich	585 cal.
Crispy Chicken Club Sandwich	750 cal.

Charlie's Counter

Burgers

Hamburger	250 cal.
Cheeseburger	290 cal.
Bacon Cheeseburger	355 cal.
Double Cheeseburger	400 cal.
Deluxe ¼ lb Hamburger	520 cal.
Deluxe ¼ lb Cheeseburger	600 cal.
Deluxe ½ lb Hamburger	730 cal.
Deluxe ½ lb Cheeseburger	850 cal.

Fish

Served with tartar sauce and pickles

Grilled Fish Sandwich	380 cal.
Crispy Fish Sandwich	500 cal.

Sides

French Fries	
Small	300 cal.
Medium	400 cal.
Large	510 cal.
Side Salad	35 cal.
Apple Slices	30 cal.

Beverages

Available in small, medium, and large

Coca Cola	160/265/350 cal.
Diet Coke	0/0/0 cal.
Sprite	160/265/350 cal.
Barq's Root Beer	160/265/350 cal.
Hi-C Fruit Punch	170/280/365 cal.
1% Milk (8 oz)	100 cal.
Fat Free Chocolate Milk (8 oz)	130 cal.
Bottled Water	0 cal.
Sweet Tea	150/180/280 cal.

A 2,000 calorie diet is used as the basis for general nutrition advice; however, individual calorie needs may vary.

CHAPTER 3

POSITIVE ATTITUDES ARE PREDICTIVE OF COLLEGE STUDENTS' INTENTION TO USE AND UTILIZATION OF POSTED CALORIE INFORMATION ON A FULL-SERVICE RESTAURANT MENU

Obesity continues to be an epidemic in the United States (U.S.) and around the world. Sixty-eight percent of American adults are either overweight or obese (Flegal, Carroll, Kit, & Ogden, 2012) and the World Health Organization (2012) estimates that nearly 2 billion adults in the world are overweight or obese. Multiple health ailments can be directly correlated to this problem, including cardiovascular disease (Centers for Disease Control and Prevention [CDC], 2011), type II diabetes (National Institute of Diabetes and Digestive and Kidney Diseases, 2010), and premature death (Flegal, Graubard, Williamson, & Gail, 2005). Many factors, including diet, lifestyle choices, and genetics impact the development of obesity and the associated consequences. A portion of the obesity epidemic can be attributed to the combination of the increased number of people eating in restaurants in addition to the poor nutritional quality of the foods served in these establishments (Lin, Frazão, & Guthrie, 1999; Nielsen & Popkin, 2003). Foods from restaurants are often high in total fat and calories but lacking in good sources of fiber and calcium (Lin et al., 1999; Scourboutakos & L'Abbe, 2012). One segment of the population that may benefit from restaurant menu labeling is university students. The college years represent a time when young individuals regularly make many decisions on their own for the first time, including where to eat and what to order.

In 2010 Congress passed the Patient Protection and Affordable Care Act, which contains the Restaurant Nutrition Menu Labeling Requirement (Public Law 111-148). This national law will require chain restaurants with 20 or more locations to provide calorie information on their menus, menu boards, and drive-thru menus. Although this law was not fully implemented at the time of this research, New York, NY, King County, WA, Westchester County, NY, and Philadelphia, PA have similar laws already in place. Preliminary studies from New York City are mixed. While several studies report that consumers who used the posted information to make decisions ordered significantly fewer calories than those who did not use the information (Dumanovsky et al., 2011; Technomic Inc., 2009), several studies also report no changes in calories ordered (Finkelstein, Strombotne, Chan, & Krieger, 2011; Wisdom, Downs, & Loewenstein, 2010). The majority of research with college students has been completed in university dining halls (Chu, Frongillo, Jones, & Kaye, 2009; Conklin, Cranage, and Lambert, 2005; Driskell, Schake, and Deter, 2008; Martinez, Roberto, Kim, Schwartz, & Brownell, 2012). However, the decisions made in dining halls may be different than those made in full-service restaurants. The reasons a college student would decide to eat in these two places would differ, thus, the factors involved when making food selections in each place may differ.

The effects of calorie labeling in fast food restaurants have been widely studied (Bassett et al., 2008; Dumanovsky et al., 2011; Elbel, Caffarelli, Bassett, Silver, & Frieden, 2009; Finkelstein et al., 2011; Lando & Labiner-Wolfe, 2007; Piron, Smith, Simon, Cummings, & Kuo, 2009; Technomic Inc., 2009; Vadiveloo, Dixon, & Elbel, 2011; Wisdom et al., 2010). However, only one study to date specifically examined the effects of calorie labeling in full-service restaurants, even though these restaurants comprise 47% of all the eating establishments in the U.S. (Technomic Inc., 2012). Pulos and Leng (2010) collaborated with six local full-

service restaurants in Pierce County, WA to evaluate the effects of menu labeling on consumer behavior. They found that over 70% of customers ages 18 years and older reported seeing the nutrition information on the menu, although only 24% admitted to using the information to choose an entrée. They found that one-third of the participants selected items that were slightly lower in fat and calories after viewing the nutrition information. Additional research is required to further explore the effects of posted calorie information in full-service restaurants. For the college population, research on the impact of menu labeling should extend to other facilities beyond the dining halls.

In a 2011 systematic review, Campos, Doxey, and Hammond found that females, older adults, and adults with higher educational levels are more likely to use nutrition information on food packages than their counterparts, but studies regarding restaurant menu label use are limited. The current research on the demographic characteristics of individuals who use fast food restaurant menu labeling only addresses gender (Bleich & Pollack, 2010; Conklin et al., 2005; Driskell et al., 2008; Dumanovsky et al., 2011; Gerend, 2009; Krukowski, Harvey-Berino, Kolodinsky, Narsana, & DeSisto, 2006; Martinez et al., 2012), race, and age (Bleich & Pollack, 2010; Piron et al., 2009). Women were more likely to use menu labels than men (Bleich & Pollack, 2010; Conklin et al., 2005; Driskell et al., 2008; Dumanovsky et al., 2011; Gerend, 2009; Krukowski et al., 2006; Martinez et al., 2012). African Americans and Hispanics were more likely than Caucasians to report that they would dine in a restaurant that posted nutrition information and that this information would influence them to make a healthier meal choice (Bleich & Pollack, 2010). Older adults were also more likely than their younger counterparts to report that menu labeling would influence food choice (Bleich & Pollack, 2010). Among minority and low income individuals surveyed in Los Angeles, those who were female, Hispanic,

and aged 25 to 34 or 55 to 75 years were more likely than their counterparts to report that menu labeling would cause them to eat fewer calories when dining in a fast food restaurant (Piron et al., 2009). The potential influences of other socio-demographic factors, such as housing situation and college rank, on college students' use of menu labeling in restaurants is unknown.

This study utilized the Theory of Planned Behavior (TPB) as a framework for investigating the effects of calorie information on restaurant menus for college students. The TPB explains personal attributes that lead to behavioral intention. This theory may help explain why someone would or would not use posted calorie information to assist in meal and beverage selection in a full-service restaurant. The TPB was developed by Icek Ajzen (1991) and uses constructs that explore an individual's motivation and intention to perform a behavior. The TPB includes four main constructs: attitudes, subjective norms, perceived behavioral control, and intention to perform the behavior (Ajzen, 1991). Attitude is an individual's positive or negative beliefs toward performing the behavior. Subjective norms refer to the perception of whether important people in the individual's life approve or disapprove of the health behavior. Perceived behavioral control is determined by beliefs of control as well as perceived power over the behavior. This construct is similar to self-efficacy. Finally, intention to perform a behavior is based on the attitudes toward the behavior, subjective norms, and perceived control of the behavior. If people intend to perform a behavior, such as using calorie information on a restaurant menu to make healthy choices, it can be expected that they will perform the behavior when provided with the opportunity. Therefore, the purpose of this study was to determine the predictors of intention to use calorie labels among college students. If there was a significant difference in total calories ordered before viewing calorie information versus after viewing

calorie information on menus, the predictors of the changes in the calorie content of meals ordered could be determined.

Methods

Participant Recruitment

Recruitment for this study was completed in conjunction with a similar study examining college students' use of menu labeling in fast food restaurants. The Institutional Review Board approved study procedures. Power calculations were completed to determine the adequate sample size to elicit statistical power. Based on Pawlak, Cerutti, and Quinton's (2009) study of 53 students showing a change of 263 calories following the provision of nutrition information, 90% power can be achieved with 87 students. Undergraduate students at a southern university were asked to participate in the study if they were attending a 100 to 400 level course offered through the College of Arts and Sciences, Commerce and Business Administration, Communication and Information Science, Education, Engineering, Human Environmental Sciences, and Social Work. Participants were excluded from participating if they were under 19 years of age, attended a nutrition class, majored in nutrition or restaurant hospitality management, or followed a restricted diet due to illness, food allergy or food intolerance. Students in 22 different classes were asked to participate in the study. Among the 1595 eligible students, 525 students (32.9%) requested more information about the study and 200 students (38.1%) completed either the fast food or full-service portion of the study. One hundred students participated in the full-service portion of the study. Participants who completed the entire protocol received a \$5 cash incentive in appreciation of their time.

Data Collection

Data collection took place over the course of five weeks in March and April 2013. All measurements and surveys were completed in a conference room that served as a simulated dining room. Upon arrival, the participants entered the dining room and sat down at the table. The study's purpose and requirements were explained and participants signed informed consent forms. The menus without calorie information were shown to the participant and he or she wrote down the menu items he or she would most likely order at this type of restaurant. Participants were asked to choose both a meal and a beverage.

In order to provide a distraction to the participant, after indicating the desired menu items, subjects were given ten short math problems to complete. Participants were asked to complete as many problems as they could within a five-minute period. Once the five minutes were up, the second menu with calorie information was provided. Subjects again wrote down the meal and beverage they would most likely order at this type of restaurant. After the second meal choices, the participants completed a survey that assessed the TPB constructs. Finally, the participants' heights and weights were measured and recorded by research assistants. A Tanita digital scale was used to measure participants' weight to within 0.1 kg. A Seca stadiometer was used to measure participants' height to the nearest centimeter. The scale and stadiometer were positioned in a room adjacent to the conference (aka dining) room to ensure privacy.

Survey Instrument

The survey included questions that assessed general health status, perceptions of weight status, frequency of restaurant visits (both fast food and full-service) and constructs from the TPB (see Appendix C1). The demographic section of the survey addressed gender, age, race/ethnicity, marital/partnership status, rank in school, and current housing situation. Overall

health status, self-perceived diet quality, nutrition knowledge, weight perceptions, current dieting behaviors and concerns about weight were assessed using valid questions from the National Health and Nutrition Examination Survey (NHANES) (CDC, National Center for Health Statistics [NCHS], 2011). Frequency of dining in full-service restaurants was assessed using a single question: “In a typical week, how many times do you eat at a full-service restaurant with waiter or waitress service?”

The document *Constructing Questionnaires based on the Theory of Planned Behavior: A Manual for Health Services Researchers* (Francis et al., 2004) was used to guide the development of questions that assessed attitudes, subjective norms, and perceived behavioral control. Seven questions were developed to address attitudes toward the posting of and use of calorie information in full-service restaurants. Questions included the following: “Using calorie information posted on a full-service restaurant menu to make a meal decision is harmful/beneficial, difficult/easy, worthless/useful, inconvenient/convenient” and “Having calorie information posted on menus at full-service restaurants is harmful/beneficial, bad/good, worthless/useful.” Participants responded on a scale of 1 to 7, with 1 representing the negative endpoint (i.e., harmful) and 7 representing the positive endpoint (i.e., beneficial). Three questions were developed for subjective norms (“My parents/friends/close friends think I should/should not use posted calorie information to make a meal decision at full-service restaurants”) and participants responded on a scale of 1 (should not use) to 7 (should use).

Four questions were developed to assess intention to use menu labels in full-service restaurants (“I expect/intend/want to use posted calorie information to make a meal decision in a full-service restaurant” and “If calorie labels were readily available in full-service restaurants, with what frequency would you use them?”). Participants responded on a scale of 1 (strongly

disagree) to 7 (strongly agree) and never (1) to often (7), respectively. A single question was used to elicit the participant's perceived behavioral control to use posted calorie information in a full-service restaurant ("I am confident that I could use calorie information in a full-service restaurant to make a healthy choice") with potential responses ranging from 1 (strongly disagree) to 7 (strongly agree).

Four questions were also formulated to address the potential barriers to using posted calorie information ("The decision to use calorie information in a full-service restaurant is based on the amount of time/how hungry I am/cost.") and participants responded on a scale of 1 (strongly disagree) to 7 (strongly agree). For the fourth barrier question, "for me to use calorie information in a full-service restaurant is easy/difficult," participants responded on a scale of 1 (difficult) to 7 (easy). The national menu labeling law will require calorie information to be posted in addition to a calorie statement (i.e., A 2,000 calorie diet is used as the basis for general nutrition advice; however, individual calorie needs may vary) (PPACA, 2010). Therefore, participants were also asked to determine if they noticed and used the posted calorie information and the calorie statement when making meal selections.

Restaurant Menus

Two full-service menus were developed to mimic the menus of the top three full-service restaurant chains by sales in the U.S. (Nation's Restaurant News, 2012) (see Appendices C2 and C3). One menu contained the caloric content of all menu items and the other one did not. A menu from a single national restaurant was not used in order to increase the generalizability of this study. The menu included 62 typical items served in these restaurants organized under the following categories: appetizers, entrees such as steak, chicken, and fish, pasta dishes, salads, sandwiches, side items, desserts, and non-alcoholic beverage choices. Each menu item was

given a descriptive name (crunchy, crispy, etc.) and all items except beverages and sides were described in such a way so that participants would be able to determine the method of preparation. Participants were told that the study was evaluating the content and location of items on a menu. After viewing the menu without calorie information and making a selection, participants were given a menu that contained identical items but in a different order, with calorie labels. The average caloric content of similar items on the menus of the top three chain full-service restaurants in sales in the U.S was used and gathered from the restaurant websites. The calorie information for similar items was averaged and added to the second menu in addition to the calorie statement. The menus differed in color scheme, name of the restaurants, and order of item appearance.

Data Analyses

All data analyses were conducted using Statistical Analysis Software (SAS version 9.3, 2012, SAS Institute Inc., Cary, NC) with alpha set at 0.1 level. Descriptive statistics, including frequencies, were used to explore the demographic data. A factor analysis with varimax rotation and eigenvalue greater than 1 was completed for three of the four constructs from TPB: attitudes, subjective norms, and intentions (Table 7). The eigenvalue scree plots were also examined and factor loadings greater than 0.40 were included. Internal consistencies of scale responses for each construct were assessed using Cronbach's alpha. Attitudes toward using and posting calorie information were assessed using seven questions (Table 7). All seven statements loaded onto one factor with factor loadings between 0.51 and 0.84 with a Cronbach's α of 0.83 (Tables 7 and 8). The three statements representing subjective norms also loaded onto one factor with a Cronbach's alpha of 0.85. The four-questions designed to represent intention toward using menu labels if available loaded onto one factor with a Cronbach's alpha of 0.90 and

yielded one factor. A Cronbach's alpha of 0.7 is considered acceptable (Nunnally, 1978) therefore, each TPB scale was deemed reliable and valid.

Table 7

Descriptive Statistics and Factor Loadings for Three TPB Construct Scales (N=100)

Factors	Mean (SD)	Range	Loading
<i>Attitudes</i>			
Using posted calorie information to make a meal decision is:			
Harmful (1) – Beneficial (7)	6.21 (1.10)	1-7	0.74
Difficult (1) – Easy (7)	5.10 (1.71)	1-7	0.51
Worthless (1) - Useful (7)	5.93 (1.33)	1-7	0.81
Inconvenient (1) - Convenient (7)	5.57 (1.69)	1-7	0.67
Having calorie information posted at full-service restaurants is:			
Harmful (1) - Beneficial (7)	6.29 (1.02)	1-7	0.84
Bad (1) - Good (7)	5.99 (1.46)	1-7	0.76
Worthless (1) - Useful (7)	6.10 (1.18)	1-7	0.75
<i>Subjective Norms</i>			
My parents think I should not (1)/should (7) use posted calorie information	4.35 (1.30)	1-7	0.81
My friends think I should not (1)/should (7) use posted calorie information	4.03 (1.32)	1-7	0.91
My close friends think I should not (1)/should (7) use posted calorie information	4.17 (1.36)	1-7	0.91
<i>Intention</i>			
I expect to use posted calorie information to make a meal decision (strongly disagree (1) – strongly agree (7))	3.99 (1.83)	1-7	0.85
I want to use posted calorie information to make a meal decision (strongly disagree (1) – strongly agree (7))	4.90 (1.75)	1-7	0.93
I intend to use posted calorie information to make a meal decision (strongly disagree (1) – strongly agree (7))	4.55 (1.87)	1-7	0.94
If calorie information were readily available in full-service restaurant, with what frequency would you use it (never (1) – often (7))	4.82 (1.88)	1-7	0.77

Table 8

Descriptive Statistics and Reliability Estimates of TPB Construct Scales (N=100)

	No. of items	Mean (SD)	Range	Cronbach's α
Attitudes	7	41.2 (6.8)	7-49	0.83
Subjective Norms	3	12.6 (3.5)	3-21	0.85
Perceived Behavioral Control	1	5.8 (1.5)	1-7	NA
Intention	4	18.3 (6.4)	4-28	0.90

The sum of the four questions that measured intention to use calorie labels in full-service restaurants was computed for each participant. The intention score had a range of 4-28, where a higher number represented greater intention to use menu labels when available. The attitudes score was constructed by summing the responses of seven items and had a range of 7-49. Higher numbers represented more positive attitudes towards posted calorie information. The subjective norms scale used three questions and had a range of 3-21, where a higher number represented greater feelings of social pressure to use menu labels. Perceived behavioral control to use calorie information to make a healthy choice was measured by one question and had a range of 1-7. Higher numbers represented greater perceived control.

Body mass index was also calculated for each participant, and categorized as normal weight ($<25 \text{ kg/m}^2$), overweight ($25\text{-}29.9 \text{ kg/m}^2$), and obese ($\geq 30 \text{ kg/m}^2$) classes (National Institutes of Health, 2000). The housing status variable was dichotomized into on-campus (dorm, on-campus apartment, fraternity/sorority) and off-campus (off-campus apartment, house, live with parents). Responses to questions that assessed the perceptions of general health and overall diet were each dichotomized into excellent/very good/good and fair/poor. This is in line with other research that provides a concise positive or negative view of current health and dietary

practices (Goodwin et al., 2006). Responses to a question regarding self-reported weight classification were recoded to underweight/about the right weight and overweight.

To determine which factors were associated with intention to use menu labels in a full-service restaurant, backwards elimination, with intention to use calorie labels in full-service restaurants as the dependent variable, was conducted. The following independent variables were tested: socio-demographic information, current health status, dieting habits, label use, frequency of dining out, potential barriers, the attitudes and subjective norms scales, and perceived behavioral control. All variables retained in the model were significant at the 0.1 level.

The calorie content for each of the two meals ordered for each participant was computed using the calorie information associated with each menu item. A paired t-test was conducted to determine if there was a significant difference in number of calories ordered without posted calorie information versus with posted calorie information. Lastly, to assess the factors associated with a change in behavior (menu selections), the difference in the caloric content of meals was determined by subtracting the calories of the meal ordered from the menu with calories labeled from the meal ordered from the menu without labels. Backward elimination, with the change in calorie content of meals ordered as the dependent variable, was conducted and the following independent variables were tested: socio-demographic information, current health status, dieting habits, label use, frequency of dining out, potential barriers, attitudes scale, subjective norms scale, and perceived behavioral control. All variables retained in the model were significant at the 0.1 level.

Results

Demographics

Table 9 describes the demographic information of the study sample. The majority of participants were women (66%) and non-Hispanic White (75.8%). Most participants were also between the ages of 19 and 22 (93%) and single (97%). Mean BMI was 24.95 kg/m² (*SD*=4.75) with a range of 18.17-42.91 kg/m². Overall, participants perceived themselves to be underweight or just about the right weight (78.1%) and reported their current health status to be excellent, very good, or good (89%). While the majority of respondents reported they were not dieting (89.8%), 42.7% were worried about their weight and 41.4% reported their diet quality to be fair or poor. Nearly half of participants reported using the calorie information on Nutrition Facts panel, while 31% reported using the Nutrition Facts panel at least most of the time when deciding to buy a food product. Respondents visited full-service restaurants an average of 1.87 (*SD*=1.70, range 0-14) times per week.

Table 9

Socio-Demographic Characteristics, Health Status Indicators, Dietary Habits, Mean Intention Scores, and Mean Differences in Calories Ordered by 100 College Students

	n	%	Mean intention score (SD) ^a	Mean difference in calories ordered (SD) ^a
Gender (N=100)				
Male	34	34.0	16.1 (5.9) [*]	-15.9 (568.3) [*]
Female	66	66.0	19.4 (6.4) [*]	-244.3 (524.3) [*]
Race (N=95)				
Non-Hispanic White	72	75.8	19.5 (6.1) ^{**}	-202.7 (452.8)
Non-Hispanic Black	23	24.2	14.8 (6.7) ^{**}	-211.7 (701.6)
Class rank (N=100)				
Freshman	26	26.0	18.0 (6.7) [*]	-213.5 (572.3)
Sophomore	29	29.0	19.2 (5.9) [*]	-194.8 (486.0)
Junior	27	27.0	15.6 (6.6) [*]	-87.4 (566.1)
Senior	18	18.0	21.2 (5.2) [*]	-172.5 (609.6)
Housing (N=100)				
On campus	38	38.0	19.4 (6.1)	-214.2 (464.8)
Off campus	62	62.0	17.5 (6.5)	-137.5 (594.7)
Perceived health status (N=100)				
Excellent, very good, or good	89	89.0	18.4 (6.5)	-169.6 (559.0)
Fair or poor	11	11.0	17.2 (5.4)	-143.2 (468.9)
Perceived diet quality (N=99)				
Excellent, very good, or good	58	58.6	20.0 (6.0) ^{**}	155.9 (516.6)
Fair or poor	41	41.4	15.8 (6.4) ^{**}	-185.9 (600.8)
Weight perception (N=96)				
Underweight or about the right weight	75	78.1	19.2 (4.6)	-5.2 (534.5)
Overweight	21	21.9	18.1 (6.9)	-219.2 (558.5)
BMI (N=100)				
<25 kg/m ²	60	60.0	19.0 (6.7)	-252.1 (565.1)
25 to <30 kg/m ²	27	27.0	17.6 (6.1)	-119.1 (413.8)
≥30 kg/m ²	13	13.0	16.3 (5.3)	128.8 (630.4)
Dieting (N=98)				
Yes	10	10.2	25.1 (3.2) ^{**}	-181.5 (306.1)

No	88	89.8	17.5 (6.3)**	-171.0 (574.3)
Worried about weight (N=96)				
Yes	41	42.7	19.9 (5.3)*	-265.2 (607.8)
No	55	57.3	17.1 (6.8)*	-89.8 (509.8)
Nutrition Facts panel use (N=100)				
Always	7	7.0	22.3 (7.2)**	131.4 (698.5)
Most of the time	24	24.0	22.5 (3.1)**	-330.6 (541.9)
Sometimes	31	31.0	19.4 (4.9)*	-177.6 (568.9)
Rarely	21	21.0	16.6 (5.8)**	-58.6 (445.7)
Never	17	17.0	10.6 (5.6)**	-171.5 (538.5)
Calorie information use (N=100)				
Always	17	17.0	22.8 (4.3)**	-176.8 (305.1)
Most of the time	30	30.0	20.1 (4.7)**	-269.5 (517.6)
Sometimes	27	27.0	19.3 (5.0)**	-136.3 (770.6)
Rarely	15	15.0	15.1 (5.9)**	-39.0 (404.8)
Never	11	11.0	8.1 (4.8)**	-120.0 (458.0)
Typical fast food visits (N=100)				
None	23	23.0	21.0 (6.0)*	-362.2 (557.4)*
1 to 3 times per week	59	59.0	18.1 (5.8)*	-128.2 (561.6)*
4 to 6 times per week	16	16.0	15.9 (7.9)*	-89.7 (325.7)*
7 times per week	1	1.0	8.0 (0.0)*	1175.0 (0.0)*
14 times per week	1	1.0	15.0 (0.0)*	-510.0 (0.0)*
Typical full-service visits (N=100)				
None	21	21.0	19.6 (6.6)	-371.0 (722.7)
1 to 3 times per week	73	73.0	17.9 (6.3)	-132.5 (461.6)
4 to 6 times per week	4	4.0	15.7 (8.5)	228.8 (865.4)
7 times per week	1	1.0	24.0 (0.0)	-225.0 (0.0)
14 times per week	1	1.0	21.0 (0.0)	110.0 (0.0)

^aT-tests and analysis of variances were used to determine differences in mean intention scores and mean differences in calories ordered.

* $p < 0.05$

** $p < 0.01$

TPB Constructs

Mean scores were computed for each TPB construct. The average attitudes score toward menu labeling was 41.2 ($SD=6.8$, range 7-49) among this group of college students (Table 8).

The mean subjective norms score was 12.6 ($SD=3.5$, range 3-21) and the mean perceived

behavioral control score was 5.8 ($SD=1.5$, range 1-7). The average intention score to use posted calorie information was 18.3 ($SD=6.4$, range 4-28).

Intention

Table 9 depicts the mean intention scores by socio-demographic characteristics, health status indicators, and dietary habits. Significant differences in mean intention scores were found for gender ($t=-2.49$, $p=0.01$), race ($t=3.14$, $p<0.01$), perceived diet quality ($t=3.28$, $p<0.01$), dieting ($t=3.76$, $p<0.01$), worry over weight ($t=2.21$, $p=0.03$), and use of the Nutrition Facts panel ($F=15.74$, $p<0.01$). Results indicated that attitudes, subjective norms, perceived behavioral control, time barrier, gender, race, and use of Nutrition Facts panel explained 63.2% of the variance in intention scores ($R^2=0.63$, $F=19.17$, $p<0.01$). The TPB constructs were predictive of college students' intention to use posted calorie information in full-service restaurants (Table 10). For each unit increase in the overall attitudes score, the intention score is predicted to increase by 0.18 ($F=4.26$, $p=0.04$). Likewise, when the subjective norms score increases by one unit, the intention score is expected to increase by 0.37 ($F=7.69$, $p<0.01$). PBC was also significant in that when the response to the single question assessing PBC increases by one unit, intention is expected to increase by 1.11 ($F=8.00$, $p<0.01$). Among the four questions that assessed barriers to the behavior, the only barrier that remained in the model was lack of time. When the perception of lack of time increased by one unit, the intention score is predicted to decrease by 0.64 ($F=5.18$, $p=0.03$).

Two socio-demographic characteristics were also predictive of college students' intention to use calorie information in a full-service restaurant. Gender ($F=3.63$, $p=0.06$) and race ($F=3.42$, $p=0.07$) remained in the model, signifying that women and non-Hispanic Whites have higher intentions to use calorie information in a full-service restaurant than men and non-

Hispanic Blacks. Additionally, for each increment increase in use of the Nutrition Facts panel, representing an increase in the frequency of use, the intention score is predicted to increase by 1.99 ($F=17.27, p<0.01$).

Table 10

Significant Predictors of Intention to use Posted Calorie Information in Full-Service Restaurants (N=100)

Variable	Parameter Estimate	SE	F Value	P value*
Attitudes	0.18	0.09	4.26	0.04
Subjective norms	0.37	0.13	7.69	<0.01
Perceived behavioral control	1.11	0.39	8.00	<0.01
Time barrier	-0.64	0.28	5.18	0.03
Gender	2.01	1.05	3.63	0.06
Race	-2.51	1.36	3.42	0.07
Use of Nutrition Facts panel	1.99	0.48	17.27	<0.01

*Backwards elimination yielded this reduced model with variables significant at the 0.1 level. The following variables were part of the full model: class rank, housing status, general health, overall diet, use of calories on Nutrition Facts panel, weight status, BMI, dieting habits, worried about weight, hunger barrier, cost barrier, ease of use barrier, frequency of dining at fast food restaurants, and frequency of dining at full-service restaurants.

**Attitudes, subjective norms, perceived behavioral control, time barrier, gender, race, and use of Nutrition Facts panel explained 63.2% of the variance in intention scores.

Changes in Calories Ordered

The average order from the first menu without calorie information was 1370 ($SD=607$) calories. Participants ordered an average of 1203 ($SD=517$) calories from the second menu that contained calorie information. Participants ordered significantly less calories when calorie information was posted on the menus ($t=-3.04, p<0.01$) versus no calorie posting. While 87% of participants noticed the calorie information posted next to each menu item on the second menu, only 41% reported using this information to make their meal decision. Forty-nine percent of participants noticed the calorie statement on the menu while only 22% used this when deciding on their meal.

Table 9 presents the mean differences in calories ordered by socio-demographic characteristics, health status indicators, and dietary habits. Significant differences in the change in calories ordered were found between gender ($t=2.01, p=0.04$). Table 11 presents the results of backwards elimination of the predictors associated with differences in calories ordered. Results indicated that attitudes, time barrier, hunger barrier, use of Nutrition Facts panel, noticed calories, used calories, used statement, and BMI variables explained 25.6% of the variance in changes in calorie content of meals ordered ($R^2=0.25, F=3.31, p<0.01$). If participants noticed the calorie information on the menu, they ordered 395.6 calories fewer than those who did not notice the information ($F=5.00, p=0.03$). However, of all the participants who noticed the calorie information, those who stated they used the calorie information ordered 261.7 calories more than participants who did not use the information ($F=3.49, p=0.07$). Those who used the calorie statement on the menu ordered 310.2 calories less than participants who did not use the statement to make their meal decision ($F=5.33, p=0.02$). Participants who use the Nutrition Facts panel also ordered 115 calories less than those who do not regularly use the panel when making decisions about a food ($F=3.85, p=0.05$). Additionally, participants ordered 134.1 more calories from the labeled menu for each increase in BMI category ($F=2.77, p=0.10$).

Attitude toward posted calorie information in full-service restaurants was the only significant predictor within the TPB of change in caloric content of the meal ordered. For each unit increase in the overall attitudes score, participants decreased the calories in the order by 27 ($F=8.85, p<0.01$). Among the four barriers tested, only time and hunger appear in the final model. Barriers were measured on a scale from 1 (strongly disagree) to 7 (strongly agree). For each unit increase in the perception of time as a barrier to using calorie information, participants ordered 63.2 calories fewer than those who did not perceive time as a barrier ($F=3.23, p=0.08$).

For each unit increase in the perception of hunger as a barrier to using calorie information, participants ordered 53.9 calories more than those who did not perceive hunger as a barrier ($F=3.09, p=0.08$).

Table 11

Variables Associated with a Change in Calorie Content of a Meal Ordered from a Full-Service Restaurant Menu (N=100)

Variable	Parameter Estimate	SE	F Value	P value*
Attitudes	-27.1	9.1	8.85	<0.01
Time barrier	-63.2	35.2	3.23	0.08
Hunger barrier	53.9	30.7	3.09	0.08
Use of Nutrition Facts panel	-115.0	58.6	3.85	0.05
Noticed calories on 2 nd menu	-395.6	176.9	5.00	0.03
Used calories on 2 nd menu	261.7	140.0	3.49	0.07
Used statement on 2 nd menu	-310.2	134.3	5.33	0.02
BMI	134.1	80.6	2.77	0.10

*Backwards elimination yielded this reduced model with variables significant at the 0.1 level. The following variables were part of the full model: perceived behavioral control, subjective norms, gender, race, class rank, housing status, general health, overall diet, use of calories on Nutrition Facts panel, weight status, dieting habits, worried about weight, hunger barrier, cost barrier, ease of use barrier, noticed statement on 2nd menu, frequency of dining at fast food restaurants, and frequency of dining at full-service restaurants.

**Attitudes, time barrier, hunger barrier, use of Nutrition Facts panel, noticed calories, used calories, used statement, and BMI variables explained 25.6% of the variance in changes in calorie content of meals ordered.

Table 12 depicts a correlation matrix of TPB constructs, intention, and the differences in calories ordered from a full-service restaurant menu. Intention was significantly correlated with attitudes ($r=0.54, p<0.01$), subjective norms ($r=0.28, p<0.01$), and perceived behavioral control ($r=0.49, p<0.01$). Additionally, changes in calories ordered were significantly correlated with the attitudes ($r= -0.30, p<0.01$) and perceived behavioral control ($r=-0.29, p<0.01$). Attitudes were also correlated with perceived behavioral control ($r=0.51, p<0.01$). Intention was not significantly correlated with a change in calories ordered from a full-service menu ($r=-0.15, p=0.15$).

Table 12

Correlation Matrix of TPB Constructs, Intention, and Differences in Calories Ordered from a Full-Service Menu by College Students (N=100)

	Attitudes	Subjective norms	Perceived behavioral control	Intention	Change in calories ordered
Attitudes	---				
Subjective norms	0.07	---			
Perceived behavioral control	0.51**	0.02	---		
Intention	0.54**	0.28**	0.49**	---	
Change in calories ordered	-0.30**	-0.01	-0.29**	-0.15	---

* $p < 0.05$

** $p < 0.01$

Discussion

The results of this study suggest that the TPB constructs of attitudes, subjective norms, and perceived behavioral control were predictive of intention to use posted calorie information on full-service menus among undergraduate students attending classes at a southern university. Previous studies have examined attitudes and intentions of college students (Bates, Burton, Howlett, & Huggins, 2009; Martinez et al., 2012), but this is the first study to examine the entire model under the context of restaurant menu labeling. This study adds to the body of literature in that this theoretical model may be able to explain the factors involved in the intention to make a decision to use posted calorie information in a full-service restaurant. However, intention to use posted menu labels does not translate to changes in a typical order at a full-service restaurant when the calories are posted. Instead, positive attitudes toward using menu labels, lack of time to eat a meal, and frequent use of the Nutrition Facts Panel predict a decrease in caloric content for the order when the menu is labeled versus when it is not. Degree of hunger and increasing BMI predicted an increase in the number of calories ordered when the menu was labeled versus when it was not.

Students in this study ordered significantly fewer calories when the calorie information was posted on the menus and a statement about the number of calories needed in a day appeared on the menu. This is congruent with previous studies that showed calorie labels could contribute to changes in purchasing behavior and the ordering of less calories among college students in university dining halls (Chu et al., 2009; Driskell et al., 2008; Freedman & Connors, 2010; Martinez et al., 2012). Students who noticed the calorie information ordered fewer calories but those who reported using the information ordered more calories from the labeled menu. It is possible that the students perceived dining out in a full-service restaurant to be a treat or special occasion. Therefore, they may not have been overly concerned with decreasing the number of calories ordered when the information was posted on the menus. Students who used the calorie statement ordered fewer calories, which suggests they were able to interpret the statement and use it to make a better choice. Results support the inclusion of the calorie statement on restaurant menus to provide patrons with a point of reference for their meal choices.

Results of this study also demonstrated that a positive attitude toward calorie labeling is predictive of both intentions to use and subsequent change in the calorie content of the ordered meal. Positive attitudes overall toward posting calorie information on menus have been reported among college students (Bates et al., 2009; Martinez et al., 2012). This suggests that college students who believe that calorie labeling is beneficial and useful may have greater intentions and use this information to make a meal decision.

The barrier of time was also predictive of both intentions and use of posted calorie information. Students who reported that time was a potential barrier to using calorie information had lower intentions to use the calories on the menu. This is consistent with several studies that showed time to be an impedance to healthy eating among college students (Silliman, Rodas-

Fortier, & Neyman, 2004; Strong, Parks, Anderson, Winett, & Davy, 2008). Additionally, regular use of the Nutrition Facts panel also predicted both intentions and use of calorie information. This finding is logical in that students who read food labels often would also utilize calorie information in full-service restaurants. These students may already use labels when making meal decisions at home and be able to translate the skill into menu labels.

Additionally, college women had higher intentions to use the calorie information on menus than men did, which is consistent with other literature (Conklin et al., 2005; Driskell et al., 2008; Gerend, 2009). However, neither gender nor race played a role in altering selections when the menu options were labeled with calories. One interesting finding is that current use of dieting methods and perception of weight status did not predict either intent to use menu labels or changes in menu orders. This finding may suggest that those who are watching their weight or trying to lose weight may have knowledge of the typical caloric values of many items on the menu already and use previous knowledge to make an informed decision. Thus, their order does not change when the calories are posted. Or these individuals may have made behavioral changes previously that are now part of the strategies used when placing an order. For example, those concerned with their weight may rely on scripted strategies, such as eating grilled chicken versus fried or drinking water versus a soda. Thus, they do not need to rely on menu labels. An alternative hypothesis may be that dining in a full-service restaurant may be a special occasion or treat. Therefore, the nutritional content of the items ordered is not a priority.

This study is not without limitations. College students were recruited from one southeastern university and the results obtained may not reflect the views and beliefs of students at other universities in different parts of the country. In addition, young adults over the age of 19 years who do not attend college may have different views related to calorie labeling in

restaurants and this study did not capture that segment of the population (Nelson, Larson, Barr-Anderson, Neumark-Sztainer, & Story, 2009). Students who follow a specific diet due to a chronic illness, food allergy or food intolerance (i.e. Celiac disease) were also excluded. While some restaurants are making strides to offer foods that are gluten- or wheat-free, the menus used in this study were intended to mimic the options in the three largest chains. Individuals with these ailments would alter their choice based on their individual health needs versus caloric content. In addition, these individuals would probably need to inquire about how the items are prepared, which was not part of the protocol.

This study used college students as the overall population, but did not conduct separate analyses by gender. Previous studies have revealed that college women are more likely to use the calorie information (Bleich & Pollack, 2010; Conklin et al., 2005; Driskell et al., 2008; Krukowski, Harvey-Berino, Kolodinsky, Narsana, & DeSisto, 2006; Martinez et al., 2012); however, this study was powered to examine college students in a general manner. This study was also limited by the short time period in which the menus were presented. Additionally, intention to use the calorie information was measured after the participants made their meal choices from both menus. This could have biased their reporting of intentions as they already performed the behavior. This study required participants to choose the meal they would most likely consume at the restaurant. The participants did not receive an actual meal, and this fictitious order may have created bias, as the study did not capture the calories that the subject consumed. However, if the amount of calories ordered from the labeled menu was reduced, this would likely mean a reduction in the amount of calories consumed. This study asked the participant to order all menu items at once. In reality many full-service restaurants ask for drink, appetizer, entrée and dessert orders at separate times and throughout the meal. Thus, the option

to order a dessert may be based on hunger/satiety cues after consumption of the entrée versus hunger cues prior to eating. Cost has been shown to play a role in the foods college students consume (Driskell, Kim, & Goebel, 2005; Driskell, Meckna, & Scales, 2006), so participants may have ordered a larger quantity or different foods and beverages if price was not a factor. Students were seated at tables like patrons in a restaurant but were not friends or introduced to each other. Thus, group decisions regarding meals and sharing of items like appetizers and desserts were not discussed. This step allowed the researcher to identify individual factors that were specifically related to menu label use and changes in order. Other factors such as price, visual cues (such as pictures on the menu), or the social context of the meal may also play a role in menu decisions. Prices were not posted on the full-service restaurant menus used in this study.

Conclusions

College students who have positive attitudes toward posted calorie information in full-service restaurants may have greater intention to use the information and make lower calorie choices. In addition to positive attitudes, students must also have adequate time to use the information as well as established regular use of the food label. With all new behaviors, the time barrier may lessen with practice. This study's findings stress the need for menu labeling in full-service restaurants that includes a statement of caloric needs to assist students in their decisions.

References

- Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, 50, 179-211.
- Bassett, M. T., Dumanovsky, T., Huang, C., Silver, L., Young, C., Nonas, C., . . . Frieden, T. R. (2008). Purchasing behavior and calorie information at fast-food chains in New York City, 2007. *American Journal of Public Health*, 98, 1457-1459. doi:10.2105/AJPH.2008.135020
- Bates, K., Burton, S., Howlett, E., & Huggins, K. (2009). The roles of gender and motivation as moderators of the effects of calorie and nutrition information provision on away-from-home foods. *The Journal of Consumer Affairs*, 43, 249-273. doi:10.1111/j.1745-6606.2009.01139.x
- Bleich, S. N., & Pollack, K. M. (2010). The publics' understanding of daily caloric recommendations and their perceptions of calorie posting in chain restaurants. *BMC Public Health*, 10(121), 1-10. doi:10.1186/1471-2458-10-121
- Campos, S., Doxey, J., & Hammond, D. (2011). Nutrition labels on pre-packaged foods: A systematic review. *Public Health Nutrition*, 14, 1496-1506. doi:10.1017/S1368980010003290
- Centers for Disease Control and Prevention. (2011). *The health effects of overweight and obesity*. Retrieved from <http://www.cdc.gov/healthyweight/effects/index.html>. Accessed on August 29, 2012
- Centers for Disease Control and Prevention. National Center for Health Statistics (NCHS). (2011). National Health and Nutrition Examination Survey Data. NHANES 2009-2010. Hyattsville, MD: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention. Available at http://www.cdc.gov/nchs/nhanes/nhanes2009-2010/nhanes09_10.htm. Accessed October 1, 2012.
- Chu, Y. H., Frongillo, E. A., Jones, S. J., & Kaye, G. L. (2009). Improving patrons' meal selections through use of point-of-selection nutrition labels. *American Journal of Public Health*, 99, 2001-2005. doi:10.2105/AJPH.2008.153205
- Conklin, M. T., Cranage, D. A., & Lambert, C. U. (2005). College students' use of point of selection nutrition information. *Topics in Clinical Nutrition*, 20, 97-108. Retrieved from <http://journals.lww.com/topicsinclinicalnutrition>
- Driskell, J. A., Kim, Y., & Goebel, K. (2005). Few differences found in the typical eating and physical activity habits of lower-level and upper-level university students. *Journal of the American Dietetic Association*, 105, 798-801. doi:10.1016/j.jada.2005.02.004

- Driskell, J. A., Meckna, B. R., & Scales, N. E. (2006). Differences exist in the eating habits of university men and women at fast food restaurants. *Nutrition Research*, *26*, 524-530. doi:10.1016/j.nutres.2006.09.003
- Driskell, J. A., Schake, M. C., & Detter, H. A. (2008). Using nutrition labeling as a potential tool for changing eating habits of university dining hall patrons. *Journal of the American Dietetic Association*, *108*, 2071-2076. doi:10.1016/j.jada.2008.09.009
- Dumanovsky, T., Huang, C. Y., Nonas, C. A., Matte, T. D., Bassett, M. T., & Silver, L. D. (2011). Changes in energy content of lunchtime purchases from fast food restaurants after introduction of calorie labelling: Cross sectional customer surveys. *BMJ*, *343*, d4464. doi:10.1136/bmj.d4464
- Elbel, B., Kersh, R., Brescoll, V. L., & Dixon, L. B. (2009). Calorie labeling and food choices: A first look at the effects on low-income people in New York City. *Health Affairs*, *28*, w1110-w1121. doi:10.1377/hlthaff.28.6.w1110
- Finkelstein, E. A., Strombotne, K. L., Chan, N. L., & Krieger, J. (2011). Mandatory menu labeling in one fast-food chain in King County, Washington. *American Journal of Preventive Medicine*, *40*, 122-127. doi:10.1016/j.amepre.2010.10.019
- Flegal, K. M., Carroll, M. D., Kit, B.K., & Ogden, C. L. (2012). Prevalence of obesity and trends in the distribution of body mass index among U.S. adults, 1999-2010. *Journal of the American Medical Association*, *307*(5), 491-497.
- Flegal, K. M., Graubard, B. I., Williamson, D. F., & Gail, M. H. (2005). Excess deaths associated with underweight, overweight, and obesity. *Journal of the American Medical Association*, *293*, 1861-1867. doi:10.1001/jama.293.15.1861
- Francis, J. J., Eccles, M. P., Johnston, M., Walker, A., Grimshaw, J., Foy, R. . . . Bonetti, D. (2004). Constructing questionnaires based on the theory of planned behaviour: A manual for health services researchers. Newcastle-upon-Tyne: University of Newcastle.
- Freedman, M. R., & Connors, R. (2010). Point-of-purchase nutrition information influences food-purchasing behaviors of college students: A pilot study. *Journal of the American Dietetic Association*, *110*, 1222-1226. doi:10.1016/j.jada.2010.05.002
- Gerend, M. A. (2009). Does calorie information promote lower calorie fast food choices among college students? *Journal of Adolescent Health*, *44*, 84-86. doi:10.1016/j.jadohealth.2008.06.014
- Goodwin, D. K., Knol, L. K., Eddy, J. M., Fitzhugh, E. C., Kendrick, O. W., & Donahue, R. E. (2006). The relationship between self-rated health status and the overall quality of dietary intake of US adolescents. *Journal of the American Dietetic Association*, *106*(9), 1450-1453. doi:10.1016/j.jada.2006.06.011

- Krukowski, R. A., Harvey-Berino, J., Kolodinsky, J., Narsana, R. T., & DeSisto, T. P. (2006). Consumers may not use or understand calorie labeling in restaurants. *Journal of the American Dietetic Association*, 106, 917-920. doi:10.1016/j.jada.2006.03.005
- Lando, A. M., & Labiner-Wolfe, J. (2007). Helping consumers make more healthful food choices: Consumer views on modifying food labels and providing point-of-purchase nutrition information at quick-service restaurants. *Journal of Nutrition Education and Behavior*, 39, 157-163. doi:10.1016/j.jneb.2006.12.010
- Lin, B.-H., Frazão, E., & Guthrie, J. (1999). *Away-from-home foods increasingly important to quality of American diet* (Agriculture Information Bulletin No. 749). Retrieved from United States Department of Agriculture website: <http://www.ers.usda.gov/publications/aib749/aib749.pdf>
- Martinez, O. D., Roberto, C. A., Kim, J. H., Schwartz, M. B., & Brownell, K. D. (2012). A survey of undergraduate student perceptions and use of nutrition information labels in a university dining hall. *Health Education Journal*, 72(3), 319-325. doi:10.1177/0017896912443120
- National Institute of Diabetes and Digestive and Kidney Diseases. (2010). *Do you know the health risks of being overweight?* Retrieved from http://win.niddk.nih.gov/publications/health_risks.htm. Accessed on September 4, 2012
- National Institutes of Health. (2000). The practical guide: Identification, evaluation, and treatment of overweight and obesity in adults (NIH Publication No. 00-4084). Retrieved from http://www.nhlbi.nih.gov/guidelines/obesity/prctgd_c.pdf. Accessed on May 20, 2013
- Nation's Restaurant News. (2012). Top 100 chains: U.S. sales. Retrieved from <http://nrn.com/us-top-100/top-100-chains-us-sales>. Accessed on December 18, 2012
- Nelson, M. C., Larson, N. I., Barr-Anderson, D., Neumark-Sztainer, D., & Story, M. (2009). Disparities in dietary intake, meal patterning, and home food environments among young adult nonstudents and 2- and 4-year college students. *American Journal of Public Health*, 99, 1216-1219. doi:10.2105/AJPH.2008.147454
- Nielsen, S. & Popkin, B. (2003). Patterns and trends in food portion sizes, 1977-1998. *Journal of the American Medical Association*, 289, 450-453. doi:10.1001/jama.289.4.450
- Nunnally, J. C. (1978). *Psychometric theory* (2nd ed.). New York: McGraw-Hill.
- Patient Protection and Affordable Care Act, Pub. L. No. 111-148, §2702, 124 Stat. 119, 318-319 (2010).

- Piron, J., Smith, L. V., Simon, P., Cummings, P. L., & Kuo, T. (2009). Knowledge, attitudes and potential response to menu labelling in an urban public health clinic population. *Public Health Nutrition, 13*, 550-555. doi:10.1017/S1368980009991303
- Pulos, E., & Leng, K. (2010). Evaluation of a voluntary menu-labeling program in full-service restaurants. *American Journal of Public Health, 100*, 1035-1039. doi:10.2105/AJPH.2009.174839
- Scourboutakous, M. J., & L'Abbe, M. R. (2012). Restaurant menus: Calories, calorie density, and serving size. *American Journal of Preventive Medicine, 43*(3), 249-255. doi:10.1016/j.amepre.2012.05.018
- Silliman, K., Rodas-Fortier, K., & Neyman, M. (2004). A survey of dietary and exercise habits and perceived barriers to following a healthy lifestyle in a college population. *Californian Journal of Health Promotion, 2*(2), 10-19. Retrieved from http://www.hawaii.edu/hivandaids/Survey_of_Diet_and_Exercise_Habits_in_a_College_Population.pdf. Accessed on May 7, 2013
- Strong, K. A., Parks, S. L., Anderson, E., Winett, R., & Davy, B. M. (2008). Weight gain prevention: Identifying theory-based targets for health behavior change in young adults. *Journal of the American Dietetic Association, 108*(10), 1708-1715. doi:10.1016/j.jada.2008.07.007
- Technomic Inc. (2009). *Executive summary: Update: Consumer reaction to calorie disclosure on menus/menu boards in New York City*. Retrieved from <http://www.edhoman.com/public/files/HB783-3.pdf>. Accessed on August 29, 2012
- Technomic Inc. (2012). *Differences are blurring between fast-food and fast-casual restaurants, says Technomic*. Retrieved from http://www.technomic.com/Pressroom/Releases/dynRelease_Detail.php?rUID=171. Accessed on September 26, 2012
- Vadiveloo, M. K., Dixon, L. B., & Elbel, B. (2011). Consumer purchasing patterns in response to calorie labeling legislation in New York City. *International Journal of Behavioral Nutrition and Physical Activity, 8*, 51. doi:10.1186/1479-5868-8-51
- Wisdom, J., Downs, J., & Loewenstein, G. (2010). Promoting healthy choices: Information vs. convenience. *American Economic Journal: Applied Economics, 2*(2), 164-178. doi:10.1257/app.2.2.164
- World Health Organization. (2012). *Obesity and overweight*. Retrieved from <http://www.who.int/mediacentre/factsheets/fs311/en/>. Accessed on August 28, 2012.

APPENDIX C1
FULL-SERVICE RESTAURANT SURVEY

Group _____ **Seat Number** _____

Instructions: Circle the appropriate response and fill in the blanks for the following questions.

1. What is your gender?
 - a. Male
 - b. Female

2. How old are you? _____ years

3. What is your race/ethnicity?
 - a. Mexican American
 - b. Other Hispanic
 - c. Non-Hispanic White
 - d. Non-Hispanic Black
 - e. Other. Please specify _____

4. What is your marital status?
 - a. Single
 - b. Married
 - c. Widowed
 - d. Divorced
 - e. Separated
 - f. Living with Partner

5. What is your class rank?
 - a. Freshman
 - b. Sophomore
 - c. Junior
 - d. Senior
 - e. Graduate

6. What is your major? _____

7. Where do you live during the school year?
 - a. Dorm
 - b. Apartment on campus
 - c. Apartment off campus
 - d. Off-campus house
 - e. Fraternity/Sorority House
 - f. Live with parent(s)
 - g. Other. Please specify _____

8. Do you have any children under the age of 19 living with you?
 - a. No
 - b. Yes. If so, how many? _____

9. Would you say that your general health is:
- Excellent
 - Very good
 - Good
 - Fair
 - Poor
 - Don't know
10. In general, how healthy is your overall diet?
- Excellent
 - Very good
 - Good
 - Fair
 - Poor
 - Don't know
11. Do you consider yourself to be a vegetarian?
- Yes
 - No
 - Don't know
12. Do you follow a specific or restricted diet because of a food allergy or intolerance (such as lactose intolerance)?
- Yes
 - No
 - I don't know
13. About how many calories do you think a man/woman of your age and physical activity needs to consume a day to maintain your current weight?
- Less than 500
 - 500-1000 calories
 - 1001-1500 calories
 - 1501-2000 calories
 - 2001-2500 calories
 - 2501-3000 calories
 - More than 3000 calories
 - Don't know
14. How often do you use the Nutrition Facts panel when deciding to buy a food product?
- Always
 - Most of the time
 - Sometimes
 - Rarely
 - Never

15. When you use the food label to decide about a food product, how often do you look for information about calories?
- Always
 - Most of the time
 - Sometimes
 - Rarely
 - Never
16. Do you consider yourself now to be:
- Overweight
 - Underweight
 - About the right weight
 - Don't know
17. Are you currently dieting?
- Yes
 - No
 - Don't know
18. Are you currently worried about your weight?
- Yes
 - No
 - Don't know
19. In a typical week, how many times do you buy food from fast food places?
- I do not typically buy food from fast food places.
 - 1 to 3 times per week
 - 4 to 6 times per week
 - 1 time per day
 - 2 times per day
 - 3 times per day
 - 4 or more times per day
20. In a typical week, how many times do you eat at a full-service restaurant with waiter or waitress service?
- I do not typically eat in full-service restaurants with waiter or waitress service.
 - 1 to 3 times per week
 - 4 to 6 times per week
 - 1 time per day
 - 2 times per day
 - 3 times per day
 - 4 or more times per day

21. Using calorie information posted on full-service restaurant menus to make a meal decision is:

Harmful	1	2	3	4	5	6	7	Beneficial
Easy	1	2	3	4	5	6	7	Difficult
Worthless	1	2	3	4	5	6	7	Useful
Convenient	1	2	3	4	5	6	7	Inconvenient

22. Having calorie information posted on menus at full-service restaurants with waiter/waitress service is:

Harmful	1	2	3	4	5	6	7	Beneficial
Good	1	2	3	4	5	6	7	Bad
Worthless	1	2	3	4	5	6	7	Useful

23. Rank the top 3 reasons (1 being the top reason) why you dine in full-service restaurants with waiters/waitresses.

- _____ Taste
- _____ Convenience
- _____ I do not know how to cook
- _____ Offer healthy/nutritious foods
- _____ Inexpensive
- _____ Offers time to socialize with friends/family
- _____ I do not like to cook at home
- _____ I am too busy to cook at home
- _____ It is a 'treat' to dine out
- _____ My friends/family likes them

24. My parents think that

I should 1 2 3 4 5 6 7 I should not

use posted calorie information to make a meal decision at restaurants with waiter/waitress service.

25. My friends think that

I should 1 2 3 4 5 6 7 I should not

use posted calorie information to make a meal decision at restaurants with waiter/waitress service.

26. My close friends think that

I should 1 2 3 4 5 6 7 I should not

use posted calorie information to make a meal decision at restaurants with waiter/waitress service.

27. It is expected of me that I use posted calorie information in restaurants with waiter/waitress service.

Strongly disagree 1 2 3 4 5 6 7 Strongly agree

28. I feel under social pressure to use posted calorie information in restaurants with waiter/waitress service to make a meal choice.

Strongly disagree 1 2 3 4 5 6 7 Strongly agree

29. I am confident that I could use calorie information in a full-service restaurant to make a healthy choice.

Strongly disagree 1 2 3 4 5 6 7 Strongly agree

30. For me to use calorie information in a full-service restaurant to make a healthy choice is

Easy 1 2 3 4 5 6 7 Difficult

31. The decision to use calorie information in a full-service restaurant is based on the amount of time I have.

Strongly disagree 1 2 3 4 5 6 7 Strongly agree

32. The decision to use calorie information in a full-service restaurant depends on how hungry I am.

Strongly disagree 1 2 3 4 5 6 7 Strongly agree

33. The decision to use calorie information in a full-service restaurant is based on the cost of the menu items.

Strongly disagree 1 2 3 4 5 6 7 Strongly agree

34. I expect to use posted calorie information to make a meal decision in a restaurant with waiter/waitress service.

Strongly disagree 1 2 3 4 5 6 7 Strongly agree

35. I want to use posted calorie information to make a meal decision in a restaurant with waiter/waitress service.

Strongly disagree 1 2 3 4 5 6 7 Strongly agree

36. I intend to use posted calorie information to make a meal decision in a restaurant with waiter/waitress service.

Strongly disagree 1 2 3 4 5 6 7 Strongly agree

37. If nutrition information were readily available in restaurants with a waiter or waitress, with what frequency would you use it in deciding what to order?

Often 1 2 3 4 5 6 7 Never

38. Did you notice the calorie information posted on the second menu you saw in this study?

- a. Yes
- b. No

39. Did you use this calorie information when making your meal decision?

- a. Yes
- b. No

40. Did you notice the calorie statement posted on the second menu you saw in this study?

- c. Yes
- d. No

41. Did you use this calorie statement when making your meal decision?
- c. Yes
 - d. No

APPENDIX C2

FULL-SERVICE MENU WITHOUT CALORIE INFORMATION

Quincy's American Fare

Where you're always welcome

Appetizers

Mozzarella Sticks

Fried mozzarella served with warm marinara sauce.

Boneless Buffalo Wings

Lightly breaded boneless chicken tossed in buffalo sauce and served with blue cheese or ranch dressing.

Spinach & Artichoke Dip

Spinach, artichokes, and onions with melted Parmesan and Asiago cheeses. Served with warm tortilla chips.

Crispy Green Beans

Battered and fried green beans with ranch dressing for dipping.

Loaded Potato Skins

Topped with cheddar cheese, crisp bacon, sour cream, and green onions.

Chips and Queso

Spicy white queso topped with tomatoes, red onion, and cilantro. Served with warm tortilla chips.

Warm Pretzels with Cheese Sauce

Chewy pretzels sprinkled with salt and served with a savory cheese sauce.

Salads & Soups

Chicken Caesar Salad

Grilled chicken breast served on a bed of romaine lettuce with parmesan cheese, croutons, and Caesar dressing.
(May substitute steak)

Southwestern Chopped Salad

Chopped lettuce with grilled steak, roasted red peppers, black beans, charred corn, tomatoes, jack cheese, and topped with tortilla strips and avocado vinaigrette.
(May substitute chicken)

Pecan Crusted Chicken Salad

Chicken coated with crunchy pecans and fried. Served on romaine and mixed greens with dried cranberries, mandarin oranges, pecans, and bleu cheese. Served with balsamic vinaigrette.

French Onion Soup

Served with melted Gruyere cheese.

Chili Cup or Bowl

Tomato Basil Soup Cup or Bowl

Add a garlic breadstick to any soup or salad order.

Burgers

5 oz Black Angus burgers cooked to order and served on a toasted bun. Served with your choice of seasoned French fries or sweet potato fries.*

Cheddar & Bacon Burger

Sharp cheddar cheese, crisp bacon, mayo, tangy BBQ sauce, lettuce, and tomato

Bleu Cheese Burger

Crumbled bleu cheese, bacon, caramelized onions, mushrooms, and mayo

Mushroom & Swiss Burger

Sautéed mushrooms, red onions, and Swiss

Turkey Burger

Seasoned ground turkey patty served with lettuce, tomato, onion, and pickle
Add your choice of cheese: American, Cheddar, Swiss, or Bleu

Cheeseburger

Classic burger topped with American cheese, lettuce, tomato, onion, and pickle

Sandwiches

Served with your choice of seasoned French fries or sweet potato fries.

Reuben Sandwich

Thin sliced corned beef brisket with crunchy sauerkraut, Swiss cheese, and 1000 Island dressing on toasted rye.

Philly Cheesesteak

Shaved steak with grilled peppers, onions, and provolone cheese on a hoagie roll

California Club

Turkey, ham, bacon, Swiss cheese, avocado, lettuce, tomato, and mayo on toasted white bread.

Grilled Chicken Sandwich

Grilled chicken breast on a toasted wheat bun with crisp bacon and melted cheddar cheese. Topped with lettuce, tomato, pickle, and honey mustard dressing.

Traditional Turkey Sandwich

Thin sliced turkey with provolone cheese, lettuce, tomato, and mayo on toasted whole wheat bread.

Grilled Cheese Sandwich

A combination of provolone and American cheeses with sliced tomato on thick Texas toast.

* Consuming raw or undercooked meats, poultry, shellfish or eggs may increase your risk of foodborne illness, especially if you have certain medical conditions.

Pasta

Blackened Steak Penne

Charred steak strips, sautéed broccoli, garlic, and tomatoes over penne pasta and a creamy Alfredo sauce.

Cajun Shrimp Pasta

Sautéed onions and peppers with blackened shrimp in a spicy Cajun Alfredo sauce. Served with linguine.

Chicken Bruschetta Pasta

Multigrain linguine in a tomato, basil, and garlic marinara sauce topped with marinated chicken breast.

Steaks & Ribs

All of the following Black Angus steaks, ribs, and combos are grilled to perfection and served with your choice of 2 side items.

Ribeye

10 ounces

Sirloin

6 ounces
10 ounces

New York Strip

12 ounces

Baby Back Ribs

Slow cooked, baby back ribs basted with a sweet and smoky barbeque sauce. Full or half rack

Sirloin & Grilled Shrimp Combo

A classic combination— 6 oz grilled sirloin steak served alongside eight skewered shrimp.

Sirloin & Half Rack of Ribs

A 6 oz grilled sirloin steak served with a half rack of our succulent ribs.

Sirloin & Full Rack of Ribs

A 6 oz grilled sirloin steak served with a full rack of our succulent ribs.

Add sautéed mushrooms or grilled onions to any steak order.

Beverages

Coke, Diet Coke, Coke Zero, Dr. Pepper, Sprite

Lemonade: Raspberry or Strawberry

Iced Tea: Sweet or Unsweetened

Coffee

Platters

All of the following platters are served with your choice of 2 side items.

Chicken Tenders

Five white-meat chicken tenders fried until crispy. Served with your choice of honey mustard or ranch dipping sauce.

Blackened Salmon

Fresh salmon rubbed with blackening seasonings and grilled to perfection.

Fried Shrimp

Large, succulent shrimp fried to golden brown and served with cocktail sauce.

Caribbean Chicken

Grilled chicken breast rubbed with a zesty blend of Caribbean spices.

Side Items

Garlic mashed potatoes

Loaded mashed potatoes with bacon and cheddar cheese

Seasoned French fries

Sweet potato fries

Rice pilaf

Coleslaw

Seasonal vegetable medley

Steamed broccoli

Fresh fruit

Dessert

Skillet Apple Pie

Layered apples in a buttery crust. Topped with a scoop of vanilla bean ice cream

Chocolate Lava Cake

Molten chocolate inside a tender chocolate cake.

Nutty Brownie Sundae

Warm brownie with walnuts and a scoop of vanilla bean ice cream

New York Cheesecake

Traditional cheesecake with a graham cracker crust.

Milkshake

Thick and creamy shake in your choice of flavors. Chocolate, strawberry, or vanilla

Quincy's American Fare

Where you're always welcome

APPENDIX C3

FULL-SERVICE MENU WITH CALORIE INFORMATION

Charlie's Kitchen

Appetizers

Soft Pretzels with Cheese Sauce

Chewy pretzels sprinkled with salt and served with a savory cheese sauce. *1150 cal*

Cheese Sticks

Fried mozzarella served with warm marinara sauce. *790 cal*

Crispy Potato Skins

Topped with cheddar cheese, crisp bacon, sour cream, and green onions. *1350 cal*

Green Bean Fries

Battered and fried green beans with ranch dressing for dipping. *910 cal*

Artichoke & Spinach Dip

Spinach, artichokes, and onions with melted Parmesan and Asiago cheeses. Served with warm tortilla chips. *1375 cal*

Queso and Chips

Spicy white queso topped with tomatoes, red onion, and cilantro. Served with warm tortilla chips. *1270 cal*

Hot Buffalo Wings

Lightly breaded boneless chicken tossed in buffalo sauce and served with blue cheese or ranch dressing. *1070 cal*

Soups & Salads

Slow Cooked Onion Soup

Served with melted Gruyere cheese. *300 cal*

Tomato Basil Soup

Cup (*145 cal*) or Bowl (*290 cal*)

Charlie's Chili Cup (*200 cal*) or Bowl (*400 cal*)

Steak Caesar Salad

Grilled strip steak served on a bed of romaine lettuce with parmesan cheese, croutons, and Caesar dressing. *780 cal*
(May substitute chicken *690 cal*)

Mexican Chicken Salad

Chopped lettuce with grilled chicken, roasted red peppers, black beans, charred corn, tomatoes, jack cheese, and topped with tortilla strips and avocado vinaigrette. *870 cal*
(May substitute steak *960 cal*)

Toasted Pecan and Chicken Salad

Chicken coated with crunchy pecans and fried. Served on romaine and mixed greens with dried cranberries, mandarin oranges, pecans, and bleu cheese. Served with balsamic vinaigrette. *1200 cal*

Add a garlic breadstick to any soup or salad order. *140 cal*

Ribs & Steaks

All of the following Black Angus steaks, ribs, and combos are grilled to perfection and served with your choice of two side items.

Smoky Baby Back Ribs

Slow cooked, baby back ribs basted with a sweet and smoky barbeque sauce.
Full rack *1450 cal*
Half rack *880 cal*

Full Rack of Ribs & Sirloin

A 6 oz grilled sirloin steak served with a full rack of our succulent ribs. *1800 cal*

Half Rack of Ribs & Sirloin

A 6 oz grilled sirloin steak served with a half rack of our succulent ribs. *1230 cal*

Grilled Shrimp & Sirloin Combo

A classic combination—8 skewered shrimp served with 6 oz grilled sirloin steak. *730 cal*

Ribeye

10 ounces *650 cal*

Sirloin

6 ounces *350 cal*
10 ounces *520 cal*

New York Strip

12 ounces *480 cal*

Add sautéed mushrooms (100 cal) or grilled onions (50 cal) to any steak order.

Platters

All of the following platters are served with your choice of two side items.

Crispy Shrimp

Large, succulent shrimp fried to golden brown and served with cocktail sauce. *700 cal*

Chargrilled Salmon

Fresh salmon rubbed with blackening seasonings and grilled to perfection. *500 cal*

Island Chicken

Grilled chicken breast rubbed with a zesty blend of Caribbean spices. *420 cal*

Chicken Strips

Five white-meat chicken tenders fried until crispy. Served with your choice of honey mustard or ranch dipping sauce. *810 cal*

Pasta

Caprese Chicken Pasta

Multigrain linguine in a tomato, basil, and garlic marinara sauce topped with marinated chicken breast. *920 cal*

Bayou Shrimp Pasta

Sautéed onions and peppers with blackened shrimp in a spicy Cajun Alfredo sauce. Served with linguine. *1080 cal*

Steak Alfredo with Penne

Charred steak strips, sautéed broccoli, garlic, and tomatoes over penne pasta and a creamy Alfredo sauce. *1280 cal*

Burgers

5 oz burgers cooked to order and served on a toasted bun with your choice of seasoned French fries (350 cal) or sweet potato fries (375 cal).

Bacon Cheeseburger

Sharp cheddar cheese, crisp bacon, mayo, tangy BBQ sauce, lettuce, and tomato. *1020 cal*

Classic Cheeseburger

Burger topped with American cheese, lettuce, tomato, onion, and pickle. *895 cal*

Swiss & Mushroom Burger

Sautéed mushrooms, red onions, and Swiss. *900 cal*

Charlie's Turkey Burger

Seasoned ground turkey patty served with lettuce, tomato, onion, and pickle. *600 cal*
Add your choice of cheese: American, Cheddar, Swiss, or Bleu. *100 cal*

Bleu Cheese and Bacon Burger

Crumbled bleu cheese, bacon, caramelized onions, mushrooms, and mayo. *1125 cal*

Sandwiches

Served with your choice of seasoned French fries (350 cal) or sweet potato fries (375 cal).

Philadelphia Cheesesteak

Shaved steak with grilled peppers, onions, and provolone cheese on a hoagie roll. *925 cal*

The Reuben

Thin sliced corned beef brisket with crunchy sauerkraut, Swiss cheese, and 1000 Island dressing on toasted rye. *940 cal*

Grilled Chicken Sandwich

Grilled chicken breast on a toasted wheat bun with crisp bacon and melted cheddar cheese. Topped with lettuce, tomato, pickle, and honey mustard dressing. *725 cal*

Toasted Cheese Sandwich

A combination of provolone and American cheeses with sliced tomato on thick Texas toast. *630 cal*

Charlie's Club

Turkey, ham, bacon, Swiss cheese, avocado, lettuce, tomato, and mayo on toasted white bread. *1050 cal*

Traditional Turkey Sandwich

Thin sliced turkey with provolone cheese, lettuce, tomato, and mayo on toasted whole wheat bread. *925 cal*

Side Items

Sweet potato fries *375 cal*

French fries *350 cal*

Garlic smashed potatoes *250 cal*

Ultimate smashed potatoes with bacon and cheddar cheese *400 cal*

Fresh fruit medley *90 cal*

Sautéed seasonal vegetables *75 cal*

Fresh steamed broccoli *50 cal*

Coleslaw *100 cal*

Rice pilaf *300 cal*

Beverages

Coke, Diet Coke, Coke Zero,
Dr. Pepper, Sprite *150 cal*

Lemonade *140 cal*

Raspberry or Strawberry *150 cal*

Unsweetened Tea *5 cal*

Sweet Tea *150 cal*

Coffee *0 cal*

Desserts

Old Fashioned Cheesecake

Traditional cheesecake with a graham cracker crust. *860 cal*

Double Chocolate Lava Cake

Molten chocolate inside a tender chocolate cake. *1090 cal*

Super Shake

Thick and creamy milkshake in your choice of flavors. Chocolate, strawberry, or vanilla. *815 cal*

Favorite Brownie Sundae

Warm brownie with walnuts and a scoop of vanilla bean ice cream. *1165 cal*

Deep Dish Apple Pie

Layered apples in a buttery crust. Topped with a scoop of vanilla bean ice cream. *1040 cal*

A 2,000 calorie diet is used as the basis for general nutrition advice; however, individual calorie needs may vary.

CHAPTER 4

OVERALL CONCLUSIONS

The purposes of this study were to (a) determine the predictors of intention to use calorie information on restaurant menus, (b) determine whether college students changed their meal choices after viewing calorie information on a restaurant menu, and (c) describe the groups of college students most likely to change their orders in both fast food and full-service restaurants after viewing menus with calorie labels. Using the TPB, the identification of characteristics of college students most likely to change can assist with development of targeted nutrition education materials. Overall conclusions are discussed below as well as implications for health practitioners.

Students Ordered Significantly Fewer Calories When Calorie Information Was Posted on Menus

Overall, students in this study ordered significantly fewer calories when the calorie information was posted on both the fast food and full-service restaurant menus. This is consistent with previous studies that demonstrated posting calorie information could contribute to the selection of fewer calories among college students (Chu et al., 2009; Driskell et al., 2008; Freedman & Connors, 2010). Students who noticed and subsequently used the calorie information to make their meal decision ordered more calories from the fast food menu than those who did not see or use the calories. However, students who noticed the calorie information on the full-service menu ordered fewer calories but those who reported using the information ordered more calories from the labeled menu. It is possible that the students perceived that

dining in this type of restaurant was a treat or special occasion, so the calorie content of their meal was not important. Participants who used the calorie statement on both the fast food and full-service menus when making their meal choice ordered fewer calories, which suggests that students were able to utilize this piece of information to choose lower calorie meals. These results lend support to the addition of the calorie statement on fast food and full-service menus to provide customers with a frame of reference when choosing a meal. Additionally, once the Restaurant Nutrition Menu Labeling Requirement of the PPACA is fully implemented, studies should reexamine college students' use of posted calorie information, as students would have more time to practice and develop skill in ordering menu items while considering the caloric content of the items.

Intention to Use Calorie Information in Fast Food and Full-Service Restaurants

The TPB constructs of attitudes, subjective norms, and perceived behavioral control should predict intention to use calorie information, which should predict use of the menu labels to select items in both fast food and full-service restaurants. Attitudes, subjective norms, and perceived behavioral control were associated with predicting college students' intention to use calorie information in full-service restaurants. However, only subjective norms and perceived behavioral control were predictive of students' intention to use calorie information in fast food restaurants. Attitudes toward menu label use were not associated with intention to use calorie information for college students in fast food restaurants. Students with positive attitudes toward calorie information in full-service restaurants, support from friends and family, and the ability to make a decision based on caloric information may have greater intention to use the information and subsequently make lower calorie choices.

Barriers such as lack of time, cost, convenience, and biological cues such as hunger may have a greater impact on food selection than nutritional content of the items. In this study, students reported that a lack of time could be associated with decreased intentions to use calorie information in full-service restaurants, but not for fast food restaurants. Service in fast food restaurants is generally quicker than service in a full-service restaurant. Additionally, many full-service restaurants have more menu items than fast food restaurants, which would require more time to examine the caloric content of the items. It is also possible that students who would like to make healthier choices use other criteria when dining out, such as grilled versus fried food, salads versus French fries, and water versus caloric beverages.

Regular use of the Nutrition Facts panel predicted intention to use calorie information in both fast food and full-service restaurants. This finding may suggest that students who read food labels often are more concerned with the nutritional content of their foods and therefore would also intend to utilize calorie information in restaurants. These students may already use labels when making meal decisions at home or the grocery store and intend to do the same in restaurants. Additionally, women and non-Hispanic Whites had higher intention to use calorie information in a full-service restaurant than men and non-Hispanic Blacks. These socio-demographic factors were not significant predictors of intention to use menu labeling in fast food restaurants. However, dieting habits and worries about weight were predictors of intention to use calorie information in fast food restaurants, but not full-service restaurants. It is possible that college students who are currently dieting or worried about their weight have sought out more nutritional knowledge and do not need to use the posted calorie information in fast food restaurants to make a healthy meal choice. These students may already use a selected set of strategies and formed good habits.

The Use of Calorie Information in Fast Food and Full-Service Restaurants

Intention to use posted menu labels did not translate to changes in a typical order at fast food or full-service restaurants when the calories are posted. Instead, positive attitudes toward using menu labels was the only TPB construct that predicted a decrease in calories ordered when the full-service menu contained calorie information. Neither subjective norms nor perceived behavioral control were predictive of decreases in calories ordered from the restaurant menus. However, it is possible that when attitudes, subjective norms, and perceived behavioral control were in the model, intention did not appear as a predictor due to multicollinearity. Restaurant menu labeling was not fully implemented at the time of this study, thus this finding may suggest that students may not have the opportunity to practice translating their intention to the behavior in front of friends and family members and building self-efficacy toward the behavior. While many students may have intention to change their behavior and use calorie labels, they may need to overcome the barriers to making the change first.

The findings of this study suggest that barriers may keep students from using the menu labels to make lower calorie choices in both fast food and full-service restaurants. Students ordered more calories when they reported that lack of time and hunger could be factors in making their meal decisions at fast food and full-service restaurants. These are barriers to both healthy eating and the use of menu labels in restaurants. Although the price of the items did not appear on the menus, participants ordered fewer calories from the labeled fast food menus when they were concerned with the cost of the items. Additionally, in order to use the calorie labels on fast food menus, they must be perceived as easy to use by students.

Regular use of the Nutrition Facts panel predicted use of calorie information in full-service restaurants, but not in fast food restaurants. These findings may suggest that students

who read food labels often would also have intentions to use calorie information in restaurants. These students may already use labels when making meal decisions at home and can easily translate the skill into menu labels. Students may take more time to make menu decisions in a full-service restaurant than fast food restaurant, thus, they may have the option of weighing the nutritional content of the items along with other attributes such as cost, convenience, appearance and preferences. Students who noticed and subsequently used the calorie information on the fast food menu to make their meal decision ordered more calories than those who did not see or use the calories. However, students who noticed the calorie information on full-service menus ordered fewer calories, but those who used the calorie information ordered more calories. Students may have been more familiar with the menu items having seen them once before. Participants who used the calorie statement when making their meal choice from both the fast food and full-service menus ordered fewer calories, which suggests that students were able to utilize this piece of information to make a meal decision. These college students may have thought they should eat more or had a higher budget for calories, but this notion changed when they viewed the 2000 calorie statement. These results lend support to the addition of the calorie statement on restaurant menus to provide customers with a frame of reference when choosing a meal.

Implications for Practitioners

Restaurant menu labeling in fast food and full-service restaurants could provide the information college students need to select lower calorie items, which may translate to lower intake. Barriers get in the way when the meal decision must be made quickly or when the student is too hungry. Thus, educators need to assist students with meal spacing, encourage breakfast consumption, and management of time (including meal planning). Once the Restaurant

Nutrition Menu Labeling Requirement of the PPACA is fully implemented, students may learn how to navigate the decision of what to order while negotiating the caloric content.

Additionally, dietitians and health educators may need to address potential barriers to using the calorie information in restaurants in their education materials for clients. Further nutrition education efforts should be implemented to teach college students how to use both the Nutrition Facts panel and posted calorie information in restaurants to make healthy meal decisions.

REFERENCES

- Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, 50, 179-211.
- Ajzen, I. (2002). Perceived behavioral control, self-efficacy, locus of control, and the theory of planned behavior. *Journal of Applied Social Psychology*, 32, 665-683.
- American Academy of Child and Adolescent Psychiatry. (2011). *Facts for families: Obesity in children and teens*. Retrieved from http://www.aacap.org/galleries/FactsForFamilies/79_obesity_in_children_and_teens.pdf. Accessed on August 29, 2012.
- Backstrand, J. R., Wootan, M. G., Young, L. R., & Hurley, J. (1997). *Fat chance*. Washington, D.C.: Center for Science in the Public Interest.
- Bassett, M. T., Dumanovsky, T., Huang, C., Silver, L., Young, C., Nonas, C., . . . Frieden, T. R. (2008). Purchasing behavior and calorie information at fast-food chains in New York City, 2007. *American Journal of Public Health*, 98, 1457-1459. doi:10.2105/AJPH.2008.135020
- Bates, K., Burton, S., Howlett, E., & Huggins, K. (2009). The roles of gender and motivation as moderators of the effects of calorie and nutrition information provision on away-from-home foods. *The Journal of Consumer Affairs*, 43, 249-273. doi:10.1111/j.1745-6606.2009.01139.x
- Binkley, U. K., Eales, J., & Jekanowski, M. (2000). The relation between dietary change and rising US obesity. *International Journal of Obesity*, 24, 1032-1039.
- Blanck, H. M., Yaroch, A. L., Ateinza, A. A., Yi, S. L., Zhang, J., Masse, L. C. (2007). Factors influencing lunchtime food choices among working Americans. *Health Education & Behavior*, 36, 289-301. doi:10.1177/1090198107303308
- Blanchard, C. M., Fisher, J., Sparling, P. B., Shanks, T. H., Nehl, E., Rhodes, R. E., . . . Baker, F. (2009). Understanding adherence to 5 servings of fruits and vegetables per day: A theory of planned behavior perspective. *Journal of Nutrition Education and Behavior*, 41, 3-10. doi:10.1016/j.jneb.2007.12.006

- Bleich, S. N., & Pollack, K. M. (2010). The publics' understanding of daily caloric recommendations and their perceptions of calorie posting in chain restaurants. *BMC Public Health*, *10*(121), 1-10. doi:10.1186/1471-2458-10-121
- Bowman, S. A., & Vinyard, B. T. (2004). Fast food consumption of U.S. adults: Impact on energy and nutrient intakes and overweight status. *Journal of the American College of Nutrition*, *23*(2), 163-168. Retrieved from <http://www.jacn.org>
- Burton, S., Creyer, E. H., Kees, J., & Huggins, K. (2006). Attacking the obesity epidemic: The potential health benefits of providing nutrition information in restaurants. *American Journal of Public Health*, *96*, 1669-1675. doi:10.2105/AJPH.2004.054973
- Campos, S., Doxey, J., & Hammond, D. (2011). Nutrition labels on pre-packaged foods: A systematic review. *Public Health Nutrition*, *14*, 1496-1506. doi:10.1017/S1368980010003290
- Cawley, J., & Meyerhoefer, C. (2012). The medical care costs of obesity: An instrumental variables approach. *Journal of Health Economics*, *31*(1), 219-230. doi:10.1016/j.jhealeco.2011.10.003
- Center for Science in the Public Interest. (2010). *Nutrition labeling in chain restaurants, state and local laws/bills/regulations: 2009-2010*. Retrieved from http://www.cspinet.org/new/pdf/ml_bill_summaries_09.pdf. Accessed on September 14, 2012
- Centers for Disease Control and Prevention. (2011). *The health effects of overweight and obesity*. Retrieved from <http://www.cdc.gov/healthyweight/effects/index.html>. Accessed on August 29, 2012
- Centers for Disease Control and Prevention. (2012). *Overweight and obesity: Causes and consequences*. Retrieved from <http://www.cdc.gov/obesity/adult/causes/index.html>. Accessed on August 29, 2012
- Centers for Disease Control and Prevention. National Center for Health Statistics (NCHS). (2011). National Health and Nutrition Examination Survey Data. NHANES 2009-2010. Hyattsville, MD: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention. Available at http://www.cdc.gov/nchs/nhanes/nhanes2009-2010/nhanes09_10.htm. Accessed October 1, 2012.
- Centers for Disease Control and Prevention. National Center for Health Statistics (NCHS). (2012a). National Health and Nutrition Examination Survey Data. NHANES 2005-2006. Hyattsville, MD: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention. Available at http://www.cdc.gov/nchs/nhanes/nhanes2005-2006/nhanes05_06.htm. Accessed October 1, 2012.

- Centers for Disease Control and Prevention. National Center for Health Statistics (NCHS). (2012b). National Health and Nutrition Examination Survey Data. NHANES 2007-2008. Hyattsville, MD: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention. Available at http://www.cdc.gov/nchs/nhanes/nhanes2007-2008/nhanes07_08.htm. Accessed October 1, 2012.
- Chu, Y. H., Frongillo, E. A., Jones, S. J., & Kaye, G. L. (2009). Improving patrons' meal selections through use of point-of-selection nutrition labels. *American Journal of Public Health, 99*, 2001-2005. doi:10.2105/AJPH.2008.153205
- Conklin, M. T., Cranage, D. A., & Lambert, C. U. (2005). College students' use of point of selection nutrition information. *Topics in Clinical Nutrition, 20*, 97-108. Retrieved from <http://journals.lww.com/topicsinclinicalnutrition>
- de Bruijn, G.-J. (2010). Understanding college students' fruit consumption. Integrating habit strength in the theory of planned behaviour. *Appetite, 54*, 16-22. doi:10.1016/j.appet.2009.08.007
- Derby, B. M., & Levy, A. S. (2001). Do food labels work? Gauging the effectiveness of food labels pre- and post-NLEA. In P. N. Bloom & G. T. Gundlach (Eds.), *Handbook of marketing and society* (pp. 372-398). Thousand Oaks, CA: Sage.
- Drichoutis, A., Lazaridis, P., & Nayga, R. (2006). Consumers' use of nutritional labels: A review of research studies and issues. *Academy of Marketing Science Review, 9*, 1-22.
- Driskell, J. A., Kim, Y., & Goebel, K. (2005). Few differences found in the typical eating and physical activity habits of lower-level and upper-level university students. *Journal of the American Dietetic Association, 105*, 798-801. doi:10.1016/j.jada.2005.02.004
- Driskell, J. A., Meckna, B. R., & Scales, N. E. (2006). Differences exist in the eating habits of university men and women at fast food restaurants. *Nutrition Research, 26*, 524-530. doi:10.1016/j.nutres.2006.09.003
- Driskell, J. A., Schake, M. C., & Detter, H. A. (2008). Using nutrition labeling as a potential tool for changing eating habits of university dining hall patrons. *Journal of the American Dietetic Association, 108*, 2071-2076. doi:10.1016/j.jada.2008.09.009
- Dumanovsky, T., Huang, C. Y., Nonas, C. A., Matte, T. D., Bassett, M. T., & Silver, L. D. (2011). Changes in energy content of lunchtime purchases from fast food restaurants after introduction of calorie labelling: Cross sectional customer surveys. *BMJ, 343*, d4464. doi:10.1136/bmj.d4464
- Dumanovsky, T., Nonas, C. A., Huang, C. Y., Silver, L. D., & Bassett, M. T. (2009). What people buy from fast-food restaurants: Caloric content and menu item selection, New York City 2007. *Obesity, 17*, 1369-1374. doi:10.1038/oby.2009.90

- Elbel, B. (2011). Consumer estimation of recommended and actual calories at fast food restaurants. *Obesity, 19*, 1971-1978. doi:10.1038/oby.2011.214
- Elbel, B., Kersh, R., Brescoll, V. L., & Dixon, L. B. (2009). Calorie labeling and food choices: A first look at the effects on low-income people in New York City. *Health Affairs, 28*, w1110-w1121. doi:10.1377/hlthaff.28.6.w1110
- Farley, T. A., Caffarelli, A., Bassett, M. T., Silver, L., & Frieden, T. R. (2009). New York City's fight over calorie labeling: A two year struggle ultimately proves that innovation in food regulation is entirely possible at the local level. *Health Affairs, 28*, w1098-w1109. doi:10.1377/hlthaff.28.6.w1098
- Finkelstein, E. A., Fiebelkorn, I. C., & Wang, G. (2004). State-level estimates of annual medical expenditures attributable to obesity. *Obesity Research, 12*, 18-24.
- Finkelstein, E. A., Strombotne, K. L., Chan, N. L., & Krieger, J. (2011). Mandatory menu labeling in one fast-food chain in King County, Washington. *American Journal of Preventive Medicine, 40*, 122-127. doi:10.1016/j.amepre.2010.10.019
- Fishbein, M. (1967). *Readings in attitude theory and measurement*. New York: Wiley.
- Flegal, K. M., Carroll, M. D., Kit, B.K., & Ogden, C. L. (2012). Prevalence of obesity and trends in the distribution of body mass index among U.S. adults, 1999-2010. *Journal of the American Medical Association, 307*(5), 491-497.
- Flegal, K. M., Graubard, B. I., Williamson, D. F., & Gail, M. H. (2005). Excess deaths associated with underweight, overweight, and obesity. *Journal of the American Medical Association, 293*, 1861-1867. doi:10.1001/jama.293.15.1861
- Francis, J. J., Eccles, M. P., Johnston, M., Walker, A., Grimshaw, J., Foy, R. . . . Bonetti, D. (2004). Constructing questionnaires based on the theory of planned behaviour: A manual for health services researchers. Newcastle-upon-Tyne: University of Newcastle.
- Franko, D. L., Cousineau, T. M., Trant, M., Green, T. C., Rancourt, D., Thompson, D., . . . Ciccazzo, L. B. (2008). Motivation, self-efficacy, physical activity and nutrition in college students: Randomized controlled trial of an internet based education program. *Preventive Medicine, 47*, 369-377. doi:10.1016/j.ypped.2008.06.013
- Freedman, M. R., & Connors, R. (2010). Point-of-purchase nutrition information influences food-purchasing behaviors of college students: A pilot study. *Journal of the American Dietetic Association, 110*, 1222-1226. doi:10.1016/j.jada.2010.05.002
- French, S. A., Harnack, L. J., & Jeffrey, R. W. (2000). Fast food restaurant use among women in the pound of prevention study: Dietary, behavioral, and demographic correlates. *International Journal of Obesity, 24*, 1353-1359.

- Gerend, M. A. (2009). Does calorie information promote lower calorie fast food choices among college students? *Journal of Adolescent Health, 44*, 84-86. doi:10.1016/j.jadohealth.2008.06.014
- Gropper, S. S., Simmons, K. P., Gaines, A., Drawdy, K., Saunders, D., Ulrich, P., & Connell, L. J. (2009). The freshman 15 – A closer look. *Journal of American College Health, 58*, 223-231. doi:10.1080/07448480903295334
- Howard M. Metzenbaum Menu Education and Labeling Act, H. R. 2426, 111th Cong. (2009).
- Howard M. Metzenbaum Menu Education and Labeling Act, S. 1048, 111th Cong. (2009).
- Huang, T. T., Howarth, N. C., Lin, B. H., Roberts, S. B., & McCrory, M. A. (2004). Energy intake and meal portions: Associations with BMI percentile in US children. *Obesity Research, 12*, 1875-1885.
- King County Board of Health. (2010). *Nutrition labeling in King County*. Retrieved from <http://www.kingcounty.gov/healthservices/health/nutrition/healthyeating/menu.aspx>. Accessed on September 4, 2012
- Krukowski, R. A., Harvey-Berino, J., Kolodinsky, J., Narsana, R. T., & DeSisto, T. P. (2006). Consumers may not use or understand calorie labeling in restaurants. *Journal of the American Dietetic Association, 106*, 917-920. doi:10.1016/j.jada.2006.03.005
- Kuczmarski, R. J., Flegal, K. M., Campbell, S. M., & Johnson, C. L. (1994). Increasing prevalence of overweight among US adults: The National Health and Nutrition Examination Surveys, 1960 to 1991. *Journal of the American Medical Association, 272*, 205-211.
- Lando, A. M., & Labiner-Wolfe, J. (2007). Helping consumers make more healthful food choices: Consumer views on modifying food labels and providing point-of-purchase nutrition information at quick-service restaurants. *Journal of Nutrition Education and Behavior, 39*, 157-163. doi:10.1016/j.jneb.2006.12.010
- Lin, B.-H., Frazão, E., & Guthrie, J. (1999). *Away-from-home foods increasingly important to quality of American diet* (Agriculture Information Bulletin No. 749). Retrieved from United States Department of Agriculture website: <http://www.ers.usda.gov/publications/aib749/aib749.pdf>
- Lin, B. H., Guthrie, J., & Frazão, E. (1999). Nutrient contribution of food away from home. In: E. Frazão, (Ed.), *America's Eating Habits: Changes and Consequences* (pp. 213-242). Washington, DC: US Department of Agriculture.

- Martinez, O. D., Roberto, C. A., Kim, J. H., Schwartz, M. B., & Brownell, K. D. (2012). A survey of undergraduate student perceptions and use of nutrition information labels in a university dining hall. *Health Education Journal*. Advance online publication. doi:10.1177/0017896912443120
- McLean-Meyinsse, P. E., Gager, J. V., & Cole, D. N. (2011). Examining the prevalence of food-label use by university students. *Journal of Food Distribution Research*, 42(1), 84-89. Retrieved from http://fdrs.tamu.edu/FDRS/JFDR_Online_OLD/Entries/2011/3/31_JFDR_Vol._XLII,_No._1_files/JFDR_2011_42_1.pdf#page=91
- Mihalopoulos, N. L., Auinger, P., & Klein, J. D. (2008). The freshman 15: Is it real? *Journal of American College Health*, 58, 531-533. doi:10.3200/JACH.56.5.531-534
- National Institute of Diabetes and Digestive and Kidney Diseases. (2010). *Do you know the health risks of being overweight?* Retrieved from http://win.niddk.nih.gov/publications/health_risks.htm. Accessed on September 4, 2012
- National Restaurant Association. (2012). *2012 restaurant industry pocket factbook*. Retrieved from http://www.restaurant.org/pdfs/research/PocketFactbook_2012.pdf. Accessed on September 4, 2012
- Nation's Restaurant News. (2012). Top 100 chains: U.S. sales. Retrieved from <http://nrn.com/us-top-100/top-100-chains-us-sales>. Accessed on December 18, 2012
- Nelson, M. C., Larson, N. I., Barr-Anderson, D., Neumark-Sztainer, D., & Story, M. (2009). Disparities in dietary intake, meal patterning, and home food environments among young adult nonstudents and 2- and 4-year college students. *American Journal of Public Health*, 99, 1216-1219. doi:10.2105/AJPH.2008.147454
- Nielsen, S. & Popkin, B. (2003). Patterns and trends in food portion sizes, 1977-1998. *Journal of the American Medical Association*, 289, 450-453. doi:10.1001/jama.289.4.450
- Nutrition Labeling and Education Act of 1990, Pub. L. No. 101-535, § 2, 104 Stat. 2353 (1991).
- Oches, S. (2012, August). The QSR 50 burger segment. *QSR*. Retrieved from <http://www.qsrmagazine.com/reports/qsr50-2012-burger-segment-breakdown>. Accessed on September 4, 2012
- O'Dougherty, M., Harnack, L. J., French, S. A., Story, M., Oakes, J. M., & Jeffrey, R. W. (2006). Nutrition labeling and value size pricing at fast-food restaurants: A consumer perspective. *American Journal of Health Promotion*, 20, 247-250.
- Patient Protection and Affordable Care Act, Pub. L. No. 111-148, §2702, 124 Stat. 119, 318-319 (2010).

- Pawlak, R., Cerutti, C. S., & Quinton, R. (2009). Taking an undergraduate nutrition course results in favorable attitudes toward a healthful diet and improved intake of several key nutrients. *Family & Consumer Sciences Research Journal*, 38(1), 3-10. doi:10.1111/j.1552-3934.2009.00001.x
- Philadelphia Department of Public Health. (2009). *A guide to menu labeling requirements at food establishments in Philadelphia: Understanding Philadelphia's menu labeling law*. Retrieved from <http://www.phila.gov/health/pdfs/MenuLabelinguideFINAL2010-27.pdf>. Accessed on September 4, 2012
- Piron, J., Smith, L. V., Simon, P., Cummings, P. L., & Kuo, T. (2009). Knowledge, attitudes and potential response to menu labelling in an urban public health clinic population. *Public Health Nutrition*, 13, 550-555. doi:10.1017/S1368980009991303
- Pulos, E., & Leng, K. (2010). Evaluation of a voluntary menu-labeling program in full-service restaurants. *American Journal of Public Health*, 100, 1035-1039. doi:10.2105/AJPH.2009.174839
- Roberto, C. A., Larsen, P. D., Agnew, H., Baik, J., & Brownell, K. D. (2010). Evaluating the impact of menu labeling on food choices and intake. *American Journal of Public Health*, 100, 312-318. doi:10.2105/AJPH.2009.160226
- Rosenheck, R. (2008). Fast food consumption and increased caloric intake: A systematic review of a trajectory towards weight gain and obesity risk. *Obesity Reviews*, 9, 535-547. doi:10.1111/j.1467-789X.2008.00477.x
- Rydell, S. A., Harnack, L. J., Oakes, J. M., Story, M., Jeffrey, R. W., & French, S. A. (2008). Why eat at fast food restaurants: Reported reasons among frequent customers. *Journal of the American Dietetic Association*, 108, 2066-2070. doi:10.1016/j.jada.2008.09.008
- Satia, J. A., Galanko, J. A., & Siega-Riz, A. M. (2004). Eating at fast food restaurants is associated with dietary intake, demographic, psychosocial, and behavioural factors among African Americans in North Carolina. *Public Health Nutrition*, 7, 1089-1096. doi:10.1079/PHN2004662
- Schnepf, R., & Richardson, J. (2011). Consumers and food price inflation. Congressional Research Service: Washington, DC.
- Scourboutakous, M. J., & L'Abbe, M. R. (2012). Restaurant menus: Calories, calorie density, and serving size. *American Journal of Preventive Medicine*, 43(3), 249-255. doi:10.1016/j.amepre.2012.05.018
- Stewart, H., Blisard, N., Bhuyan, S., & Nayga, R. (2004). *The demand for food away from home: Full-service or fast food?* (Agricultural Economic Report No. 829). Washington, DC: U.S. Government Printing Office.

- Technomic Inc. (2009). *Executive summary: Update: Consumer reaction to calorie disclosure on menus/menu boards in New York City*. Retrieved from <http://www.edhoman.com/public/files/HB783-3.pdf>. Accessed on August 29, 2012
- Technomic Inc. (2012). *Differences are blurring between fast-food and fast-casual restaurants, says Technomic*. Retrieved from http://www.technomic.com/Pressroom/Releases/dynRelease_Detail.php?rUID=171. Accessed on September 26, 2012
- The Keystone Center. (2006). *The Keystone forum on away from home foods: Opportunities for preventing weight gain and obesity*. Retrieved from http://keystone.org/files/file/about/publications/Forum_Report_FINAL_5-30-06.pdf. Accessed on August 29, 2012
- The University of Alabama, Office of Institutional Research and Assessment. (2012). *Total enrollment by gender – all students*. Retrieved from <http://oira.ua.edu/factwork/efactbook/headcount-enrollment/historical/gender-1944-present>. Accessed on October 19, 2012.
- Todd, J. E., Mancino, L., & Lin, B.-H. (2010). *The impact of food away from home on adult diet quality* (Economic Research Report No. 90). Washington, DC: U.S. Government Printing Office.
- U.S. Department of Agriculture and U.S. Department of Health and Human Services. (2010). *Dietary guidelines for Americans* (7th Edition). Washington, DC: U.S. Government Printing Office.
- Vadiveloo, M. K., Dixon, L. B., & Elbel, B. (2011). Consumer purchasing patterns in response to calorie labeling legislation in New York City. *International Journal of Behavioral Nutrition and Physical Activity*, 8, 51. doi:10.1186/1479-5868-8-51
- Wing, R. R., Lang, W., Wadden, T. A., Safford, M., Knowler, W. C., Bertoni, A. G., . . . Wagenknecht, L. (2011). Benefits of modest weight loss in improving cardiovascular risk factors in overweight and obese individuals with type 2 diabetes. *Diabetes Care*, 34, 1481-1486. doi:10.2337/dc10-2415
- Wisdom, J., Downs, J., & Loewenstein, G. (2010). Promoting healthy choices: Information vs. convenience. *American Economic Journal: Applied Economics*, 2(2), 164-178. doi:10.1257/app.2.2.164
- Wootan, M. G., Osborn, M., & Malloy, C. J. (2006). Availability of point-of-purchase nutrition information at a fast-food restaurant. *Preventive Medicine*, 43, 458-459. doi:10.1016/j.ypmed.2006.07.008
- World Health Organization. (2012). *Obesity and overweight*. Retrieved from <http://www.who.int/mediacentre/factsheets/fs311/en/>. Accessed on August 28, 2012.

Young, L. R. & Nestle, M. (2012). Reducing portion sizes to prevent obesity: A call to action. *American Journal of Preventive Medicine*, 43, 565-568.
doi:10.1016/j.amepre.2012.07.024

APPENDIX A1
REVIEW OF CURRENT LITERATURE

The following review presents the concepts of obesity, the relationship between meals away from home and obesity, and the current research on the impact of menu labeling and its relationship to recent laws that will require chain restaurants to disclose nutrition information on menus.

Obesity Statistics

Obesity continues to be a problem, not only in the U.S., but also around the world. In 2008, The World Health Organization (2012) estimated that more than 1.4 billion adults were overweight and more than 500 million were obese. This translates to approximately 28% of the world's population being overweight or obese. In 2009-2010, 68.8% of U.S. adults were either overweight or obese (Flegal et al., 2012). Obesity first received national attention in the late 1980s as a sharp 8% increase in trends was noted since data collection for NHANES in 1976-1980 (Kuczmarski, Flegal, Campbell, & Johnson, 1994). Rates continued to rise well into the early 21st century; however, evidence suggests that the prevalence of obesity among adults has remained stable since 2005-2006 (Flegal et al., 2012).

Obesity is caused by the combination of eating too many calories and not participating in adequate physical activity (Centers for Disease Control and Prevention [CDC], 2011). It is a multifactorial condition and one of the causes can be related to an increase in the number of meals eaten in fast food establishments and restaurants (Burton, Creyer, Kees, & Huggins, 2006). The increased intake of energy-dense foods and saturated fat, along with decreased physical activity contribute to the obesity epidemic. Americans now spend almost half of their monthly food budget on meals prepared outside the home (Schnepf & Richardson, 2011; Stewart, Blisard, Bhuyan, & Nayga, 2004). The National Restaurant Association (NRA) (2012) reports Americans were projected to spend \$632 billion in restaurants in 2012, a 50% increase from

2000. Americans tend to eat more calories when dining in a restaurant than when eating at home (Binkley, Eales, & Jekanowski, 2000; Todd, Mancino, & Lin, 2010), and this problem is exacerbated when portion sizes are large and consumers are unaware of the nutritional content of their food.

Consequences of Obesity

Overweight and obesity are related to numerous health conditions, including disability, disease, and premature death. Cardiovascular disease (CVD) has a higher incidence rate in the obese, as hypertension is more prevalent than it is for adults with a healthy weight (CDC, 2011). In addition, type II diabetes rates have increased dramatically along with the nation's obesity rates. It is estimated that over 85% of adults diagnosed with type II diabetes are overweight or obese (NIDDK, 2010). Thirty years ago, older adults were most often affected by type II diabetes, but it has now evolved to be a problem for children, teenagers, and young adults (CDC, 2012). Overweight children have a 70% chance of being overweight or obese as an adult. This risk increases to 80% if a parent is also overweight or obese (American Academy of Child and Adolescent Psychiatry, 2011). Osteoarthritis, infertility, and increased risks of certain cancers, such as breast, endometrial, gall bladder, and colon, are also associated with obesity (CDC, 2012).

Disease and disability can occur because of obesity, and may also lead to premature death. More than 112,000 deaths are associated with obesity every year in the U.S. (Flegal et al., 2005). A 5-10% weight loss has been found to significantly decrease the risk factors associated with CVD in adults (Wing et al., 2011). In addition, compared to adults with a healthy weight, those who are obese can have a 50 to 100% increased risk of premature death (CDC, 2011).

Obesity affects not only the quality of life of individuals, but also the national economy. More than \$190 billion dollars were estimated to be spent on obesity-related health care costs in 2005 (Cawley & Meyerhoefer, 2012). The dramatic increases in obesity-related illness have resulted in increased expenses for the Medicare and Medicaid programs (Finkelstein, Fiebelkorn, & Wang, 2004). Medical costs stemming from obesity are now estimated to make up 20.6% of the nation's annual medical expenditures (Cawley & Meyerhoefer, 2012).

Effect of Meals Eaten Away from Home and Obesity

Meals away from home or food away from home refers to any food item that was prepared outside the home and can be eaten in the food establishment or at home (Lin, Guthrie, & Frazão, 1999). Away from home food can be thought of as 'ready to eat' with no preparation required by the consumer. This includes both fast food and dining in full-service restaurants, in addition to take out and pizza delivered to the home. The number of meals eaten in restaurants and fast food establishments has increased significantly over the last 20 years. Americans eat away from home now more than ever, and this is partially due to the increase in the number of restaurants in the U.S. Over the last 30 years, the number of restaurants in the U.S. has nearly doubled and Americans eat out twice as often (The Keystone Center, 2006).

Obesity is not only related to the increased number of people eating in restaurants, but it is related to the poor nutritional quality of the foods served in these establishments. Foods in restaurants and fast food establishments are typically high in total fat and calories but lacking in good sources of fiber and calcium (Lin et al., 1999; Scourboutakos & L'Abbe, 2012). Portion sizes at many fast food and full-service restaurants continue to increase and these excess calories can contribute to weight gain (Young & Nestle, 2012).

The “portion distortion” can also be attributed to the increasing sizes of foods served in restaurants (O’Dougherty et al., 2006). As the size of meals grows, consumers become accustomed to the amount and believe it to be a normal serving. For example, Applebee’s (2012) Sizzling Shrimp Fajitas contain 1340 calories and 60 grams of fat. This meal meets over 65% of the calories and 92% of the fat required for a 2,000 calorie diet. However, restaurants are starting to make healthier options available for consumers. Applebee’s has teamed with Weight Watchers to offer a small menu section of healthy entrees under 550 calories.

Multiple studies correlate increased intake of foods in fast food establishments to obesity. Bowman and Vinyard (2004) used the national dataset of the Continuing Survey of Food Intakes by Individuals (CSFII) from 1994-1996 to examine the effect of fast food consumption on body weight. Two 24-hour recalls were completed on each participant. Researchers discovered that participants with high intakes of fast food consumed higher amounts of fat, saturated fat, and sodas while milk and fruit intakes were disproportionately low. Those who consumed fast food on at least one of the survey days had increased odds of being overweight than participants who did not consume any fast food.

Huang, Howarth, Lin, Roberts, & McCrory (2004) also used CSFII data to associate fast food intake and BMI among children. Almost 2,000 children or parents of young children completed two 24-hour recalls. The investigators concluded that consumption of food away from home was positively associated with increased BMIs of adolescent boys (ages 12-19). These boys ate in fast food restaurants more frequently and consumed higher amounts of calories than girls, which may account for the statistically significant association with BMI seen only in adolescent boys.

Consumption of meals away from home, specifically fast food, has been hypothesized to increase the risk of obesity in the U.S. Few large cross-sectional or cohort studies with extensive follow-up have been conducted to address this issue. Rosenheck (2008) conducted a systematic review to examine the association between fast food intake and the risk of obesity. Evidence from ten studies (four cross-sectional and six prospective cohort studies) suggested that increased consumption of fast food can increase the amount of calories consumed and, hence, the risk of obesity.

Dining Out in the U.S.

There are an estimated 970,000 restaurants in the U.S. (NRA, 2012), leaving a multitude of dining choices for consumers. While little research has been conducted on the demographic characteristics of people who dine in full-service restaurants, several studies have examined the characteristics of those who eat at fast food restaurants. Generally, adults who are younger (Blanck et al., 2009; Bowman & Vinyard, 2004; French, Harnack, & Jeffrey, 2000) and employed (French et al., 2000; Satia, Galanko, & Siega-Riz, 2004) are more likely to frequent fast food restaurants.

An additional contributor to obesity may be the lack of nutritional information available in restaurants. Researchers visited 29 McDonald's restaurants in August 2004 in Washington, D.C. to determine the availability and accessibility of nutrition information (Wootan, Osborn, & Malloy, 2006). Each location was visually inspected for posted information and if it was not available, cashiers or managers were asked for print materials. Only 59% of the locations had in-store information available, and two or more employees needed to be questioned in more than 60% of restaurants to find out whether the store had any information. Ten percent of the restaurants had one page charts, 43% had information listed on tray liners, and 43% had

pamphlets. Therefore, even if a customer was interested in the nutrition content of a meal, this information may be difficult to find in a fast food restaurant.

Researchers conducted a study of adolescents and adults who frequently dine in fast food restaurants to determine the reasons why they chose that particular type of restaurant (Rydell et al., 2008). Participants attributed several reasons to frequent fast food consumption: the restaurants were quick, they serve good tasting food, they were easily accessible, and the food was inexpensive. Furthermore, participants indicated that the least frequent reasons for their patronage at fast food restaurants were that it was a way to socialize with friends and that these restaurants have nutritious foods to offer. Overall, taste and convenience were the top reasons adults visited fast food restaurants.

Menu Labeling Legislation

Nutrition Labeling and Education Act

Prior to 1990, much of the information on the nutrition labels was incomplete or misleading to the consumer. The first major policy to provide consumers with nutrition information to base their decisions upon was the Nutrition Labeling and Education Act (NLEA) of 1990. This law required nutrition labels on food packaging to provide the serving size, number of servings per container, calories, total fat, saturated fat, cholesterol, sodium, total carbohydrates, sugars, total protein, and dietary fiber (Nutrition Labeling and Education Act, 1991). The ingredient lists were mandated only on food packaging for items containing more than one ingredient. The NLEA also regulated the terms placed on packages, such as low fat, high fiber, and low cholesterol, and made a uniform definition for each. Health claims were also included under the NLEA, and only proven relationships between disease prevention and

nutrient intake were allowed. However, foods sold in restaurants did not fall under the NLEA, unless a health claim was made about a product.

Research conducted after implementation of the NLEA demonstrated that consumers, especially women and those with higher socioeconomic status, were positively affected by the provision of nutrition information on food products (Drichoutis, Lazaridis, & Nayga, 2006). The information allowed buyers to make informed decisions regarding the nutritional content of foods purchased in supermarkets and convenience stores. Before the NLEA was implemented, approximately one-third of consumers surveyed reported that using nutrition labels caused them to change their purchasing habits (Derby & Levy, 2001). Several years after implementation, this number increased dramatically and nearly half of consumers surveyed reported that the label affected their decisions to purchase a product.

Menu Labeling Policies

Since the introduction of the NLEA, menu labeling has emerged as one solution to improve nutritional habits and help combat obesity in the U.S. In 2006, New York City became the first city to require posted calorie information on menus and menu boards on restaurants within city limits (Farley, Caffarelli, Bassett, Silver, & Frieden, 2009). The law went into effect in January 2008 and required chain restaurants with more than 15 outlets nationwide to post the calorie content of foods on the menu. All menu items and each size of the item (i.e. small, medium, and large French fries) required calorie information as well as alcoholic beverages. The size of the label also needed to be at least the same size as the name of the food or the price, to ensure that consumers would see the information. Finally, foods intended to contain multiple servings, such as a pizza, would be required to post the calorie content of the entire pizza, not just the amount per slice. This would provide information for those who will eat the whole pizza

on their own. Special items or foods on the menu for less than 30 days were exempt from this law.

Shortly after the menu labeling law was passed in New York City, King County, WA followed with their own law in July 2007 (King County Board of Health, 2010). Effective August 1, 2008, chain restaurants were required to post not only calorie information, but also grams of saturated fat, grams of carbohydrates, and milligrams of sodium. Restaurants could choose to display the information on the menus or on a large sign where patrons stand in line. The law also required restaurants to post the following sign: “*The Dietary Guidelines for Americans* recommend limiting saturated fat to 20 grams and sodium to 2,300 milligrams for a typical adult eating 2,000 calories daily. Recommended limits may be higher or lower depending upon daily calorie consumption” (King County Board of Health, 2010). Similar to the New York law, the law affected chain restaurants with 15 or more establishments and the typeface of the calorie information must be in a size similar to the price. Foods are considered exempt under this law if on the menu for less than 90 days.

Menu labeling laws have also been enacted in Westchester County, NY and Philadelphia, PA (Center for Science in the Public Interest [CSPI], 2010). The law in Westchester only required calorie information to be posted, but Philadelphia passed the strictest law in the country. Legislators required calories, grams of saturated and *trans* fats, grams of carbohydrates, and milligrams of sodium on menus (Philadelphia Department of Public Health, 2009). The statement: “A 2000 calorie daily diet is used for the basis of general nutrition advice; individual calorie needs, however, may vary” also must be placed on the menus or menu boards.

As these four menu labeling laws have shown success, many more states and counties have drafted and passed their own laws (CSPI, 2010). This topic began to receive national attention, which led to the development of a national law.

Howard M. Metzenbaum Menu Education and Labeling Act. The Howard M. Metzenbaum Menu Education and Labeling Act, or MEAL Act, (2009) was introduced into Congress several times, most recently in May 2009, to amend the NLEA to require chain restaurants to post nutritional information on menus. The bill was referred to the Senate Health, Education, Labor, and Pensions committee and the House Energy and Commerce committee for review. The stipulations of the proposed law were similar to those previously enacted in New York and Philadelphia. Calories, grams of saturated and *trans* fats, grams of carbohydrates, and milligrams of sodium would need to be posted for each menu item in restaurants and vending machines. Although this bill was introduced in 2007 and 2009 in both the Senate and House of Representatives, it was not enacted and was instead replaced by stipulations within the federal health care law.

Patient Protection and Affordable Care Act. Restaurant menu labeling was finally passed into law as part of the Patient Protection and Affordable Care Act (PPACA) (2010). The Restaurant Nutrition Menu Labeling Requirement, Section 4205 the PPACA (Public Law 111-148), requires chain restaurants with 20 or more locations to provide calorie information on their menus, menu boards, and drive-thru menus. This law also affects vending machines, in that owners of 20 or more machines will need to post a sign containing the nutrition information of the items. People who use these machines are unable to view the Nutrition Facts Panel on the products before purchase. This law will provide them with the necessary information to make better decisions. Restaurants will also be required to have printed materials on hand that contain

additional nutrition information, such as sodium and cholesterol, available upon consumer request. Several items are exempt from this law, including condiments, daily specials, temporary menu items (less than 60 days), and custom orders.

In addition to the calorie postings, restaurants will also be mandated to post a statement about the suggested daily caloric intake for Americans (PPACA, 2010). This statement is designed to give consumers a point of reference and assess the nutritional significance of the available food. Under this new law, restaurants will also be required to provide additional nutritional information, including total calories, calories from fat, total fat, saturated fat, cholesterol, trans fat, sodium, total carbohydrates, sugars, dietary fiber and protein, upon customer request. The FDA is responsible for overseeing implementation of the law and final regulations are expected to be released sometime in 2013. Restaurants will likely have six months to comply with the national law once the regulations are complete.

Utilization of the Nutrition Facts Panel

Nutrition labels, such as the Nutrition Facts Panel, on prepackaged foods provide a significant amount of information to consumers. In a systematic review, Campos, Doxey, and Hammond (2011) suggest that 50% of consumers use food labels on packaged items. Most studies reviewed found that middle aged and older adults were more likely to use labels than their younger counterparts. Also, women were found to be more likely than men to use labels when making food choices. Income and education levels were also found to predict food label utilization. Individuals with lower incomes and lower education levels were less likely to use labels than those with higher incomes and educational attainment. Finally, Caucasian adults are more likely than other racial or ethnic groups to use a label when making food choices.

A recent study specifically highlighted the frequency of food label use by college students at a southeastern university (McLean-Meynsse, Gager, & Cole, 2011). Eighty seven percent of participants were African-American. Researchers found that nearly 60% of the 441 questionnaire respondents read food labels sometimes or often. Calories, total fat, and sugars were most commonly examined by these students. Freshmen and sophomores read labels less frequently than their junior and senior counterparts. These results highlight the fact that, while food labels provide a wealth of nutrition information, efforts should be made to teach college students how to read labels and properly utilize the information.

Consumer Knowledge

Consumer Knowledge of Daily Caloric Requirements

Meals eaten in restaurants and fast food establishments may contribute to the obesity epidemic, but it appears as though consumers also may not understand the basic nutritional requirements for a day. Bleich and Pollack (2010) conducted a telephone survey to assess the nutrition knowledge of a nationally representative sample of 663 adults. Seventy-eight percent of those surveyed were able to correctly identify energy needs for a moderately active man and 69% could do the same for a moderately active female. However, over 60% of respondents could not correctly estimate the required calories for inactive adults. Women were more accurate than men at identifying the correct calorie needs. Overall, only half of those surveyed reported they had the confidence and knowledge to make a good decision at a restaurant.

After menu labeling legislation was passed in New York City, Elbel (2011) conducted a study to determine whether mandatory calorie labeling affected low-income consumers' estimation of daily caloric needs and knowledge of calories in fast food restaurants. Newark, New Jersey was used as a comparison city as demographic characteristics are similar and menu

labeling was not implemented. Participants at fast food establishments in each city (New York City n=450; Newark n=162) were asked what the recommended daily caloric intake is for an average American and how many calories were in the meal purchased from the restaurant. Nearly half of all respondents believed that zero to 1,500 calories was an appropriate daily intake. One-third reported that 1500 to 2,499 calories was a suitable level while only 8% believed that 2,500 calories or more was appropriate. In this population, restaurant menu labeling in New York did not have an effect on the estimation of daily caloric needs.

Krukowski, Harvey-Berino, Kolodinsky, Narsana, and DeSisto (2006) also found similar results in their study. Researchers conducted a telephone survey among both community members and college students in Vermont. Only 67% of participants were able to recognize the number of calories they should be consuming in a day. Additionally, in a study conducted in Los Angeles County Health Departments in low income areas, only 25% of participants were aware of the number of calories they should be consuming in one day (Piron, Smith, Simon, Cummings, & Kuo, 2009). Similar to the Bleich and Pollack study (2010), women tended to be more accurate than men in identifying the number of calories that should be consumed in one day. The above studies all reveal that knowledge related to daily caloric requirements is low. Thus, calorie labels on menu items must include statements about caloric needs for an average adult for reference.

Consumer Knowledge of the Nutrient Content of Food

In addition to the difficulties adults experience in estimating daily caloric requirements, consumers also have difficulties estimating the nutrient content, such as calories and total fat, in foods obtained in restaurants. It can be difficult for dietitians, let alone consumers, to estimate the nutrient content of a meal served in a full-service restaurant or fast food establishment. A

survey was conducted at a national nutrition conference to assess nutrition professionals' knowledge of the calorie and fat content of several meals from chain restaurants (Backstrand, Wootan, Young, & Hurley, 1997). Nearly 80% of those surveyed were registered dietitians and almost three-quarters completed some graduate studies in nutrition. Meals consisted of lasagna, grilled chicken Caesar salad, tuna salad sandwich, Porterhouse steak dinner, and hamburger with onion rings. On average, the dietitians underestimated the nutrient content of the foods by 220 to 680 calories and 18 to 57 grams of fat. Although this study was conducted nearly 15 years ago, it still demonstrates that even trained nutrition professionals have difficulty estimating the nutrition content of foods prepared in restaurants and lends to the rationale for national restaurant menu labeling.

Similar to the above study, Burton et al. (2006) asked consumers to estimate the calorie, total fat, saturated fat, and sodium levels of nine restaurant entrees. Nearly all (97%) respondents were high-school graduates and more than 80% had some college education. Entrees were divided into 'healthful' (grilled chicken breast), 'unhealthful' (fettuccine alfredo), and 'very unhealthful' (cheese fries with ranch dressing) categories. Healthful items contained 370-640 calories and 6-26 grams of fat; unhealthful items contained 930-1660 calories and 63-97 grams of fat; and the very unhealthful item contained 3010 calories and 217 grams of fat. Participants were able to distinguish the healthful items from the unhealthful and very unhealthful items, demonstrating some nutritional awareness. However, subjects underestimated the nutrient content of less healthful items by an average of 642 calories and 44 grams of fat. Saturated fat and sodium levels were also significantly underestimated. This study revealed that consumers may not know the true nutritional content of the foods they order in restaurants, and calorie labeling may help to further educate the public.

After implementation of mandatory menu labeling, study participants in New York were better able to estimate the calories in meals purchased from fast food restaurants (Elbel, 2011). Fifteen percent of consumers were able to estimate the content of their meals within 100 calories before the labeling laws and 24% were able to correctly estimate the caloric content after nutrition information was placed on the menus. Results show that in this low-income population, mandatory calorie labeling may help improve consumers' nutritional knowledge.

Utilization of Restaurant Menu Labeling

Determinants of use of calorie information in restaurants differ by gender and by race/ethnicity. The following studies report on the utilization of restaurant menu labels by these two factors.

Gender

Similar to studies on nutrition label use on packaged foods (Campos et al., 2011), women are more likely to use nutrition information in restaurants than men. Using a telephone survey, Bleich and Pollack (2010) surveyed 663 adults and found that women were more likely than men to report that they would dine in a restaurant and choose a healthy option if calorie information was posted on the menu. Krukowski et al. (2006) also found similar results in their study. Among both community members and college students in Vermont, women were more likely than men to use the calorie labels to make a meal decision. Additionally, New York City women were more likely than men to use posted nutrition information in fast food restaurants (18% of women vs. 13% of men) (Dumanovsky et al., 2011).

Gerend (2009) studied the effect of calorie information on fast food choices among college students. Every participant (n=288) received three scenarios and made a food choice for each one from a McDonald's menu. The three situations included a quick dinner (have 45

minutes to get something to eat), starving (had a very hectic day on an empty stomach and now are very hungry), and not too hungry (had a late lunch and have plans for the evening, not hungry now but will not be able to eat again until much later). Students received either a standard menu or a menu with calorie labels. Women who received menus with calorie information ordered, on average, 146 calories less than did the women with the standard menu. The calorie information did not have any effect on the items ordered by the men. Males actually ordered slightly more calories when the information was present, but this difference did not reach statistical significance. Although these choices were hypothetical and the participants did not actually consume the meals, the research suggests that college students, especially women, may be more likely to use the calorie information on restaurant menus.

Conklin, Cranage, and Lambert (2005) conducted a study to determine the utilization of food labels in campus dining halls by freshman university students. Researchers also sought to assess gender differences and if the food label caused students to alter their meal choices. This university posted a modified nutrition label on all products in all campus dining halls and cafeterias. A 12-question survey was distributed to all freshmen by email. Results showed that female students were more likely to use the labels than males. Also, females used labels to select items lower in fat and calories while males chose items based on higher protein content and overall nutrients.

In an additional study with college students, Driskell, Schake, and Deter (2008) conducted a study in university dining halls using 'Nutrition Bytes' labels posted at the point of sale. Labels were similar to the Nutrition Facts Panel of food packages. Of the 205 students surveyed, significantly more females (79.1%) than males (42.1%) used the information ($p < 0.001$). Similar to Conklin et al. (2005), males were more concerned with the level of protein

in their meals. Females were more interested in the ingredients and serving sizes. Finally, within a sample of undergraduate college students in a dining hall, females reported viewing posted nutrition information more frequently than men (Martinez, Roberto, Kim, Schwartz, & Brownell, 2012). Women were also more likely to report that calorie information was one of the more important parts of the nutrition posting, and that this information influenced their meal decisions.

Race/Ethnicity and Age

Two studies have reported on the connection between race/ethnicity, age, and the use of restaurant menu labels. Among minority and low income individuals surveyed in Los Angeles, those who were female, Hispanic, and aged 25 to 34 or 55 to 75 years were most likely to report that menu labeling would cause them to eat fewer calories when dining in a fast food restaurant (Piron et al., 2009). In addition, results from a nationally representative sample of adults showed that African Americans and Hispanics were more likely than Caucasians to report that they would dine in a restaurant that posted nutrition information and that this information would influence them to make a healthier meal choice (Bleich & Pollack, 2010). Older adults were also more likely than their younger counterparts to report that labels would influence food choice.

Theoretical Framework for Study: The Theory of Planned Behavior

This study utilized the Theory of Planned Behavior (TPB) as a framework for investigating the effects of calorie information on restaurant menus for college students. The TPB was designed by Icek Ajzen (1991) and uses constructs that explore an individual's motivation and intention to perform a behavior, such as using calorie labels in restaurants to make a meal choice. This theory evolved from the Theory of Reasoned Action (TRA) (Fishbein, 1967). Fishbein and Ajzen collaborated to define the TRA's constructs and measurements of behavioral intention, attitude, and subjective norms. The TRA is based on the assumption that

behavior is voluntary and independent of outside factors. Ajzen and Driver (1991) went on to add perceived behavioral control to the TRA to form the TPB. This accounted for other factors that may influence intention and behavior. The TPB includes four main constructs: attitudes toward the behavior, subjective norms, perceived behavioral control, and intention to perform the behavior (Figure 1).

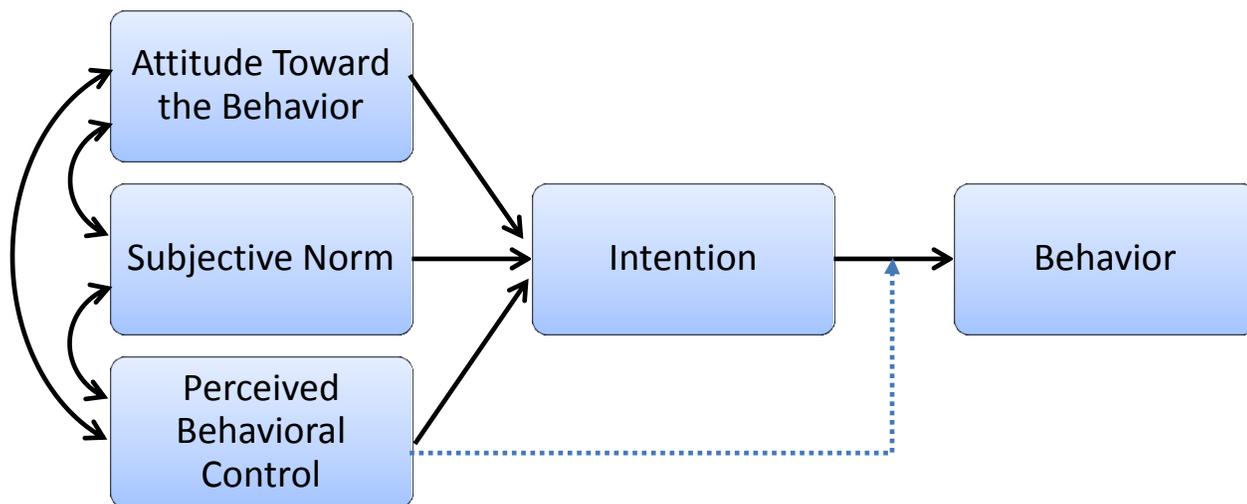


Figure 1. The Theory of Planned Behavior. Adapted from “The theory of planned behavior,” by I. Ajzen, 1991, *Organizational Behavior and Human Decision Processes*, 50, p. 182.

Attitudes toward Restaurant Menu Labeling

Attitude is an individual’s positive or negative beliefs toward performing the behavior (Ajzen & Driver, 1991). For this study, the behavior of interest is the use of calorie labeling on fast food and full-service restaurant menus to make a meal decision. Attitude toward a behavior is thought to be a better predictor of that behavior than attitude toward an object. For example, attitude toward using restaurant menu labels may be a better predictor of utilizing these labels than general attitude toward obesity or weight gain. Also, a person who values the outcome of reading calorie information on a restaurant menu, such as eating a healthier meal or subsequent

weight loss, may be more likely to have a positive attitude toward restaurant menu labeling. Restaurant patrons who value price, convenience, and taste or who perceive themselves to be thin may not have an interest in the calorie information on menus.

Positive attitudes overall toward posting the calorie information have been reported (Bates, Burton, Howlett, & Huggins, 2009; Bleich & Pollack, 2010; Lando & Labiner-Wolfe, 2007; Martinez et al., 2012; Piron et al., 2009). However, a positive attitude does not guarantee that the restaurant patron will utilize this information. Studies addressing college students' and adults' attitudes toward calorie labeling will be addressed below.

College students. Bates et al. (2009) conducted a study to determine if calorie disclosure as well as a mixture of healthful and less-healthful items on the menu affected the intake of 68 college students. The healthful items included McDonald's Grilled Chicken Caesar salad and Subway Club with chips and a drink. The less healthful items included a Big Mac value meal, Whopper value meal, Whopper value meal with King Size fries, and Subway Italian BMT with chips and a drink. As a result, the less-healthful items were negatively perceived while the more healthful items were positively perceived for the students who received a menu with calories listed.

One recent study sought to determine how college students perceive menu labeling. A group of undergraduate students was surveyed to assess whether they used labels posted in a university dining hall in addition to their attitudes toward this information (Martinez et al., 2012). Each dining hall on campus had already posted nutrition labels on foods, including serving size, ingredients, calories, fat, sugar, carbohydrates, protein, cholesterol, sodium, and *trans* fats. Ninety-eight percent of students had favorable attitudes toward the nutrition labeling. They believed that information should be posted in the dining halls or online for all meals. In

addition, 48% of students reported that the nutrition information influenced them to purchase a lower calorie or healthier item. Overall, college students appear to have positive attitudes towards posting calorie information in restaurants.

Adults. Multiple studies have been conducted that examine attitudes toward restaurant menu labels. Piron et al. (2009) studied the attitudes and possible response to menu labeling among 639 minority and low-income individuals. Patrons of six of the Los Angeles County Health Departments in low-income areas were recruited to participate in the study. Recruited individuals completed a self-administered written survey that addressed demographic information, self-reported height and weight, knowledge of calorie needs, frequency of restaurant dining, and attitudes towards calorie information on menus. Participants frequented fast food restaurants often. Nearly 75% of respondents ate fast food in the last year and 22% ate fast food at least once each week. A majority of participants had favorable attitudes towards menu labeling, and 86% thought that menu labeling should be a requirement for restaurants.

In order to gain additional knowledge on attitudes toward restaurant menu labeling, Lando and Labiner-Wolfe (2007) conducted eight focus groups in four US cities. Fictitious restaurant menu boards were developed to elicit reactions to calorie labeling as well as to discuss placing symbols next to healthier options and grouping healthy menu items together. Similar to the above study by Piron et al. (2009), focus group participants had favorable attitudes toward calorie postings in fast food restaurants. Convenience, taste, family preference, and price were reported to often interfere with healthy eating in restaurants. Although participants said they would not use the nutrition information at each visit, most thought that posting calorie information only, instead of each macronutrient, would be beneficial. Most participants were also in favor of restaurants posting healthier options in a separate section from the regular menu.

Positive perceptions of calorie labeling were also evident in a group of 663 adults in 2009. Bleich and Pollack (2010) conducted phone interviews among a nationally representative sample of 663 US adults 18 years and older. Sixty-eight percent of respondents favored a governmental mandate for calorie labeling in chain restaurants and over three quarters reported that the information would be very or somewhat useful. The overall attitudes of adults towards restaurant menu labeling appear to be positive. This could prove to be one of the determinants that predict use of restaurant menu labeling.

Intention to Use Calorie Information in Restaurants

Intention to perform a behavior is based on the attitudes toward the behavior, subjective norms, and perceived control of the behavior (Ajzen & Driver, 1991). If people believe they have control over a particular behavior, such as using calorie information on a restaurant menu to make healthy choices, it can be expected that these people will perform the behavior when provided with the opportunity. Intention to perform a behavior can be thought of as the direct antecedent to that behavior (Ajzen, 2002).

In addition to examining college students' attitudes toward calorie labeling, Bates et al. (2009) also explored college students' intention to use posted calorie information to make a meal decision. A menu was presented to university students that contained both healthful and less-healthful meal options. Again, the healthful items included McDonald's Grilled Chicken Caesar salad and Subway Club with chips and a drink. The Big Mac value meal, Whopper value meal, Whopper value meal with King Size fries, and Subway Italian BMT with chips and a drink were considered less-healthful meal choices. When shown a mix of these items on a menu, the purchase intention of college females, but not males, increased for the more healthful items when calorie information was present. The researchers suggest that posting calorie information on

menus decreases the positive perceptions and purchase intentions for menu items deemed less-healthy. Additionally, the calorie information was also thought to increase the positive perceptions for the healthy menu items.

Piron et al. (2009) studied the intention to use restaurant menu labeling among minority and low-income individuals at Los Angeles County Health Departments. Researchers recruited 639 individuals to complete a self-administered written survey that addressed demographic information, self-reported height and weight, knowledge of calorie needs, frequency of restaurant dining, and intention to use calorie information on menus. Over two-thirds (67%) of participants reported that they would choose foods and beverages lower in calories if given this information in a restaurant.

Calorie labeling was also found to influence intention to use the information in a group of 663 nationally representative adults with an oversampling of African Americans and Hispanics (Bleich & Pollack, 2010). During phone interviews, 60% of participants reported that calorie labels would cause them to select a lower calorie meal option. However, 38% reported that menu labels would not have an influence on their purchases. Overall, it appears as though posting calorie information on restaurant menus would have a positive effect on US adults. The above studies demonstrate that purchase intention for lower-calorie meal options may increase if calorie information is in place.

Subjective Norms and Restaurant Menu Labeling

Subjective norms refer to whether important people in the individual's life approve or disapprove of the health behavior (Ajzen & Driver, 1991). Positive subjective norms are held when a prominent person in an individual's life believes the behavior should be performed, and the individual is motivated to meet these expectations. For example, if a woman looks highly

upon her mother and the mother utilizes posted nutrition information on restaurant menus, the woman is more likely to use this information. To date, no studies were found that address subjective norms and restaurant menu label utilization.

Perceived Behavioral Control and Restaurant Menu Labeling

Perceived behavioral control is determined by beliefs of control as well as perceived power over the behavior (Ajzen & Driver, 1991). This construct is similar to self-efficacy. Control beliefs refer to an individual's beliefs about the factors that may impede or facilitate the behavior of interest, such as using calorie information in a restaurant to make a healthy meal choice. Behavioral control can directly affect intention, along with attitudes and subjective norms. Similar to subjective norms, no studies were found during the literature search that examines perceived behavioral control and use of restaurant menu labels.

The Effects of Menu Labeling on Consumer Behavior in Fast Food Restaurants

Posting calorie information on fast food restaurant menus may influence patrons to order fewer calories or make healthier meal decisions. However, two studies did report that no differences in ordering patterns were seen (Finkelstein, Strombotne, Chan, & Krieger, 2011; Wisdom, Downs, & Loewenstein, 2010). As previously discussed, several cities and counties opted to institute menu labeling laws prior to the passage of the PPACA in 2010. Their findings are discussed below, along with a mock study conducted in a laboratory and specific effects on college students.

Changes in Consumer Behavior after Calorie Information Posted

Laboratory study. A study in New Haven, CT was completed to determine if calorie labels on restaurant menus affected food choices and intake (Roberto, Larsen, Agnew, Baik, & Brownell, 2010). Subjects were recruited to participate in a study dinner and were randomized

to one of three groups: a standard menu, a menu with calorie labels, or a menu with calorie labels and a statement about the recommended caloric intake for adults. Participants ordered their meals and caloric intakes were recorded by the investigators. The following day, participants returned and a dietary recall was performed to determine if calories consumed after the study dinner differed across groups. Researchers observed that the groups with the calorie labels ordered significantly less calories than the group with the standard menu ($p=0.03$). The groups receiving the calorie labeled menus consumed significantly less calories than the standard menu group ($p=0.04$). Calories consumed after the study meal were also examined, and those participants who received menus without a calorie label consumed significantly more calories than the group who received the menus with labels ($p=0.02$). Although this study was conducted in a laboratory, results suggest that posting nutritional information on menus may help reduce the amount of calories consumed at a restaurant meal and affect dietary intake for the rest of the day.

Experimental studies. Prior to implementation of the menu labeling law in New York City, Bassett et al. (2008) also conducted a study to examine the purchasing behavior and use of calorie information in fast food restaurants. At this time, Subway was the only restaurant with calories posted at the point-of-purchase, as the company made several health claims about the nutrient content of their products. Researchers found that those who saw the calorie postings at Subway purchased 52 fewer calories when compared to patrons who did not see the information. In addition, 37% of people who saw the calories reported that it influenced their meal decision.

Technomic Inc. (2009) performed a large survey in New York City after implementation of the menu labeling law to assess consumer reactions. Researchers surveyed over 700 New York City residents and found nearly 80% were aware of the calorie postings in chain restaurants and 90% were in favor of the law. A majority of those questioned (90%) reported the caloric

content of menu items was higher than anticipated and 82% said this made an impact on the foods they purchased. Calorie information was shown to have a positive effect on patrons, in that 71% of those surveyed sought out lower calorie alternatives and more than half stopped ordering a particular item due to the calorie content.

Dumanovsky et al. (2011) collected receipts from patrons exiting fast food restaurants and gave each person a short survey. Researchers sought to determine if calorie labeling in fast food restaurants affected the average number of calories ordered and to determine the average number of calories ordered by patrons who reported that calorie information was used in making a meal decision. Nearly 8,500 receipts were collected during lunchtime hours. Fifteen percent of consumers reported that calorie information was used to make a meal decision. Also, customers in wealthier areas of New York City were more likely to report label use. While no overall decline in calories purchased was seen for the whole sample, three fast food chains did show a significant reduction in the number of calories ordered per customer after menu labeling implementation. Approximately 15% of all customers surveyed reported that posted calorie information influenced their meal choice, and these customers purchased significantly fewer calories than those who did not utilize the nutrition information (757 vs. 863 calories, respectively; $p < 0.001$). More long-term studies will be needed to further assess the impact of menu labeling once the national law takes effect.

Receipts and survey responses were also collected from a low income population in New York City and compared to results from Newark to determine the influence of calorie labeling on food choices (Elbel, Kersh, Brescoll, & Dixon, 2009). Street-intercept surveys were completed prior to, and four weeks after, introduction of calorie labeling in New York City. No differences between cities were found in the number of people who saw nutrition information on pamphlets

or posters prior to implementation. After calorie information was posted, 54% of fast food patrons in New York reported seeing the information. Nearly 28% of the 1,156 customers surveyed who saw the calorie information reported that the information influenced their meal choices and 88% of these patrons chose a meal with fewer calories. However, no significant changes were found in the average number of calories ordered prior to and after menu labeling implementation in New York or Newark.

An additional group of researchers also sought to determine if menu labeling in New York City changed the purchasing patterns of a group of adults in New York City and Newark, NJ (Vadiveloo, Dixon, & Elbel, 2011). Similar to the study by Dumanovsky et al. (2011), fast food customers provided receipts and completed a short survey to clarify their meal orders both before the menu labeling law was enacted and after calorie information was posted for nine months. Results of this study were mixed. After calorie labels were posted, a greater percentage of New York City patrons ordered caloric (vs. non-caloric) beverages and regular (vs. low fat) salad dressing than patrons in Newark. However, adults who reported that they saw and used the posted nutrition information ate out at fast food restaurants less frequently than patrons who did not see the labels. Subsequently, adults who saw the calorie labels but did not use them were less likely to order a caloric beverage, such as a regular soda, and ate out at fast food restaurants less frequently than patrons who did not see the labels. Although it appears that posted calorie information may be beneficial to fast food restaurant patrons, additional research is warranted to determine if differences, such as greater interest in health, exist between adults who notice labels and those who do not. This increased awareness lends additional support to require posting of calorie information as people use it to make better, more informed decisions.

College students. Several studies have examined the relationship between calorie labels and nutritional intake among college students (Chu, Frongillo, Jones, & Kaye, 2009; Conklin et al., 2005; Driskell et al., 2008; Freedman & Connors, 2010; Gerend, 2009). Most of the food labeling research among college students has been done in dining halls rather than full-service restaurants. It is hypothesized that dining patterns for college students may be different for fast food or full-service restaurants versus dining halls.

Chu et al. (2009) studied student intake of salad, soup, sandwiches, and other hot entrées using sales data during three periods at university dining halls. During the pretreatment period (14 days), only food descriptions were on a large menu board. Product descriptions and a simplified food label were placed at the point of selection for each item during the 14-day treatment period. Finally, during the post-treatment phase (13 days), the menu board was removed and product descriptions were placed on a floor stand, which was typical prior to the study. An instant decline in calories purchased was observed when calorie labels were posted and was maintained throughout the treatment period. The caloric content of entrees purchased slowly increased during the post-treatment phase when the calorie labels came down. Interestingly, even though the amount of calories decreased during the treatment phase, the sales revenue did not change.

Freedman and Connors (2010) also conducted a study with university students, but instead of calorie information, tags indicating healthy items were placed on shelves under foods in an on-campus convenience store. The healthy items were chosen arbitrarily, as the goal of the study was to determine if the tag changed the sales. Baseline sales data on bread, soup, crackers, and cereal were collected for 6 weeks prior to implementation of the tags. These items were used because they were commonly purchased and had the same pricing throughout each category

(i.e. all the soup had identical prices). This way, cost and economics would not affect the sales of items. “Eat Smart” tags were then placed on the healthy options and sales data were recorded for five additional weeks. There was no difference in sales of products between baseline and the intervention. However, although not statistically significant, the sales of the tagged cereal, soup, and crackers did increase over the course of the intervention.

Previous studies reported that women are more receptive than men to calorie information on restaurant menus (Conklin et al., 2005; Gerend, 2009). Driskell et al. (2008) conducted a study with university students that lends additional support to this topic. University dining hall patrons were surveyed on the use of ‘Nutrition Bytes’ labels posted at the point of sale. These labels included information similar to that which is on the Nutrition Facts Panel of food packages. More than half of the 205 students surveyed reported using the Nutrition Bytes information. Eighty percent of participants noted that they sometimes changed their food choices after reading the Nutrition Bytes labels. Overall, it appears as though posting calorie information or signs to indicate healthier food items results in college students making better meal choices.

No Change in Consumer Behavior after Calorie Information Posted

Two studies reported no change in consumer behavior, such as ordering fewer calories, after calorie information was posted on restaurant menus. A study completed at a Subway restaurant sought to determine if calorie information on the menu affected consumers’ meal choices (Wisdom et al., 2010). Participants first selected their meal and then completed a survey. Next, they were given a coupon for their free lunch, which contained their order. Menus varied by provision of daily calorie recommendations, access to calorie information for each menu item, and convenience of healthy options. Participants either received a menu with healthy

options, unhealthy options, or mixed options first. If they did not like their first options, participants had an opportunity to receive another menu with additional options. The survey asked participants to estimate the caloric content of the chosen meal and their estimated calorie needs for the day. Participants who received the healthy menu first were 48% more likely to choose a low-calorie sandwich. On the other hand, those who viewed the unhealthy menu first were 43% less likely to select a low-calorie sandwich. No differences were seen in the ordering habits between participants who received a menu with calorie labels and those who received a standard menu. However, this study does suggest that providing low-calorie ‘featured’ items first may help reduce the subsequent calories ordered for the meal.

Finkelstein et al. (2011) examined whether calorie postings changed the average calories purchased per transaction at a fast food Mexican chain in King County, WA. Seven restaurants in the county were used as experimental groups and seven restaurants outside the county without menu labeling laws were used as controls. Menu labeling was not found to impart a significant difference on the average number of calories ordered. It is possible that consumers do not understand the posted information or that other factors, such as taste and price, overshadow the health effects of choosing a lower-calorie meal option. However, this study has limited generalizability in that study data were collected from only one Mexican fast-food chain.

Fast food restaurants play a large role in the diets of many Americans. However, there is little data in the literature that explores what people order in these restaurants. Prior to the implementation of menu labeling laws in New York City, researchers sought to gather baseline information about the average number of calories ordered in fast food restaurants (Dumanovsky, Nonas, Huang, Silver, & Bassett, 2009). Receipts were collected to determine the items ordered from 7,750 people in spring 2007 and a short survey was given to clarify if any customizations

were made or if purchases were made for other people. Purchases for lunchtime meals averaged 827 calories. Patrons of sandwich-type shops ordered meals with the least amount of average calories (734 calories) while patrons of chicken chains ordered meals with the highest average calories (931 calories). Nearly one-third of the customers purchased meals over 1,000 calories. A moderately active female aged 19 to 50 years requires approximately 2,000 calories per day and a moderately active male of the same age ranges requires approximately 2,600 calories per day (US Department of Agriculture & US Department of Health and Human Services, 2010). This study suggests that patrons of fast food restaurants may consume more than half of their estimated energy needs for the day in one meal. As evidenced by the studies above, posting calorie information on restaurant menus may help to alter the number of calories ordered by patrons. Restaurant menu labeling may assist customers in choosing healthier options.

The Effects of Menu Labeling on Consumer Behavior in Full-Service Restaurants

The effects of calorie labeling in fast food restaurants have been widely studied. However, only one study to date specifically examines the effects of calorie labeling in full-service restaurants, even though these restaurants comprise 47% of all the eating establishments in the U.S. (Technomic Inc., 2012). Pulos and Leng (2010) collaborated with six local restaurants in Pierce County, WA to voluntarily institute calories, grams of fat, sodium, and grams of carbohydrates on their menus. Sales data for entrees sold were collected in the 30 days prior and 30 days after posting the nutrition information. Written surveys were also provided to customers post-implementation at the end of the meal to ascertain whether the calorie information was used to make their entrée selection. If the calorie information was used, additional questions were asked to determine how the information was used, such as whether a lower calorie meal was ordered or if the patron shared the meal.

Over 70% of customers reported seeing the nutrition facts on the menu, although only 24% admitted to using the information to choose an entrée (Pulos & Leng, 2010). Most often, participants used the calorie information to choose items lower in fat and calories.

Approximately one-third of the patrons changed their behavior after viewing the nutrition information. There was only a slight overall reduction in calories and fat ordered. When compared to entrée sales before calorie labeling, patrons who viewed nutrition information only ordered an average of 15 fewer calories and 1.5 fewer grams of fat. However, when divided among the 20.4% of patrons who changed their meal choice, those who used the labels ordered 75 calories less than before labeling. Additional research is required to further explore the effects of posted calorie information in full-service restaurants.

Attitude and intention constructs within the TPB have been addressed in other research studies. Intention to use a calorie label (Bates et al., 2009; Bleich & Pollack, 2010; Piron et al., 2009) and attitudes (Bleich & Pollack, 2010; Lando & Labiner-Wolfe, 2007; Martinez et al., 2012; Piron et al., 2009) toward calorie labeling in restaurants has been explored but neither subjective norms nor perceived behavioral control has been addressed. However, there is nothing in the literature to suggest that any researchers have used the entire TPB model to assess motivation and intention to use restaurant menu labels. This topic is cutting edge, and the restaurant menu labeling laws from the PPACA (2010) are expected to go into effect within the next year. It will be crucial for research studies to examine the differences in all constructs within the TPB to determine where future educational efforts should be placed.

Rationale for the Study

Several gaps in the literature need to be addressed. The TPB has been used in other studies that address college students and nutrition (Blanchard et al., 2009; de Bruijn, 2010;

Franko et al., 2008). The TPB explains personal attributes that lead to behavioral intention. This theory may help explain why someone would or would not use posted calorie information to assist in meal and beverage selection in a restaurant. Attitudes (Bates et al., 2009; Bleich & Pollack, 2010; Lando & Labiner-Wolfe, 2007; Martinez et al., 2012; Piron et al., 2009) and intention to use calorie labeling (Bates et al., 2009; Bleich & Pollack, 2010; Piron et al., 2009) have each been studied, but the entire TPB model has not been utilized to predict use of this calorie information. It is known that adults generally have positive attitudes towards calorie labeling on menus and that posting this information can change a person's intention to purchase a healthier item. However, it is unknown whether norms and perceived behavior control will affect this relationship.

In addition to the gaps in the TPB model, current research on restaurant menu labeling only addresses gender (Bleich & Pollack, 2010; Conklin et al., 2005; Driskell et al., 2008; Dumanovsky et al., 2011; Krukowski et al., 2006; Martinez et al., 2012), race, and age (Bleich & Pollack, 2010; Piron et al., 2009). Recent research suggests that adults with higher educational levels are more likely to use nutrition information on food packages (Campos et al., 2011), but this information has not been studied for restaurant menu label use. It is unknown whether other socio-demographic information, such as marital status, number of children in the home, and housing situation, play a role in college students' use of menu labeling in restaurants. Also, most research on college students' use of posted calorie information was limited to dining halls and cafeterias (Chu et al., 2009; Driskell et al., 2008; Martinez et al., 2012). It is unknown whether their use of this information would differ in fast food or full-service restaurants.

A majority of the current research on restaurant menu labeling use examines adults and is restricted to fast food restaurants (Bassett et al., 2008; Dumanovsky et al., 2011; Elbel et al.,

2009; Finkelstein et al., 2011; Lando & Labiner-Wolfe, 2007; Piron et al., 2009; Technomic Inc., 2009; Vadiveloo et al., 2011; Wisdom et al., 2010). Only one study to date that addresses menu label use in a full-service restaurant (Pulos & Leng, 2010). Full-service restaurants account for 47% of all restaurants in the U.S. so additional research in this arena is necessary.

College life represents a time when many students are living independently for the first time. Food and meal decisions that were previously made by parents or guardians are now made solely by the student. Students make choices about what to eat, how much to eat, and at what times. For these reasons, it is important for college students to understand proper nutrition and be able to make sound meal choices. Restaurant menu labeling in both chain fast food and full-service restaurants could provide the needed nutritional information for college students.

Reasons college students frequent fast food restaurants is hypothesized to differ from the reasons they would visit full-service restaurants. Therefore, the use of restaurant menu labels may differ in these locations as well.

Therefore, this study addressed the TPB in its entirety. Attitudes, subjective norms, perceived behavioral control, and intention were all addressed in this study. Additionally, this research examined the socio-demographic characteristics of college students and how restaurant menu label use differs in both fast food and full-service restaurants. Once the determinants of the use of posted calorie information in these two types of restaurants are identified, researchers and health educators can be better equipped to develop targeted nutritional messages to encourage healthier eating habits when dining out.

APPENDIX A2
METHODOLOGY

This section describes, in detail, the methodology that was used for this study including methods used to assess the constructs of the TPB and whether posted calorie information changed meal selections. The majority of current research is limited to investigation of consumers' use of calorie labeling in fast food restaurants. Therefore, this study explored which TPB constructs were associated with intention to use menu labels in both fast food and full-service restaurants.

The purpose of this study was to further investigate the a) knowledge, b) attitudes, c) subjective norms, and d) intention of college students to use calorie labels posted on fast food and full-service restaurant menus. This research also determined whether college students change their meal choice after viewing calorie information on a fast food or full-service restaurant menu. A sample of college students on The University of Alabama campus, ages 19 and older, made meal choices from restaurant menus with and without calorie information and completed a survey that addresses the TPB constructs, current health status, and demographic information, and then had their height and weight measured.

Research Questions

This study focused on two types of restaurants: fast food restaurants and full-service restaurants. For this study, fast food restaurants were defined as those with counter service that serve food quickly while full-service restaurants were those with table service and a wait staff.

Theory of Planned Behavior and Fast Food Restaurants

The research questions focused on depicting the characteristics of the individual who may change their order based on nutrition information presented on the menu. Undergraduate students from the University of Alabama were recruited to choose a meal from a fictitious fast food restaurant menu without calorie information, complete four math problems as a distractor,

and then choose a meal from the menu with posted calorie information. The participant then completed a survey that addresses socio-demographic information and TPB constructs. Finally, the participant's height and weight were measured. The following research questions were proposed:

1. Which socio-demographic information, current health status indicators, and Theory of Planned Behavior constructs are associated with intention of college students to use calorie labels in fast food restaurants?
2. Is there a significant difference in total calories ordered by college students before viewing calorie information and after viewing calorie information on a fast food restaurant menu?
3. If a difference exists, which socio-demographic information, health status indicators, and Theory of Planned Behavior constructs are associated with changes in the calorie content of meals ordered from fast food restaurant menus without calorie information versus with calorie information?

Theory of Planned Behavior and Full-Service Restaurants

For this portion of the study, the research questions focused on depicting the characteristics of the individual who may change their order based on nutrition information presented on the menu. Study procedures were identical to the fast food restaurant study with one exception: students received a fictitious full-service restaurant menu without calorie information and with calorie information. The research questions were also identical except the focus shifted from a fast food menu to a full-service restaurant menu.

1. Which socio-demographic information, current health status indicators, and Theory of Planned Behavior constructs are associated with intention of college students to use calorie labels in full-service restaurants?
2. Is there a significant difference in total calories ordered by college students before viewing calorie information and after viewing calorie information on a full-service restaurant menu?
3. If a difference exists, which socio-demographic information, health status indicators, and Theory of Planned Behavior constructs are associated with the changes in the calorie content of meals ordered from full-service restaurant menus without calorie information versus with calorie information?

Subject Recruitment

College students from the University of Alabama campus, ages 19 and older, were recruited to participate in this study. There were two portions to this study. The first portion addressed the research questions related to the fast food restaurants and the second portion addressed the questions related to the full-service restaurants. Subjects only participated in one study portion. Power calculations were completed to determine adequate sample size. Based on Pawlak, Cerutti, and Quinton's (2009) study of 53 students showing a change of 263 calories following provision of nutrition information, we can achieve 90% power with 174 students. Therefore, 200 students were recruited to account for any data from incomplete surveys that cannot be used in the final analyses. This equated to 100 participants in the fast food portion and 100 participants in the full-service portion of the study.

Once approval was granted through the institution's Institutional Review Board (IRB), the researcher emailed professors in various departments on campus to ask for time at the

beginning of their classes to recruit participants for this study. Professors who teach classes at the University were contacted, including (but not limited to) those in the School of Social Work, the College Arts and Sciences, the College of Education, and the College of Human and Environmental Sciences. The researcher asked for five to ten minutes of class time to recruit potential participants in this study. Professors of the following colleges were contacted: College of Arts and Sciences, Commerce and Business Administration, Communication and Information Science, Education, Engineering, Human Environmental Sciences, and Social Work. Professors in the Department of Human Nutrition and Hospitality Management were not contacted. Students in this department were expected to have significantly more nutritional knowledge than students in other departments so they were excluded to avoid potential bias.

Once approval of the instructor was obtained, the researcher attended the classes, described the proposed study to the students, and provided the information sheet. Students who would like to participate were then asked write down their email address on the information sheet and hand it back to the researcher. The researcher then emailed the interested students with possible dates and times to participate in the study. The students then replied to the email with their desired time. Students received a reminder email the day before their scheduled appointment. As an incentive to participate, \$5 cash was provided after subjects have completed the study.

Exclusion Criteria

Potential study participants were excluded if they were under 19 years of age, were in the Department of Human Nutrition and Hospitality Management, or if they followed a restricted diet. The age of legal consent in the state of Alabama is 19 years. Additionally, students who

follow specific or restricted diets due to food allergies or intolerances may need to limit the number or types of foods they eat at both fast food and full-service restaurants.

Study Design

Instruments

In order to assess the relationship between TPB constructs and intention of college students to use restaurant menu labels, the following items were created: two survey instruments to address socio-demographic information and TPB constructs (one for participants in the fast food portion and one for participants in the full-service portion), two fast food menus (one standard menu and one menu with calorie information), and two full-service restaurant menus (one standard menu and one menu with calorie information). In addition, a scale and stadiometer were required for measurement purposes.

Anthropometrics. Height and weight were recorded and used to calculate the body mass index (BMI) of each participant to determine weight status. A calibrated Tanita digital scale was used to measure participants' weight to within 0.1 kg. A Seca stadiometer was used to measure participants' height to the nearest centimeter. The Department of Human Nutrition and Hospitality Management at U.A. owns both pieces of equipment.

Surveys. Two surveys were developed to address socio-demographic information, general health status, food label use, and constructs in the TPB. The first survey addressed dining in fast food restaurants and the second survey addressed dining in full-service restaurants.

Demographics. The first section of questions on both surveys addressed socio-demographic information of participants. Demographic questions from the National Health and Nutrition Examination Survey (NHANES) (Centers for Disease Control and Prevention [CDC], National Center for Health Statistics [NCHS], 2011) were used to collect information for this

study. Questions addressed the following: gender, age, race/ethnicity, and marital/partnership status. In addition to NHANES questions, the researcher also ascertained information related to status in school (freshman/sophomore/junior/senior), the participant's current housing situation (rent home/own home/dormitories/apartment/fraternity or sorority house/lives with parents), and whether they are a parent with children are living in the home.

General health status, diet quality, and label reading questions. After demographic information was assessed, the next set of questions addressed the participant's overall health status, self-perceived diet quality, nutrition knowledge, and weight perceptions. These items have been previously validated and used in NHANES (CDC, NCHS, 2011) and appeared on both the fast food and full-service restaurant surveys.

1. Would you say that your general health is: excellent, very good, good, fair, poor, or don't know?
2. In general, how healthy is your overall diet? Responses include excellent, very good, good, fair, poor, and don't know.

Additionally, consumers may not use calorie labeling properly in restaurants if they do not understand what the average daily calorie requirements are for an adult. Previous research also shows that individuals report higher use of nutrition labels when their diet quality is good (Campos et al., 2011).

3. About how many calories do you think a man/woman of your age and physical activity needs to consume a day to maintain your current weight? Less than 500, 500-1000 calories, 1001-1500 calories, 1501-2000 calories, 2001-2500 calories, 2501-3000 calories, more than 3000 calories, don't know? (CDC, NCHS, 2012b)

4. How often do you use the Nutrition Facts panel when deciding to buy a food product? Would you say always, most of the time, sometimes, rarely, or never? (CDC, NCHS, 2012a)
5. When you use the food label to decide about a food product, how often do you look for information about calories? Would you say always, most of the time, sometimes, rarely, or never? (CDC, NCHS, 2012a)

Several additional questions were asked in order to determine the participant's current weight perceptions and whether they were dieting or concerned about their weight (CDC, NCHS 2012b).

6. Do you consider yourself now to be overweight, underweight, about the right weight, don't know?
7. Are you currently dieting? Yes, no, or I don't know?
8. Are you currently worried about your weight? Yes, no, or I don't know?

Dining out questions. The following questions were used to address how often the participant dines in both fast food and full-service restaurants:

1. In a typical week, how many times do you buy food from fast food restaurants?
 - A. I do not typically buy food from fast food restaurants.
 - B. 1 to 3 times during the past 7 days
 - C. 4 to 6 times during the past 7 days
 - D. 1 time per day
 - E. 2 times per day
 - F. 3 times per day
 - G. 4 or more times per day
2. In a typical week, how many times do you eat at a full-service restaurant with waiter or waitress service?
 - A. I do not typically eat in restaurants with waiter or waitress service.
 - B. 1 to 3 times during the past 7 days

- C. 4 to 6 times during the past 7 days
- D. 1 time per day
- E. 2 times per day
- F. 3 times per day
- G. 4 or more times per day

TPB questions. The document *Constructing Questionnaires based on the Theory of Planned Behavior: A Manual for Health Services Researchers* (Francis et al., 2004) was used as a guide to question development for TPB constructs. Attitudes toward a behavior are the person’s overall thoughts on performing the behavior. Semantic differential questions are generally used to measure attitudes. *Attitudes* towards calorie labeling at either fast food or full-service restaurants were assessed with the following questions:

1. Using calorie information posted on restaurant menus to make a meal decision is:

Harmful	1	2	3	4	5	6	7	Beneficial
Easy	1	2	3	4	5	6	7	Difficult
Worthless	1	2	3	4	5	6	7	Useful
Convenient	1	2	3	4	5	6	7	Inconvenient

2. Restaurants that have calorie information posted on their menus are:

Harmful	1	2	3	4	5	6	7	Beneficial
Good	1	2	3	4	5	6	7	Bad
Worthless	1	2	3	4	5	6	7	Useful

3. Rank the top 3 reasons (1 being the top reason) why you would dine in fast food/full-service restaurants.

- ___ Taste
- ___ Convenience
- ___ I do not know how to cook
- ___ Offer healthy/nutritious foods
- ___ Inexpensive
- ___ Offers time to socialize with friends/family

- ___ I do not like to cook at home
- ___ I am too busy to cook at home
- ___ It is a 'treat' to dine out
- ___ My friends/family likes them

Subjective norms are a person's evaluation of whether important people in their lives think they should perform or not perform the behavior. This construct is often measured using semantic differential questions. *Subjective norms* and the relationship to calorie labeling at either fast food or full-service restaurants was elicited through questions similar to the following:

1. My parents think that

I should 1 2 3 4 5 6 7 I should not
 use posted calorie information to make a meal decision at restaurants.

2. My friends think that

I should 1 2 3 4 5 6 7 I should not
 use posted calorie information to make a meal decision at restaurants.

3. My close friends think that

I should 1 2 3 4 5 6 7 I should not
 use posted calorie information to make a meal decision at restaurants.

4. It is expected of me that I use posted calorie information in restaurants.

Strongly disagree 1 2 3 4 5 6 7 Strongly agree

5. I feel under social pressure to use posted calorie information in restaurants to make a meal choice.

Strongly disagree 1 2 3 4 5 6 7 Strongly agree

Perceived behavioral control refers to whether the person feels like they have the ability to conduct the behavior. This construct is often measured using semantic differential questions.

Perceived behavioral control when either fast food or full-service restaurants post calorie information was measured using the following questions:

1. I am confident that I could use calorie information in a restaurant to make a healthy choice

Strongly disagree 1 2 3 4 5 6 7 Strongly agree

2. For me to use calorie information in a restaurant to make a healthy choice is

Easy 1 2 3 4 5 6 7 Difficult

3. The decision to use calorie information in a restaurant is based on the amount of time I have.

Strongly disagree 1 2 3 4 5 6 7 Strongly agree

4. The decision to use calorie information in a restaurant depends on how hungry I am.

Strongly disagree 1 2 3 4 5 6 7 Strongly agree

5. The decision to use calorie information in a restaurant is based on the cost of the menu items.

Strongly disagree 1 2 3 4 5 6 7 Strongly agree

Intention to use calorie labels in fast food or full-service restaurants will be measured using questions from the 2007-2008 Consumer Behavior Phone Follow-Up Module in NHANES (2012b). Using the following four questions, sufficient internal consistency can be shown. There is little difference in what is asked between these questions so the responses from participants were expected to be similar. The following questions were used to assess behavioral intention. The term “restaurant with a waiter or waitress” will be substituted for “fast food restaurant” in the full-service restaurant survey.

1. If nutrition or health information were readily available in fast food restaurants, would you use it often, sometimes, rarely, or never, in deciding what to order?

2. I expect to use posted calorie information to make a meal decision in a fast food restaurant.

Strongly disagree 1 2 3 4 5 6 7 Strongly agree

3. I want to use posted calorie information to make a meal decision in a fast food restaurant.

Strongly disagree 1 2 3 4 5 6 7 Strongly agree

4. I intend to use posted calorie information to make a meal decision in a fast food restaurant.

Strongly disagree 1 2 3 4 5 6 7 Strongly agree

The national menu labeling law will require calorie information to be posted in addition to a calorie statement (i.e. A 2,000 calorie diet is used as the basis for general nutrition advice; however, individual calorie needs may vary) (PPACA, 2010). In order to determine whether the participant noticed and used the posted calorie information and the calorie statement, the following questions were asked on both the fast food and full-service surveys:

1. Did you notice the calorie information posted on the second menu you saw in this study?
 - a. Yes
 - b. No
2. Did you use this calorie information when making your meal decision?
 - a. Yes
 - b. No
3. Did you notice the calorie statement posted on the second menu you saw in this study?
 - a. Yes
 - b. No

4. Did you use this calorie statement when making your meal decision?
 - a. Yes
 - b. No

Restaurant Menus. A total of four restaurant menus were developed for this study.

Fast Food Menus. The first fast food menu was developed to mimic the top hamburger chain fast food restaurants by sales in the U.S. A menu from a national restaurant, such as McDonald's was not used in order to increase the generalizability of this study. The menu was designed to be generic so that participants would not select an item based on their preference for the item at a specific restaurant. The menu included burgers, chicken sandwiches, fried fish, salads, side items such as French fries and fruit cups, and beverage choices. The second fast food menu was identical to the first menu, but contained calorie information next to the name of each food/beverage item. The top three fast food hamburger restaurants by sales in the U.S. are McDonald's, Wendy's, and Burger King (Oches, 2012). The researcher obtained calorie information from the websites of these fast food restaurants and computed an average calorie level for each menu item. This way the calorie information would be realistic and similar to what would be posted on a restaurant menu board. There were 32 menu items on each fast food menu.

Full-Service Menus. The first full-service menu was developed to mimic the menus of TGI Friday's, Applebee's, and Chili's, the top full-service restaurants by sales in the U.S (Nation's Restaurant News, 2012). A menu from a national restaurant was not used in order to increase the generalizability of this study. The menu included appetizers, entrees such as steak, chicken, and fish, pasta dishes, salads, sandwiches, side items, desserts, and non-alcoholic beverage choices. The second full-service menu was identical to the first menu but calorie information will be added next to the name of each food/beverage item. The researcher obtained

calorie information from the websites for the top three chain full-service restaurants by sales in the U.S. The calorie information for similar items was averaged and added to the second menu. Participants were then able to view realistic calorie information on the study menus. There were 62 items on each full-service menu.

Data Collection

After receiving IRB approval, data were gathered from participants in several ways: two separate presentations of restaurant menus where subjects will indicate the meal they would most likely choose, a paper and pencil survey, and measurement of height and weight.

Data collection took place over the course of five weeks in March and April 2013. All measurements and surveys were completed in a conference room on The University of Alabama's Tuscaloosa campus. This room served as a simulated dining room. Participants were appointed a date and time to participate in the study and reported to the room. Up to 15 participants were able to be accommodated at a single time. Each group of participants received either the fast food or full-service menus and surveys. The researcher alternated between fast food and full-service materials for each group. Each study group also received a group number that appeared on all of the data collection documents.

Upon arrival, the participants entered the dining room and sat down at the table. Each seat around the table contained a number on it ranging from 1-15 that represented the participants' study number. Participants were asked to write down their seat number on each meal choice form and the survey. The study's purpose and requirements were explained and participants signed informed consent forms. Next, the participant ranked their current hunger status on a scale of 1 to 9. Then the standard menus from either full-service or fast food restaurants were shown to the participant and he or she wrote down the menu items that they

would most likely order at this type of restaurant. Participants were asked to choose a both a meal and a beverage.

In order to provide a distraction to the participant, after indicating the desired menu items, subjects were given 10 short math problems to complete. Participants were asked to complete as many problems as they could in five minutes. Once the five minutes were up, the second menu with calorie information was provided. Subjects were again asked to write down the meal and beverage they would most likely order at this type of restaurant. After the second meal choice was made, the corresponding survey that addressed socio-demographic information and TPB constructs was given. Participants were given ample time to complete the survey. Finally, the participants' height and weight were measured and recorded by trained research assistants. The measurements were recorded on a paper that identified both the group number and seat number of the research participant to ensure that the measurements were grouped with survey responses. The scale and stadiometer were positioned in a private area to ensure confidentiality. The total time required by each participant was approximately 30 minutes.

Data Analysis

The researcher entered all data from the fast food restaurant survey and full-service restaurant survey into separate Microsoft Excel spreadsheets. All data were grouped together by group number and seat number. The data was then imported into Statistical Analysis Software (SAS) (version 9.3, 2012, SAS Institute Inc, Cary, NC) which was used to conduct all data analysis. The files were analyzed separately in order to answer the corresponding research questions. Alpha was considered statistically significant at 0.1.

Descriptive Statistics. The participants in this study were characterized using descriptive statistics. Frequency scores were created separately for the fast food survey and the

full-service survey using the demographic questions, including gender, age, race/ethnicity, marital status, class rank, and where the student lives.

Research question 1: Which socio-demographic information, current health status indicators, and Theory of Planned Behavior constructs are associated with intention of college students to use calorie labels in fast food restaurants?

Using survey questions that measured intention to use calorie labels in fast food restaurants, an overall intention score for each participant was calculated. The score ranged from 7-49 and the higher end of the range represented greater intention. Backwards elimination, with intention to use calorie labels in fast food restaurants as the dependent variable, was conducted with the following independent variables: gender, age, race/ethnicity, current health status, attitudes toward calorie labeling, subjective norms, and perceived behavioral control. This was used to determine the attributes of college students that are associated with intention to use calorie labels in fast food restaurants.

Research question 2: Is there a significant difference in total calories ordered by college students before viewing calorie information and after viewing calorie information on a fast food restaurant menu?

Paired t-tests were performed to determine if the mean number of calories ordered prior to viewing calorie information changes after the participants received the fast food menu containing calorie information.

Research question 3: If a difference exists, which socio-demographic information, health status indicators, and TPB constructs are associated with the significant changes in the calorie content of meals ordered from fast food restaurant menus without calorie information versus with calorie information?

A change in the caloric content of meals was determined by subtracting the calories of the meal ordered with calorie labeled menus from the meal ordered without labels. Backwards elimination, with the change in calorie content of meals ordered as the dependent variable, was conducted with the following independent variables: gender, current health status, and whether the participant is dieting. This was used to determine the attributes of college students associated with a significant change in total calories ordered when calorie information is present on a fast food restaurant menu.

Research question 4: Which socio-demographic information, current health status indicators, and Theory of Planned Behavior constructs are associated with intention of college students to use calorie labels in full-service restaurants?

Using survey questions that measured intention to use calorie labels in fast food restaurants, an overall intention score for each participant was calculated. The score ranged from 7-49 and the higher end of the range represented greater intention. Backwards elimination, with intention to use calorie labels in fast food restaurants as the dependent variable, was conducted with the following independent variables: gender, age, race/ethnicity, current health status, attitudes toward calorie labeling, subjective norms, and perceived behavioral control. This was used to determine the attributes of college students that are associated with intention to use calorie labels in full-service restaurants.

Research question 5: Is there a significant difference in total calories ordered by college students before viewing calorie information and after viewing calorie information on a full-service restaurant menu?

Paired t-tests were performed to determine if the mean number of calories ordered prior to viewing calorie information changes after the participants received the full-service menu containing calorie information.

Research question 6: If a difference exists, which socio-demographic information, health status indicators, and TPB constructs are associated with the significant changes in the calorie content of meals ordered from full-service restaurant menus without calorie information versus with calorie information?

A change in the caloric content of meals was determined by subtracting the calories of the meal ordered with calorie labeled menus from the meal ordered without labels. Backwards elimination, with the change in calorie content of meals ordered as the dependent variable, was conducted with the following independent variables: gender, current health status, and whether the participant is dieting. This was used to determine the attributes of college students associated with a significant change in total calories ordered when calorie information is present on a full-service restaurant menu.

Data Management

All information gathered during this study was secured in a locked office on the University of Alabama's campus. This included height and weight measurements, survey results, and choices made from each of the two menus. The researcher performed all data collection, entry, and analysis to protect the confidentiality of participants. Only the participants' round number and seat number were attached to the study materials. Materials that contained participant names, such as the consent forms and receipt of incentives, were kept separate from all other study materials.

Ethics/Responsibility

This study was approved by The University of Alabama's Institutional Review Board. All data collected as a result of this study was de-identified, in order to protect the participants. The names of participants were only kept on the informed consent sheets and were not kept with the data collected during the study. Participants received group and seat numbers during the study to keep track of their study materials.

Limitations

The proposed study was not without limitations. First, this study recruited college students from one southeastern university. The results obtained may not reflect the views and beliefs of students at other universities in different parts of the country. In addition, young adults over the age of 19 years who do not attend college may also have different views related to calorie labeling in restaurants and this study will not capture that segment of the population (Nelson, Larson, Barr-Anderson, Neumark-Sztainer, & Story, 2009). Students who follow a specific diet due to a food allergy or intolerance (i.e., Celiac disease) were excluded from participating in this study. While some restaurants are making strides to offer foods that are gluten- or wheat-free, the menus used in this study would significantly reduce the number of available meal choices for those potential participants. However, the current body of literature is lacking in information related to young adults' use of calorie labeling in both fast food and full-service restaurants. This study could add to the current knowledge and possibly fuel future studies on the topic.

This study required the participants to first rank their current hunger status and then choose the meal they would most likely consume at the restaurant. The participants did not receive an actual meal, and this fictitious order could have created bias as the study did not

capture the calories that the subject consumed. Additionally, the participants' food preferences were not addressed in this study. However, since the subjects served as their own controls, this was not anticipated to be problematic.

Prices were not posted on the fast food or full-service restaurant menus that were used in this study. Cost has been shown to play a role in the foods college students consume (Driskell, Kim, & Goebel, 2005; Driskell, Meckna, & Scales, 2006), so participants may be more likely to order a larger quantity or different foods and beverages if price is not a factor. Not including cost in this study may reduce the potential impact of this variable. Additionally, pictures of menu items, which are common on many fast food and full-service restaurants, were not present on any menus.

APPENDIX A3
IRB APPROVAL LETTER

Office for Research
Institutional Review Board for the
Protection of Human Subjects



March 8, 2013

Kimberly Stran, MS, RD
Department of Health Science
College of Human Environmental Sciences
Box 8703115

Re: IRB # 13-OR-084-ME: "An Investigation of the Content and Placement of Items on a Restaurant Menu"

Dear Ms. Stran,

The University of Alabama Institutional Review Board has granted approval for your proposed research.

Your application has been given expedited approval according to 45 CFR part 46. Approval has been given under expedited review category 7 as outlined below:

(7) Research on individual or group characteristics or behavior (including, but not limited to, research on perception, cognition, motivation, identity, language, communication, cultural beliefs or practices, and social behavior) or research employing survey, interview, oral history, focus group, program evaluation, human factors evaluation, or quality assurance methodologies.

Your application will expire on March 7, 2014. If the study continues beyond that date, you must complete the IRB Renewal Application. If you modify the application, please complete the Modification of an Approved Protocol form. Changes in this study cannot be initiated without IRB approval, except when necessary to eliminate apparent immediate hazards to participants. When the study closes, please complete the Request for Study Closure (Investigator) form.

Please use reproductions of the IRB-stamped consent form.

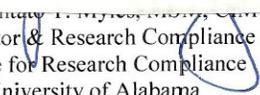
Should you need to submit any further correspondence regarding this application, please include the assigned IRB application number.

Good luck with your research.

Sincerely,



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