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AN ANALYSIS OF THE INFLUENCE OF NUTRITION INFORMATION ON
CONSUMERS' RESTAURANT MENU CHOICES

Thesis

A thesis submitted in partial fulfillment of the
requirements for the degree of Master of Sciences
College of Agriculture
at the University of Kentucky

By

Joseph Adam Higgins

Lexington, KY

Thesis Director, Mary Roseman, Ph.D., RD, Associate Professor

University of Mississippi 2012

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ABSTARCT OF THESIS

AN ANALYSIS OF THE INFLUENCE OF NUTRITION INFORMATION ON CONSUMERS' RESTAURANT MENU CHOICES

Obesity has risen drastically in the past few decades. Some experts contribute this to an increased prevalence of eating food away from home and consuming large portion sizes. A popular discussion in policy and legislation arenas has been mandatory implementation of nutrition information on restaurant chain menus. Menu labeling in restaurants that have 20 or more locations nationally was first implemented by New York City in an effort to increase consumer awareness of the calorie content of menu entrees. Since New York City's implementation of restaurant menu labeling in 2008, there have been conflicting studies on whether nutrition menu labeling improves consumers' selection of healthier menu items. Conducted on consumers in Lexington, Kentucky, this study focuses on factors influencing nutrition information on restaurant menus. This experimental research design included one menu with calorie information next to the menu items while the other menu did not provide calorie information. Also, this study compares the level of hunger of participants to their restaurant menu selection and participant's BMI status to their restaurant menu selection. This study shows that when calorie information is provided, it does not influence the participants purchasing behavior.

KEY WORDS: restaurants, menu labeling, nutrition information, BMI, hunger.

Joseph Adam Higgins

February 3rd, 2012

AN ANALYSIS OF THE INFLUENCE OF NUTRITION INFORMATION ON
CONSUMERS' RESTAURANT MENU CHOICES

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Chapter 1: Introduction

In recent years, restaurant nutrition labeling has received considerable media and industry attention. Much of the interest has occurred due to increases in obesity in the last 25 years (Centers for Disease Control and Prevention, 2011), while the amount of food dollars spent by consumers away from home during a similar period increased from 42.5% in 1990 (Ebbin, 1999) to 48% in 2009 (National Restaurant Association, 2009). The health consequences of being overweight can impact the longevity of one's lifespan (Goldstein 1992). For example, hypertension, diabetes mellitus, heart disease and some forms of cancer are some of the health risks that can arise from being overweight (Strum 2002). Ahmedian, Ward, and Hao (2005) state that heart disease is one of the top causes of death in men and women today in the United States.

Body Mass Index (BMI) is commonly used to indicate weight status and is calculated by the total weight in kilograms divided by the height in meters squared. Centers for Disease Control and Prevention (CDC, 2011) defines the classes of BMI as underweight (BMI less than 18.5), normal (18.5–24.9), overweight (25–29.9), and obese (30 or more). Niemeier, Raynor, Lloyd-Richardson, Rogers, and Wing (2006) have researched the prevalence of eating out at fast food locations and the association to BMI's, while there is limited research analyzing individuals' BMI and caloric choice of menu items.

Nutrition labeling is a concept that was introduced as part of the NLEA (Nutrition Labeling and Education Act) of 1990 to disclose information such as fat (saturated and unsaturated), cholesterol, carbohydrate, sodium, sugar, calories, and fiber (American Heart Association, 2009). The NLEA bill excluded restaurants from disclosing nutritional information. However, New York City became the first city in the United States to pass a law requiring chain restaurants to post calorie information on December 5, 2006 which was enforced May 5, 2008 (Center for Science in the Public Interest, 2009). Since supporters of menu labeling believe it influences the purchasing behavior of consumers, many cities soon after adopted similar laws requiring the posting of nutritional information on menus and menu boards. In March 2010, President Barack Obama signed into law the Patient Protection and Affordable Care Act (Grossman, 2010).

A section of the Act mandates that restaurant chains with 20 or more units post calorie information at point of purchase locations. This issue is further complicated since some state laws have stricter nutritional regulations than the Federal mandate of only calorie information. However, conflicting studies have questioned whether adding nutritional information changes consumer behavior.

The main points of interest this study explores are described in the following seven hypotheses.

Hypothesis

1. Participants who want to see nutritional information on restaurant menus will select healthier menu options compared to less healthy menu items.
2. When nutritional information is provided on restaurant menus, consumers will select the healthier menu options compared to less healthy menu items.
3. Participants will prefer additional nutritional information on restaurant menus compared to only calories.
4. Participants who use nutrition labels while grocery shopping will choose menu items in restaurants with fewer calories compared to participants who do not use nutrition labels during grocery shopping.
5. Participants with an “overweight” or “obese” status BMI will select menu items with higher calories compared to participants with a “normal” BMI status.
6. Participants indicating they are “very hungry” prior to selecting restaurant menu items will select items higher in calories than those who indicate they are “less hungry”.
7. Participants who state they will select healthier menu choices when nutritional information is available on restaurant menus will select healthier menu items when provided calorie information on a menu than participants who were not provided a menu with calorie information.

Chapter 2: Literature Review

There are varied reasons in the literature regarding the increased prevalence of obesity among adults in the United States. Two factors important to this study are the lack of nutritional knowledge by consumers and the lack of nutritional information on restaurant menus. The following review examines current research to date.

Obesity

According to the Centers for Disease Control and Prevention (CDC, 2004), National Health and Nutrition Examination Survey (NHANES), two-thirds of the adult population was considered overweight and one-third was considered obese. CDC has defined BMI categorical ranges to be 18.5- 24.9 as normal, 25-29.9 as overweight, and 30 and over as obese. In 1985, there were only eight states that had 10-14 percent of their population considered obese. By 2002, every state had surpassed that percentage of obese citizens (Schwartz, 2009). The CDC reported that from 1976-1980, 6.5 percent of children and adolescents aged 6-19 years old were considered overweight. The percent of children and adolescents considered overweight in 2003-2006 was 17 percent (U.S DH HS, 2008).

A recent publication by Epstein, Lin, Carr, and Fletcher (2011) found dietary disinhibition (the loss of control of eating) and food reinforcement played a role in predicting BMI and energy intake. Responses from a Three Factor Eating Questionnaire determined that participants who found food more satisfying and had a higher level of dietary disinhibition were more likely to have a higher BMI and consume more calories.

Bowman and Vinyard (2004) discovered a small but significant correlation between fast food intake and an overweight BMI status. Dietary intake records from over 9,000 adults aged 20 years and older from 1994-1996 were used for this study. There was a substantial difference in the amount of calories consumed on days in which participants consumed fast food compared to days they did not. Young adults aged 29 years and younger were four times more likely to report having consumed fast food than adults aged 55 years of age and older. In addition the study found a statistically significant correlation between participants eating fast food and having a higher BMI.

In a study of 57 females with a mean age of 20, Nederkoorn, Guerrieri, Havermans, Roefs, and Jansen's study (2009) showed that hunger alone does not predict the calorie content when choosing entrees. Twenty-five participants ate a sandwich or bread roll four hours before the study and then refrained from eating until the study began. The other 32 participants were told to eat the sandwich or bread roll 30 minutes before the study began. Participants were then given six foods to taste test. Food was measured before and after to determine intake of participants. A positive relationship between hunger and ineffective response inhibition in selecting calorie dense meals was found. The significance of this study was that hunger alone was not found to play a role in determining the amount of food consumed.

Nutritional knowledge of the public

A recent study performed by Burton, Howlett, and Tangari (2009) focused on the estimated amount of calories, fat, and sodium in meals that consumers purchased. One hundred fifty-five college undergraduates at New York University were asked to keep a seven-day diary of food and beverages consumed at fast food restaurants. Participants estimated the amount of calories, sodium, and fat levels in the foods they purchased. The healthiness of the meal, likelihood of weight gain, likelihood of developing heart disease, and if the purchases were a daily part of their dietary intake were also rated. The scale was numerical from one to nine, with nine, representing an increased likelihood of either gaining weight or developing heart disease and one, representing a decreased likelihood. After the data collection was over, participants were asked to go to restaurant websites to retrieve nutritional information of the items they consumed. Once participants had collected the nutritional information, they were asked to reevaluate their previous purchases using the same scale they used before.

The results showed that undergraduates choosing meals with more than 1,000 calories had the largest underestimated guess of caloric content. After viewing nutritional information, the intention to purchase higher calorie meals fell more than the intention to purchase lower calorie meals. This study found that undergraduates underestimate calories, fat, and sodium content in meals they purchase. Participants reported that after they saw the nutritional information, they had a higher perceived likelihood of gaining weight for higher calorie meals and a lower perceived likelihood of gaining weight for lower calorie meals. A

telephone survey conducted by Bleich (2010) examined the public's knowledge of calorie intake. The population surveyed was 18 years of age or older with a heavier sample of African Americans and Hispanics across the United States (663 participants). The survey focused on knowledge of energy requirements for active and sedentary adults, likelihood of eating at chain restaurants with calorie information, use of calorie information to select healthier options, if calories were more important than taste when purchasing food, and if participants felt guilty about picking a higher calorie meal when information was made available. Bleich discovered that the majority of the participants knew how many calories active adults should get a day but fewer knew how many calories inactive adults should get. Participants who were white had a higher knowledge of calorie intake than Hispanics or African Americans. Fifty percent of participants responded that they would be more likely to eat at restaurants with calorie information posted. The African American and Hispanic population were more likely to choose meals lower in calories when calorie information was at the point of purchase. African Americans were slightly higher in responding that calories were more important than taste when it comes to purchasing food. Almost 70% of participants supported the role that government was taking to implement calorie information.

Mirsa (2007) conducted a study that focused on college students and their attitude, knowledge, nutritional education, and label reading behaviors. This study included 537 college students with a mean age of 23; majority female. Participants' nutrition knowledge was assessed by the Label Reading Survey.

The results of this study showed that 90% percent of students reported that food labels were useful; however, two thirds of the students did not believe the accuracy of the nutrition claims. Roughly 92% of the students correctly answered how many grams of fat should be included in a 2,000 calorie diet, yet only 11 percent correctly estimated the correct serving sizes of some food items. Two-thirds of students reported using nutrition labels to compare products while shopping. Students who had some nutrition education background and a positive attitude towards food labels scored the highest.

Policies and laws on restaurant nutritional labeling

The Food and Drug Administration is the main governing body responsible for regulating the sale of safe foods for consumers to eat. The Nutritional Labeling and

education Act (NLEA) is a federal law that requires food labels on all products sold. The law was introduced in 1990 and required food that was packaged to have information regarding “the serving size or other common household unit of measure customarily used; (2) the number of servings or other units per container; (3) the number of calories per serving and derived from total fat and saturated fat; (4) the amount of total fat, saturated fat, cholesterol, sodium, total carbohydrates, complex carbohydrates, sugars, total protein, and dietary fiber per serving or other unit; and (5) subject to conditions, vitamins, minerals or other nutrients (Library of Congress, 2009). In 2006, trans fat was added to the nutritional labeling law requiring the total amount of trans fat in products. Items that contain less than 0.5 grams of trans fat per serving can be classified as trans fat free.

Some items that are exempt from the NLEA pertinent to this study include “(1) food sold for immediate consumption in restaurants, or sold to restaurants for sale or use in restaurants; (2) processed and prepared primarily in a retail establishment and not for immediate consumption in the establishment; (3) which is customarily processed, labeled, or repacked in substantial quantities at establishments other than those where it was originally processed or packed; (4) contains insignificant amounts of all the nutrients and does not make any claim with respect to the nutritional value of the food; (5) sold by certain small businesses, unless the label provides nutrition information or makes a nutrition claim; and (6) sold by a distributor to restaurants or certain other establishment” (Library of Congress, 2009).

While the NLEA of 1990 excluded restaurants posting calorie information on their menus and menu boards, some states or cities have recently passed laws that require restaurant chains to post nutritional information on point of purchase locations (CSPI, 2009).

New York City and King County in Seattle, Washington are two cities that first adopted menu labeling laws for restaurants (CSPI, 2009). The law in New York City was met with much resistance from the State Restaurant Association. New York City’s menu labeling law requires only calories to be posted at the point-of-purchase where King County requires the addition of saturated fat, sodium and carbohydrate information.

On March 23rd, 2010 President Barack Obama signed into law the Patient Protection and Affordable Care Act. In Section 403(q)(5) of the Federal Food, Drug, and Cosmetic Act,

there were several added additions to the law affecting restaurants. The first addition was the clause that restaurant chains operating under the same name with 20 or more locations must disclose calorie information at the restaurant's point of purchase. This includes full-service restaurants as well as fast-food restaurants. The calorie information is to be adjacent to the name of the menu item and clearly associated with the menu item. Food that is sold on a buffet line or self serve line shall have a sign posted that lists the calorie information of the menu items per serving. Items excluded from nutrient disclosure are condiments, special or seasonal items that will be on the menu for less than 60 calendar days of the year, and food that is part of a customary market test that will appear on the menu less than 90 calendar days (Grossman 2010). Within one year of enactment of the clause, proposed regulations will be made to enforce the law.

Kentucky introduced the Consumer Meal Education and Labeling Act (CMEAL) in 2009. This bill would require chain restaurants of 10 or more units in Kentucky to post calorie information at point of purchase locations including drive-thru menu boards at fast food franchises. Kentucky is currently considering the bill (CSPI, 2011).

Studies on grocery and restaurant nutritional labeling

Possibly studies on consumer's use of nutrition labels on packaged goods while grocery shopping offer insight applicable to nutrition labeling on restaurant menus. Therefore, studies on whether people who use nutrition labels while grocery shopping make healthier selections was reviewed for this study. Nayga, Lipinski, and Savur (1998) compiled a study to see if consumers use nutrition labels while at home and grocery shopping. A 1996 study of 159 participants located in Middlesex County, New Jersey was conducted at four different supermarket locations. Participants were asked three questions regarding their usage of nutrition labels to compare and purchase food items. Responses on survey questions indicated nutrition was important while shopping in order to avoid too much sodium and saturated fat. Individuals who had a lower annual family income (around \$30,000) were less likely to use nutrition labels than the population group that made around \$50,000. Balasurbramanian and Cole (2002) conducted a study in 1993-94 that dealt with the effectiveness of nutrition labels in three different grocery store chains in the Midwest by comparing 337 participants food selections before and after labeling had been implemented. Methods involved trained watchers who counted the time in seconds spent looking at the

nutrition facts on the label. Results of the study concluded that there was no change in the search intensity for nutrition information after the labeling went into effect.

Lindhorst, Corby, Roberts, and Zeiler (2007) established 18 workshops across Canada to determine the behaviors and attitudes towards nutrition labeling of 259 rural citizens. The workshops came from a program called HESY (Healthy Eating is in the Store for You) developed by Canadian Diabetes Association and Dietitians of Canada. The results of the workshop determined that people used food labels more often, food labels influenced their purchase, and a higher percent could now compare two products using the food label. Furthermore, results showed that those who reported having an income below \$45,000 Canadian dollars reported a higher change of perceiving the nutritional information to be important and letting the nutritional information influence what they bought.

Cathleen Jones (2009) found that mothers and seniors had both positive and negative reactions when shown a restaurant menu that included a healthy icon and nutritional information. A “Heart Smart icon” was placed next to a menu item that had 3g of fat or less, 20mg of cholesterol, and 40 mg or less of sodium. Participants changed their top three menu choices after they were shown the menu with healthy icons. Participants chose healthier options when they were able to see the amount of calories, fat grams, grams of fiber, and sodium in each menu item. However, some participants complained that they did not want to see the nutritional information because they felt like the menu was judging them or thought that people would not use the information.

A 2010 study by Temple, Johnson, Recuperto, and Suders focused on 47 participants near the University of Buffalo who were separated in groups and were shown one of two videos. One video featured nutrition labeling education while the other featured the organic food movement. Afterwards participants were provided a lunch buffet in which menu labels were provided at the buffet for one group while other group did not view nutrition labels. The findings of the study determined that females consumed fewer calories than males and participants who were provided nutrition labels consumed fewer calories than participants who were not provided with nutritional labels regardless of gender or video shown.

The court ruled that “some state and local menu labeling laws, such as New York City’s revised Regulation 81.50, involve nutritional labeling requirements for restaurants and

do not regulate restaurants' descriptive claims. Therefore, state and local efforts like New York City's revised Regulation 81.50 are not subject to preemption by the NLEA". This ruling allows local and state governments to pass nutritional labeling laws adapted to their location. For Example, King County's law requires restaurant chains that have more than 15 restaurants and one million dollars in sales to post nutritional information. The nutritional information is not limited to calories as it was in New York City, however, in addition to calories; menus were required to list saturated fat, sodium, and carbohydrate information (CSPI, 2009).

The effect of posting nutritional information

Hwang and Lorenzen (2008) conducted a study of 120 participants that focused on the consumer's perceptions of the correct amount of nutritional information to be listed on a menu and if nutritional information influenced healthier choices. Participants were presented with one menu entrée on one of five different menus. Each menu had an increased level of nutrition information. The second part of the study asked participants to rate the healthiness of the menu item without nutritional information, and then re-rate the menu item with nutritional information. They were then shown a low fat menu item with nutritional information and asked to rate the healthiness on a one to seven scale. The findings showed that people preferred the menu that had the most nutritional information listed and that perception of the healthiness of the menu item dropped once nutrition information was given.

Chu, Frongillo, Jones, and Kaye (2009) focused their research on the sales of The Ohio State University cafeteria before, during, and after nutritional information was posted for a two week period in 2004. The study included a pre-treatment study that included just the description of the entree on a menu board, the treatment period, and a post treatment that removed the nutrition labels. The study found that calories during the treatment period decreased at roughly 0.3 calories per day when the treatment started. During post-treatment, purchases resumed as before. Entrees that had the highest calorie content were purchased less during the treatment phase than pre and post-treatment.

A similar study done by Albright, Flora, and Fortmann (1990) tested if participants were influenced by a healthy claim posted on a menu in four restaurant chains in California. A picture of a heart was placed by each menu item listed that had less than 15g of fat and

125mg of sodium per serving. The findings from this experiment showed that all four restaurants, irrespective of sales, revealed significantly more females than males saw and understood the menu labels. Participants over the age of 50 were more likely to take a tip sheet, follow its recommendations, and select a labeled food.

Pulos and Leng (2009) studied consumer behaviors before and after nutritional information went into place in six restaurants in Pierce County, Washington. Patrons who visited the restaurants after the nutritional information was provided were asked four questions: if they noticed the nutritional information, looked at the key, understood the nutritional information, and used the information in selecting an entrée. The nutritional information that was posted on the menus included calories, grams of fat, milligrams of sodium, and grams of carbohydrates. Participants who chose lower calorie options purchased an entrée that was on average 75 calories less than an entrée before nutritional information was posted. After nutritional information was posted, about 71% of patrons noticed the information. Of that group, 80% looked at the key and 96% felt like they understood the information to identify healthy menu entrees. However, only 59% of the patrons reported using the information to affect their purchasing behavior.

Roberto, Larson, Agnew, Baik, and Brownell's (2010) study focused on 295 participants at a dinner where either a regular menu with no nutrition information was given (group 1), a menu with calorie information was given (group 2), or a menu with calorie information and the recommended average caloric intake of an adult was given (group 3). Roberto found a significant difference in the meals ordered between the participants who did not see calorie information and those who did. There was no significant difference from the group with calorie information and the group that saw calorie information plus the recommended caloric intake. The group that was exposed to calorie information plus a recommendation of how many calories they should eat a day consumed the fewest amount of calories in the experiment.

A recent study by Finkelstein, Strombotne, Chan and Krieger (2011) examined a Mexican fast food restaurant in King County, Washington in 2010. The study was conducted to compare consumer behavior before and after nutrition labeling was implemented. The results of the study showed that consumers made no changes after the law was passed or when the nutritional information was posted at point of purchase locations.

A 2007 study in the United Kingdom by Sacks, Rayner, and Swinburn (2009) examined consumer purchasing behavior for four weeks when a “traffic light” nutrition labeling system was put in place at a local retail store. A green light signified a healthy option; while a red light signified an unhealthy option. Sales were tracked for the food items as well as to see if there was an increase in the healthy items once the labeling went into effect. The results of the 4 week study showed no significant sales increase of sandwiches and no correlation of higher sales of green light items.

Elbel, Gyamfi, and Kersh (2011) conducted a study involving 349 low income adolescents’ menu choices in New York; it showed no significant difference in the menu choices after menu labeling had been implemented. Four fast food restaurants, McDonalds, Wendy’s, KFC, and Burger King, were examined. A second location in Newark, New Jersey was chosen to be the control since it had similar demographics but nutrition information would not be implemented there. The results of this study found no significant difference in amount of calories chosen by adolescents after nutritional information had gone into effect. Only 9% of participants reported that it influenced their purchasing behavior.

Tandon, Wright, Zhou, Rogers, and Christakis’s (2010) study examined calorie intake of 99 mothers of three to six year olds in a pediatric care clinic in Seattle, Washington. Participants were given a survey about what the mother would choose for themselves and for their child if their next meal was at a McDonald’s restaurant. Half of the mothers were shown calorie information in addition to prices next to each menu item while the other half just saw menu items and prices. This study found on average that the intervention group who saw calorie information chose meals that contained fewer calories than the control group who did not see nutritional information. The intervention group chose about 100 fewer calories for their child than the control group. When asked what meals the mothers would get for themselves, however, there was no significant difference in calorie content for meals between the two groups.

The literature on nutrition menu labeling lacks consistent research findings. In summary, some studies have found that when nutritional information is presented at the point of purchase location, the patrons who see and use the information purchase entrees that have fewer calories than those who do not see the information. However, other studies have shown no significant difference in the amount of calories chosen before and after nutritional

information is implemented. Furthermore, few studies found that consumers choose lower calorie items when participants are made aware of the recommended amount of daily caloric intake. Possibly applicable to restaurant nutrition labeling, some studies have shown that consumers who use nutrition labels while grocery shopping make healthier selections than consumers who do not. In addition, one study found that once nutritional information is removed, the average amount of calories per entrée chosen by the consumer gradually rose. However, there is limited research that connects how hungry a person is prior to eating and selecting higher calorie menu items compared to a person with a lower level of hunger. Also, few studies have researched if there is an association between a person's BMI status and the amount of calories ordered in a meal.

Chapter 3: Research Purpose

The overall purpose of this study was to examine research questions regarding consumers' response to restaurant nutrition labeling. There is limited research on this topic so this study will attempt to provide additional information to the literature. While there are multiple questions on the issue, for this study, the following six areas were researched and analyzed.

The specific research questions for this study were six fold: one, if consumers select lower calorie menu items in restaurants when presented with calorie information on menus; two, how much nutritional information consumers want, if any, on restaurant menus; three, if people who use nutritional labels while grocery shopping select lower calorie items from restaurant menus; four, if participants BMI status is associated with the caloric level of the menu items they choose; five, if consumer's level of hunger prior to ordering plays a role in the amount of calories of menu items they choose, and six, if people who state they will select healthier restaurant menu choices when nutritional information is available, actually do select healthier restaurant menu items when they see nutritional information on the menu.

Chapter 4: Methodology

The methodological framework for this study was a quantitative method containing two experimental groups. The main research elements in this study included a survey and a mock restaurant menu. The survey consisted of seven questions that were Likert-type scale or required a “yes” or “no” answer. The menus contained identical menu items of seven common menu entrees popular with consumers at quick service and casual dining restaurants; however, one menu provided caloric information and the other did not.

Research design and instrumentation

This study used a quantitative experimental research design. The primary focus of the design was to have participants react to two menus, one with nutritional information in the form of calories and one without. Calorie content was the only nutritional information included since Kentucky’s proposed CMEAL bill and the Federal Food, Drug, and Cosmetic Act only include calorie content (CSPI, 2011; FDA, 2011).

First, the survey was administered to each participant. Its six questions focused on consumers’ knowledge, habits, and opinions regarding nutritional information. After completing the six question survey, a second page asked for optional information regarding each participant’s age, weight, and height. The second page also featured instructions and an example on filling out the menu. Participants were instructed to mark their first and second choice of entrée and side item they would select if that specific menu was presented to them at a restaurant. The study was completed once the participants marked their selections on the menu. The menus with caloric and non-caloric information were rotated among participants.

The two menus included a list of seven menu items, a description of the content of the menu item, and options regarding side items or condiments; caloric information was provided on one of the versions. The entrées listed were: chef salad, crispy chicken salad, fried fish sandwich, grilled chicken sandwich, crispy chicken sandwich, hamburger, and bacon cheeseburger. For sandwich entrées, the menu included a choice of small fries, medium fries, or no side item; for salad entrees, a choice of fat-free ranch dressing, ranch dressing, or no dressing was given. The calorie content information was displayed in the

same size and type font as the description of the menu item. Examples of the exact menus used in the study are provided in appendix C and D.

Prior to fielding the study, menu items were entered into Data Analysis Plus 9 (9th edition) to obtain an accurate calorie content. Menu prices were not included since it was not a variable for this study and the researchers did not want price to influence participants' purchase behavior.

Subjects

The subjects who participated in this study were recruited from Lexington, Kentucky. The study consisted of 304 participants recruited at a high pedestrian downtown street corner. To randomize the participants, the researcher stood to the east and asked the first person approaching if they would be interested in participating in the study. The researcher walked down that street for a few blocks asking all pedestrians to participate in the study. The researcher then turned to the south and asked the next person walking down that street. The researcher walked down that street for a few blocks then turned to the west, and then the north, repeating the pattern in order to randomize and avoid biasing. The researcher informed the participants he was a graduate student from the University and was collecting data for his thesis. The researcher wore a name tag that identified his name and his specific college. UK's IRB approved that the research methods provide a written explanation of the study to the individuals that they could keep but did not require the consent form to be signed. If the individual agreed to take part in the study, they received a survey and menu along with a pen or pencil to fill out the form. Prior to fielding the study, the researcher piloted the study using graduate students from the University of Kentucky as well as employees at a local hospital. This allowed the researcher to see if difficulties with or understanding of the survey arose before fielding the study.

Description of research procedures

The study began June 21, 2010 and concluded in August, 2011 after reaching the desired sample size of approximately 150 participants per menu which was determined to be a large enough sample size for statistical analysis. Based on previously described methods, potential respondents who were walking toward the researcher were asked to participate in

the survey. If a large group walked toward the researcher, all were invited to participate to avoid any biasing. The consent form provided detail regarding what to expect in the research study and identity protection. Upon agreeing to participate, the individuals were handed a survey and one of the two menus; assistance was provided if any further questions arose. An example of an unsolicited question from a participant was, "I don't like ranch dressing but I do like Italian dressing." They were instructed by the investigator that ranch was a default dressing listed and that it was representative of any regular (not fat free) dressing.

Analysis

Data were entered into an excel sheet and was checked by another CITI certified researcher to ensure data was entered without errors. The researcher met with the College statistician to analyze the data. Based on advice from the statistician, only first choice menu responses were analyzed. The data were analyzed using SAS software (9.3 edition). SAS provided descriptive statistics on the participants and Chi-squared tests were run to provide the statistical analysis.

Chapter 5: Results

A total of 304 participants 18 years of age or older took part in the survey. Two surveys were determined ineligible because the participants did not fill out the menu selection portion of the study, leaving a total of 302 respondents. One hundred fifty four participants viewed the menu with calories, while 148 participants viewed the menu without calories. The analysis of the menu consisted of separating entrees into four categories based on caloric content: 1) 500 calories or less, 2) 501-700 calories, 3) 701-900 calories, and 4) 901 calories or greater.

The results of the six survey questions asked of all study participants are provided in Table 1. For survey question “Are you aware of the government’s health care bill that was recently passed that mandates that restaurants with over 20 chains nationwide have to post calorie information on menus?”, 170 (56%) responded yes they were aware while 132 (43%) responded they were not aware. For question 2, “Do you want to see nutritional information (ex. calories) on menus in restaurants and fast food locations?”, 264 (87%) responded yes compared to 38 (13%) who responded no. For question 3, “What additional nutritional information would you like to see on a restaurant menu?” participants could select “no additional information” or select as many of the following as they desired: sodium, fat, cholesterol, fiber, protein, and carbohydrates. Per table 1a, 53 participants (18%) selected no additional information, 176 (58%) selected sodium, 203 (67%) selected fat, 118 (39%) selected cholesterol, 89 (29%) selected fiber, 93 (31%) selected protein, and 208 (69%) selected carbohydrates.

Table 1: Percent of participant responses to survey questions 1, 2, and 4-6

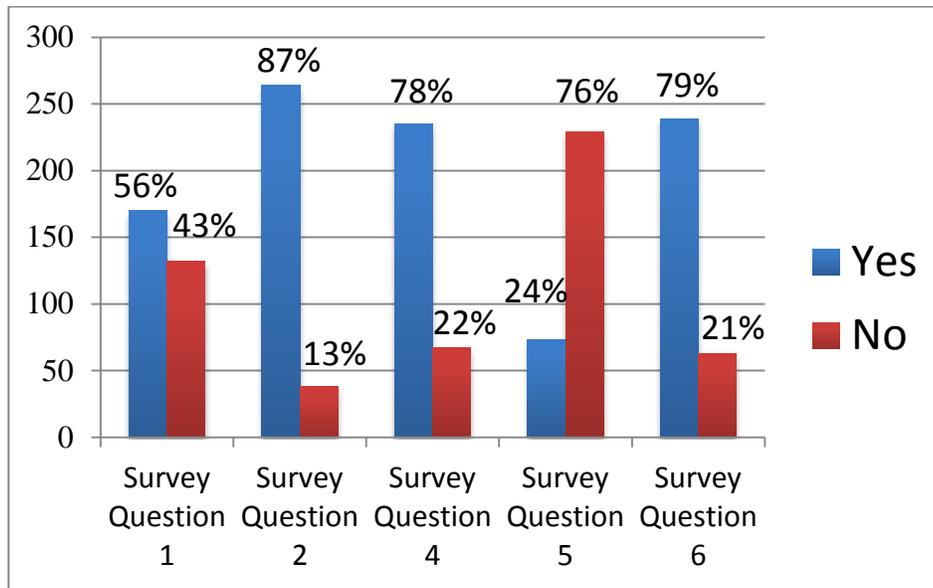
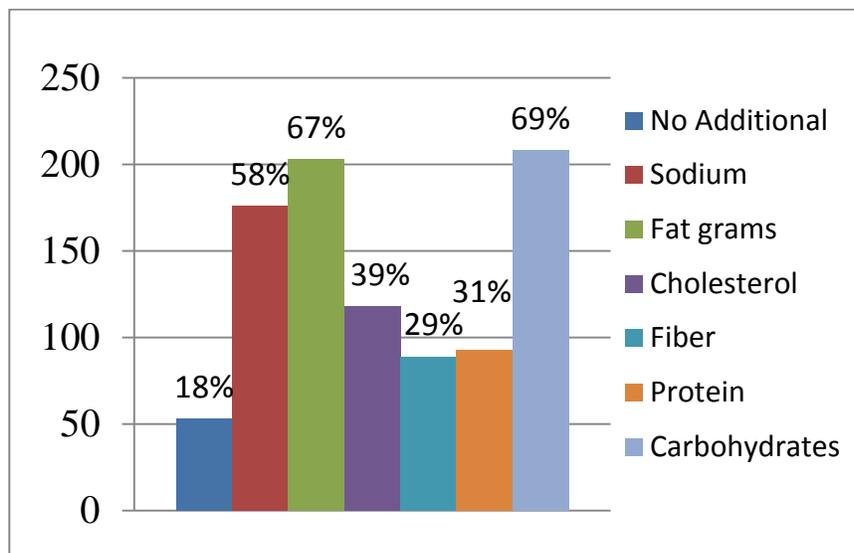


Table 1a: Percent of participant response to survey question #3



For survey question 4, “If you shop at a grocery store, do you look at the nutritional labels on packaged foods?” -235 participants (78%) responded yes compared to 67 (22%) who responded no. Question 5 asked, “On a one to seven scale, how hungry are you right now?” For the purpose of this study, responses 1 through 4 were grouped together to represent an answer of “not hungry” compared to responses 5 through 7 which were grouped

together to represent an answer of hungry/very hungry. Two hundred twenty-nine (76%) participants responded they were “not hungry” compared to 73 (24%) who responded they were “hungry/very hungry”. When asked, “Do you believe you will make healthier selections when nutritional information (ex. calories) is provided on menus?”, 239 (79%) participants responded yes compared to 63 (21%) who responded no. Requests for participants’ age, height, and weight were optional. One hundred-three out of 304 participants included their age and 74 participants included their height and weight. Thirty-three participants had a normal BMI status (18.5-24.9), 28 participants had an overweight BMI status (25-29.9), while 13 participants had an obese BMI status (above 30).

Upon analysis of the data using chi-squared test, four of the seven hypotheses were found to be null (hypothesis 2, 5, 6, and 7); therefore they were rejected. Hypothesis 1, 3, and 4 were supported. In response to the first hypothesis, participants who responded they wanted to see calorie information on restaurant menus chose menu selections that were significantly lower in caloric content than participants who responded they did not want to see calorie information ($n=302$; $p\leq 0.0001$). For the second hypothesis, when comparing menu selections of participants who viewed menus with calorie information compared to participants who viewed menus without calorie information, there was no significant difference in the caloric levels of the items they chose ($n=302$; $p=0.5711$). In support of the third hypothesis, a majority of respondents 248 (82%) preferred additional nutrition information than calories on restaurant menus, while 53 (18%) wanted no additional nutritional information. For the fourth hypothesis, when comparing participants who responded to viewing nutritional labels when they shop at grocery stores compared to those who do not, a significant difference was found in the caloric levels of entrees chosen ($n=302$; $p\leq 0.0001$).

Based on the chi-squared test, in analyzing the fifth hypothesis, no significant difference was found between those with a normal BMI and the caloric level of their chosen menu items when compared to the chosen menu items of participants with a overweight or obese BMI status ($n=74$, $p=0.7673$). When analyzing respondents’ self-reported hunger level and menu choice for the sixth hypothesis, the level of participant’s hunger was found to not be significant when compared to the caloric content of the entrees they selected ($n=302$, $p=0.4235$). Lastly, the seventh hypothesis comparing participants who stated they would

“choose healthier menu selections if shown calorie information” found no significant difference in the caloric level of selected menu items between the group that viewed caloric information and those who did not (n=239; p=0.1233).

Chapter 6: Discussion

This study is important to the body of literature because it confirmed recent studies regarding restaurant nutritional labeling's affect on consumers. In addition, this study examined hunger level and the amount of calories in consumers' restaurant menu selections. Furthermore, it has similarities to studies regarding consumers who use nutrition labels while grocery shopping and compares individuals' BMI status and caloric level of menu items selected.

Effectiveness of calorie information on menus

Similar to the findings of recent research on menu labeling, this study did not find significant differences in the amount of calories of the menu items chosen between participants who viewed menus with calorie information and those who did not view calorie information. These finding are supported by a recent study from Finkelstein, Strombotne, Chan, and Krieger (2011) that looked at consumer purchasing behavior before and after nutritional information was implemented in King County, Washington. The results of their study showed consumers made no changes in menu selection after the law was passed requiring restaurants to disclose nutritional information at point of purchase locations. Similarly, a 2008 study by Elbel, Gyamfi, and Kersh (2011) showed no significant difference in menu items selected by adolescents in New York at four fast food locations (McDonalds, Wendy's, KFC, and Burger King) after implementation of restaurant nutrition labeling compared to the same restaurant brands with similar socioeconomic locations in New Jersey that had not implemented menu labeling.

This study's findings are further supported by Harnack and French's study (2008). After review of six studies analyzing the affect of consumer behavior by the addition of nutritional information at point of purchase locations, five studies showed possibly an influence in food choices but most of the data were weak or inconsistent. One of the studies found no difference in menu selections when nutritional information was present.

Another study supports that calorie information on restaurant menus is not affecting consumer behavior toward choosing healthier menu items (Julienne, Joelle, Brennan, Loren Yamamoto (2005). One hundred six adolescents were asked to order from each of three menus (McDonald's, Panda Express, and Denny's). Participants were then told to choose

entrees from the same restaurants but were given menus with calorie and fat information next to each menu item. Seventy-one percent of the participants made no change in their menu selections and only one third of those who thought they were overweight chose menu items fewer in calories.

While not exactly the same, Sacks, Rayner, and Swinburn (2009) study supports this research; their findings showed no significant changes in consumer behavior before and after a 4 week experiment with the “traffic light” symbols on menu items.

In contrast, an experiment by Jones (2009) does not support the results of this study regarding the affect of nutritional information on restaurant menus. Participants who saw a menu with health icons or nutritional information chose healthier entrees based on level of calories compared to a menu with no nutritional information. Also, Pulos and Leng (2010) found significant results supporting the implementation of restaurant nutrition labeling in their study in Pierce County, Washington. Analysis of sales receipts from restaurants 30 days prior to and after implementation of nutritional labeling found that on average, consumers purchased meals that had 75 fewer calories after implementation. Only slightly more than half of consumers who saw the information reported using it to influence their purchase.

Roberto, Larsen, Agnew, Baik, and Brownell (2010) somewhat supports this research; it discovered that when consumers were presented with nutritional information compared to those who were not, the consumers that viewed the nutritional information chose entrees with fewer calories at dinner; however, that group also reported consuming snacks higher in calories in the evening than participants who did not see calorie information at dinner. In contrast, a group in the research study saw nutritional information along with a recommendation on how many calories an average adult needs per day. This group chose lower calorie dinner entrees and did not consume calorie dense snacks in the evening. Roberto, Larsen, Agnew, Baik, and Brownell’s study offers insight that nutritional information alone at point of purchase locations may not be the best approach to changing consumer purchasing behaviors.

Chu, Edward, Frongillo, Jones, and Kaye (2009) showed that menu selections were influenced initially by menu labeling but consumer selections reversed back to their normal

ways once nutritional information was removed. Another study that supports the idea that possibly more than posting calories on restaurant menus is needed was conducted by Temple, Johnson, Recupero, and Suders (2010). They separated 47 participants into two groups and showed them a video explaining nutritional labels or organic foods. After the video the participants were treated to a buffet lunch. Regardless of what video participants were shown, the groups that were presented with nutrition labels at the lunch buffet chose meals that contained fewer calories than groups who did not see nutrition labels.

Consumer's desire for nutritional information

A large percentage of participants in this study reported wanting to see nutritional information on restaurant menus. These results are supported by four national polls that indicate at least 60% of participants in favor of a law to implement nutritional information on point of purchase locations (Keystone Center, 2006). This is further supported by Roberto, Schwartz, and Brownell's (2009) study that found that after nutritional labeling went into effect in New York City in 2008, 89% of people surveyed said it was a positive thing. Similarly, Aramark's telephone survey of 5,297 people, found large support for restaurant nutritional information available for all menu items. And, a 2007 survey in California found overwhelming support for requiring fast food and chain restaurants to post nutritional information (Brownell, Pomeranz, and Friedman, 2008). While somewhat like Aramark's and Brownell, Pomeranz, and Friedman's studies, this research found a large majority of individuals believe they would choose healthier options if nutritional information was presented to them on restaurant menus. However, in this study, when those participants' menu selections were compared to the selections of those who did not state they would choose healthier menu options, there was no significant difference in the caloric content of the menu items selected by either group.

Use of nutritional information

This study found that the majority of participants would like to see nutrition information regarding the amount of sodium, fat, and carbohydrates in addition to calories on point of purchase materials. However, the findings from this study do not support that consumers will use the information to make healthier selections.

Similarly, Hwang and Lorenzen (2008) found that consumers prefer additional nutritional information. The results from their study showed that people preferred a menu that had the most nutritional information listed.

Correspondingly, the results of this study indicate that a large percentage of people use nutritional labels at grocery stores when shopping. This finding is supported by a 2008 national survey that indicated 63% of adults use nutrition labels when they shop (Keystone Center, 2006). Further analysis of this study examined whether participants who reported they use labels when grocery shopping chose menu items lower in caloric content than participants who do not use nutrition labels when shopping. A significant majority of the participants who use nutrition labels chose menu items that ranged from 700 calories or less compared to those who did not use labels when shopping. This finding supports Nayga, Lipinski, and Savur's (1998) study that consumers who use nutrition labels while they grocery shop seem to be more health conscious. These results are further supported by Guthrie, Fox, and Welsh's (1995) study, which found that consumers who use nutrition labels while shopping are more likely to be concerned about food safety and nutrition and believe that following the Dietary Guidelines for American is important. The diets of people who use nutritional labels were found to be lower in cholesterol and higher in Vitamin C.

Hunger as a factor in determining calorie dense meals

Responses from this study indicate that about one fourth of participants replied that they were hungry while completing the questionnaire. Further analysis determined that participants who reported they were hungry did not chose menu items higher in caloric content than participants who were not hungry. These findings show the intensity of hunger does not predict calorie content of meals. This is similar to the findings of Nederkoorn, Guerrieri, Havermans, Roefs, and Jansen (2009) that found hunger alone was not a predictor of calorie content of meals selected by consumers. However, a conflicting study by Siep, Roefs, Roebroek, Havermans, Bonte, and Jansen (2009) of 12 females indicated that food deprived participants chose entrees higher in calories compared to satiated participants. Pictures of high calorie foods, low calorie foods, or neutral objects were shown to the participants in a CAT scan so the researchers could measure activity levels of the amygdala and orbitofrontal cortex. The results of the study suggested that higher calorie food stimuli become more rewarding when participants were deprived of food.

BMI as an indicator of menu item selection

In this study, since self-reported height and weight information was optional, only one-fourth of the participants included this information. While not significant, a higher percentage of participants in the obese group selected menu items over 900 calories than either overweight or normal BMI participants (38%, 21%, and 21% respectively). While the data were not significant, it is valuable since there is limited research that compares BMI as a predictor in the selection of calorie dense meals.

Importance to Kentucky and Kentucky legislative

Kentucky's SB 133 (CMEAL) which would make chain restaurants that have ten or more locations inside the state of Kentucky post calorie information at the point of purchase is currently being considered. The findings of this study may influence the legislators of Kentucky to revise their bill since no significant difference was found in purchasing behavior when calorie information was made available. A previous study that had calorie information plus a recommendation of daily calorie intake showed significant changes in consumer restaurant purchasing behavior (Roberto, Larson, Agnew, Baik, and Brownell's (2010).

Limitations

This study has several limitations which may have influenced the results. First, the data collected were based on consumer perceptions rather than actual consumer behavior. Participants chose their menu items from a mock restaurant menu rather than from an actual restaurant experience. Since consumer perception and actual behavior can sometimes differ, the data may not reflect what consumers would actually do. Also, participants may not have accurately reported their height and weight since it was self reported data. However, a study by Stunkard and Albaum (1981) found self reported weights of 550 participants to be fairly accurate, even among obese participants. Jacobson and DeBock's (2001) study found men's self reported weights were not significantly different than measured weights but women's weights were.

Surveys were conducted at all times of the day but the majority of them were done in the early afternoon. This coincided with participants taking the survey either on their way to or coming back from their lunch break. The principle investigator encountered more

resistance from potential participants when they were on their way to lunch than participants coming back from their lunch break. This could be reflected in the lower percentage of participants who responded they were hungry/very hungry.

Chapter 7: Conclusion

The aim of this study was to determine the affect of nutritional information on restaurant menus on consumer preferences. Studies have shown conflicting results on whether or not nutritional information on point of purchase locations actually facilitates change in consumer purchasing behavior. This study found no significant difference in amount of calories selected between participants who viewed a menu with calorie information and participants who did not view calorie information on the same menu items. This study's survey found that participants preferred more nutritional information rather than calories alone on restaurant menus, which is supported by other studies. In addition, it showed that participants who use nutritional labels while grocery shopping selected restaurant menu items that were lower in calories than participants who did not use nutritional labels at grocery stores. While the results were not significant, this study also found that fewer participants in the normal BMI category chose higher caloric menu items than participants in the obese category. This is a unique finding since there is limited research on this topic. Most research has focused on the prevalence of eating at fast food locations and the risk of becoming overweight. No significant results were found when comparing menu selections of very hungry participants to non hungry participants. This finding is unique since it adds new information about the level of hunger in connection with the amount of calories selected from a restaurant menu. No significant results were found between participants who stated they were going to select healthier menu choices when nutritional information was present than participants who also stated they would select healthier menu options but were not provided a menu with nutritional information.

Future studies using actual consumer restaurant behavior instead of simulated behavior before and after menu labeling implementation are recommended to address the effect menu labeling has on consumer purchasing behavior. A comparison study utilizing actual measurements of participant's height and weight, along with actual restaurant menu selections with and without nutritional information would be most beneficial to determine if there is a correlation between elevated BMI and calorie dense menu selections. Further studies could compare individual's level of guilt if the chosen menu item is high in calories when nutritional information is provided at the point of purchase.

Appendix A: Participant Questionnaire

1. Are you aware of the government's health care bill that was recently passed that mandates that restaurants with over 20 chains nationwide have to post calorie information on menu items?

Yes

No

2. Do you want to see Nutritional information (ex. Calories) on menus in restaurants and fast food locations?

Yes

No

3. What additional Nutrition Information would you like to see on a restaurant menu? (check all that apply)

No additional information Sodium Fat Grams Cholesterol
 Fiber Protein Carbohydrates

4. If you shop at a grocery store, do you look at the nutritional labels on packaged foods?

Yes

No

5. On a one to seven scale, how hungry are you, right now?

1 2 3 4 5 6 7

Not hungry at all Somewhat hungry Extremely hungry

6. Do you believe you will make healthier selections when Nutrition information (ex. Calories) is provided on menus?

Yes

No

Appendix B: Participant Information

Date _____

Age (optional) _____

Height and weight (optional) Height _____ Weight _____

On the Menu Provided to you, Please mark a “1” next to the menu item you are most likely to order.

Then, Mark a “2” on the menu item that you would most likely order next.

Ex.

Bacon Cheeseburger

Grilled hamburger patty topped with cheese, two strips of bacon, lettuce, tomato, and mayonnaise on a toasted bun.

___ No side

___ 1 with small fries

___ with medium fries

Grilled Chicken Sandwich

4oz grilled chicken breast with Lettuce, tomato, and mayonnaise on a toasted bun

___ no side

___ 2 with small fries

___ with medium fries

Appendix C: Menu without calorie information

Chef Salad

Two cups chopped Iceberg lettuce
With sliced carrots and tomatoes,
a hardboiled egg, diced cheddar cheese,
two ounces of ham, two ounces of turkey,
topped with croutons.

- no dressing
- with fat free ranch
- with buttermilk ranch

Crispy Chicken Salad

Two cups chopped Iceberg lettuce
with tomatoes, cheese, 4 ounces of
fried chicken, and topped with croutons.

- no dressing
- with fat free ranch
- with buttermilk ranch

Fish Sandwich

3oz fried fish on with tartar sauce
on a toasted bun.

- no side
- with small fries
- with medium fries

Crispy Chicken Sandwich

4oz fried chicken breast with lettuce,
tomato, and mayonnaise on a toasted bun.

- no side
- with small fries
- with medium fries

Bacon Cheeseburger

Grilled 5oz hamburger patty topped with
cheese, two strips of bacon, lettuce,
tomato, and mayonnaise on a toasted
bun.

- no side
- with small fries
- with medium fries

Hamburger

Grilled quarter pound hamburger
with lettuce, tomato, and mayonnaise on
a toasted Bun.

- no side
- with small fries
- with medium fries

Grilled Chicken Sandwich

4oz grilled chicken breast with
Lettuce, tomato, and mayonnaise on
a toasted bun

- no side
- with small fries
- with medium fries

Appendix D: Menu with calorie information

Chef Salad

Two cups chopped Iceberg lettuce with sliced carrots and tomatoes, a hardboiled egg, diced cheddar cheese, two ounces of ham, two ounces of turkey, topped with croutons.

| | |
|--------------------------|--------------|
| ___no dressing | 468 calories |
| ___with fat free ranch | 543 calories |
| ___with buttermilk ranch | 686 calories |

Crispy Chicken Salad

Two cups chopped Iceberg lettuce topped with tomatoes, cheese, 4 ounces of fried chicken and topped with croutons.

| | |
|--------------------------|--------------|
| ___no dressing | 528 calories |
| ___with fat free ranch | 603 calories |
| ___with buttermilk ranch | 745 calories |

Fish Sandwich

3oz fried fish with tartar sauce on a toasted bun.

| | |
|----------------------|--------------|
| ___no side | 390 calories |
| ___with small fries | 663 calories |
| ___with medium fries | 845 calories |

Crispy Chicken Sandwich

4oz fried chicken breast with lettuce, tomato, and mayonnaise on a toasted bun.

| | |
|----------------------|--------------|
| ___no side | 489 calories |
| ___with small fries | 763 calories |
| ___with medium fries | 946 calories |

Bacon Cheeseburger

Grilled 5oz hamburger patty topped with cheese, two strips of bacon, lettuce, tomato, and mayonnaise on a toasted bun.

| | |
|----------------------|---------------|
| ___no side | 670 calories |
| ___with small fries | 944 calories |
| ___with medium fries | 1127 calories |

Hamburger

Grilled quarter pound hamburger patty with lettuce, tomato, and mayonnaise on a toasted bun.

| | |
|----------------------|---------------|
| ___no side | 573 calories |
| ___with small fries | 847 calories |
| ___with medium fries | 1030 calories |

Grilled Chicken Sandwich

4oz grilled chicken breast with lettuce, tomato, and mayonnaise on a toasted bun.

| | |
|----------------------|--------------|
| ___no side | 417 calories |
| ___with small fries | 691 calories |
| ___with medium fries | 874 calories |

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